Executive Summary

Border to Gowrie

Revised Draft Environmental Impact Statement

INLAND RAIL

Inland Rail is a subsidiary of
Australian Rail Track Corporation

COVER IMAGE
Photo of existing Queensland Rail railway line and farmland near Kurumbul, Queensland.

ACKNOWLEDGEMENT OF COUNTRY

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

Executive Summary

1. Project overview

The Inland Rail route consists of 12 sections delivered sequentially, covering approximately 1,000 kilometres (km) of existing track (with necessary enhancements and upgrades) and 600 km of new track. The Inland Rail—Border to Gowrie Project (the Project) is one of the segments within the Inland Rail Program, providing a more direct route between Melbourne and Brisbane compared to the current inland and coastal road and rail networks. The Project aligns with the Australian Government's goal of providing a long-term, competitive rail solution for freight movement.

The Project involves the construction of a 217 km dedicated single-track, open-access freight railway between the NSW/Queensland (QLD) border and Gowrie, in Queensland. The railway will consist of 7 km of standard-gauge track (1,435 millimetres (mm)) and 210 km of dual standard- and narrow-gauge track (1,435 mm standard gauge and 1,067 mm narrow gauge). The new railway will be built across approximately 149 km of greenfield (new) rail corridor and 68 km of brownfield (existing) rail corridor, which forms part of Queensland Rail's (QR) South Western Line and Millmerran Branch Line.

The Project commences at the NSW/QLD border, approximately 18 km southeast of Goondiwindi, and runs northeast near the towns of Yelarbon, Inglewood, Millmerran, Pampas, Brookstead, Pittsworth, and Southbrook, ultimately reaching Gowrie Junction, northwest of Toowoomba. Figure 1 illustrates the Project's route and its connection to adjacent Inland Rail projects.

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

This Project is crucial for addressing Australia's expanding freight demand, improving road safety, and supporting a mode of freight transportation which is significantly less carbon intensive. Inland Rail will strengthen the national freight and supply chain network by connecting existing freight routes through rail, roads and ports, and contributing to Australia's economic growth.

When operations start, the Project will accommodate double-stacked freight trains up to 1,800 metres (m) in length. During the initial years of operation, it is estimated that, the Project will support an average of 14 train services per day. This is expected to increase to an average of 20 trains per day within 15 years, and up to 25 trains per day during peak periods. Train services would be provided by various operators.

The Project has been the subject of technical feasibility investigations including the development of a revised reference design and preparation of a draft EIS undertaken pursuant to the requirements of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act). The Project EIS was previously publicly notified between 23 January 2021 and 4 May 2021. Written submissions were invited to the Coordinator-General regarding the draft EIS during this period.

Following notification of the draft EIS, the Project's reference design and the draft EIS have been updated, resulting in this revised draft EIS which responds to:

- Submissions received throughout the 2021 public notification period
- Additional information requirements from the Coordinator-General
- Further consultation with agencies, landowners, communities, technical authorities, councils and other key stakeholders
- Additional monitoring, survey, research and analysis aimed at further reducing environmental and property impacts. This includes extensive flora and fauna surveys, which have led to a reduction in ecological impacts, as well as hydraulic modelling and updates to flooding infrastructure (e.g. bridge, culverts and scour protection) to further minimise impacts.
- Review of design and constructability optimisation opportunities to improve safety, incorporate efficiencies and reduce environmental and community impacts.

The updated assessment and findings contained in this revised draft EIS supersede those of the draft EIS.

During the course of the assessment and preparation of this Border to Gowrie revised draft Environmental Impact Statement (EIS), Inland Rail was subject to a review by Dr. Kerry Schott on behalf of the Australian Government and the findings presented in *The Delivery of Inland Rail: an Independent Review* (2023) (Independent Review). The Australian Government released its response to the Review on 6 April 2023, which included a number of recommendations, including a revised delivery program and further assessment of the scope and cost of individual segments of Inland Rail.

ARTC is the proponent for Inland Rail. ARTC is fully owned by the Australian Government and was created after the Australian Government and State governments agreed in 1997 to the formation of a single entity to manage and operate the national interstate rail network. Following the release of the findings of the Independent Review of Inland Rail in April 2023, Inland Rail Pty Ltd was established as a subsidiary of ARTC to build Inland Rail on behalf of the Australian Government. As each section of Inland Rail is completed, it will be operated and managed by ARTC. Further information on ARTC and Inland Rail can be found at **artc.com.au** and **inlandrail.com.au**.

At the time of preparing the revised draft EIS document, the outcomes of the recommendations were not quantified for application in the social, economic and environmental assessments; the EIS is based on assumptions current at the time of assessment. From a consideration of the initial findings of the Independent Review, it is unlikely the outcomes and conclusions presented in the revised draft EIS will change.

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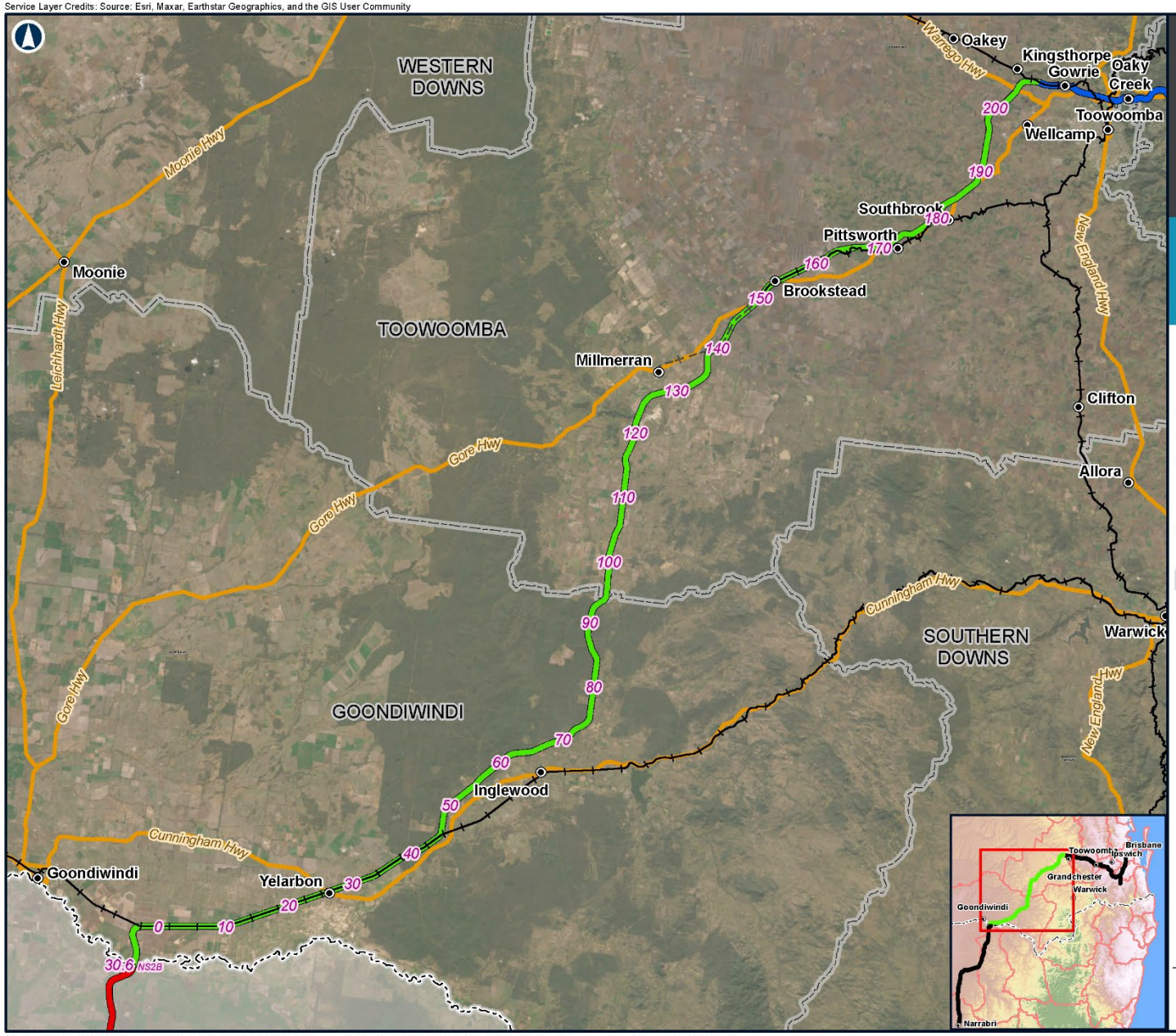

INLAND RAIL ARTC

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

BORDER TO GOWRIE

Figure 1: Project rail alignment

LEGEND

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Existing rail (operational)
- Existing rail (non-operational)
- Major roads
- NSW/QLD border
- Local Government Areas

0 20 40 km

Coordinate System: GDA 1994 MGA Zone 56

Date: 04/11/2024 Paper: A4
Author: FFJV GIS Scale: 1:800,000
Data Sources: FFJV

Map by: MEF/KG Z:\GIS\GIS_310_B2G\Tasks\310-ITR-201903071702_Transport\310-ITR-201903071702_ARTC_Fig20.1_Project_Alignment_v3.mxd Date: 11/01/2023 09:46

2. Environmental assessment process

2.1 Assessment requirements

The Project is a declared 'coordinated project for which an EIS is required' under the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act). The declaration initiated the statutory environmental impact assessment procedure in Part 4 of the SDPWO Act, which requires the proponent to prepare an EIS for the Project.

On 9 April 2018, the then Commonwealth Minister for the Environment determined the Project to be a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) due to the likely impacts on matters of national environmental significance (MNES) (reference number EPBC 2018/8165). The relevant controlling provision for the Project is listed threatened species and communities (Sections 18 and 18A). The Project will require approval from the Commonwealth Minister for the Environment under Part 9 of the EPBC Act before it can proceed.

Assessment of the Project was determined to be under the Bilateral Agreement between the Commonwealth of Australia (the Department of Climate Change, Energy, the Environment and Water (DCCEEW)) and the State of Queensland (the assessment bilateral agreement). This will allow the EIS to meet both the Queensland and Australian Government impact assessment requirements.

2.2 Draft EIS

2.2.1 Draft EIS preparation

The Terms of Reference (ToR) for the Project were finalised and issued by the Queensland Coordinator-General (Coordinator-General) in November 2018. The ToR set out the matters to be addressed in an EIS for the Project under the SDPWO Act. Further, as the Project is being assessed under the assessment bilateral agreement between the Commonwealth of Australia and the State of Queensland, the ToR also set out the requirements for the assessment of the EPBC Act controlling provision.

The draft EIS was prepared in response to the finalised ToR.

2.2.2 Draft EIS notification

Between 23 January 2021 and 4 May 2021, the draft EIS was made available for public comment in accordance with the requirements of the SDPWO Act 2. Following completion of the public notification period, the Coordinator-General requested additional information under Section 34B(2) of the SDPWO Act. The requested additional information and the proponent's responses to the public submissions received are addressed in this revised draft EIS.

2.2.3 Revised Draft EIS

This revised draft EIS documents the environmental impact assessment undertaken by ARTC to support the delivery of the Project, following the notification of the draft EIS, receipt of submissions and additional information requests.

The objective of the revised draft EIS is to identify and assess the relevant environmental, social and economic impacts of the Project, and demonstrate that the delivery of the Project is based on sound environmental principles and practices. The revised draft EIS includes a draft Outline Environmental Management Plan (EMP), which proposes an environmental management framework to implement mitigation measures that avoid or minimise adverse impacts and enhance potential benefits.

In preparing the revised draft EIS, ARTC progressed development of a revised reference design for the Project, resulting in a revised study area being identified. On 8 May 2024, ARTC submitted a request to DCCEEW to vary the proposed action under Section 156A(3) of the EPBC Act, to amend the EPBC Act referral study area to accommodate the Project's revised reference design. On 23 May 2024, ARTC received approval of the request to vary under Section 156B of the EPBC Act.

2.3 Remaining steps

The following steps in the coordinated project process remain to be completed:

- The revised draft EIS will be publicly notified. Submissions can be made to the Coordinator-General for consideration during evaluation of the revised draft EIS
- Following public notification, the Coordinator-General will evaluate the revised draft EIS and may accept it as the final EIS
- If accepted as final, the Coordinator-General will prepare an evaluation report (i.e. the Coordinator-General's evaluation report) on the final EIS in accordance with the requirements of the SDPWO Act.

The Commonwealth Minister for the Environment will receive a copy of the Coordinator-General's evaluation report and will take this report into account when deciding whether to approve the Project under the EPBC Act and, if it is approved the conditions that will apply to the Project.

The Coordinator-General's evaluation report for the Project applies to the assessment of relevant development applications under the Planning Act. The Coordinator-General's report for the EIS may state that:

- Any development approval given for the development must be subject to stated conditions
- Any development approval given must be only for a stated part of the development
- Any development approval given must be a preliminary approval only
- The Coordinator-General has no conditions or requirements for the development
- A development approval for the development must not be given.

Following the completion of the EIS process, ARTC will obtain the necessary post-EIS development permits and other applicable State and local approvals.

2.4 Stakeholder and engagement approach

Stakeholder engagement is critical to the successful delivery of the Inland Rail Program. Comprehensive community and stakeholder engagement processes have been carried out across the proposed corridor alignment in a phased approach align with the Project's development to date. Understanding the concerns of stakeholders and the community is important for identifying local issues, mitigating risks, and minimising the social and environmental impacts of the Project.

The preparation of this revised draft EIS has occurred in parallel with a supporting program of stakeholder engagement and community consultation program. This allowed local knowledge and ongoing community feedback to inform the revised reference design, and consequently this revised draft EIS.

Engagement and communication with the stakeholders has taken place:

- 2006 to 2017: As preliminary consultation following the Inland Rail announcement and during early alignment planning
- 2018 to 2020: During the establishment of the Project route, and the preparation of the draft EIS and reference design
- 2021: In support of the public notification of the draft EIS
- 2021 to 2025: Throughout the preparation of further assessments and design revisions, and preparation of this revised draft EIS, including consideration and use as applicable of submissions received on the draft EIS.

2.5 Making a submission

Properly made submissions must be accepted by the Coordinator-General and considered by the Coordinator-General in evaluating the revised draft EIS. The Coordinator-General may accept submissions which are not properly made.

Under the SDPWO Act, a properly made submission must:

- Be made to the Coordinator-General in writing
- Be received on or before the last day of the submission period
- Be signed by each person who makes the submission
- State the name and address of each person who makes the submission
- State the grounds of the submission and the facts and circumstances relied on in support of those grounds.

A person wishing to make a submission about the revised draft EIS should also:

- Clearly state the matter(s) of concern or interest and list points to help with clarity
- Reference the relevant section(s) of the revised draft EIS
- Ensure the submission is legible.

Submissions regarding this revised draft EIS should be addressed to:

The Coordinator-General
C/- EIS Project Manager–Inland Rail, Border to Gowrie
Coordinated Project Delivery
Office of the Coordinator-General
Box 15517
CITY EAST QLD 4002

Submissions can be made electronically at the following email address:
inlandrailb2g@coordinatorgeneral.qld.gov.au

Electronic submissions are still required to meet the properly made requirements of the SDPWO Act.

For further enquiries, please contact telephone: 13 QGOV (13 74 68).

3. Project rationale

The Border to Gowrie Project is a critical link in the Inland Rail Program, providing inland connectivity between the existing NSW and Queensland freight rail networks. As an essential component of the broader Inland Rail Program, the Project is key to enhancing the national freight network and supply chain capabilities. It connects existing freight routes through rail, roads, and ports, contributing to Australia's economic growth.

3.1 The Inland Rail Program

Australia is heavily reliant on efficient and reliable supply chains to provide competitive domestic freight links and gateways for international trade. At present, there is no continuous inland rail link between Melbourne and Brisbane. Interstate rail freight currently travels between Melbourne and Sydney via Albury, and then between Sydney and Brisbane, generally along the coast. Long transit times are encountered due to the functional limitations of the existing network.

The *Australian Infrastructure Plan* (Infrastructure Australia, 2021a) notes that the existing north–south rail corridor between Melbourne and Brisbane is not competitive with road transport. This is largely the result of historic alignments leading to low travel speeds, poor reliability and major bottlenecks, most notably in the Sydney metropolitan area. Much of the existing regional rail network relies on legacy infrastructure and has maintenance and renewal issues.

Infrastructure Australia (2021a) notes that the demand for urban transport infrastructure is projected to increase significantly by 2036. Freight services will need to rise to the challenge of *The Australian Government's Modern Manufacturing Strategy* (Department of Industry, Science and Resources, 2020) and the $100 billion agriculture sector ambition of *Delivering Ag2030* (Department of Agriculture, Water and the Environment, 2022a) to meet the growing demand on transport infrastructure and increase market connectivity.

Inland Rail provides an opportunity to change the fundamentals of the freight logistics supply chain in Australia and deliver long-term economic and social benefits.

The Inland Rail Program is founded on the following key characteristics:

- Reliability—98 per cent, defined as the percentage of goods delivered on time by road freight, or available to be picked up at the rail terminal or port when promised
- Price—cheaper, relative to road transportation, as a combined cost of access to the rail network, rail haulage and pick-up and delivery
- Transit time—24 hours or less from Melbourne to Brisbane
- Availability—services available with departure and arrival times that are convenient for customers, which depends on cut-off and transit times.

The Inland Rail Program will enhance the attractiveness of the corridor as a location for investment in value-add operations including logistics, manufacturing and warehousing. Key examples could include grain storage facilities, cotton-handling facilities, and regional airport expansions. The Inland Rail Program will also encourage the formation of supply chain hubs such as intermodal facilities. Several intermodal facilities are already being investigated because of the Inland Rail Program. In Queensland, there are a number of existing intermodal facilities, including Acacia Ridge, Bromelton and the Brisbane Multimodal Terminal at Port of Brisbane. Funding has been received through the Queensland Government's Job Fund for a new road and rail intermodal 'InterLinkSQ' located in Charlton in the Darling Downs region, which will promote increased productivity and jobs growth in the region. A new intermodal facility is also being investigated at Ebenezer as recommended by the Australian Government response to the Independent Review of Inland Rail (2023) and subject to the outcome of a business case.

The construction of ancillary and complementary infrastructure, such as intermodal terminals, provides efficient movement of freight between transport modes, allowing better connectivity to ports, regional networks and capital cities.

3.2 Freight movement alternatives

Alternative solutions with the potential to address Australia's current and future freight challenges were assessed in the *2015 Melbourne–Brisbane Inland Rail Report* to the Australian Government (Inland Rail Implementation Group (IRIG), 2015)) and the *Inland Rail Programme Business Case* (ARTC, 2015c).

Three capital investment options were assessed by the *Inland Rail Programme Business Case* (ARTC, 2015c), including:

- Progressive road upgrades
- Upgrading the existing east coast railway
- An inland railway.

These capital investment options were subject to a rigorous assessment against seven equally weighted criteria consistent with Infrastructure Australia's *Reform and Investment Framework Guidelines* (2014) as per the *Inland Rail Programme Business Case* (ARTC, 2015a), including:

- Capacity to serve future inter-capital and regional/bulk freight market needs on the east coast
- Foster economic growth through improved freight productivity and service quality (including improved reliability and resilience)
- Optimise environmental outcomes
- Alleviate urban constraints
- Enable regional development
- Ease of implementation
- Cost effectiveness.

Overall, constructing an inland railway was found to be the preferred option with an average 'high likelihood' of improving outcomes across all criteria. Progressive road upgrades and upgrading the existing east coast railway both had an average 'medium likelihood' of improving outcomes across all criteria.

The alternatives reviewed by the IRIG are discussed below.

3.3 Project benefits

Inland Rail presents a unique opportunity to develop an integrated and resilient national freight network, enhancing supply chain capabilities by connecting existing freight routes across rail, roads, and ports. This will better link businesses, manufacturers, and producers to both national and global markets.

The Project allows the upgrade of existing rail infrastructure sections to address and mitigate existing issues such as active erosion caused by varying design standards and changes in surrounding land use. The impact of weather events on transport infrastructure and the effect this has on communities highlights the need for a resilient freight network.

Inland Rail will strengthen connections between regions and major cities, helping to ensure a more reliable and sustainable network. By shifting more freight to Inland Rail, Australia can achieve safer, less congested roads, reduced emissions, and a faster, more resilient freight system that keeps pace with the increasing demands of our growing population.

The benefits of the Border to Gowrie Project support the broader Inland Rail Program, from Beveridge in Victoria to Kagaru, in Queensland. Anticipated direct benefits of the Project and the broader Inland Rail Program include:

- Improved access to and from regional markets
- Reduced costs for the market
- Improved reliability and certainty of transit time
- Increased capacity and resilience of the transport network
- Reduced distances travelled
- Improved road safety and reduced congestion
- Improved sustainability
- Reduced air pollution and greenhouse gas emissions
- Direct and indirect employment opportunities during construction and operations.

Indirect benefits were also identified by the *Melbourne to Brisbane Inland Rail Concept Business Case* (ARTC, 2014) and include:

- Acting as a catalyst for growth
- Facilitating training and skills development
- Enabling complementary market-driven investments
- Providing benefits to communities, businesses, and industry throughout the life of the Project.

The Project will support local and regional business in the Darling Downs by providing a freight transport solution that connects the network of existing intermodal terminals, as well as supports the opportunity for new potential terminals.

4. Project description

The Project is one of the interconnecting projects that make up the Inland Rail Program for the delivery of 1,600 km of freight rail line between Melbourne and Brisbane. The Project connects directly to the North Star to NSW/QLD Border (NS2B) project in the south and the Gowrie to Helidon (G2H) project in the northeast.

4.1 Revised reference design

4.1.1 Summary of reference design updates

As noted above, the draft EIS, the Project's reference design and associated disturbance footprint have been updated.

Key updates to the reference design since the notification of the draft EIS are:

- The vertical gradient of the rail alignment was adjusted to be more responsive to the natural topography of the surrounding landscape to a maximum gradient of 1 in 80. This results in a number of significant enhancements for the community including improved safety outcomes at road rail interfaces via six additional grade separations, and more efficient bulk earthworks. The extent of bulk earthworks is significantly reduced requiring less fill and reliance on imported external fill.
- An alignment change at Millmerran to avoid and minimise impacts to an existing intensive livestock operation and local employer
- Minor modifications to the alignment to further reduce property impacts, including removing short-stacking constraints to reduce severance and total impacted areas
- The location and layout of the Project, including temporary construction zones and permanent area requirements through the Bringalilly and Whetstone State Forests was reviewed iteratively in conjunction with field survey information to reduce clearing by approximately 21.5 ha
- Flooding and hydrology related updates:
  - Additional flood modelling further informed drainage design and scour protection, particularly in high-risk areas. This includes areas of known highly erodible soils, flood-sensitive receptors, and the Condamine and Macintyre floodplain crossings.
  - Further consultation was undertaken with the Independent International Panel of Experts for Flood Studies (the Expert Flood Panel), established to provide advice on the flood models and structural designs developed by ARTC for Inland Rail in Queensland. ARTC also sought input from the community, including photographic and video evidence of flood events and local historical knowledge. Community feedback helped to inform the design of the proposed Condamine River floodplain crossing.
  - The proposed bridge over the North Branch (Condamine River) was extended by approximately 250 m north in response to community feedback and to further increase flood conveyance.
  - The Yandilla rail bridge was moved further south and combined with the proposed Grasstree Creek bridge to reduce environmental impacts and further increase flood conveyance.
  - The number of proposed culverts near the Yandilla grain silos was increased to ensure the drainage channel to the south of the silos has sufficient capacity to convey flood water.

- Road-rail interfaces:
  - removal of road rail crossings through engagement at:
    - McDougall's Road—alternative access provided via Cremascos Road
    - Hall Road—alternative access provided by connecting Hall Road to Bellevue Road
    - Lindenmayer Road—formed road no longer impacted due to horizontal alignment change at Millmerran.
  - level crossings that are now grade separations. These treatment changes were a result of 1 in 80 grade changes across challenging terrain and in line with the Project level crossing treatment methodology:
    - Bybera Road (rail bridge over road)
    - Heckendorf Road (road bridge over rail, including elimination of a road detour and intersection upgrade)
    - Gilgai Lane (rail bridge over road)
    - Commodore Peak Road and Scragg Road (rail over road)
    - Upgrade to Owen Scrub Road (road bridge over rail) to improve safety and increase design speeds in the approach to the rail crossing
    - Athol School Road (rail bridge over road)
    - Consolidation of Purcell Road to Athol School Road via a new road.
  - passive level crossings that are now active level crossings. These treatment changes were the result of updated traffic surveys undertaken in collaboration with the relevant road manager and updated in Australian Level Crossing Assessment Model (ALCAM) at:
    - Kooroongarra Road
    - Paton Road
    - Nicol Creek Road
    - Millwood Road
    - Harris Road (involves a road redesign within Pampas)
    - Mann Silo Road
    - Linthorpe Valley Road.
  - new interface:
    - pedestrian level crossing at Yelarbon.
- Stock route interfaces:
  - Kildonan Road—creation of an adjacent stock level crossing to avoid livestock interaction with road vehicles
  - South Kurumbul Road—realignment of the stock route with an adjacent stock level crossing designed to minimise interaction of livestock with road vehicles
  - inclusion of suitably sized holding yards at key interfaces
  - new stock route corridors will be a minimum of 60 m, except for the new realigned Millmerran-Inglewood Road stock route, which will be 100 m wide.
- Non-resident workforce accommodation site facilities:
  - two temporary accommodation facilities at Inglewood and Yelarbon have been included in the temporary footprint to accommodate the Project construction workforce requirements
- Modification of embankment grade and heights enabled reductions in the area of land required for the construction and operation of the Project
- Turallin Facility:
  - inclusion of a 20-hectare (ha) site in the temporary footprint to be utilised for a laydown area, a training facility or native plants nursery and traditional land management training facility
- Yelarbon levee:
  - subject to detailed design, modification of the existing Yelarbon levee from a category 2 to a category 3 will be required due to the size of the affected population
- Whetstone Material Distribution Centre (MDC):
  - ARTC is proposing to establish a temporary MDC in Whetstone on land bounded by the QR South Western Line to the north and the Cunningham Highway to the south to assist in the delivery of the Project through improved construction efficiencies and reduction of construction vehicle movements.
- Borrow pits:
  - earthworks efficiencies in cut-and-fill arrangements have reduced the fill deficit and reliance on imported materials. Seven borrow pit locations (at six locations, one location with dual pits) have been nominated to supply material.

4.1.2 Basis of design and key features

ARTC has developed a Basis of Design—a set of standardised performance specifications to provide consistent design requirements and parameters across the Inland Rail Program. Key standardised performance specifications for Inland Rail and the Project are:

- Operationally caters for train lengths up to 1,800 m, speeds to a maximum of 115 km/h and axle loads up to 25 tonnes
- Support the Inland Rail Program achieve a train transit time capability of less than 24 hours from Melbourne to Brisbane
- Rail alignment maximum vertical gradients of 1 in 80 and minimum curve radius of 800 m
- Track drainage flood immunity of 1% annual exceedance probability (AEP) without overtopping the formation
- Regular spacing of crossing loops (2,200 m in length) allowing 1,800 m long trains operating in both directions on single-line track.

Specific design elements are described in the following sections. Some design elements are explained using chainage as the reference. Chainage is the distance measured along the railway line from its beginning point. It should be noted that the first section of the Project is expressed in chainages on the NS2B project, then transitions to Border to Gowrie Project.

4.1.2.1 Land requirements

The Project footprint is the land area required to accommodate all permanent and temporary components of the Project, being:

- **Permanent footprint**: the area required to accommodate permanent infrastructure associated with the Project, including rail, road and other miscellaneous infrastructure.
- **Temporary footprint**: the area required to accommodate construction activities and facilities of a temporary nature and duration to support the Project. The temporary footprint is generally wider than the permanent footprint to allow for the construction of Project elements and the siting of temporary Project facilities.

4.1.2.2 Rail

The approximate lengths of Project interface with existing railways are summarised in Table 1.

TABLE 1 SUMMARY OF INTERFACES WITH EXISTING QUEENSLAND RAIL INFRASTRUCTURE

Proposed interface with Queensland Rail corridor	Approximate length (km)
Upgrade of South Western Line to a dual-gauge track	46.8
Upgrade of Millmerran Branch Line to a dual-gauge track	21.2

The staging of the existing rail upgrade works during construction and its associated impacts will be subject to interface and track possession agreements with QR.

The track structure will be a ballasted track system (including bridges) consisting of continuously welded rail, resilient fasteners, rail pads and concrete full-depth sleepers.

4.1.2.3 Crossing loops

Crossing loops are located at specific intervals to enable trains using single track to operate in bi-directional movement. The Project includes five crossing loops. The selection of crossing loop locations was informed by operational modelling for the Inland Rail Program and has taken into consideration proximity to sensitive receptors and interferences with existing infrastructure.

The loops will consist of new 2,200 m long track sections built parallel to the main line, designed to accommodate 1,800 m long trains.

4.1.2.4 Turnouts

Turnouts are switches that allow a train to be guided from one section of track to another. The Project is anticipating five turnouts.

4.1.2.5 Signalling and communications

During operations, the Project will be controlled by ARTC using Centralised Train Control (CTC), which is a method of managing the risks associated with the movement of rail traffic. The CTC system is comprised of the Human Machine Interfaces at the centralised operational control centre and within the vehicles under their control, and the integrated systems that connect them together. The Human Machine Interface within the rail vehicle can be either via lineside signals, or the use of in-cab signalling following the fitment of appropriate levels of the European Train Control System.

The Project interfaces with QR's South Western System, on the South Western Line and Millmerran Branch Line, which operates under Direct Train Control, a verbal authority-based system similar to ARTC's Train Order Working. While mainline junctions will be controlled by ARTC under CTC, a CTC to Direct Train Control interface will be required at the QR interfaces. This signalling system interface and associated operational procedures are subject to ongoing discussions, development and definition between ARTC and QR now and during the Project's detailed design stage.

4.1.2.6 Earthworks

The revised reference design for earthworks incorporates embankments, cuttings, and formation layers to support the railway infrastructure. Embankment fill slopes are engineered to resist erosion by employing suitable batter geometries and material specifications. Typically, embankments are designed with a slope ratio of 1V:2H, which is further flattened to 1V:3H when crossing floodplains to enhance stability and manage hydrological impacts. Cuttings, created by excavating the existing ground profile to the desired rail level, generally adopt the same slope ratio of 1V:2H. The formation design includes layers of structural fill and capping, providing a stable and durable foundation for the placement of railway ballast, sleepers, and tracks.

4.1.2.7 Bridges

Bridge structures are required so that water, vehicles and, in some cases, stock and pedestrians, may cross the proposed rail corridor. Bridge structures may either be rail-over-watercourse, rail-over-road, or road-over-rail, depending on local topography and rail or road alignment requirements.

The Project involves the construction of 37 new bridge structures, as follows:

- Rail-over-road bridges: 14
- Rail-over-watercourse bridges: 18
- Road-over-rail bridges: 5.

The type of bridge proposed for a location depends on a range of factors, including the local topography, road use, rail and road alignments at the crossing point and access requirements. Bridges have been provided at all major watercourse crossings along the Project alignment to minimise impacts to flow regimes and to avoid having to divert watercourses. The Project does not involve the reinstatement or reconstruction of any existing bridge structures.

4.1.2.8 Drainage infrastructure

To ensure changes to the flow and movement of water through the landscape are minimised and the targeted flood impact objectives achieved, the revised reference design has incorporated a range of drainage infrastructure solutions. Cross-drainage structures have been incorporated into the revised reference design where the Project intercepts existing watercourses and other drainage features. The type of cross-drainage structure (e.g. bridges, culverts, longitudinal drains, embankment and/or catch drains) included in the revised reference design depends on various factors such as the natural topography, rail formation levels, direction of flow and soil type.

The culvert scour protection has been updated in the revised referenced design as a result of the updated Flood Impact Objectives and revised modelling.

Longitudinal or track drainage removes water that has percolated through the track ballast and diverts surface runoff to the nearest bridge or culvert location before it reaches the subgrade. Two types of track drainage are proposed: embankment drains and catch drains, which are both longitudinal drains running parallel to the railway and located within the rail corridor.

The existing Yelarbon levee provides the town with an estimated flood immunity of 5% to 10% AEP. Augmentation works are proposed to achieve and maintain this level of protection once the Inland Rail is constructed.

4.1.2.9 Road–rail interfaces

Road-rail interfaces are points at which the rail alignment intersects a public road. The Project interfaces with 9 State-controlled roads, 41 local government (Goondiwindi Regional Council (GRC) and Toowoomba Regional Council (TRC)) roads, and 2 stock routes (Department of Resources (DoR)), with treatment types categorised as:

- Grade-separated crossings—road and rail cross each other at different heights so that traffic flow is not affected. Grade separations are either road-over-rail, or rail-over-road.
- Level crossings—road and rail cross each other at the same level. Level crossings have either passive or active controls to guide road users:
  - passive—have static warning signs (e.g. stop and give way signs) that are visible on approach. This signage is unchanging with no mechanical aspects or light devices.
  - active—flashing lights with or without boom barriers for motorists, and automated gates for pedestrians. These devices are activated prior to and during the passage of a train through the level crossing.
- Crossing consolidation, relocation, diversion or realignment—existing road–rail interfaces may be closed, consolidated into fewer crossing points, relocated or diverted. Roads will only be closed where the impact of diversions or consolidations is considered acceptable, or where the existing location is not considered safe and cannot reasonably be made safe.

For public crossings, ARTC is undertaking consultation, and will continue to consult with, the Department of Transport and Main Roads (DTMR) and local governments in relation to the road-rail interface treatments for each location.

In addition to public road-rail interfaces, there will also be stock route interfaces. The Project interfaces with the State stock route network, which consists of stock routes and reserves in 11 locations. The Project has endeavoured to maintain the integrity (i.e. connectivity and functionality) of the stock route network. In the revised reference design, Inland Rail has updated stock route interface designs to accommodate requirements identified by DoR and local councils.

Further, the Project is estimated to intersect with 168 private (unformed) and 74 private (formed) access roads or tracks within the bounds of private lots and which may require an occupational crossing to provide access between lot(s) owned by the same landowner that will be divided by a rail corridor. The final number of occupational crossings on private property will be determined during detailed design.

4.1.2.10 Rail maintenance access roads

Rail maintenance access roads (RMAR) are required to facilitate maintenance for critical infrastructure (e.g. turnouts, bridges, etc.) and to provide access for emergency recovery. The design includes two types of RMAR: formation level and surface level. RMAR will be provided at surface level for the majority of the corridor. Formation level access has been proposed for all turnout locations and, where practical, for the full extent of crossing loops.

A surface-level access road has been proposed for bridge abutments that require access for inspection and maintenance unless there are location-specific reasons for providing a formation-level access road.

4.1.2.11 Utilities and services

A total of 723 utilities interfacing with the revised reference design have been identified. Each utility has been assessed and categorised for appropriate action, including protection, relocation/realignment, no treatment, or classification as abandoned. All utility owners have been consulted by ARTC during the revised reference design process to establish potential interface impacts and to identify initial design solutions. Consultation with existing utility owners will continue through the detailed design stage of the Project to further verify interface impacts and to confirm appropriate interface treatments.

4.1.2.12 Fencing

To prevent public access to the Project's rail corridor, fencing will be provided for the majority of the rail corridor. Fencing will act to protect adjoining lands from trespass, and to prevent livestock and wildlife from gaining access to the railway. Fencing between the rail corridor and private properties adjoining the railway, will be typically standard rural fencing, with specifics discussed with relevant landowners as part of the detailed design process.

Where ARTC proposes to construct within the QR corridor for all returned works (QR South Western Line and Millmerran Branch Line), ARTC will comply with QR standards; this includes for all new and replacement fencing. All existing fencing is proposed to be removed and replaced.

Where ARTC is proposing to construct new railway corridor that coincides with road manager or landowner fencing, this will be replaced, typically with reference to the ARTC guidelines. Where superior fencing is required, for example where tracks are in close proximity to roads and/or communities, or where trespass is anticipated to occur, a 1.8 m chain link boundary fence may be provided.

Gates will be provided at suitable corridor entry/exit locations to enable access to infrastructure for maintenance purposes, and at private level crossings and stock crossings.

Fencing returns will be installed at bridge abutments and drainage or fauna crossing culverts. Fencing across small waterways will be designed to avoid storm damage and to retain effective stock control.

4.1.2.13 Fauna fencing and crossings

Maintaining effective and safe fauna movement across the rail corridor has been an important design consideration for the Project. A fauna connectivity strategy has been prepared for the Project, which provides an overview of connectivity impacts for target species and describes design elements and other mitigation measures to facilitate movement for these species. Specific mitigation measures include: the provision of fauna crossing structures; fauna furniture within and adjacent to entrances and exits of crossing structures; and fencing to funnel fauna into crossing structures and prevent them from accessing the railway to reduce the risk of wildlife-train collision. The fauna connectivity design elements will also include the provision of Glider pole sand canopy bridges for arboreal mammals, and Koala refuge poles and rails within and adjacent to crossing structures for Koalas.

4.1.2.14 Pest exclusion fencing

The Project intersects two types of barrier fences identified under the *Biosecurity Act 2014* (Qld) for the management of pest animals. These are the wild dog check fence (WDCF) and the rabbit-proof fence.

The WDCF protects areas of grazing and cropping land in southern Queensland from wild dogs and plays an important role in wild dog control in southern Queensland. The Project intersects operational sections of the WDCF at three locations in GRC. ARTC will reinstate the WDCF at the three locations of impact on a like-for-like basis, in consultation and agreement with the relevant stakeholders, notably the Department of Environment, Science and Innovation, impacted landowners and lessees, Department of Agriculture and Fisheries (DAF), and GRC. DAF consultation is required before any amendments to the WDCF under Section S91(3) of the *Biosecurity Act 2014* (Qld).

The Project will reinstate the WDCF as an early works package prior to the commencement of the construction of rail infrastructure. Replacement fencing will be in accordance with detailed designs accepted by GRC or the Darling Downs Moreton Rabbit Board, as relevant.

4.1.2.15 Fish passage

The permanent disturbance footprint crosses waterways that are classified based on the potential risk of impact (low to major) on the ArcGIS data layer (2023), *Queensland waterways for waterway barrier works*, developed by DAF (2023a). Culverts, bridges (under both rail and road) and other cross-drainage structures have been designed, where practical, to accommodate fish-passage requirements. The design of each cross-drainage and bridge structure intersecting a mapped waterway for waterway barrier works will be verified at the detailed design stage, in consultation with DAF.

4.2 Project delivery

Delivery and funding of the Project will be confirmed through decisions to be made by the Australian Government in line with the recommendations from the Independent Review released in April 2023. At the time of the revised EIS assessment, the estimated capital expenditure for the Project was approximately $2.2 billion. These costs will continue to be revised and updated, providing cost certainty through the Project approvals, design progression and land acquisition as appropriate.

Table 2 details the Project's indicative timing of stages in relation to relevant approvals for the Project works based on assumed receipt of the Queensland Coordinator-General's evaluation report under the SDPWO Act and Australian Minister for the Environment's controlled action decision under the EPBC Act. The commencement is marked by the receipt of the Coordinator-General's evaluation report and EPBC Act controlled action decision, and Year 1 marks the commencement of physical works in the pre-construction activities and early works stage. Construction activities are expected to commence in the third quarter of Year 1 with an anticipated construction completion by the first quarter of Year 5.

The following sections outline principal tasks in the delivery of the Project through to its operation.

The Project involves the remaining key stages:

- Detailed design
- Project approvals and corridor acquisition
- Pre-construction activities and early works
- Construction works
- Commissioning
- Operations
- Decommissioning.

Project works are works subject to approval under EPBC Act by the Australian Minister for the Environment and the receipt of the Coordinator-General's evaluation report under the SDPWO Act. Project works include all the Project stages listed above, except for decommissioning.

TABLE 2 ANTICIPATED TIMING OF PROJECT STAGES

Year	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Detailed design						
Project approvals and corridor acquisition						
Pre-construction activities and early works						
Construction works						
Commissioning						
Operations						

4.3 Pre-construction activities and early works

Pre-construction activities and early works are Project works undertaken prior to full mobilisation of the contractor undertaking the construction works. These works may be undertaken under a separate contract but will not commence until necessary Project approvals are received, the Outline EMP has been approved, and the relevant early works Construction Environmental Management Plan (CEMP) endorsed by the Environmental Monitor. Pre-construction activities and early works include:

- Site preparation for construction
- Establishment of access roads/tracks
- Vegetation clearing and other ground disturbance activities that will be required to comply with relevant legislative requirements, approval conditions, guidelines and plans
- Additional surveys and geotechnical investigations to inform construction works
- Relocation or protection of QR assets not undertaken as part of enabling works
- Utility/service interfaces not undertaken as part of enabling works
- Modification of biosecurity fencing
- Installation of boundary fencing
- Establishment of site offices and initial laydown areas, including the Whetstone MDC
- Establishment of non-resident workforce accommodation
- Pre-construction activities and early works may also include works within local road reserves, including establishing new access points and/or to facilitate he future upgrades and road closures, subject to agreement between ARTC and the relevant local government.

4.4 Construction works

Construction works will commence following endorsement of the CEMP by the Environmental Monitor for the relevant Project works and include:

- Site set out and pegging within the Project footprint, where not completed in pre-construction activities and early works
- Establishment of laydown areas and compounds, including vehicle inspection/workshops, washdown facilities and temporary fencing, where not completed in pre-construction activities and early works
- Clearing—using dozers, chainsaws, excavators, trucks and similar equipment, where not completed in pre-construction activities and early works
- Establishment of erosion and sediment controls as per approved Erosion and Sediment Control Plan, where not completed during pre-construction activities and early works
- Rail corridor works, including track works turnouts and crossing loops
- Road and road-rail interface works
- Road realignments, grade separations and upgrades works
- Rail maintenance access roads
- Bridge construction
- Fencing
- Fauna habitat connectivity measures (fencing, crossing structures in accordance with detailed design specifications, and Fauna Connectivity Strategy and subsequent Wildlife Connectivity Plan
- Signalling and communications
- Stockpile, and storage areas, that are not for enabling works and where not completed in pre-construction activities and early works
- Ballast—supply, delivery and installation
- Concrete sleepers—supply, delivery and installation
- Utilities and services to support/service the Project (that are not for enabling works)
- Bulk earthworks—major cut-to-fill operations include the winning of suitable construction material from sections of cut along the Project alignment or from borrow pits external to the site
- Permanent and temporary drainage controls, including culverts and longitudinal drainage
- Clean-up, landscaping, site restoration and rehabilitation, and any other activities necessary to complete such works.

4.4.1 Workforce

The onsite workforce required to undertake the construction tasks for the Project to the anticipated construction schedule is estimated to peak at 900 full-time equivalents (FTE) around week 80 of construction. It is estimated that, over the construction works stage, an additional 332 direct and indirect jobs will be generated on average each year for Darling Downs–Maranoa, and 107 jobs for the rest of Queensland.

4.4.2 Hours of work

Major construction will only commence once the relevant components of the Project approvals and corridor acquisition are complete, and the Project's CEMP has been endorsed as required.

The majority of construction works will be undertaken during the day; however, extended hours on construction may be undertaken, subject to appropriate controls and approval, to shorten the duration of the construction period and to minimise potential impacts to the community. Extended construction hours including night-time activities may be required for safety, logistics and construction reasons such as the delivery of oversized plant or structures requiring special arrangements to transport along public roads, works requiring continuous construction support such as continuous concrete pours, pipe-jacking or other forms of ground support necessary to avoid a failure or construction incident, and works required to be undertaken during rail possession.

When extended construction hours or night works are proposed, advance notice will be provided to potentially impacted local residents, and disruption minimised through careful planning and mitigation controls. Works will be undertaken in compliance with relevant guidelines, approval conditions and management plans. Timely and accurate information of upcoming construction works will be shared with the community.

All works will be undertaken under the structured approach to the management of environmental issues as detailed in the Project's CEMP, to demonstrate the management of the works consistent with relevant guidelines, Project-specific requirements and all relevant laws. The CEMP will detail control measures based on site-specific assessments, and support the justification of nominated construction hours at the work locations based on the construction program. The planning process for any works undertaken during extended hours will include consultation with affected stakeholders to inform them of the proposed work, any anticipated impacts, and the measures implemented to control potential impacts.

4.4.3 Non-resident workforce accommodation facilities

An assessment of workforce demand and safe commutable distances has identified the need for non-resident workforce accommodation in proximity to Yelarbon, Inglewood and Millmerran.

The Project identifies two non-resident workforce accommodation facility sites at Yelarbon and Inglewood to meet the construction stage workforce requirements. The location for the proposed Millmerran workforce accommodation facility is not included in the revised draft EIS as the site selection due diligence will be undertaken during the detailed design stage. The necessary secondary approvals for each non-resident workforce accommodation facility will be sought prior to commencement of any accommodation establishment works. Stated conditions for those approvals is not sought through this revised draft EIS.

4.4.4 Laydown, site offices, stockpile locations and storage areas

A total of 78 laydown areas and one MDC at Whetstone have been allocated within the Project's temporary footprint. Establishing temporary laydown areas will generally involve clearing, grubbing, stripping of topsoil, installing environmental controls, laying hardstand material, and constructing parking areas and temporary vehicle access. This may be undertaken as part of early works. Eleven of these laydown areas (including Whetstone MDC) have been nominated for the location of site offices, noting that not all locations are required to have site offices. Each bridge location along the Project alignment will have a dedicated laydown and work area. The work area may also include crane pads for the lifting of bridge members.

Each laydown area has been positioned to avoid or minimise potential impacts to environmental and social receptors. The locations of the laydown areas have been chosen to avoid areas that are within the 1% AEP floodplains, where possible, and areas of native vegetation. Some laydown areas supporting bridge construction must be within floodplains and near watercourses or drainage features. Precautions will be taken on those work areas to minimise potential flooding impacts.

4.4.5 Concrete batching

Two concrete batching plants are required to support construction due to the large distance between the Project alignment and commercial suppliers of pre-cast structures, and due to the high demand for concrete structures associated with bridge structures and culverts. The proposed locations for concrete batching facilities are immediately north and south of the Condamine River floodplain outside the 1% AEP flood extents.

4.4.6 Erosion and sediment control

Temporary site drainage and water-management controls will be installed as per the approved Erosion and Sediment Control Plan to minimise the impacts of runoff and sedimentation from construction activities on adjacent receptors. These temporary controls will be installed in accordance with the International Erosion Control Association's *Best Practice Erosion and Sediment Control* (2008).

4.4.7 Waste disposal

Waste management practices during construction will maximise the reuse or recycling of Project waste to reduce the volume of material that will otherwise be disposed to landfill. As part of the CEMP, a Waste Management Plan will be developed and implemented to ensure that recycling and reuse targets are achieved and keep detailed waste-tracking records.

4.4.8 Construction water

Appropriate quality water will be required during construction works for earthworks, track works, concrete production, dust suppression, revegetation and worker's accommodation facilities. The estimated water requirement by construction activity:

- Total volume for civil earthworks—2,390 megalitres (ML)
- Total volume for track works—2.2 ML
- Concrete batching—13.5 ML
- Whetstone MDC—75 ML
- The daily water usage for a single non-resident workforce accommodation is expected to be 67.5 kilolitres per day.

Construction water sources and requirements will be finalised during detailed and construction planning. Through this process, water demand planning will be refined, including detailed contingency options, in the event that protracted dry seasonal conditions prevail and water supply options become unavailable. An assessment of the suitability of each source will be made for each construction activity requiring water and the final water-sourcing strategy for the Project will be documented in a Construction Water Plan.

4.4.9 Bulk earthworks and borrow pits

Earthwork assessment for the revised reference design confirms a material deficit associated with the various components of the Project, necessitating the sourcing of suitable fill from a number of borrow pit sites to support Project construction. In accordance with the *Waste Reduction and Recycling Act 2011* (Qld) hierarchy for waste and resources management, the Project's material deficit and reliance on imported material has been reduced by maximising cut-to-fill opportunities, the application of earthwork efficiencies and the application of treatment and reuse.

Following earthwork reuse and minimisation opportunities, the Project will have a fill deficit requiring the importation of external fill from licenced quarries and from seven borrow pit sites established for the Project for use during construction. The seven borrow pit sites, located between Goondiwindi and Millmerran, will supply an estimated 298,000 cubic metres of the Project's fill deficit during the Project's construction stage. The borrow pit and access track locations, size and configurations were selected based on environmental constraints to avoid or minimise impacts, landowner feedback and proximity to Project fill requirements during construction, to minimise haulage. Field survey has confirmed the absence of impacts to MNES and matters of State environmental significance (MSES) at the proposed borrow pit and access track disturbance locations.

It is anticipated the Project's future design stages will result in further opportunities to increase mass haul efficiencies, resulting in an expected reduction in the reliance on the importation of external fill.

4.5 Commissioning

Testing and commissioning (checking) of the rail line and communication/signalling systems will be undertaken to confirm that all systems and infrastructure are designed, installed, and operating according to operational requirements.

4.6 Operations

Operations include the use of the railway for freight purposes, operation and maintenance of safety systems, signalling, and general track and infrastructure maintenance.

Operational items include, but are not limited, to:

- Bridge and culvert inspections and maintenance
- Sleeper replacement
- Rail replacement, welding and grinding
- Ballast replacement and cleaning
- Track tamping and reconditioning
- Level crossing maintenance
- Vegetation management
- Signalling systems, and equipment testing and maintenance
- Transportation of equipment, materials and workforce
- Other asset management in accordance with ARTC technical maintenance.

4.6.1 Hours of operation and workforce

The railway will be operational 24 hours a day, 365 days a year, on a variable schedule.

It is anticipated that the ongoing operation and maintenance of the Project will require a workforce of approximately 10 to 15 full-time equivalent workers (FTE). The operational workforce will be based at provisioning centres outside the immediate vicinity of the Project.

4.6.2 Train operations and operational maintenance

While the Project will be operational once constructed, the Inland Rail Program will not be whole until all sections are complete. Prior to this, rail traffic may use the Project alignment, subject to relevant infrastructure agreements and connections into the existing Queensland rail network. Similarly, rail traffic may connect to the NSW network if suitable connections are in place.

Train control will be managed via ARTC's existing control centres. Train services will be provided by a variety of operators and will include a mix of grain, bulk freight, intermodal and other general freight transportation.

It is estimated that, once Inland Rail is complete and operational, the Project will involve an estimated annual average of 14 train services per day during the initial years of operation. This is likely to increase to an average of 20 trains per day after 15 years, and up to 25 per day during peak operational periods. Annual freight tonnages will increase in parallel, from approximately 14.2 million tonnes per year in Year One of operations to 21.8 million tonnes per year in peak operations.

Standard ARTC maintenance activities will be undertaken according to established maintenance schedules. Emergency maintenance may be required in response unplanned requirements (e.g. maintenance following adverse weather events).

There is no provisioning for rollingstock maintenance facilities or permanent refuelling facilities associated within the Project.

4.6.3 Landscaping and rehabilitation

Ongoing monitoring is proposed to ensure that the Project landscaping succeeds. Additional maintenance or corrective action may be required if monitoring demonstrates that landscape and rehabilitation completion criteria established in the Rehabilitation and Landscaping Management Plan are not being achieved.

The ongoing maintenance of the rail corridor will include management of weeds, pests and vegetation (e.g. for bushfire and safe access), fauna furniture and fencing, and other infrastructure. These works will be managed in accordance with operational environmental management documentation.

4.7 Decommissioning

The Project is expected to be operational for more than 100 years. The design life of structures is 100 years to support this operational objective. The decommissioning of the Project cannot be foreseen at this point in time and is therefore not considered further as a Project stage in this revised draft EIS.

If the Project, or elements of it, were subject to plans for decommissioning, it is envisaged that the works would be undertaken in accordance with any approvals and laws applicable at that point in time and a Decommissioning Environmental Management Plan, or similar, which would be developed in consultation with relevant stakeholders and regulatory authorities to guide and manage the decommissioning works.

5. Key findings of the Environmental Impact Statement

5.1 Land use and tenure

5.1.1 Existing environment and potential impacts

The Project crosses land used predominantly for grazing, and other agricultural uses, including cropping and irrigated cropping. Other land uses include production forestry, other minimal uses (consisting of vacant land, residual native forest and land reserved for stock routes), and transport and communication uses.

The Project passes by Kurumbul, Yelarbon, Whetstone State Forest, Bringalily State Forest, Commodore Mine, Inglewood, Millmerran, Pittsworth, Linthorpe, Southbrook, Athol, Biddeston, Wellcamp, Kingsthorpe, several feedlots, poultry farms and piggeries and, at the north-eastern end, the Toowoomba Wellcamp Airport and Toowoomba Enterprise Hub. The Project also interfaces with the State stock route network in multiple locations.

Land tenure within the Project footprint is mostly freehold where new (greenfield) rail corridor is required for the Project, and leasehold where using the existing QR South Western Line and Millmerran Branch Line rail corridors, where possible, minimising the extent of properties to be acquired.

The Project footprint comprises an area of approximately 3,382 ha and includes all areas where works are proposed, both temporary and permanent. Of the 581 lots and 42 easements impacted by the Project footprint, 495 lots and 33 easements are impacted by the permanent footprint, and the temporary footprint covers an additional 86 lots and 9 easements.

The Project will result in the change from rural land uses to a rail corridor and have the following impacts:

- Acquisition of land
- Partial revocation of Whetstone and Bringalily State forests
- Changes in tenure including potential impacts to native title
- Changes in land uses particularly impacts on agricultural uses and activities:
  - loss of agricultural land
  - land fragmentation and disruption to access and infrastructure
- Alterations to stock routes
- Alterations to biosecurity fences
- Accessibility:
  - impacts on road network
  - impacts on property access
- Impacts on services and utilities.

The Project will support agricultural land uses by improving rail access to regional markets as well as supporting future industrial development including at regional hubs such as the Charlton-Wellcamp Enterprise Area.

The Project is consistent with the intent of regional and State planning instruments including the *State Planning Policy* (Department of Infrastructure, Local Government and Planning, 2017c), *State Infrastructure Strategy* (Department of State Development, Infrastructure, Local Government and Planning, 2022), *ShapingSEQ 2023* (Department of State Development, Infrastructure, Local Government and Planning, 2023), *Darling Downs Regional Transport Plan* (Department of Transport and Main Roads (DTMR), 2019g) and the *Darling Downs Regional Plan* (Department of State Development, Infrastructure and Planning, 2013).

5.1.2 Proposed mitigation measures

Where possible, potential land use and tenure impacts have been avoided or minimised through measures that have been factored into the revised reference design. Where impacts remain, land use and tenure mitigation measures are proposed to be implemented during detailed design and planning for land access to further reduce and manage the potential impacts, including:

- Detailed design to further refine the Project footprint required to safely construct, operate and maintain the Project, including to minimise property acquisition requirements, property severance and disruption to land use and transport networks
- Individual property treatments to address land use impacts will be developed in consultation with landowners/occupants, with respect to the management of construction on, or adjacent to, private properties. These will detail any required adjustments to fencing, access, farm infrastructure or relocation of impacted structures, as required. Measures, where agreed, will be documented in individual property agreements.
- Australian Rail track Corporation will consult with the resource holders of authorities to prospect, pipeline licences and potential commercial areas within the Project footprint
- Where legal access to a property is permanently affected and a property has no other legal means of access, alternative access to and from a public road will be provided to an equivalent standard, where feasible and practicable
- Consultation with the Department of Resources (DoR), GRC and TRC will continue through the detailed design stage to maintain the utility of existing public stock routes.

Where agricultural land is required to be used temporarily during construction, disturbed areas will be rehabilitated in accordance with the Rehabilitation and Landscaping Management Plan and landowner agreements.

Australian Rail track Corporation will consult with directly impacted landowners, whose property would be partially or fully acquired for the Project, regarding land acquisition. With the commencement of the acquisition of land process, ARTC will work with all directly impacted landowners to ensure that Project impacts are minimised or mitigated where possible.

5.2 Land resources

5.2.1 Existing environment and potential impacts

The assessment of land resources has considered a range of attributes in relation to geology and topography, soils, contaminated land and agricultural land. The existing conditions are broadly described as follows:

- Soil type varies considerably along the Project footprint and consists of a number of broad Australian Soil Classification groups
- There is considered to be a low risk of inland acid sulfate soil (ASS) or potential inland ASS present
- Most soils encountered within the Project footprint are sodic to strongly sodic (dispersive sodic clay soils have been identified as having the highest erodibility rating and are generally associated with texture contrast soils, specifically sodosols)
- Multiple Soil Conservation Plans exist for properties in the vicinity of the Project footprint
- The assessment of potential sources of contamination identified 23 lots recorded on the Environmental Management Register under the *Environmental Protection Act 1994* (Qld)
- A review of available geological mapping indicates there are no rock types within the Project footprint that are known to contain naturally occurring asbestos materials.

Considering the existing conditions in the assessment area, anticipated changes with the potential to adversely impact land resources include:

- Permanent alteration to landform and topography in some locations
- The loss of soil resources on some agricultural and other economically valuable land
- The potential for accelerated loss of topsoil through erosion
- Exacerbation of some areas of existing soil salinity and sodicity
- Contribution to the creation of new areas of salinity
- Disturbance of contaminated land
- Potential to contaminate land in the work areas and maintenance areas.

5.2.2 Proposed mitigation measures

Potential impacts to land resources including loss of soil resources, erosion, geomorphic impacts and disturbance of contaminated land can be managed effectively through the implementation of mitigation measures including adherence to the Flood and Geomorphic Impact Mitigation Framework, the CEMP and supporting plans.

Management and mitigation measures for impacts to land resources include:

- Additional geotechnical investigations will be undertaken to inform the design of earthworks and foundations for structures, suitability of borrow and quarry material, and construction planning for the Project
- Opportunity to minimise the Project footprint to that required to construct, operate and maintain the Project safely and efficiently, primarily along greenfield sections of the Project alignment
- Opportunities for reuse of material and slope batter optimisation will be assessed through the detailed design
- Review Soil Conservation Plans potentially impacted by the Project. Confirmation will involve consultation with DoR in addition to the holders of each Soil Conservation Plan and affected stakeholders
- Finalise the Soil Management Plan to specify the management requirements for specific soils, and their physical and chemical properties, encountered along the alignment
- An Erosion and Sediment Control Plan will be developed as a component of the Project CEMP, and will guide development of location-specific Erosion and Sediment Control Plans, and include detailed erosion hazard assessments and erosion and sediment control structure designs
- A Rehabilitation and Landscaping Management Plan will be developed, as a component of the Project CEMP. This Plan will be based on the Inland Rail Landscape and Rehabilitation Strategy.
- Temporary earthworks and permanent landform for the Project are designed to avoid unwanted water ponding. This objective will be achieved through surface levelling and use of cross-drainage and longitudinal drains within the rail corridor.
- A Contaminated Land Management Plan will be incorporated into the Project CEMP
- A contamination assessment of EMR-listed sites and other areas of potential contamination will be undertaken by a suitably qualified person once detailed design, the Project footprint, and the cut-and-fill balance are finalised.

5.3 Landscape and visual amenity

Development of the reference design for the Project has progressed in parallel with the impact assessment process, and the reference design has been amended for the revised draft EIS, to reflect outcomes of ongoing engagement with the community and key stakeholders. Consequently, design solutions for avoiding, minimising or mitigating impacts have been incorporated into the revised reference design as appropriate and where possible, including:

- Where possible, avoiding impacts on nationally or regionally protected landscape areas and minimising impacts on State forests
- Intentionally aligning the Project along the eastern boundary of the Rainbow Reserve to minimise the extent of encroachment into the reserve
- Avoiding, where possible, direct impacts on areas of regional landscape significance defined using the regional scenic amenity methodology (ShapingSEQ)
- Co-locating with existing rail and road infrastructure, where possible, to minimise the need to develop land that has not previously been subject to disturbance for transport infrastructure
- A reduction in the number of crossings and extent of impact on watercourses
- Revising the vegetation clearing extents to the minimum area required for safe and efficient construction, operation and maintenance.
- Avoiding to the greatest extent possible significant settlements to minimise visual impacts (e.g. Inglewood, Millmerran, Pittsworth) except where the Project is within or adjacent to existing rail corridor (e.g. through Yelarbon, Pampas and Brookstead)
- Changes to alignment in the vicinity of Millmerran.

The revised reference design has incorporated a range of landscape mitigation measures. The assessment has identified a need for additional mitigation measures in project delivery, including undertaking an updated visual impact assessment during the detailed design stage to address design refinements, undertaking a wildlife lighting assessment during the detailed design phase in accordance with DCCEEW's *National Light Pollution Guidelines for Wildlife*, consultation with key stakeholders, protection of existing vegetation, rehabilitation of disturbed vegetation and opportunities for urban design of key structures.

5.3.1 Existing environment and potential impacts

The key landscape and visual impacts of the Project relate to the introduction of rail infrastructure including new rail, viaducts and road and rail bridges, into rural and natural settings, together with the removal of vegetation and earthworks for embankments and deep cuts. There is also the potential for temporary landscape and visual impacts to occur during construction due to material stockpiles, site offices and non-resident workforce accommodation facilities, lighting, signage and the presence and movement of construction equipment.

There are 12 landscape character types (LCTs) and their associated landscape character areas have been identified within the landscape and visual amenity impact assessment area. Some impacts of a 'high' level of effect have been identified for two character areas prior to the application of mitigation measures:

- LCT F: Rural Settlement—which includes the landscapes around the settlements of Yelarbon, Brookstead and Pittsworth. Impacts relate to the introduction of large embankments and bridges within the vicinity of settled areas (of Yelarbon, Brookstead and Pittsworth).
- LCT I: Settled Hills—which comprises landscapes of high local scenic value. Impacts are principally associated with clearance of vegetation and the construction of extensive cuts and embankments through landscapes of high local scenic value

The Project has the potential to impact upon landscapes identified as having high scenic amenity value including:

- Tree-lined watercourses, particularly the Condamine River and other tributaries traversed by the alignment
- Elevated and vegetated hills in the vicinity of Pittsworth.

The number of visual receptors varies greatly across the landscape and visual amenity impact assessment area. Localities with high numbers of receptors include the various population centres close to the alignment, such as Kingsthorpe, Gowrie Mountain, Southbrook, Pittsworth, Brookstead, Pampas and Yelarbon, as well as numerous rural living areas. Additionally, views can be obtained from major roads throughout the area, including the Cunningham Highway, Gore Highway, Warrego Highway and tourist drives (including parts of the Warrego Way and Adventure Way, Open Plains Country Drive and Border Rivers Tourist Drive routes).

Visual impacts are often contained by the presence of vegetation and landform; however, there are localised elevated areas affording views over a wider area, including three scenic lookouts at varying distances to the alignment, which are located at Mount Basalt Reserve, Commodore Peak Picnic Area and Mount Kingsthorpe summit.

A total of 29 representative viewpoints have been assessed. Of these, seven visual impacts up to a high level of effect were identified for the operations stage of the Project prior to the application of mitigation measures. These comprise the impact:

- Of the Cunningham Highway road bridge and introduction of additional rail infrastructure
- Of the new road bridge and embankments north of Brookstead and additional rail infrastructure near Brookstead State School
- Of bridges and large embankments on the northern edge of Pittsworth
- Of large embankments and new rail and bridge infrastructure close to rural residential lots near Southbrook
- Of large embankments and new rail and bridge infrastructure at Pittsworth
- Of embankments and a proposed controlled level crossing in proximity to existing rural residential lots near Athol School Road
- On views obtained from the summit of Mount Kingsthorpe lookout.

An additional six representative viewpoints have the potential for the significance of impact during operation to increase, should it be determined that noise barriers are required.

Lighting impacts of a ‘low’ level of effect were identified for the construction and operation stage. Lighting associated with the realignment of existing roads will be consistent with current arrangements unless safety requirements are identified.

5.3.2 Proposed mitigation measures

Mitigation measures for impacts to landscape and visual amenity include:

- Further refinement of the detailed design to minimise clearing, impacts to waterways, avoid items and places of Indigenous, non-Indigenous and natural heritage significance and incorporate lighting requirements
- Ongoing consultation with relevant stakeholders to determine any site-specific screening and visual impact mitigation measures
- Implementation of a Rehabilitation and Landscaping Management Plan as a component of the CEMP to minimise and mitigate visual impacts during and post-construction to ensure appropriate stockpile management, erosion and sediment controls, fuel storage, waste management and rehabilitation.

These opportunities and implementation of mitigation measures have the potential to enhance the legacy of the Project and would reduce the residual impact of the Project on some landscapes and views, particularly those landscapes and views around several rural settlements.

5.4 Flora and fauna

5.4.1 Existing environment and potential impacts

The Project is situated within the Brigalow Belt South bioregion, which has experienced a long history of human disturbance as a result of agricultural practices and resource development. At a regional level, most remaining areas of vegetation are now fragmented, occurring on the rockier hilly areas of ranges, as part of State-protected lands (State Forests), as roadside vegetation, or as relatively small, isolated remnants.

The flora and fauna impact assessment area provides suitable habitat for a large number of conservation significant species and other protected matters. This includes:

- Matters of national environmental significance threatened species
- Matters of national environmental significance threatened ecological communities (TECs)
- Non-threatened migratory birds (assessed as MSES)
- State-listed threatened species and special least concern species (MSES, listed under the *Nature Conservation Act 1992* (Qld) (NC Act))
- Matters of State environmental significance regulated vegetation including 'endangered', 'of concern' and 'least concern' regional ecosystems (REs) protected under the *Vegetation Management Act 1999* (Qld) (VM Act).

Matters of national environmental significance threatened species and TECs are controlling provisions under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A total of 64 ecological values or their associated habitat were identified within the Project footprint for the purposes of this assessment. This includes 3 TECs, 19 threatened flora species, 30 threatened fauna species, 8 non-threatened migratory birds, and 2 Special Least Concern (SLC) mammals. Additionally, 1 TEC was recorded just outside the Project footprint and has therefore been included in assessments. One MSES threatened fauna species was included due to the presence of State-mapped essential habitat within the Project footprint.

The Project also runs through bioregional corridors (connectivity areas) and consists of prescribed (remnant) regional ecosystems (REs) that are 'endangered' (two), 'of concern' (seven), within a mapped wetland, and within a defined distance of a watercourse.

Project works have the potential to impact ecological values through:

- Habitat loss and degradation from vegetation clearing
- Fauna species injury or mortality
- Reduction in biological viability of soil to support plant growth
- Introduction and spread of weed, pathogen and animal pest species (both terrestrial and aquatic)
- Habitat fragmentation leading to:
  - reduction in the connectivity loss of biodiversity corridors
  - barrier effects
  - edge effects
- Noise and vibration
- Air quality and dust
- Lighting
- Waste generation and management
- Alterations to hydrology (e.g. surface water and groundwater) and flood distribution dynamics
- Erosion and sedimentation
- Changes to groundwater resources affecting groundwater dependant ecosystems
- Contamination of land
- Aquatic habitat degradation
- Waterway barrier effects
- Water quality.

5.4.2 Project updates and reduced environmental impacts

Following public notification of the draft EIS, the project's reference design, disturbance footprint and approach to construction have been updated. Changes to reduce ecological impacts were made in response to significant site survey, on-going research on key ecological species, submissions on the draft EIS and issues raised during consultation with species experts, contractors, agencies and technical authorities. Design revisions have also followed further assessments of scientific data, field verified survey outputs, and a review of opportunities to increase efficiencies while avoiding and reducing impacts to ecological receptors. Consequently, the net impact of the Project on the receiving environment differs due to the evolution of the Project scope and delivery approach.

Key Project design updates since the draft EIS relevant to flora and fauna include:

- Project footprint reductions including through the Bringalily and Whetstone State Forests. Design refinements at Bringalily State Forest reduced clearing by approximately 21.5 ha, minimising impacts on remnant vegetation and habitats for species including the koala, south-eastern long-eared bat, and spotted-tailed quoll. Adjustments included relocating a laydown area outside the State Forest into an adjacent road corridor.
- Project areas associated with construction activities such as laydown areas were reassessed against construction needs in conjunction with field survey information to avoid and reduce impacts to ecological values and rehabilitation land requirements. Construction laydown areas were relocated away from environmentally sensitive zones to minimize impacts on wildlife and habitat.
- Adjusting road access configuration and other design refinements to avoid impacts on verified Threatened Ecological Communities (TEC) including Semi-evergreen Vine Thicket (SEVT), White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Box Gum).
- Consideration of essential habitat and other environmental values when locating the Millmerran alternative realignment to reduce clearing requirements and minimise disturbance to vegetated corridors providing fauna connectivity function.
- Modifying workforce accommodation and borrow pit locations to reduce risks to protected species.
- Relocating the Whetstone Material Distribution Centre from an unmapped Brigalow TEC area to a previously cleared site located south of the rail alignment
- Update of drainage structures, including additional bridges, culverts, and scour protection, based on soil, geomorphological, and ecological surveys. These improvements minimised impacts on riparian vegetation, banks, instream habitats, aquatic fauna passage and areas of ecological importance in the Condamine and Macintyre floodplains.

5.4.3 Proposed mitigation measures and offsets

Management, mitigation and compensation measures for impacts to flora, fauna and habitats include:

- Refinement of the revised reference design and Project footprint during detailed design to further reduce ecological impacts
- Design considerations such as utilising bridges over culverts and designing cross-drainage structures with consideration for fish passage
- Development of the following management plans as part of the Project CEMP including the Biodiversity Management Plan, Biosecurity Management Plan, Soil Management Plan, Rehabilitation and Landscaping Management Plan
- Finalisation of the Draft Koala Management Plan Fauna Management Plan to reduce impacts to the Koala and other relevant species and provide management and reporting requirements for relevant Project works
- Development of a Wildlife Connectivity Plan in accordance with the rationale and approach described in the Fauna Connectivity Strategy to mitigate impacts to fauna connectivity and wildlife train strike risk. This will be through the provision of fauna movement infrastructure and a range of other connectivity measures designed for site conditions for the site target species.
- In consultation with relevant agencies and landowners, preparation and implementation of property-specific Offset Area Management Plans to provide the delivery of environmental offsets, where appropriate, ahead of clearing works
- Annual monitoring of remnant and regrowth vegetation communities and habitats retained within the Project footprint.

ARTC will continue to monitor the effectiveness of the mitigation measures with contingency under an adaptive management framework, to change or improve management strategies that have been identified as not meeting the performance criteria (i.e. where deleterious impacts to the identified ecological values are observed, or not minimised).

The Project will result in significant residual impacts to MNES and MSES after the implementation of all mitigation measures, including rehabilitation. In accordance with the respective significant impact guidelines for MNES and MSES, the Project is likely to result in significant residual impacts to 5 threatened flora species, 10 threatened fauna species and 3 threatened ecological communities listed under the EPBC Act, as well as 2 threatened flora species and 4 threatened fauna species listed only under the NC Act. The Project will also result in impacts to three categories of regulated vegetation and connectivity areas identified under the *Environmental Offsets Act 2014* (Qld) (EO Act).

An Environmental Offset Delivery Strategy has been prepared to inform the development of offset delivery components, including an Environmental Offset Delivery Plan and Offset Area Management Plans. A detailed Environmental Offset Delivery Plan and property-specific Offset Area Management Plans will be developed in consultation with relevant Australian Government and State regulatory agencies and implemented by ARTC prior to the commencement of Project works.

5.5 Air quality

5.5.1 Existing environment and potential impacts

The existing environment (air quality) is described in terms of meteorological conditions, climate, land use and existing (background) air quality. The key indicator for background air quality is particulate matter (PM) less than 10 micrometres in diameter (PM_{10}) and particulate matter less than 2.5 micrometres in diameter ($PM_{2.5}$). Monitoring data for these characteristics was collected for the Project at two air quality monitoring stations. Background concentrations for other pollutants of interest not monitored by these air quality monitoring stations were estimated using data available from other air quality monitoring stations operated by the Department of Environment, Science and Innovation (DESI).

Air quality goals for the air quality impact assessment are adopted from the air quality objectives from the *Environmental Protection (Air) Policy 2019* (Qld). For most pollutants and averaging times, the background concentrations are less than half of the air quality goal, indicating a moderate assimilative capacity of the receiving environment. The main pollutant of concern during the construction works stage of the Project is particulates, predominantly airborne PM_{10} and deposited dust (referred to as TSP—total suspended particles). These emissions were the focus of the construction-works stage air quality impact assessment.

The assessment concluded that earthworks, haulage track-out (where dust and dirt is tracked off site from vehicles and machinery) and other construction activities have the greatest potential for dust emission. The assessment also concluded that surrounding sensitive receptors are expected to have a medium sensitivity to dust deposition and a low sensitivity to human health impacts. The potential impacts of the qualitative air quality risk assessment conclude that the unmitigated air emissions from the construction of the Project poses a ‘low’ risk of human health impacts but a ‘medium’ risk of dust deposition.

5.5.2 Proposed mitigation measures

Management and mitigation measures for impacts to air quality include:

- Development of an Air Quality and Dust Management Plan as part of the Project CEMP prior to the commencement of pre-construction activities and early works
- A quantitative assessment of potential dust deposition from construction works areas in proximity to sensitive receptors will be undertaken prior to construction when more detailed construction information is available
- Haulage routes and access roads will be confirmed for construction of the Project based on the shortest and safest trafficable route
- Baseline dust deposition data will be collected prior to construction in proximity to Commodore Mine
- Assessment of the potential for air quality and odour impacts to the intrinsic value of Indigenous heritage sites will be undertaken prior to construction

- Construction activities will avoid ground-disturbing activities during sustained windy conditions
- Vehicle loads will be covered to prevent wind-blown dust emissions and spillages
- Other mitigation measures during construction such as reduced vehicle speeds on unsealed haul roads, watering down roads, covering long term stockpiles, ensuring vehicles are clean, the installation of rumble grids where vehicles depart construction sites, revegetation of disturbed areas as soon as possible, where practical.

Following the implementation of the proposed mitigation measures, Project works are not anticipated to adversely impact environmental values related to air quality.

5.6 Surface water quality

5.6.1 Existing environment and potential impacts

The Project is located across two catchment (surface water) areas, namely the Condamine River basin and the Border Rivers basin. The Project includes full-width crossings of 19 major waterways (stream order greater than or equal to 3) and 81 minor waterways (stream order less than 3) within these catchments. There are 18 defined watercourses within the impact assessment area as defined under Section 5 of the *Water Act 2000* (Qld) (Water Act).

All waterways and watercourses (as defined under the *Fisheries Act 1994* (Qld) (Fisheries Act) and the Water Act) within the surface water impact assessment area have been identified as sensitive receptors within the receiving environment. Of these, a number of high-sensitivity water quality receptors with associated environmental values were identified.

The revised reference design has been developed to avoid the need to permanently divert watercourses, as defined and mapped under the Water Act. Two drainage features (not mapped watercourses under the Water Act) defined as waterways under the Fisheries Act are expected to require diversion.

Without adequate management controls, Project works have the potential to adversely impact surface water through:

- Altered water quality, principally from increased water turbidity, sedimentation or debris
- Altered water chemistry, including increased salinity
- Introduction of contaminants including fuel, oil, grease, chemicals and residual heavy metals
- Increase in rates of erosion and resultant sedimentation of waterways, where soils are exposed as a result of unsuccessful site rehabilitation.

The interim site-specific water quality objectives (WQOs) were developed as a tool for identifying potential impacts arising from construction activities. While each stream crossing location was not assessed for water quality values, it was considered that the values presented within this report provide a reasonable indication of water quality across key stream crossing locations along the proposed footprint. A review of historic and field water quality data identified that surface waters within the surface water impact assessment area do not currently achieve all WQOs for the protection of aquatic ecosystems within each basin. The interim WQOs will be supplemented by additional water quality sampling before commencement of construction to allow for full determination of WQOs.

5.6.2 Proposed mitigation measures

Management and mitigation measures for impacts to surface water quality include:

- Continuation of the baseline surface water monitoring as part of the surface water monitoring program
- Developing the detailed design ensure that the potential for diversion of watercourses and waterways is minimised
- Minimise potential impacts to riparian vegetation, and in-stream flora and habitats
- Minimise impacts to bed, banks and environmental flows through bridge and waterway crossing design

- Wherever a potential salinity risk is identified, the following design management measures will be implemented:
  - temporary earthworks and permanent landform for the Project are designed to avoid unwanted water ponding. This objective will be achieved through surface levelling and use of cross-drainage and longitudinal drains within the rail corridor.
  - design water retention structures, such as sediment basins, to prevent downward leakage of water, with the use of lining or similar.
- Where possible, avoiding the need for diversions or alterations to water resources. The Project CEMP will include management plans to mitigate surface water impacts during and after construction, including:
  - Surface Water Management Plan
  - Erosion and Sediment Control Plan
  - Rehabilitation and Landscaping Management Plan
- The construction water requirements (e.g. volumes, quality, demand curves, approvals requirements and timing) will be confirmed through the construction approach refinement process and will be documented in a Construction Water Plan
- Where the dewatering of excavations (e.g. trenches and pier holes) is required, discharge water will need to meet the established WQO for receiving waterways before being released/discharged into local waterways
- Where applicable, consultation will occur with downstream landowners assessed as at risk from the Project (e.g. where the Project may impact on instream or overland flow).

5.7 Flooding and geomorphology

5.7.1 Existing environment and potential impacts

The Project alignment crosses several major waterways, with the key waterways being the Macintyre River, Macintyre Brook, Condamine River and Gowrie Creek. Other major creek crossings include Pariagara Creek, Cattle Creek, Native Dog Creek, Bringalily Creek, Nicol Creek, Back Creek, Westbrook Creek and Dry Creek. Detailed hydrologic and hydraulic assessments have been undertaken due to the catchment sizes and substantial floodplain flows associated with each of these watercourses. The resulting assessment outcomes relative to the Project design criteria have been incorporated into the revised reference design.

Flooding in the vicinity of the Project alignment occurs through two mechanisms, or a combination of both mechanisms, being:

- Rainfall over the upstream waterway catchment areas
- Backwater from downstream major systems.

The Project is located within the eastern uplands and the landscape comprises four regional geomorphic landform types that have distinctive topography and geology. The Australian Government established an Expert Flood Panel to review flood modelling and designs for Inland Rail in Queensland, ensuring they meet national guidelines and industry best practice. Independent of ARTC, the panel assessed hydrologic and hydraulic modelling for key catchments along the Project alignment, and worked with ARTC to address concerns through additional technical data and sensitivity testing. The panel's final report, released in October 2022, confirmed ARTC's modelling as "fit for purpose" for the EIS and future detailed design, upon implementing the recommended actions. The Australian and Queensland Governments accepted the findings, and a process has been agreed upon to implement recommendations, including ongoing expert review. Flood Impact Objectives (FIOs) were developed in consultation with the panel to identify and mitigate potential adverse impacts. A detailed issues management register outlines ARTC's responses and is included in the revised draft EIS.

The potential flooding impacts associated with the construction works including temporary Project facilities, such as Whetstone MDC, borrow pits and laydown areas, as well as those arising from the operations stage of the Project, are summarised as follows:

- Changes in peak water levels and associated areas of inundation
- Increased velocities directly adjacent the Project alignment causing localised scour and erosion on the floodplain
- Changes in time of inundation, and subsequent impacts to the design life of existing assets and the viability and tolerance of crops
- Increased depth multiplied by velocity combination leading to higher flood hazard
- Increased depth of water affecting trafficability of roads and tracks
- Risk to downstream population due to rail embankment failure during extreme flood event
- Impacts to effectiveness of emergency services response during and after flood events
- Concentration of flows, redirection of flows or changes to flood flow patterns.

The potential impacts associated with geomorphic processes in the pre-construction activities and early works and construction works stage are:

- Increased erosion due to vegetation clearance of sites and access track development
- Increased erosion due to disturbance of the soil surface and the creation of infiltration and erosion pathways
- Potential blockage of drainage pathways from improperly designed site layout and/or storage areas
- Sediment transport causing infilling/deposition of sediment within drainage infrastructure, reducing capacity.

The potential impacts associated with geomorphic processes in the operations stage are:

- Watercourse:
  - erosion
  - deposition
  - channel-type change
  - channel planform change
- Floodplains:
  - erosion
  - deposition
  - floodplain connectivity.

5.7.2 Proposed mitigation measures

Management and mitigation measures for impacts to flooding and geomorphology cover further design development, construction and operations stages:

- Design modifications during the detailed design stage will be subject to further flood modelling, to minimise the risk of adverse flood impacts, having regard to the FIOs for the Project developed in consultation with the Expert Flood Panel
- The detailed design phase will utilise the Flood and Geomorphic Impacts Mitigation Framework to assess and minimise the FIO impacts in development of the preferred detailed design solution for events up to and including the 1% AEP (without climate change) for land, receptors and infrastructure
- The geomorphology assessment identified locations at high risk of alterations to existing flooding regime and geomorphic processes from Project infrastructure. Several mitigation measures to include in detailed design were identified as part of the geomorphology assessment, including the relocation of bridge abutments in some areas to avoid high-energy flood flow paths.

- Scour protection measures will be designed in accordance with *Guide to Road Design Part 5B: Drainage—Open Channels, Culverts and Floodways* (Austroads, 2013) and have been included around culvert entrances and exits where the design 1% AEP event exceed the allowable soil velocities or where velocity FIO exceedances occur to avoid erosion
- The design requirements for augmentation of the existing Yelarbon levee will be confirmed through further consultation with GRC and incorporated into the detailed design.
- Impacts will be determined at all drainage structures and waterways affected by construction works via completion of Flood Risk Assessments against temporary works
- Construction tasks will be scheduled to minimise, where reasonable and practicable, bulk earthwork activities within the 1% AEP extent during periods of elevated flood risk
- During operation, inspections will be carried out on waterway and drainage systems and erosion at prescribed intervals, with frequency to be determined by ARTC during the detailed design stage
- Application of the *ARTC Emergency Management* (ARTC, 2024) and *Inland Rail Border to Gowrie Flood Emergency Response Plan* including coordination with the relevant local council and local disaster management group in the operations stage of the Project.

The hydrologic and flooding assessment undertaken to the acceptance of the Independent International Panel for Flood Studies of Inland Rail in Queensland (the Expert Flood Panel) has demonstrated that the Project is predicted to result in impacts on the existing flooding regime that generally comply with the FIOs. A comprehensive consultation exercise has been undertaken to provide the community with detailed information and certainty around the flood modelling and the Project design.

Throughout the detailed design, construction works and operations stages of the Project, ARTC will continue to work with:

- Landowners concerned with flooding and geomorphology
- Directly impacted landowners affected by the alignment
- Local governments, State government agencies and suitably qualified and experienced hydrologist and soils specialist's knowledge of site conditions.

5.8 Groundwater

5.8.1 Existing environment and potential impacts

Potential impacts related to groundwater for the Project are considered minor and temporary in nature, associated with the construction works stage of the Project.

In the few deep-cut locations where construction activities have the potential to intersect groundwater, modelling has predicted impacts to be localised within the Project footprint. Best practice engineered controls will be utilised at deep-cut locations where groundwater is intercepted to minimise the extent and duration of disturbance to groundwater resources and ensuring structurally sound construction sites. All potential impacts on groundwater resources are localised and not expected to extend outside the Project footprint, and are manageable with the implementation of the mitigation measures.

The four main hydrostratigraphic units present within the groundwater impact assessment area that are relevant to the Project are:

- Cainozoic to recent alluvial/colluvial sediments (Quaternary/Tertiary) of shallow alluvial systems along river valleys (Border Rivers and Condamine River alluvial units)
- Tertiary Main Range Volcanics, fractured basalt aquifers in the eastern portion of the Project
- Jurassic to Cretaceous-age Kumbarilla beds
- Jurassic-age Walloon Coal Measures.

These are part of the larger Great Artesian Basin and have potential to be sensitive to impacts from Project activities.

A search of registered groundwater bores within the groundwater impact assessment area identified a total of 526 registered bores. Of the 526 registered bores, 197 were excluded from further evaluation in the revised draft EIS due to no data being available on aquifer, quality or bore construction attribute details.

Analysis of water entitlements within the groundwater impact assessment area indicates that irrigation is the primary groundwater entitlement licence purpose, followed by 'any', 'stock', 'town water' and 'industrial'.

There are no high potential aquatic groundwater dependent ecosystems located within 5 km of the Project alignment.

Construction for the Project includes several activities that have the potential to impact on groundwater resources. These activities include site preparation, bulk earthworks (cut-and-fill sections), drainage construction, haul road and access track construction, bridge pilings, and the excavation of borrow pits for construction materials.

In addition, other Project activities that have potential to impact on groundwater resources via:

- Site clearing and grading
- Loss or damage to existing groundwater bores, including restriction of access
- Drawdown due to seepage
- Ground settlement
- Construction of new fill embankments
- Altered aquifer characteristics, groundwater flow or chemistry or reduction in groundwater resources from bridges and pilings
- Water supply sourced from bores
- Dewatering
- Contamination/accidental discharge
- Acid rock drainage
- Disturbance to potential ASS
- Mounding of groundwater can result due to long-term surface loading of alluvial soils from embankments and other construction activities.

5.8.2 Proposed mitigation measures

Management and mitigation measures for impacts to groundwater resources include:

- A Groundwater Management and Monitoring Program (GMMP) will be developed to provide an ongoing assessment of the Project impacts during construction
- Further geotechnical and hydrogeological investigations will be undertaken in parallel to the detailed design process to ensure site-specific geotechnical and groundwater conditions are reflected in the finalised design
- Predictive numerical modelling will be re-run during detailed design using additional information obtained from further geotechnical and hydrogeological investigations, in addition to finalised cut dimensions to better understand seepage estimates and groundwater level variation resultant from cuts
- Where a groundwater bore is expected to be decommissioned or have access to it impaired as result of the Project, 'make good' measures will be developed in consultation with the affected landowner
- Construction water sources will be finalised as the construction approach is refined during the detailed design stage of the Project and will be documented as part of the Construction Water Plan
- Ongoing baseline groundwater monitoring data (e.g. levels and quality) is being undertaken at Project bores in accordance with the baseline GMMP. Upon construction of the updated groundwater monitoring network to address spatial data gaps, these bores will be incorporated into the existing baseline monitoring program.
- Excavation cutting face treatments and seepage control measures will be appropriately designed

- Groundwater level monitoring will be undertaken in accordance with the Construction GMMP to identify potential impacts to groundwater levels resulting from the Project
- To mitigate and manage groundwater quality, any suspected contaminated soils or materials will be managed in accordance with the unexpected finds protocol/procedure documented in the Contaminated Land Management Plan of the Project CEMP
- If acid rock drainage is identified during construction, seepage water from relevant deep cuts will be sampled at weekly intervals to inform development of a management response
- Appropriate controls will be in place to prevent environmental incidents, including leaks and spills from refuelling activities and locomotive operations, and to protect the environment, including groundwater quality, in the event of an incident. All fuel and chemical spills will be managed with in a manner consistent with relevant health and safety guidelines.

5.9 Noise and vibration

5.9.1 Existing environment and potential impacts

The Project passes through the townships of Kurumbul, Yelarbon, Whetstone, Inglewood, Millmerran, Pampas, Brookstead, Pittsworth, and Southbrook. Outside of these towns, the alignment is within regions of agricultural lands, intensive animal production and the Whetstone and Bringalily State Forests. The landowners, residents, and natural environment of these rural and township settings can be sensitive to noise and vibration from the construction and operation of the Project.

To assess potential impacts, sensitive receptors were identified within a noise and vibration study area covering a region at least 2 km either side of the construction work areas, the proposed new and upgraded roads, and the railway corridor.

Noise and vibration surveys were undertaken in the study area during 2018, 2022 and 2023 to quantify and characterise the existing (pre-construction activities) acoustic environment at sensitive receptor locations throughout the study area. The surveys confirmed the local acoustic environment is typical of the rural setting of the Project.

To assess the noise and vibration impact of the Project, noise and vibration criteria and limits were adopted from the following transport noise management codes, and additional guidelines referenced within these codes:

- *Transport Noise Management Code of Practice Volume 1 Road Traffic Noise* (DTMR, 2013a) for the management of airborne noise from construction traffic and the new and upgraded roads associated with the Project)
- *Transport Noise Management Code of Practice Volume 2 Construction Noise and Vibration* (CoP Vol 2) (DTMR, 2023a) for the management of airborne noise and vibration from construction activities
- *Interim Guideline Operational Railway Noise and Vibration, Government Supported Infrastructure* (DTMR, 2019c) for the management of airborne noise, ground borne noise and vibration from railway operations.

The potential levels of noise and vibration were predicted for the construction activities and railway operations that would generate the typical worst-case noise and vibration impacts. The assessment of noise associated with the construction of the Project indicates exceedances of CoP Vol 2 standard and non-standard hours external noise limits at sensitive receptors at various stages of the construction program. The assessment identified the management, and mitigation measures the Project is likely to be required to reduce noise and vibration levels to meet adopted criteria and minimise impacts, where reasonable and practicable.

The potential impacts during construction will be temporary as the works progress along the Project alignment and the worst-case noise and vibration levels that form the basis of the assessment will not be experienced at all locations for the full schedule of construction. Furthermore, due to the remote nature of a large proportion of the Project, there are substantial regions of the construction works that are a sufficient distance from sensitive land uses and receptors to minimise the potential for noise impacts in these areas.

Noise from road traffic during the construction of the Project will need to be included as part of the construction noise management measures to reduce the potential impacts from the temporary increase in road traffic on local roads. The new and upgraded roads within the Project scope require a review of reasonable and practicable mitigation measures to reduce overall road traffic noise.

Noise and vibration from railway operations on the Project were assessed for the opening year of the Project and the design year 2040. Potential sleep disturbance impacts have also been assessed for the design year 2040. The railway operations include the existing rail traffic and the new (additional) intermodal freight services that will be introduced by Inland Rail.

Noise from railway operations will be infrequent and only occur when trains are passing in the immediate local area. Once a train has passed through, there will be no further railway noise until the next train is scheduled. Based on the year 2040 peak train movements for the Project, this could equate to approximately one train per hour.

A combination of the Project design and the separation distance from the alignment results in the railway noise levels meeting the assessment criteria at the majority of sensitive receptors.

Under the typical worst-case design year 2040 train movements scenario, an assessment of potential (unmitigated) rail noise levels at sensitive receptors indicated the noise criteria from DTMR's Interim Guideline, *Operational Railway Noise and Vibration: Government Supported Transport Infrastructure* (Interim Guideline) (DTMR, 2019c), are achieved at the majority of the sensitive receptors; however, there are 97 sensitive receptors (82 residential receptors and 15 non-residential receptors) where noise levels trigger a review of mitigation.

Also under the typical worst-case design year 2040 train movements scenario, the potential sleep disturbance impacts from (unmitigated) rail noise have been assessed based on the Australian Government's Department of Health publication, *The Health Effects of Environmental Noise, 2018* (enHEALTH, 2018). The results of the sleep disturbance assessment are that 169 dwellings are predicted to exceed the threshold, of which 82 residential receptors are also predicted to exceed the Interim Guideline criteria as described.

The railway operations assessment determined that noise mitigation will be required to reduce railway noise levels where sensitive receptors are located near to the alignment. The Project will implement reasonable and practicable mitigation measures to reduce and control noise and vibration emissions.

Concept railway noise barriers were investigated, and found to be effective at reducing noise, at the towns of Kurumbul, Yelarbon, Pampas, Brookstead, Pittsworth, and Gowrie. Through the application of the assessed concept noise barriers for the design year (2040), over half the residential receptors exceeding the noise criteria for the Project were mitigated to achieve the criteria. A total of 82 residential exceedances was reduced to 38 exceedances with the inclusion of the concept noise barriers at six locations along the rail alignment.

Noise mitigation is also expected to include at-property treatments to buildings, or at-property upgrades to existing property boundary fencing to reduce railway noise at individual sensitive receptors along the alignment.

Vibration and ground-borne noise from railway operations are expected to be within the assessment criteria at the sensitive receptors and may not require the implementation of additional measures to reduce vibration levels. Noise and vibration from railway operations will continue to be assessed during the future stages of the Project. ARTC will continue to engage with the communities and stakeholders to discuss the predicted railway noise and vibration levels and measures to ameliorate potential impacts.

A literature review study has been undertaken into the effects of railway noise on domestic livestock and intensive animal operations. The review determined thresholds where responses such as disturbance and behavioural changes in livestock could occur from discrete noise events. The assessment concluded that, except where the route traverses through or is immediately adjacent to intensive animal operations, the railway noise levels are expected to be below the thresholds for impacts to livestock. ARTC will continue to consult with landowners that may be affected where the intensive animal operations noise target level may be triggered.

5.9.2 Proposed mitigation measures

Noise and vibration levels will continue to be assessed, and mitigation measures will be verified during detailed design and construction. Monitoring will be conducted during construction and after the Project's operation, with findings used to confirm noise and vibration levels at sensitive receptors and to refine mitigation strategies.

The Project is committed to best practice and innovation, where practicable, in addressing noise and vibration impacts. Where Performance Criteria indicate exceedances, management measures will align with relevant codes of practice, policies, and guidelines, ensuring compliance with approval conditions and the pursuit of feasible best practices.

Management and mitigation measures for impacts to noise and vibration include:

Detailed design

- ARTC will primarily seek to control noise and vibration at source, and through measures implemented within railway lands, for example railway noise barriers. Where these measures are not feasible or not fully effective, at-property treatments to receptor properties to reduce the intrusion of noise will be provided
- At-Property treatment as noise-control measures may include:
  - architectural property and construction treatments subject to an inspection of each individual property to confirm its suitability for the implementation of noise-control treatments
  - upgrading existing property fencing subject to landowner consultation
  - relocation of property assessed on a case-by-case basis subject to assessment to ensure there would be a notable improvement to the noise environment at the relocation site
- Railway noise walls or barriers at a number of locations including Kurumbul, Yelarbon, Brookstead, Pittsworth, and Gowrie are proposed to mitigate railway noise at groups of sensitive receptors adjacent to the alignment
- Where practicable, use soft-tone warning bells at level crossings will be used to reduce maximum noise levels from the alarm bells in proximity to sensitive receptors
- Investigate the potential for the application of rail dampers on sections of generally straight track that would not be highly susceptible to prominent or regular wear
- Undertake a structural survey of sites of heritage significance if they are retained and situated within close proximity of the outer rail of the detailed design. Where the surveys verify a site is of clear risk of structural damage, specific measures to reduce railway induced vibration and/or potential impacts to the structure will be developed in consultation with heritage specialists and the asset/ landowner owners.
- To inform the management of vibration, building condition/dilapidation surveys will be reviewed during the detailed design.

Construction

- Development of a Noise and Vibration Management Plan (NVMP) as a component of the Project CEMP. The NVMP will provide a structured approach to the management of environmental issues during the delivery of the Project, with the objective of supporting delivery of the Project in a manner that maintains human health and wellbeing including ensuring a suitable acoustic environment, so the characteristic activities of land use are not unduly disturbed, and the health and biodiversity of ecosystems are protected. The CEMP will be developed by ARTC and endorsed by the Environmental Monitor consistent with the Draft Outline EMP, Conditions of Approval, and all relevant laws, prior to the commencement of any relevant Project works. The NVMP will detail the specific management and mitigation measures to control noise and vibration during construction works.
- During the construction phase, residual impacts will be managed through additional measures outlined in the EIS, such as respite periods, temporary relocations, and architectural treatments.

Operations

- ARTC will monitor operational rail noise and associated noise attenuation measures and consult with sensitive receptors. Corrective actions will be undertaken, where appropriate.

5.10 Social

A social impact assessment (SIA) was undertaken to identify how the Project may affect local and regional communities and inform how ARTC will work with stakeholders to manage and mitigate the identified social impacts while enhancing Project benefits.

The revision of the SIA included an engagement process designed to ensure the involvement of a broad range of stakeholders. SIA engagement activities were integrated with the Project's overall engagement process for the revised draft EIS, including participation in community information sessions throughout the SIA study area, and in ARTC's Southern Darling Downs Community Consultative Committee (CCC) and Inner Darling Downs CCC meetings. Additional SIA-specific stakeholder engagement included a community survey, workshops, meetings and interviews.

5.10.1 Social benefits, opportunities and impacts

The SIA has identified that the Project would result in social benefits, primarily in relation to employment, training and business supply opportunities for residents in the SIA impact assessment area.

Without appropriate mitigation strategies, however, the Project has potential to result in social impacts, including:

Construction

- Relocation of households due to land acquisition
- Concern related to property acquisition discussions and/or fears about Project impacts on property use and amenity, environmental qualities, or potential for changes to flooding risks
- Impacts on the use and management of agricultural land, including severance
- Construction activities impacts on the amenity of residents, sensitive receivers and businesses
- Community cohesion may be reduced through temporary construction arrangements, displacement of resident and the presence of non-resident workforces
- Potential to affect Aboriginal cultural landscapes or heritage values, by adding additional infrastructure to the natural and rural landscapes, potentially affecting feelings of connection to Country

Operation

- Level crossings resulting in periodic disruptions to traffic and delay emergency vehicles
- Social impacts for individuals, families, communities and rail staff associated with any increased risk of road/rail accidents and rail fatalities.

Further impacts are identified and addressed in the SIA.

5.10.2 Proposed mitigation measures

The SIA includes a social impact management plan (SIMP), which outlines the objectives, outcomes and measures for mitigation of social impacts. Measures intended to enhance Project benefits and opportunities are also provided. Management sub-plans within the SIMP include:

- Community and stakeholder engagement
- Workforce management
- Housing and accommodation
- Health and community wellbeing
- Local business and industry content.

These SIMP sub-plans provide the objectives, outcomes and measures of social impacts including how the Project will communicate and engage with the community, maximise training and employment opportunities, manage impacts on housing and accommodation, and other impacts on community facilities, services and community wellbeing as well as impacts on businesses including agribusiness and tourism.

ARTC will provide full, fair and reasonable opportunities for capable local businesses (within the Goondiwindi and Toowoomba LGAs and nearby LGAs) and Indigenous businesses to compete and participate in the Project's supply chain. An Australian Industry Participation Plan will be prepared to support opportunities for businesses to supply the Project. This will include capacity building programs for local and Indigenous businesses to be delivered as part of the Australian Industry Participation Plan and within the Inland Rail Skills Academy.

A monitoring strategy that will enable the Project to report on the delivery and effectiveness of the SIMP is also provided.

5.11 Economics

The economic impact assessment focused on the specific economic impacts resulting from the construction and operation of the Project; however, the assessment acknowledges the role of the Project, and the remaining Inland Rail project links, in collectively delivering the benefits of Inland Rail. In its entirety, Inland Rail will enhance Australia's existing national rail network and serve the interstate freight market. The *Inland Rail Programme Business Case* (ARTC, 2015a) identified the key economic impacts of Inland Rail including:

- Lower prices for consumers as a result of lower inter-capital freight transport costs, which reduces the cost of living for households
- Positive direct net economic benefits, driven by improvements in freight productivity, reliability and availability, and benefits to the community from reduced environmental externalities, reduced road congestion and improved safety benefits
- Economic growth is increased profits (for industries and producers where inter-capital freight is an input or output) and incomes are multiplied through the economy
- The Inland Rail Program is anticipated to deliver a net positive impact of $16 billion on Gross Domestic Product ($2015) over its 10-year construction period and 50 years of operation
- Nationally, Inland Rail is also expected to deliver significant jobs creation during construction and operation
- In Queensland, 332 direct and indirect jobs will be generated on average each year for Darling Downs–Maranoa and 107 jobs for the rest of Queensland
- Enhanced competition between rail and road freight, by providing a credible transport alternative, which will drive further innovation and efficiency
- Potential to promote the expansion and development of freight precincts around Inland Rail terminals as a result of the benefits from co-location and clustering of industries (as a result of reduced transport costs to warehousing, economies of scale and knowledge-sharing opportunities).

The economic benefits assessment estimates that the Project is expected to provide a total of $703.26 million ($2022 present value terms) in incremental benefits to society. These benefits result from improvements in freight productivity, reliability and availability, and benefits to the community from crash reductions, reduced environmental externalities and road decongestion benefits.

The Project will promote regional economic growth across the Darling Downs–Maranoa region. Over the construction works stage, real Gross Regional Product is projected to be $410 million higher than the baseline level for Darling Downs–Maranoa region.

At a local level, the Project will support regional economic development through opportunities for local and regional employment, businesses and industries:

- The Project offers opportunities to encourage, develop and grow Indigenous, local, and regional businesses through the supply of resources and materials for the construction and operation of the Project (e.g. borrow and ballast materials, fencing, electrical installation (excluding rail systems) and instrumentation, rehabilitation and landscaping and transportation).
- The Project offers opportunities in secondary service and supply industries (such as retail, hospitality and other support services) for businesses in close proximity to the construction footprint.

- As part of the Inland Rail Program, the Project has the potential to stimulate business and industry development at the Toowoomba Enterprise Hub in Wellcamp. By providing efficient transport access to intrastate and interstate markets, the Project has the potential to act as a catalyst for further private-sector investment in this area, particularly for freight and logistics operations. The further development of the Toowoomba Enterprise Hub has the potential to unlock greater economic activity in the region, such as by promoting greater international export opportunities via Wellcamp Airport.

The Project alignment has been designed to minimise impacts on local business and industry; however, the Project may result in the disruption of the agriculture and tourism industries through:

- The loss of agricultural land (through disturbance, acquisition, or sterilisation by the permanent disturbance footprint), disruption to farm management, or changes in accessibility or connectivity to the market. This may negatively impact the productive capacity and total economic value-add from the local agricultural industry. Based on the proportion of productive agricultural land lost, it is estimated that the Project could result in a loss of $1.20 million (value foregone) in gross agricultural production per year.
- ARTC will work with individual landowners to develop suitable management solutions based on individual farm management practices to mitigate and manage the direct impacts on individual farm properties.
- Changes to the amenity of, or connectivity to, local landscape attractions. ARTC will work with tourism associations to ensure that generalised impacts on tourism values are reduced wherever possible.

ARTC is committed to capturing the economic benefits of the Project, while avoiding, mitigating or managing any adverse economic impacts. Accordingly, there is a range of actions that ARTC will undertake to manage the social and socio-economic impacts of the Project and enhance Project benefits and opportunities.

5.12 Cultural heritage

5.12.1 Existing environment and potential impacts

5.12.1.1 Indigenous cultural heritage

ARTC has three approved and registered Cultural Heritage Management Plans (CHMPs) with the Bigambul People, Endorsed Party s35(7) and Western Wakka Wakka People under the *Aboriginal Cultural Heritage Act 2003* (Qld) (ACH Act). Approved CHMPs developed with relevant Aboriginal Parties cover the construction of new rail infrastructure and associated structures for the Inland Rail Program, as well as operation and maintenance of the rail corridor to be managed by ARTC. CHMPs will not extend to activities performed by Queensland Rail (QR).

There are numerous reported Indigenous cultural heritage sites within 1 km of the Project footprint. The majority of these sites are artefact scatters, with the remainder being scarred/carved trees, object collections, a shell midden, Aboriginal Intangible Places and burials.

Indigenous cultural heritage will be protected and managed through development of mitigation strategies after completion of relevant survey undertaken in consultation with Traditional Owners in accordance with the terms and conditions of the relevant CHMP.

5.12.1.2 Non-Indigenous cultural heritage

The assessment of non-Indigenous heritage values and impacts has used a combination of register searches and historical and archival research to identify areas of high cultural heritage potential within 1 km of the Project footprint. Through this process, 41 Areas of Interest (AOI) were identified and assessed against standard significance criteria. Following this assessment, potential direct and indirect impacts to non-Indigenous heritage values were established.

A review of the relevant Australian Government, State and local heritage registers was completed to identify previously registered heritage and archaeological sites within 1 km of the Project footprint. An assessment of heritage significance was undertaken against standard criteria as defined in the *Queensland Heritage Act 1992* (Qld) (QHA). The QHA prescribes eight criteria that may be used to measure the heritage value of a place and determine its significance. A place need only fulfil one of these criteria to be considered to be of heritage significance. Following inspection, it was determined that 22 of the AOI meet the criteria for local heritage significance.

Potential Project impacts on heritage places were assessed using International Council on Monuments and Sites standard guidelines (2011) both before (initial significance) and after the implementation of mitigation measures (residual significance). The assessment found that, with appropriate measure measures, Project impacts would be reduced to moderate for one heritage place (Green Hills Hotel complex), and neutral or slight for the remainder of potentially impacted sites.

5.12.2 Proposed mitigation measures

Management and mitigation measures for impacts to cultural heritage include:

Overarching

- A Heritage Management Plan (as a component of the CEMP) will be developed during detailed design for the Project, and will detail mitigation and management measures to be implemented during construction in relation to cultural heritage. The Heritage Management Plan will be separate to the Indigenous CHMP for the Project and will relate to all heritage aspects of importance to all stakeholders. Design will be developed and refined in response to the outcomes of additional heritage surveys undertaken through the detailed design stage to avoid direct impacts to identified items or sites of Indigenous, historic and natural heritage significance, where possible and practical
- Clearing extents/site boundary/limit of works are consistent with the detailed design requirements and marked with flagging or marking tape, signage or other suitable means to delineate ‘no-go areas’
- Further surveys will be conducted during detailed design ahead of ground-disturbing works where sections of original rail infrastructure may be impacted
- Temporary protective barricading will be installed around heritage places or artefacts that are located within 20 m of the Project footprint and are to be retained for the construction works stage. These areas will be established as ‘no-go areas’ and mapped on all Project plans.
- If a suspected Indigenous or historic heritage item or site is identified, any works that may impact the item or site will stop, and the Unexpected Finds Procedure.

Indigenous

- The proposed locations of additional components that are outside of the Project description will be subject to assessment in accordance with the requirements of the relevant CHMP and the ACH Act
- Impacts to Indigenous heritage will be managed through the CHMPs, in accordance with the ACH Act, which includes management measures for cultural heritage inductions for Project staff, cultural heritage awareness programs and provisions for managing unexpected finds of objects or places of Indigenous significance
- Impacts to previously unregistered and unassessed items or places of cultural heritage significance will be managed in accordance with the CHMP
- Where practicable, surface disturbance will be contained to areas that have been previously surveyed for cultural heritage.

Non-Indigenous

- Additional archaeological survey of heritage sites that are complexes within the Project footprint will be undertaken to map elements and identify areas of possible subsurface deposit
- Archival photographic recording of sites/places that will be directly impacted by the Project
- Areas of rail heritage potential which have not been previously assessed will be surveyed ahead of construction works

- A Heritage Interpretation Plan will be prepared by ARTC to promote the heritage values of the temporary footprint
- Pre-construction and post-construction condition/dilapidation surveys will be undertaken at all heritage places at risk of vibration impact
- If warranted by results of archaeological survey, archaeologists will monitor ground-breaking works to identify any subsurface deposits
- Damage to heritage structures will be repaired in a way that seeks to conserve the heritage values of the place
- Where significant impact to heritage elements cannot be otherwise avoided, relocation of buildings or items of moveable heritage may be appropriate
- Vibration will be monitored at heritage places where exceedances of 2.5 mm per second are possible.

5.13 Traffic, transport and access

5.13.1 Existing environment and potential impacts

The traffic, transport and access assessment evaluated the traffic, transport and access impacts of the Project on the surrounding transport infrastructure, including the potential road impacts from the movement of materials, workforce and equipment during construction works and operations stages of the Project on the surrounding road network. The *Guide to Traffic Impact Assessment* (DTMR, 2017d) provided guidance on the conditions for determining the spatial extent for the Traffic Impact Assessment based on required mitigation measures. Key findings of the Traffic Impact Assessment are:

- The Project alignment crosses 7 State-controlled roads (SCR) at 10 locations and 55 local government roads (LGR) managed by the GRC and TRC. SCR are expected to experience construction traffic that exceeds 5 per cent of the background traffic.
- Seventy-six LGR are expected to experience construction traffic that exceeds 5 per cent of the background traffic, with 29 of these roads in the Goondiwindi LGA and 44 in the Toowoomba LGA. Impacts to many of these roads are expected to be minimal as the high percentage of construction traffic is a function of low existing traffic volumes.
- Based on the level of service comparison, it is not expected that the Project would generate the need to upgrade the road network for these temporary construction activities; however, the routes will be reviewed in the preparation of a Traffic Management Plan (TMP) from a physical and safety perspective prior to the commencement of construction activities to ensure they are suitable.
- Intersection analysis has identified 10 locations where the addition of construction traffic warrants right-turn treatments. The analysis also identified 37 locations currently warrant upgrades to the right turn treatments to maintain operational safety; however, these are required regardless of the addition of construction related activities.
- Intersection analysis has identified four locations where the addition of construction traffic warrants left-turn treatments. The analysis also identified 32 other locations currently warrant upgrades to the right-turn treatments to maintain operational safety; however, these are required regardless of the addition of construction related activities.
- The findings of the pavement impact assessment show that 12 SCR and 71 LGR are likely to cross the 5 per cent Standard Axel Repetitions threshold, with several road segments exceeding this threshold by a significant margin. Detailed pavement design life assessments will be carried out prior to the commencement of construction, in consultation with DTMR, once specific construction routes are agreed in the next stage of the Project.
- Sixteen cycle routes are identified in Queensland and NSW that might be impacted by construction traffic. Some of the proposed construction routes are aligned through areas of moderate to high pedestrian activity through the areas surrounding the towns of Yelarbon, Inglewood, Millmerran, Brookstead, Pittsworth and Toowoomba. While increased heavy vehicle movements through these locations may adversely impact pedestrian movements, the majority of these routes currently facilitate a high proportion of heavy vehicle movements.

- Five public transport services have been identified with routes that are proposed to be used, in part, by construction traffic for the Project. Low increase in construction traffic comparatively to background traffic, is considered unlikely that increased journey times would be experienced on those public transport services as a consequence of construction traffic for the Project. No public transport routes directly intersect with the Project alignment.
- Thirty existing school bus services share elements of proposed construction routes for the Project. During the construction works stage, ARTC and its construction contractor should collaborate with Brookstead State School other stakeholders, such as DTMR and TRC, to address and mitigate construction impacts, especially those affecting school zone access and the operation of the S118 bus service. Specific mitigations will be further examined and determined during the detailed design and construction works stage and will be documented as part of the TMP.
- Thirteen existing long-distance coach services share elements of proposed construction routes for the Project. Where possible, the contractor will avoid use of impacts coach service routes and consider the operations of long-distance bus routes in the preparation of the TMP.
- The Project interfaces with the State stock route network in multiple locations. The revised reference design for the Project has, in all instances, maintained access and connectivity for stock route users.
- In relation to rail operational traffic and maintenance processes, rail operational traffic volumes are likely to be negligible, with no envisaged impact to operational conditions of the surrounding road networks.

5.13.2 Proposed mitigation measures

Design solutions for avoiding, minimising or mitigating impacts have been incorporated into the revised reference design as appropriate and where possible. Where mitigation measures could not be incorporated into the revised reference design, the following management and mitigation measures will be adopted:

- Road safety audits will be undertaken at the level crossings pre and post construction in accordance with the Austroads guidelines
- Level crossings will be reviewed to confirm that the level of protection continues to be appropriate, and the infrastructure is appropriate for the traffic conditions
- Once a contractor is appointed, consultation between the contractor, ARTC, local councils and DTMR regarding the provision of road impact assessments and road safety audits for all impacted roads will be required
- Property-specific management agreements will be developed in consultation with landowners for suitable private property access
- Consultation with Toowoomba and Goondiwindi Local Disaster Management Groups, in addition to Queensland Police Service, Queensland Ambulance Service, Queensland Fire and Emergency Services, District Disaster Management group and new Emergency Services Working Group will continue through the detailed design process
- Traffic management arrangements for construction sites, laydown areas or non-resident workforce accommodation requiring access directly off/onto a SCR, will be negotiated with and approved by DTMR
- Temporary road works, including diversion and signage, will be in accordance with the *Queensland Manual of Uniform Traffic Control Devices Part 3: Traffic Control Works on Roads* (DTMR, 2019b) and the *Traffic and Road Use Management Manual: Volume 7 Road Works* (DTMR, 2012g)
- A TMP will be developed by the contractor in consultation with DTMR, relevant local councils, an accredited road safety auditor and, where relevant, QR
- A Road Use Management Plan will be prepared in accordance with the *Guide to Traffic Impact Assessment* (DTMR, 2017d), to support works to the existing road network
- Continued consultation will occur with QR to confirm interconnectivity and interoperability details of the Inland Rail network with existing railway network and the construction approach for the Project within existing rail corridors
- Physical controls, such as boom gates and/or warning lights, will be incorporated into the design at active level crossing locations

- Pavement conditions assessment will be conducted prior and post construction activities as well as ongoing intervals during construction, with intervals developed in consultation with local councils prior to commencement of construction
- For unsealed local government roads, a visual condition will be conducted prior to and post construction activities
- The use of an approved Maintenance Contractor to maintain impacted road for the duration of the construction period, including crack sealing, pothole patching, edge repairs, resealing, and grading of gravel roads as needed
- Construction speed limits will apply to all unsealed routes used by construction vehicles, with applicable speed limits determined through consultation with the relevant local council and documented in the TMP
- Appropriate operational controls, such as maintaining safety treatments for passive and active level crossings (including sight lines) by conducting routine inspections of crossing infrastructure will be undertaken
- Railway safety messages will be provided to the community through awareness activities, community engagement activities, and campaigns to increase public awareness regarding the Project. Fact sheets and guidelines will also be made available to provide guidance to the community regarding safety around level crossings.

5.14 Hazard and risk

5.14.1 Potential impacts

The hazards and risks associated with the Project works have been assessed to identify the potential for impacts to people, property and the environment. An assessment has identified potential incidents related to:

- Bushfire
- Flooding
- Climatic conditions
- Landslide, sudden subsidence, movement of soil or rocks
- Fatigue and heat stress
- Contaminated land
- Rail incidents
- Road–rail interface
- Existing infrastructure and utilities
- Bridges
- Emergency access
- Freight dangerous goods

5.14.2 Proposed mitigation measures

The implementation of ARTC risk management policies and procedures will effectively manage the risks associated with the Project. Opportunities to further reduce the level of risk will be investigated in the future delivery stages of the Project through the application of the hierarchy of controls (i.e. elimination, substitution, engineering controls, administrative controls and personal protective equipment).

5.15 Waste and resource management

5.15.1 Potential impacts

Construction and maintenance activities for the Project are expected to result in the production of various waste streams. These waste streams include commercial and industrial, construction and demotion, general waste, green waste, recyclable wastes and regulated wastes.

Balancing of the cut-and-fill volumes for the Project may result in a deficit of bulk earthworks material, depending on adjustments made during detailed design, and the feasibility and success of material treatment options. The fill deficit for the Project will be met through the importation of appropriate material type from operational licenced quarries or from borrow pits established for the Project.

The proximity of existing waste-management facilities to the Project has been considered based on a haul route distance of 50 km for bulk waste and TRC/GRC areas for municipal waste, collected in domestic collection vehicles. Established waste-management facilities in proximity to the Project are located in Toowoomba, Inglewood, Yelarbon and Goondiwindi.

Feedback from consultation with TRC and GRC has indicated that the identified facilities that are owned and/or managed by these councils are expected to have sufficient combined capacity to accept waste materials generated by the Project, excluding Millmerran, which is projected to have landfill airspace exhausted prior to Project construction.

Project impacts that relate to waste and resource management are:

- Waste disposal, additional to current levels, resulting in increased consumption of airspace and reduction of community access to waste facilities within the region
- Uncontrolled release of waste from the improper storage or failure of management systems resulting in contamination of receiving environments (i.e. land, surface water and air)
- Increase in the incidence of vermin, insects and pests from the inappropriate storage and handling of putrescible wastes
- Reduced visual amenity of land uses adjacent to the Project
- Increased transportation of waste materials on and offsite, resulting in increased greenhouse emissions and decreased local amenity for land uses adjacent to the Project
- Risks to human health and safety of site personnel, through the release of pollutants from the poor management of regulated wastes.

5.15.2 Proposed mitigation measures

A hierarchical approach to waste management will be implemented for the Project from the most preferable, avoidance, to the least preferable, disposal. Avoidance can be achieved through development of the revised reference design for the Project, which has incorporated design solutions, where possible, to avoid, minimise and mitigate impacts.

Where mitigation measures could not be incorporated into revised reference design, the following management and mitigation measures will be adopted:

- A Waste Management Plan will be prepared
- For management and handling of hazardous materials, workers will have and/or complete training to gain appropriate skills and qualifications and in accordance with the Hazardous Materials Management Plan
- Assess and confirm opportunities for beneficial use of materials under the End or Waste (EOW) framework. If appropriate to do so, ARTC will register as a resource producer to operate under an EOW code.
- Wastes to be disposed of at appropriately licenced facilities where disposal to landfill is unavoidable
- Regulated wastes and contaminated soils or other materials must be transported and disposed in accordance with the *Environmental Protection Act 1994* (Qld) and procedures within the Waste Management Plan
- Waste-tracking documentation to be retained by the contractor for materials removed from site for disposal
- Aim to maximise the reuse of excavated material as a stabilised structural fill.

ARTC will continue to consult with relevant local governments and waste facility operators prior to the commencement of construction to confirm the Project's approach to waste disposal and spoil management.

5.16 Cumulative impacts

Projects with spatial (location) and/or temporal (timing) overlap in construction schedule can result in cumulative impacts. Technical assessments that comprise the revised draft EIS have considered existing and operational projects where they are located within the defined impact assessment area for each of the studies. Consequently, existing, operational projects have been accounted for as part of the existing environment in the impact assessment of the Project. The cumulative impact assessment considered the potential for a number of projects within a wide geographic extent to contribute to cumulative impacts, in combination with the Project.

Where the potential for cumulative impacts have been identified with other projects in the Inland Rail Program, it is proposed that these potential impacts be managed through a combination of mitigation measures proposed for the Project, in isolation, in addition to the implementation of Program-wide management measures. These will be consistent with the environmental management framework contained within the Draft Outline EMP for the Project.

ARTC will facilitate communication between the contractor/s of adjoining Inland Rail packages to collaborate on construction methodologies and the scheduling of activities to be cognisant of one another and do not exacerbate the potential impacts of a single project.

Where cumulative impacts have been identified with other projects outside of the Inland Rail Program, individual proponents will be invited to participate in the Community Reference Group established for the Project. This will provide opportunities to verify outcomes of the cumulative impact assessment and, if necessary, identify further mitigation measures which can be implemented by ARTC within their area of control.

It is proposed that monitoring be undertaken during construction of the Project that is scheduled or in response to complaints. Results obtained from these monitoring events will be compared to baseline data established during the detailed design stage of the Project. Where exceedances in adopted criteria are observed, ARTC will investigate the cause of that exceedance. If the exceedance is found to be attributed to by non-Project activities, then one of the following actions may be taken:

- If the recorded impact is contributed to by coincident short-term activities, ARTC will consult with the proponent of the contributing activity to establish a shared understanding of activities and schedules so as to avoid the future compounding of impacts
- If the recorded impact is contributed to by long-term activities by one or more developments, then additional measures may have to be implemented to mitigate impacts that are within ARTC's control. These additional measures would be bespoke to the type of impact, and the receptor(s) that is/are impacted.

6. Approach to environmental management

ARTC's system of corporate governance comprises corporate policies and core values. This governance system applies across the whole of the ARTC network, including all works associated with the Inland Rail Program.

The Inland Rail Environment and Sustainability Policy provides a framework for continual improvement of ARTC's environmental performance and sets out commitments for managing potential environmental risks.

The draft Outline Environmental Management Plan (draft Outline EMP) has been developed for the Project to:

- Provide an environmental management framework to enable the identified environmental and social outcomes to be achieved for the life of the Project, through the detailed design, pre-construction activities and early works, construction works and operations stages
- Establish the process for the preparation and implementation of the CEMP and the Operations Environmental Management Plan (Operations EMP).
- Support the refinement and implementation of the SIMP for the Project.

The draft Outline EMP will be updated following completion of the EIS process. The finalised Outline EMP will incorporate relevant approval conditions, design refinements, and detailed construction planning to inform the CEMP and Operations EMP. The detailed design will be developed with the objective of minimising potential impacts on the local and regional environment and the community in line with the Outline EMP.

The CEMP provides a structured approach to the management of environmental issues during the construction of the Project. The CEMP will be endorsed by the Environmental Monitor as being consistent with the final Outline EMP, all permit and approval conditions, and relevant legislation, standards and guidelines, prior to the commencement of any relevant Project works. The design and construction methodology would continue to be developed in a manner consistent with the Outline EMP, taking into account the input of stakeholders and the local community, and the conditions of approval.

Prior to the commencement of Project operation, an Operations EMP will be prepared consistent with the final Outline EMP, all permit and approval conditions and relevant laws, and ARTC's environmental management policies.

ARTC has adopted a comprehensive and integrated approach to ensuring that the mitigations identified within the various chapters of the revised draft EIS are implemented for each stage of the Project to which they relate. The mitigations include measurable outcomes and clear timeframes. In the event of any inconsistency between the draft Outline EMP and the revised draft EIS chapters, the draft Outline EMP will apply.

ARTC is committed to ongoing engagement with the local community and key stakeholders, and values the relationships built to date. Following Project approval, ARTC will develop a Community and Stakeholder Engagement Management Plan to guide and monitor community and stakeholder engagement activities, community feedback and to manage complaints during the construction works stage.

ARTC acknowledges that active and responsive stakeholder engagement is an ongoing process and is committed to continuing to work with the community to maintain open and responsive communication channels throughout the life of the Project.

7. Concluding statement

The Border to Gowrie Project is a critical link required to unlock the full potential of the Inland Rail network. While the full benefits of Inland Rail will only be realised once all projects are complete, the Project will play a key role in enhancing Australia's freight capacity, improving connectivity national road safety, and supporting economic growth through a modal shift from road to rail.

The Project will contribute to a more reliable, efficient, and sustainable freight network, reducing congestion on roads, improving road safety, reducing carbon emissions, and driving job creation in regional communities. By providing better access to domestic and global markets, the Project will help future-proof Australia's freight infrastructure, ensuring that it can meet the growing demand for freight services. Ultimately, the Project is a vital building block in a national freight solution that will deliver long-term benefits for Australia's economy, environment, and communities.

This revised draft EIS addresses the Coordinator-General's Terms of Reference, the submissions received during notification of the draft EIS in 2021, and the additional information requirements from the Coordinator-General following the public notification of the draft EIS. The revised reference design and additional assessments undertaken for this revised draft EIS mean that potential impacts have been avoided or reduced where possible. For those areas where the potential impacts cannot be avoided, mitigation measures will be implemented to minimise and manage those impacts.

The revised draft EIS has adopted a conservative approach to identifying the potential impacts of the Project, including cumulative impacts. Project revisions have been developed taking into account consultation with the community and key stakeholders and submissions made; however, a proposal of this scale would inevitably have some impacts on the local environment and community, particularly during construction and as a result of establishing a significant new section of freight rail corridor. Where environmental impacts have been identified through the assessment process, efforts have been made to avoid or minimise those impacts through development of the revised reference design.

Where residual impacts remain, further design refinement and mitigation measures have been proposed for implementation during the detailed design, construction works and operations stages of the Project. The detailed design for the Project would be developed with the objective of further avoiding and minimising potential impacts on the local and regional environment, and the local community. The design and construction methodology would continue to be developed with this objective in mind, taking into account the input of stakeholders and the local community, and the conditions of approval.

The Project will have some residual impacts in construction and operation. These include social, noise and vibration and traffic disruptions in some areas, some loss and degradation of flora and fauna habitat (including MNES), and changes to areas of agricultural land and the existing flooding regime. With implementation of the proposed mitigation measures set out in the Outline EMP, delivery of environmental offsets and the approach to management described in the revised draft EIS, it is concluded that the potential environmental impacts of the Project would be adequately managed and on balance is acceptable.

Overall, the Project, and the Inland Rail Program as a whole, offers a safe and sustainable solution to existing freight bottlenecks and growing pressure on existing road and rail corridors. It will better link businesses, manufacturers, and producers to both national and global markets. The Inland Rail presents opportunities for long-term economic, safety and sustainability benefits by connecting regional and urban markets to buyers in a more efficient and safer mode of transport, help keep pace with the increasing freight demands of Australia's growing population, and allow a lasting legacy of connection and opportunity for regional communities.

The Project will incorporate environmental management and design features that aim to minimise and mitigate potential impacts as far as practicable. The impacts associated with the Project works will be effectively mitigated through the implementation of best-practice management, where practicable, including implementation of the management approaches described in the draft Outline EMP and SIMP.