INLAND RAIL

Summary of findings

Calvert to Kagaru

Draft Environmental Impact Statement

ARTC

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

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.

Printed on uncoated ecostar paper. This document is uncontrolled when printed.

Front and back cover image: Flinders Peak (view from Kagaru), Scenic Rim Region, Queensland

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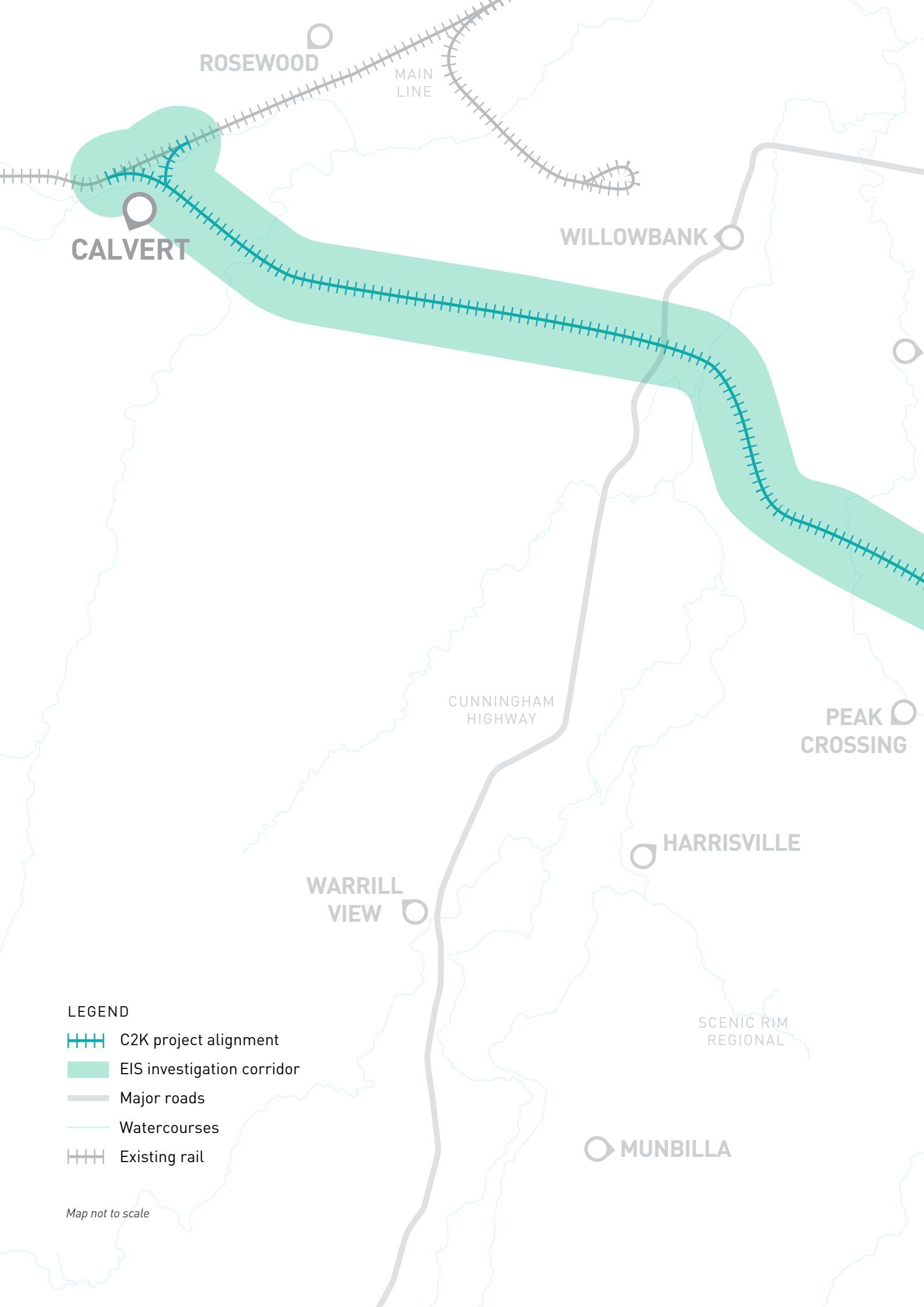
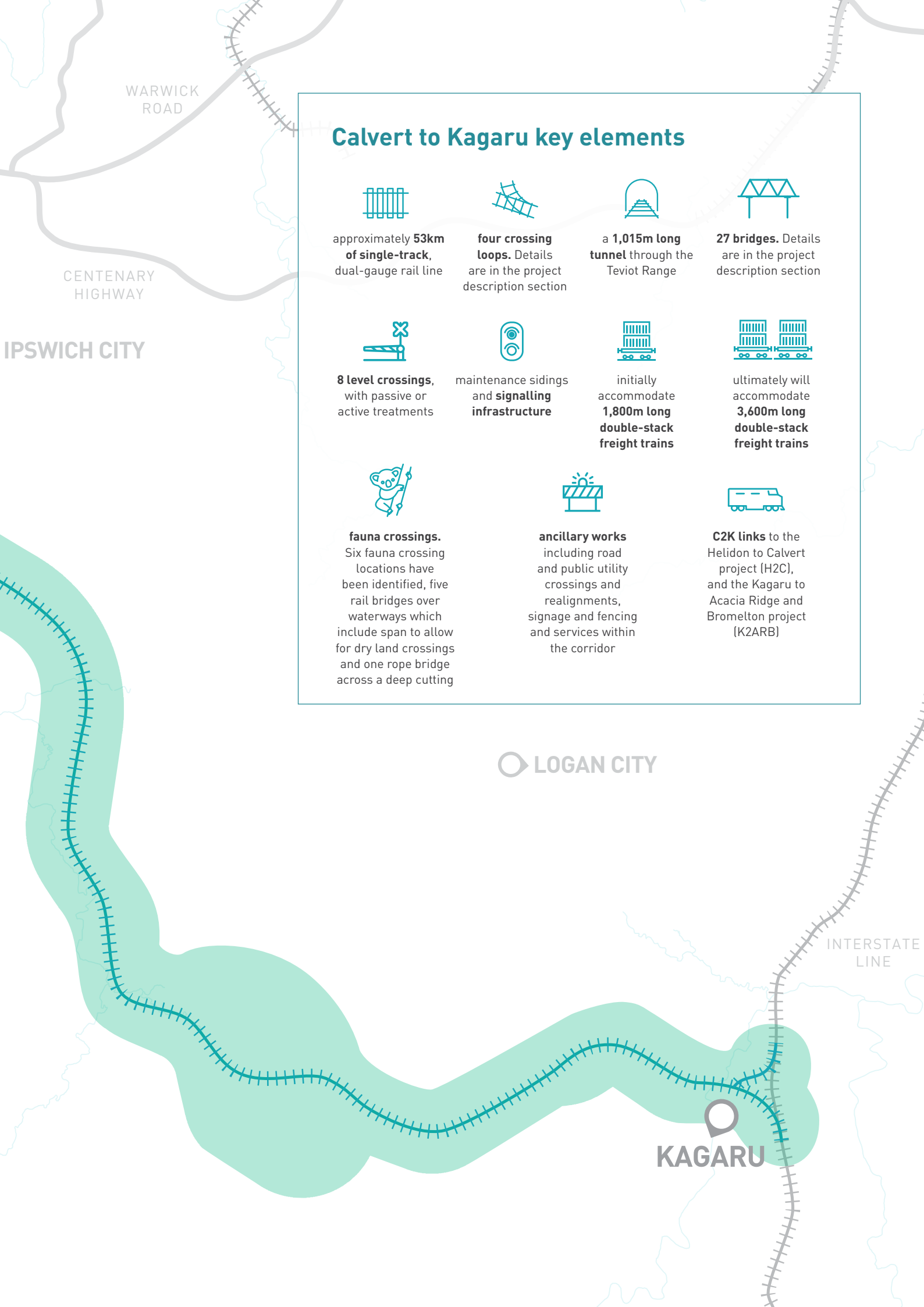

ROSEWOOD
MAIN LINE
CALVERT
WILLOWBANK
CUNNINGHAM HIGHWAY
PEAK CROSSING
HARRISVILLE
WARRILL VIEW
SCENIC RIM REGIONAL
MUNBILLA
LEGEND
C2K project alignment
EIS investigation corridor
Major roads
Watercourses
Existing rail
Map not to scale



Calvert to Kagaru key elements

approximately **53km of single-track**, dual-gauge rail line

four crossing loops. Details are in the project description section

a **1,015m long tunnel** through the Teviot Range

27 bridges. Details are in the project description section

8 level crossings, with passive or active treatments

maintenance sidings and **signalling infrastructure**

initially accommodate **1,800m long double-stack freight trains**

ultimately will accommodate **3,600m long double-stack freight trains**

fauna crossings. Six fauna crossing locations have been identified, five rail bridges over waterways which include span to allow for dry land crossings and one rope bridge across a deep cutting

ancillary works including road and public utility crossings and realignments, signage and fencing and services within the corridor

C2K links to the Helidon to Calvert project (H2C), and the Kagaru to Acacia Ridge and Bromelton project (K2ARB)

Summary of findings

This Summary of findings provides a high-level overview of each chapter of the EIS. It summarises the major findings of the technical studies and shows where in the EIS more detailed information can be found.

ARTC is proposing the Inland Rail Program – 13 individual projects spanning 1,700km. By connecting interstate rail lines, Inland Rail will enable trains to travel between Melbourne and Brisbane in 24 hours or less.

Calvert to Kagaru Project

The 53-kilometre Calvert to Kagaru section of Inland Rail includes building a new dual-gauge track, providing convenient access for freight to major distribution centres at Bromelton and Acacia Ridge in Queensland.

Purpose of this 'Summary of findings'

A draft Environmental Impact Statement (EIS) has been prepared for the Calvert to Kagaru Project. The EIS describes the Project, considers potential environmental, social and economic impacts of the Project, and identifies measures to avoid, minimise and mitigate these impacts.

The EIS is a robust, thorough and comprehensive document with analysis and input from technical and scientific experts to demonstrate that the Project is based on sound environmental principles and practices.

This document provides a high-level overview of each EIS chapter. It summarises the major findings of the technical studies and shows where in the EIS more detailed information can be found.

If you wish to understand the full details of each chapter, we recommend you view the relevant chapters or technical reports in the EIS.

About the EIS

The EIS has been undertaken under both the Queensland *State Development and Public Works Organisation Act 1971* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. Both levels of government will be involved in the EIS assessment process and will consider feedback from the community and other stakeholders during the public notification period before making a decision.

The EIS has been prepared in response to the Terms of Reference (ToR) published by the Office of the Coordinator-General in December 2017.

Since this time, Inland Rail has worked with multiple technical specialists to undertake a range of studies and investigations required under the ToR.

The EIS comprises two parts:

1. chapters describing the Project and EIS process, environmental, social and economic impacts, and proposed mitigation measures
2. appendices supporting the chapters, including specialist technical reports on identified environmental, social and economic aspect.

The public notification process

The EIS will be on public display from Saturday 19 December to Monday 8 March 2021, during which time the Office of the Coordinator-General for the Queensland Government invites comment on the Project. Written, emailed and online submissions can be received by the Office of the Coordinator-General, up to and including the last day of public notification.

Where to view a copy of the EIS

The EIS can be downloaded from the Office of the Coordinator-General website at: **statedevelopment.qld.gov.au/inlandrail-c2k**

The EIS can be viewed at the following locations:

- Ipswich Central Library, Nicholas Street Precinct, Ipswich
- Rosewood Library,15 Railway Street, Rosewood
- Beaudesert Library, 58 Brisbane Street, Beaudesert
- State Library of Queensland, Cultural Centre, Stanley Place, South Bank, Brisbane
- National Library of Australia, Parkes Place W, Canberra, ACT
- ARTC Inland Rail Office, Suite 5, 47 North Street, Gatton.

How to make a submission

Submissions can only be made to the Office of the Coordinator-General.

Each submission must:

- be made in writing
- be received on or before the last day of the submission period
- be signed by each person making the submission
- state the name and address of each person
- state the grounds of the submission, as well as the facts and circumstances relied on in support of those grounds.

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

- clearly state the matters of concern or interest and list points to help with clarity
- reference the relevant sections of the EIS
- ensure the submission is legible.

What happens after Public Notification?

At the end of the Public Notification period, the Coordinator-General will review and consider the submissions made and will determine if additional information is required from the Project to address any issues raised.

For further information on the EIS process and the making of submissions, please call the Office of the Coordinator-General on **13 QGOV (13 74 68)**.

How to have your say

Online

Online submissions via the Office of the Coordinator-General website are preferred. To make a submission online, please visit: **haveyoursay.dsd.qld.gov.au/coordinatorgeneral/inlandrailc2k**

By post

Attention: The Coordinator-General
c/- EIS Project Manager,
Inland Rail – Calvert to Kagaru project
Office of the Coordinator-General
PO Box 15517
CITY EAST Qld 4002 Australia

By email

inlandrailc2k@coordinatorgeneral.qld.gov.au

Introduction

The Australian Government has committed to delivering Inland Rail, a significant piece of national transport infrastructure that will enhance Australia's existing rail network and serve the interstate freight market.

The Project

The Calvert to Kagaru Project is one of the 13 projects that make up the Inland Rail Program.

This section consists of approximately 53 kilometres of new single-track, dual-gauge railway with four crossing loops and makes up one of the 'missing links' within the Inland Rail Program.

The Project design responds to key environmental features and has been developed in line with engineering constraints to produce a feasible rail design based on minimising environmental and social impacts, minimising disturbance to existing infrastructure and meeting engineering design criteria.

The construction of the Project is expected to cost approximately $648 million and will be delivered as part of the Gowrie to Kagaru Public Private Partnership (PPP). This estimate is due to significant infrastructure elements including bridge structures and earthworks required along the undulating topography and the requirement for a tunnel for the Teviot Range crossing.

The location

The Project is located within the Ipswich City Council, Logan City Council and Scenic Rim Regional Council Local Government Areas in South East Queensland.

The Project will generally be located within the existing Southern Freight Rail Corridor (see page 10), which was protected in November 2010 as future railway land. The Project provides a link between the adjacent projects:

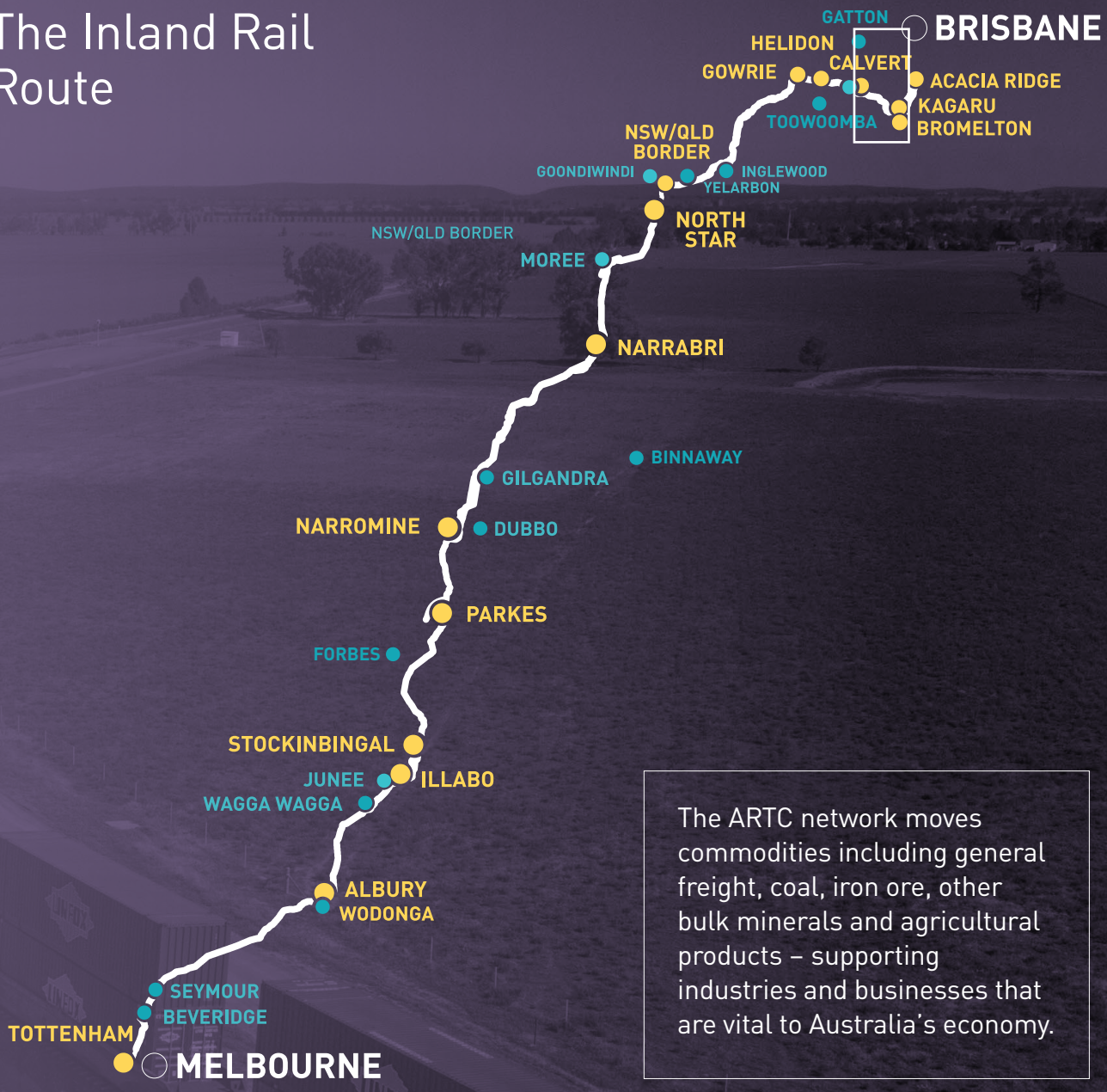
- Helidon to Calvert (H2C) in the north-west, where it connects to the Queensland Rail (QR) 'West Moreton System' near Calvert and
- Kagaru to Acacia Ridge and Bromelton (K2ARB) to the south-east where it connects to the existing operational Sydney to Brisbane interstate railway line at Kagaru.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 1: Introduction**
- **Chapter 2: Project Rationale**
- **Chapter 6: Project Description**

The Inland Rail Route



The ARTC network moves commodities including general freight, coal, iron ore, other bulk minerals and agricultural products – supporting industries and businesses that are vital to Australia's economy.

The Proponent

Australian Rail Track Corporation (ARTC) has been tasked with delivering Inland Rail under the guidance of the Department of Infrastructure, Regional Development and Cities.

ARTC was created in 1997 as a 'one stop shop' for all operators seeking to access the national interstate rail network. ARTC plays a critical role in the supply chain by managing and maintaining 8,500 kilometres of rail network across five states, investing in building, extending and upgrading the rail network to get freight off the road and onto rail. As the operator and manager of Australia's national rail freight network, ARTC has successfully delivered more than $5 billion in capital upgrades to the national rail freight network.

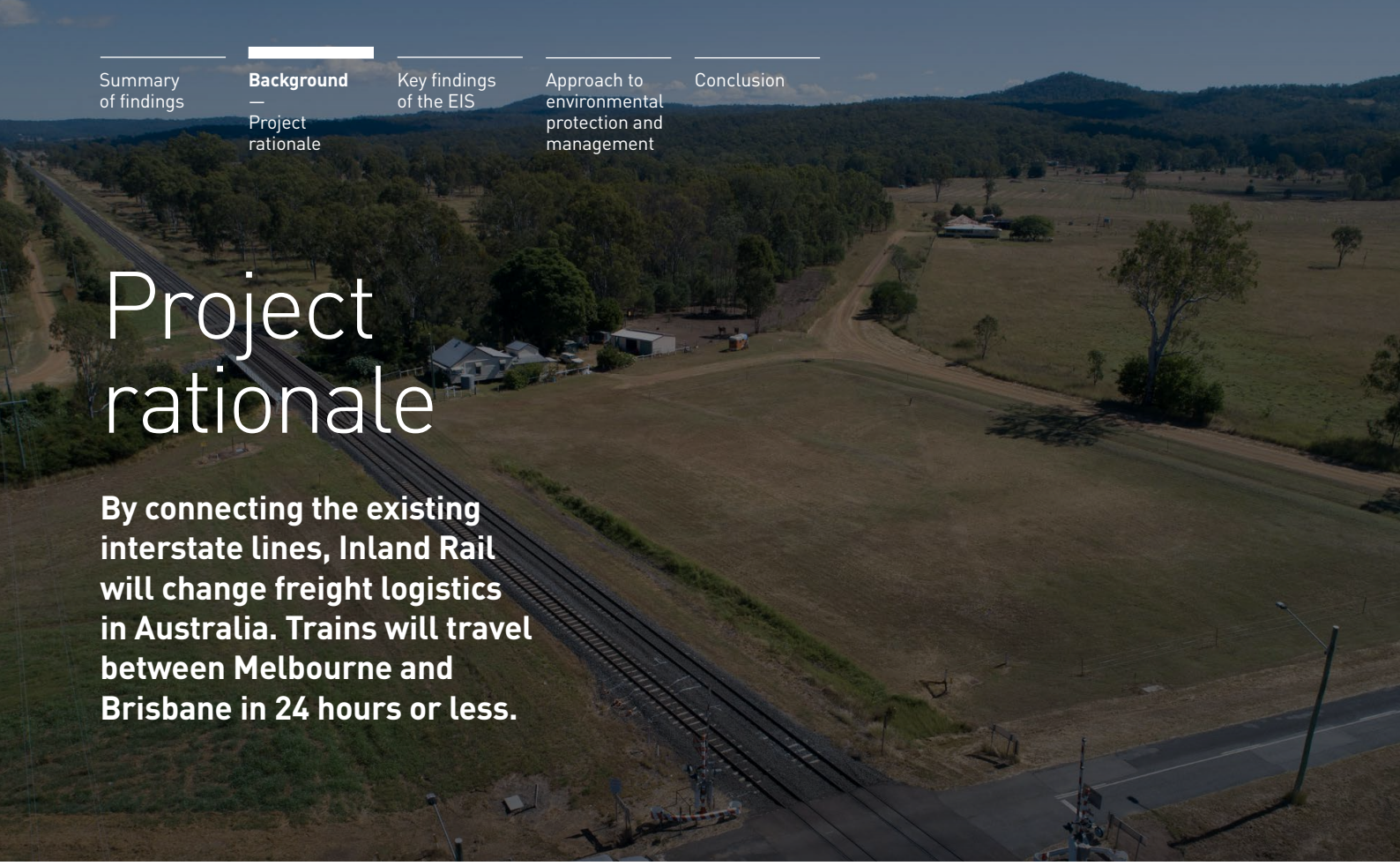
Project timeline

Construction is planned to commence in late 2021, however there are a number of factors which could potentially impact the project and push out the start of construction to 2022. The Project will be operational when all 13 sections of the broader Inland Rail Program are complete. The Project will be managed and maintained by the Proponent, however, train services will be delivered by a variety of operators.

Once operational, the Project is anticipated to be used by an average of 33 services per day in 2026, forecast to increase to an average of 47 train services per day by 2040.

**the actual number of trains using the rail line will vary to meet market requirements*


LINFOX
LINFOX
LINFOX
FCT



Project rationale

By connecting the existing interstate lines, Inland Rail will change freight logistics in Australia. Trains will travel between Melbourne and Brisbane in 24 hours or less.

This chapter describes the rationale for the Calvert to Kagaru Project as part of the broader Inland Rail Program.

The Melbourne to Brisbane corridor is one of the most important general freight routes in Australia, supporting key population and employment precincts along the east coast and inland NSW. With the population of the eastern states forecast to increase by 60 percent over the next 40 years, the need for efficient and effective freight transport will continue to increase.

> Inland Rail will fundamentally change the freight logistics supply chain in Australia, delivering economic and social benefits into the future.

Potential benefits include:

- improved access to and from regional markets
- reduced costs for the market
- improved reliability and certainty of transit time
- increased capacity of the transport network
- reduced distances travelled
- improved road safety
- improved sustainability and amenity for the community.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 2: Project Rationale (Binder 01)**
- **Chapter 22: Cumulative Impacts (Binder 02)**

Justification for Inland Rail

Currently, there is no continuous Inland Rail link between Melbourne and Brisbane. Existing road and rail networks do not have the capacity to meet the demand for future freight movements, which will have a negative impact on freight productivity, transport costs and existing passenger services that also use the line.

Trains running on Inland Rail will be double-stacked freight trains initially up to 1,800 metres long – as long as 18 football fields. This means fewer B-double trucks on already busy road networks and less congestion for road and rail users.

Consequences of not proceeding with Inland Rail

Not progressing with Inland Rail would potentially hinder the national economy. The continuing growth in freight demand requires urgent attention. Without making a step-change in rail efficiency and performance, pressure on the road networks will increase, freight costs will rise, consumers will pay more for products, and productivity in important sectors could decline.

Without Inland Rail, road would increasingly become the dominant mode, with rail becoming less relevant. A continued over-reliance on road transport to meet the future east coast freight task will increase the vulnerabilities to demographic changes that are, even today, driving shortages of long-distance truck drivers and increasing costs.

Benefits of proceeding with Inland Rail

Potential benefits include:

- improved access to and from regional markets
- reduced costs for the market
- improved reliability and certainty of transit time
- increased capacity of the transport network
- reduced distances travelled
- improved road safety
- improved sustainability and amenity for the community.

What Inland Rail will offer

ARTC's service offering is central to the delivery and competitiveness of Inland Rail and reflects the priorities of freight customers. Developed in consultation with key market participants and stakeholders, the key elements to be delivered by Inland Rail for competitive and complementary service offering compared to other modes are:

reliability: 98% defined as the percentage of goods delivered on time by road freight, or available to be picked up at the rail terminal or port

price: cheaper relative to road transport 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.

The Project

The objectives of the Project are to:

- provide rail infrastructure that meets the Inland Rail Program specifications, to enable trains using the Inland Rail corridor to travel between Calvert and Kagaru, connecting with other sections of Inland Rail to the north and south
- minimise the potential for adverse environmental and social impacts.

Alternate locations and route options

Alternative routes for Inland Rail were considered in:

- North–South Rail Corridor Study (Ernst & Young, ACIL Tasman & Hyder Consulting 2006)
- Melbourne–Brisbane Inland Rail Alignment Study (ARTC 2010)
- Melbourne–Brisbane Inland Rail Engineering and Technical Services Alignment Refinement Report (ARTC 2015).

Selecting the Calvert to Kagaru alignment

Following preliminary studies in 2005, in 2010 the Southern Freight Rail Corridor (SRFC) Study was completed by the Department of Transport and Main Roads. The aim of the study was to identify a future route for a freight rail corridor connecting the western rail line near Calvert to the interstate railway north of Beaudesert. An approximately 55 kilometre-long and 2 kilometre-wide corridor of interest was investigated.

The findings of the studies provided an understanding of the onsite constraints within the corridor of interest that ultimately influenced the alignment development process and final location. Of particular note, measures were taken to minimise clearing of koala bushland habitat by realigning the SFRC corridor for 12 kilometres through Ebenezer and Willowbank.

Based on design criteria and the studies referenced above, a preferred alignment for the SFRC was gazetted as Future Rail Corridor. The SRFC is 80 metres to 100 metres wide and extends about 53 kilometres from Calvert at its northern extent to Kagaru at its south-eastern extent.

The SRFC was adopted as the base case alignment for the Calvert to Kagaru Project.

Project design and alignment refinement

Multi-Criteria Analysis (MCA) and comparative cost estimates were undertaken as part of the EIS and design development.

Through these processes, ARTC considered options to refine the alignment within the EIS investigation corridor (and outside the SFRC) to identify where there was potential for significant efficiencies in constructability and reductions in potential environmental impacts.

After each alignment was refined to comply with ARTC's design criteria, the alignments were assessed by a multi-disciplinary team to determine key metrics and values that would provide design, impact and cost estimate differentiators.

The specific metrics assessed were chosen to align with ARTC's established MCA criteria.

- technical viability
- safety assessment of the proposed alignment
- operation approach
- constructability
- schedule
- environmental and heritage impacts
- community and property impacts
- approvals and stakeholder risk.

Alignment options

Teviot Range

The Teviot Range was the focus of an MCA owing to several project delivery challenges such as culturally and environmentally sensitive sites, management of stormwater flows from the tunnel, and access constraints due to remoteness. The preferred option has fewer property, topographical and waterway impacts than the alternative options.

Washpool Road

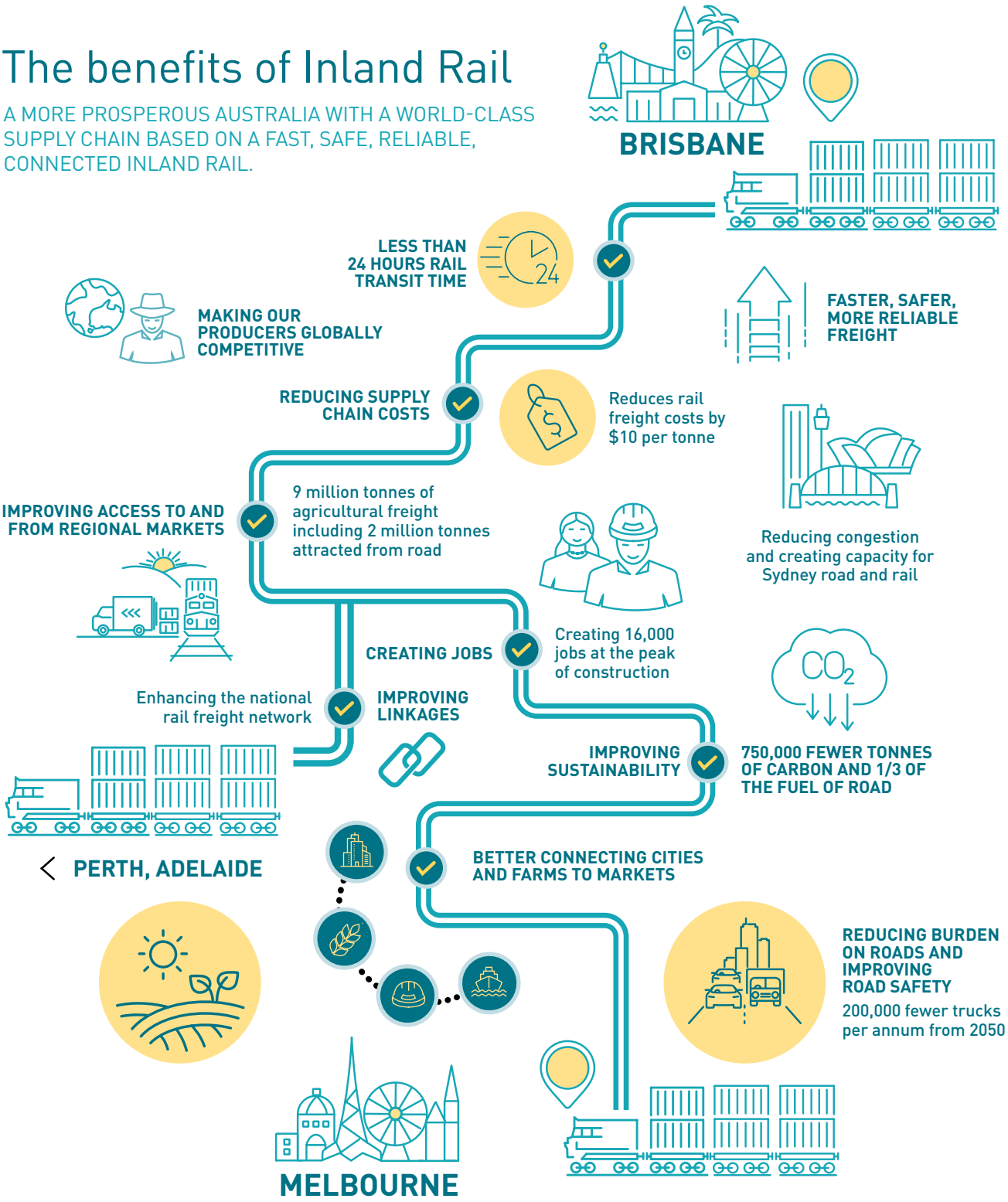
An alternative was selected near Washpool Road following an initial flood assessment of Purga Creek. It also involves realignment of Washpool Road to maintain local access.

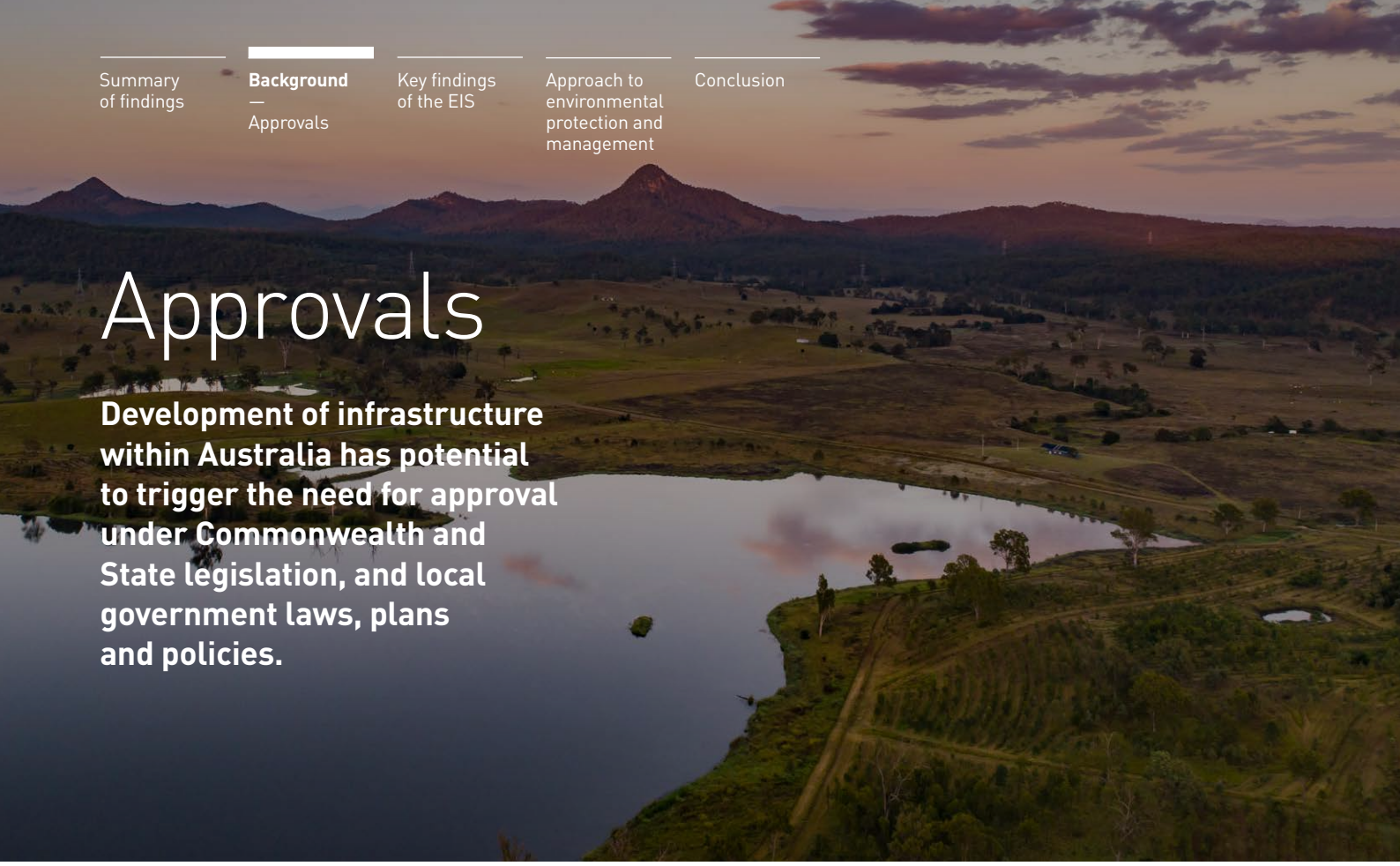
Sandy Creek/Mount Flinders Road

An alternative was selected for the crossing of Sandy Creek. Key benefits of the change in alignment were reduced bridge length, avoiding a revegetation growth area, and flexibility for future loop extension.

The benefits of Inland Rail

A MORE PROSPEROUS AUSTRALIA WITH A WORLD-CLASS SUPPLY CHAIN BASED ON A FAST, SAFE, RELIABLE, CONNECTED INLAND RAIL.





Approvals

Development of infrastructure within Australia has potential to trigger the need for approval under Commonwealth and State legislation, and local government laws, plans and policies.

Chapter 3 of the EIS summarises the relevant Commonwealth, State, and local legislation and identifies the approvals, permits, licences and authorities necessary for the planning, construction, and operational phases of the Project.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 3: Project Approvals (Binder 01)**
- **Appendix A: Terms of Reference (Binder 03)**
- **Appendix B: Terms of Reference Compliance Table (Binder 03)**

On 16 June 2017, the Project was declared to be a 'coordinated project for which an EIS is required' by the Coordinator-General under Section 26 of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act). This declaration initiated the statutory environmental impact assessment procedure of Part 4 of the *SDPWO Act*, which requires the proponent to prepare an EIS for the Project.

On 21 June 2017, the then Australian Government Minister for the Environment determined the Inland Rail Calvert to Kagaru Project to be a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) due to the likely potential impacts on Matters of National Environmental Significance (MNES).

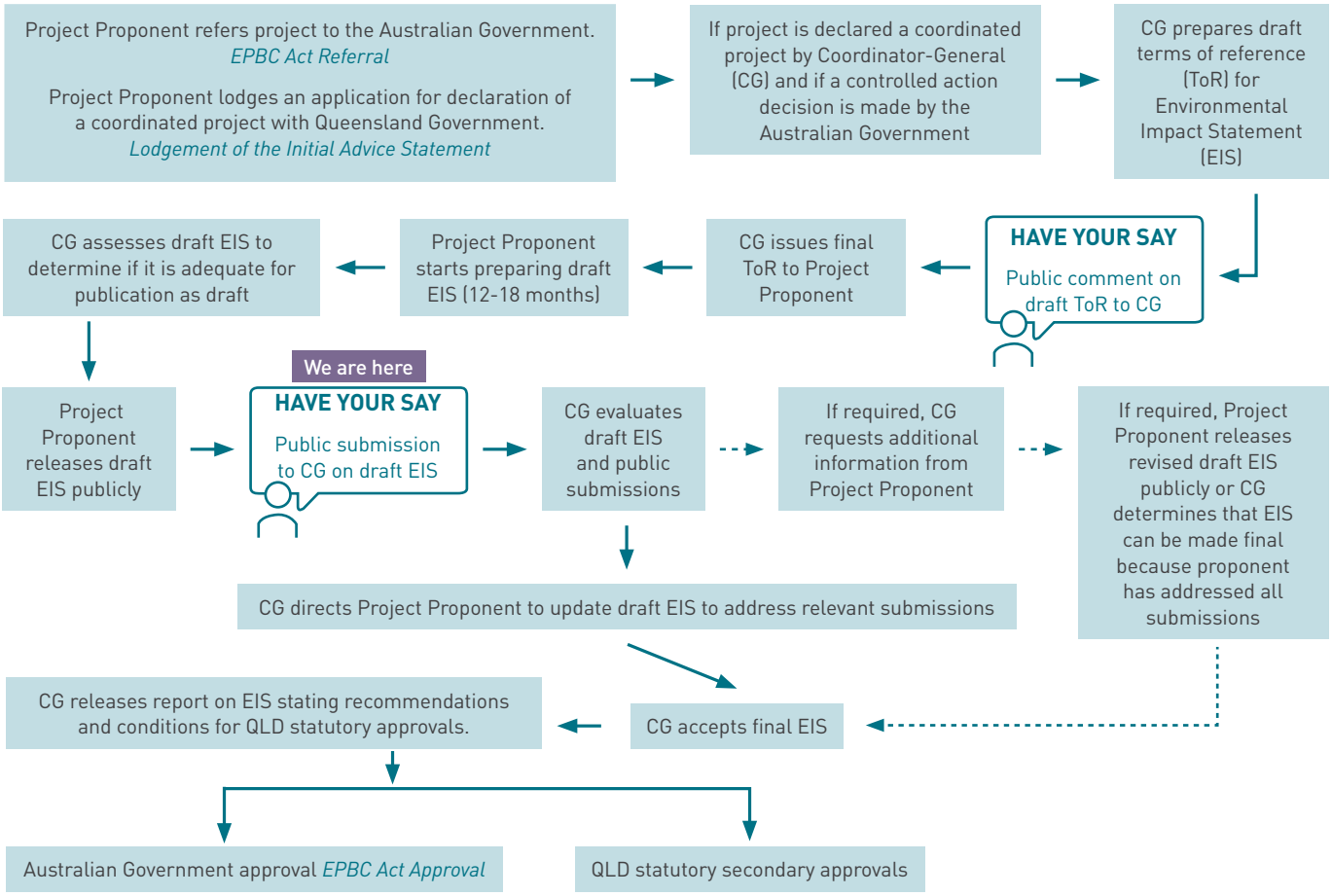
Assessment of the Project was determined to be under the Bilateral Agreement between the Commonwealth (now the Department of Agriculture, Water and the Environment (DAWE)) and the State of Queensland (QLD).

The relevant controlling provision for the Project is listed threatened species and communities (Sections 18 and 18A) (reference number EPBC 2017/7944).

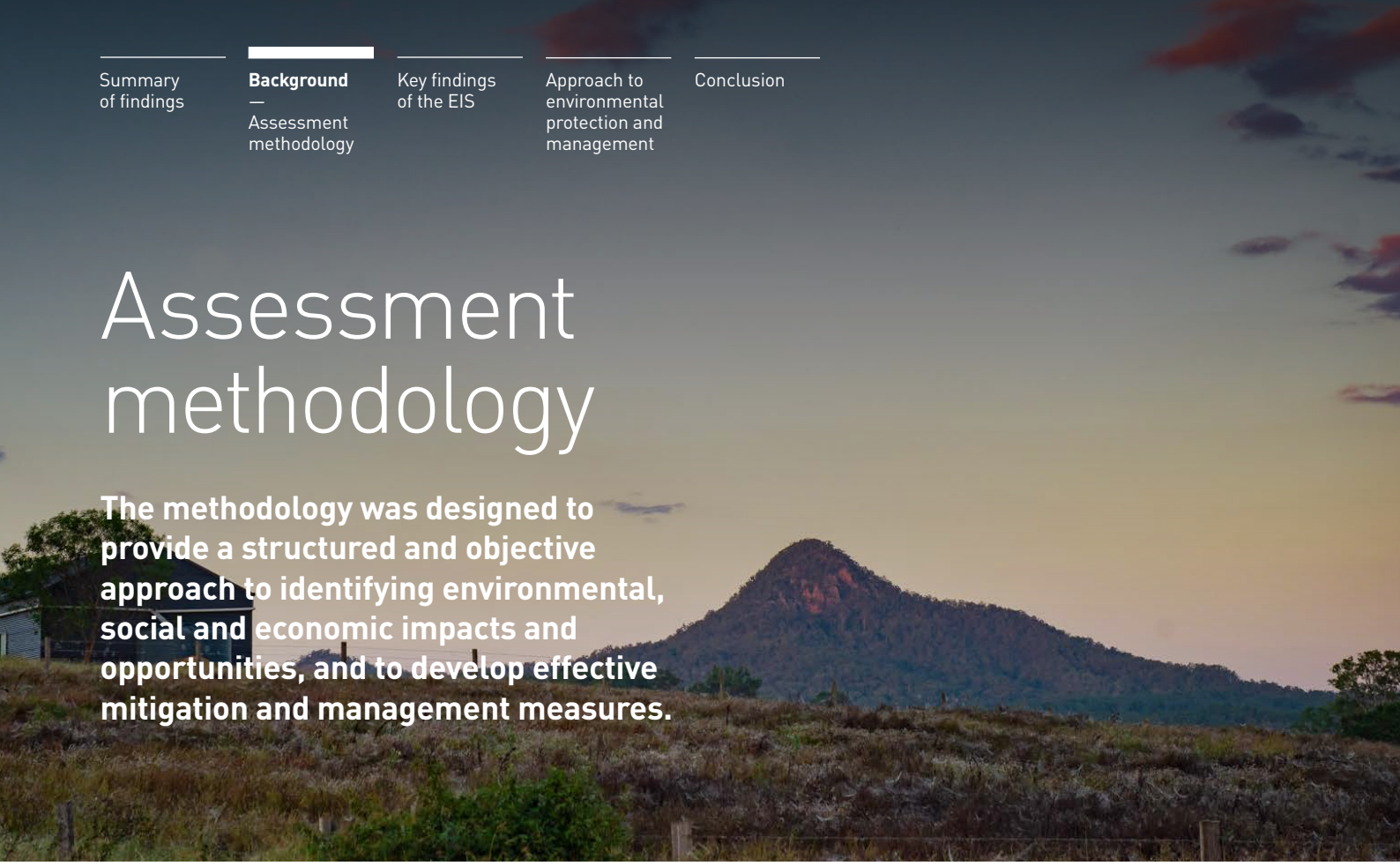
The final Terms of Reference (ToR) for the Project was approved by the Coordinator-General under Section 30 of the SDPWO Act and was released on 8 December 2017. The ToR sets out the matters a proponent must address in an EIS for the Project under the SDPWO Act. Further, as the Project will be assessed under the Bilateral Agreement between the Commonwealth and the State of QLD, the ToR also sets out the requirements for the assessment of the EPBC Act controlling provision, mitigation measures and any offsets for residual impacts.

The Calvert to Kagaru EIS has been prepared to address the ToR issued by the Office of the Coordinator-General. The figure on the next page illustrates the steps in the coordinated project process and the current status of the Project.

APPROVALS PROCESS FOR QUEENSLAND MAJOR PROJECTS



A principal purpose of this EIS is to provide sufficient information to enable the Coordinator-General and Australian Government Minister for the Environment to evaluate and assess the Project under the SDPWO Act and EPBC Act respectively, and for recommendations to be made regarding approvals required by the Project under other legislation.



Assessment methodology

The methodology was designed to provide a structured and objective approach to identifying environmental, social and economic impacts and opportunities, and to develop effective mitigation and management measures.

Chapter 4 describes the methodology used to assess potential impacts and opportunities as a result of the Project in accordance with the Terms of Reference.

The impact assessment has taken a conservative approach to identifying the potential impacts of construction and operation of the Project, including cumulative impacts.

This has involved:

- defining the study area
- reviewing relevant studies, reports and spatial datasets
- and undertaking field assessments and modelling.

Where environmental impacts have been identified, efforts have been made, where practicable, to avoid or minimise those impacts through development of the design. The need for environmental offsets to address adverse residual impacts was also assessed.

Where attempts to avoid or minimise impacts through design have a limited effect, further proposed mitigation measures have been outlined to implement in future phases of the Project.

A consolidated description of commitments to implement management measures including monitoring and offsets is provided in Appendix E: Proponents Commitments of the EIS.

Opportunities to maximise the economic and social benefits of the Project have been identified and include local employment, local industry participation, and opportunities for complementary investment with continued community benefits. These opportunities are further detailed in the Social Impact Management Plan, and associated action plans.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 4: Assessment Methodology (Binder 01)**
- **Chapter 23: Draft Outline Environmental Management Plan (Binder 02)**
- **Appendix E: Proponent Commitments (Binder 03)**

Approach

Three methods were used to assess potential impacts and opportunities:

- compliance assessment (quantitative)
- risk assessment (qualitative)
- significance assessment (qualitative).

For each environmental value, a decision tree was used to select the appropriate impact assessment method. In some cases, the assessment method was adapted to meet the needs of a particular environmental value. For example, flora and fauna and land resources were assessed using both compliance and significance assessment methods.

Compliance assessment

Type: Quantitative

Relevance: Used where compliance with a known guideline or standard (e.g. published limits or thresholds) can be quantitatively assessed.

Environmental values

- Flora and fauna.
- Land resources (soil properties).
- Land use and tenure.
- Hydrology and flooding.
- Economics.
- Air quality (operation).
- Noise and vibration.
- Traffic, transport and access.
- Sustainability.

Compliance assessments were applied to environmental values with quantifiable impacts (e.g. emissions and discharges from project infrastructure and activities). Mapping, modelling and data from the field was used to assess compliance with performance criteria adopted from legislation, statutes, guidelines or policies.

If compliance with the adopted performance criteria could not be achieved with initial mitigation measures, then additional mitigation and management measures were proposed. Following that, the need for environmental offsets to compensate for any adverse residual impacts was assessed.

Risk assessment

Type: Qualitative

Relevance: Used where an impact may occur; air quality (construction).

Environmental values

- Hazard and risk.
- Land resources (contaminated land).
- Social.
- Waste and resource management.

The risk assessment method was applied to environmental values that might be impacted by the Project, and impacts cannot be quantified. This includes unknown or unpredictable impacts. Potential impacts are assessed in terms of how likely they are to occur, and the consequences if they do occur.

Likelihood and consequence criteria are consistent with AS/NZ 31000:2009 Risk Management – Principles and Guidelines. Risk assessments have been documented in tabular form in the relevant EIS chapters.

Significance assessment

Type: Qualitative

Relevance: Used where an impact will occur to assess the sensitivity or the vulnerability of the draft environmental value to the impact.

Environmental values

- Flora and fauna.
- Groundwater.
- Surface water quality.
- Landscape and visual amenity.
- Cultural heritage.

The significance assessment method was applied to environmental values that will be impacted by the Project, and where impacts cannot be quantified. The significance of a potential impact was assessed in terms of the sensitivity or vulnerability of the draft Environmental value, and the magnitude of the potential impact.

The following sensitivity, magnitude and significance criteria were adopted for significance assessments. Significance assessments have been documented in tabular form in the relevant EIS chapters.

Significance classifications

MAJOR: Arises when an impact will potentially cause irreversible or widespread harm to an environmental value that is irreplaceable because of its uniqueness or rarity. Avoidance through appropriate design responses is the only effective mitigation.

HIGH: Occurs when the proposed activities are likely to exacerbate threatening processes affecting the intrinsic characteristics and structural elements of the environmental value. While replacement of unavoidable losses is possible, avoidance through appropriate design responses is preferred to preserve its intactness or conservation status.

MODERATE: Results in degradation of the environmental value due to the scale of the impact or its susceptibility to further change even though it may be reasonably resilient to change. The abundance of the environmental value ensures it is adequately represented in the region, and that replacement, if required, is achievable.

LOW: Occurs where an environmental value is of local importance and temporary or transient changes will not adversely affect its viability provided standard environmental management controls are implemented.

NEGLIGIBLE: Does not result in any noticeable change and hence the proposed activities will have negligible effect on environmental values. This typically occurs where the activities are located in already disturbed areas.

Stakeholder engagement

Consultation has assisted in highlighting local issues and concerns and has assisted in identifying potential project impacts.

Chapter 5 outlines the consultation activities undertaken to date, key issues raised and communication collateral used in the process.

Stakeholder engagement

Public consultation for the Project was an inclusive process that included a broad range of stakeholder groups, including affected landowners, residents, community groups, Traditional Owners, federal, state and local government agencies, and non-government organisations, local businesses and traditionally underrepresented stakeholders.

A project of this size and significance requires a far-reaching communication and stakeholder engagement approach. Input from a variety of key stakeholders and community members is required to understand constraints, values and impacts at all levels.

ARTC has consulted with affected and interested parties through a range of communication tools and consultation methods. The next phases of consultation associated with the EIS process will build on these activities.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 5: Stakeholder Engagement (Binder 01)**
- **Appendix C: Consultation Report (Binder 03)**

> Community consultation is an ongoing process and will continue throughout the life of the Project.

Community Consultation

SINCE 2015, WE HAVE CONSULTED WIDELY WITH THE COMMUNITY AND STAKEHOLDERS.

Who we consult with

Community

Government *(Local, State and Commonwealth)*

Emergency Services

Impacted landowners

Local services

Indigenous stakeholders

Local Businesses

How we consult

Face-to-face meetings

Calls

Emails

E-news

Printed newsletters *(letter box drops)*

Workshops and info sessions

Community Consultative Committee (CCC)

Interactive map

Website

Social media

Please note the above lists are not exhaustive. Detailed lists can be found in Chapter 5 and Appendix C.

Stages of consultation

A phased approach was developed to engage key stakeholders and other potentially affected stakeholders about the Project. Broad public engagement has been ongoing since 2016. Consultation for the development of the Terms of Reference and Project design commenced in mid-2017.

STAGE ONE

February – December 2017

- Raising public awareness in Inland Rail program

STAGE TWO

December 2017 – October 2020

- One-on-one consultation, public forums relating to designs, engagement for property impacts and acquisition

STAGE THREE

October 2020 – early 2022

- Formal consultation to support EIS assessment and approval, progression of detailed design

STAGE FOUR

2022–2026

- Engagement during construction.

STAGE FIVE

June 2026

- Completion and handover to operations

Integration with the EIS

Consultation has been undertaken with multiple stakeholders to share information and receive feedback on:

- project updates and progress
- technical study methodologies and findings
- technical model validation and data collection
- suggested mitigation and environmental management measures
- project alignment
- project delivery mechanisms.

Outcomes and feedback from stakeholder consultation have been addressed within the EIS, helping inform technical study methodologies, technical model validation and data collection, mitigation and environmental management measures, route alignment and project delivery mechanisms. Consultation allowed the Project team to more accurately assess impacts and identify appropriate mitigation measures.

Major themes of the consultation process

Inland Rail maintains a secure stakeholder management database—Consultation Manager—to record all consultation undertaken as a part of the Project.

The database was established in mid-2014 for the Inland Rail Program and will continue to be maintained throughout the EIS process and into Project construction and operation. This central database is used to record stakeholder consultation and monitor and report on enquiries, issues and team responses across all ARTC operations and Inland Rail projects.

For the C2K Project, issues of most interest to stakeholders were:

- surface water and hydrology
- traffic, transport and access
- land use and tenure, including property
- cultural heritage
- landscape and visual amenity
- waste and spoil management
- flora and fauna
- socio-economic
- air quality
- noise and vibration.

Major themes

Project description

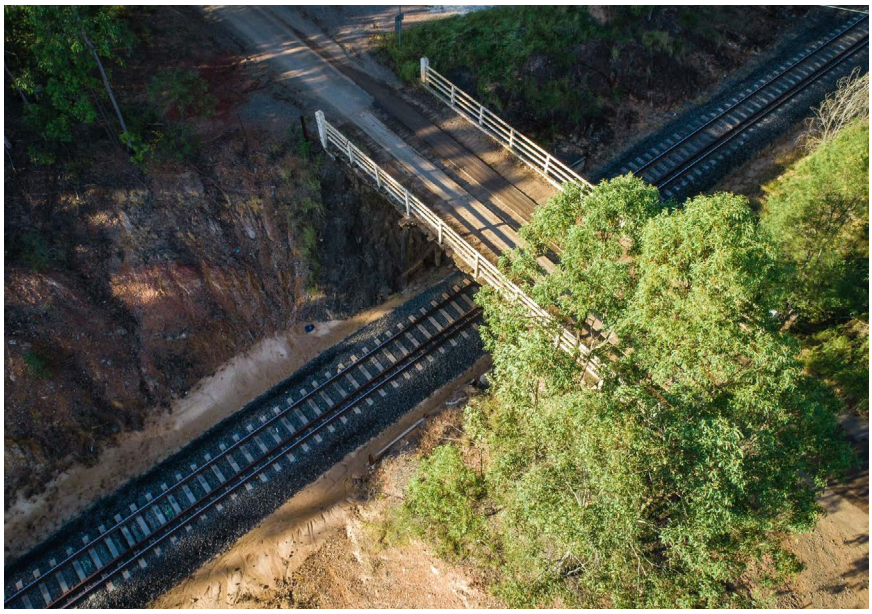
The Project is a new single track, dual-gauge railway, approximately 53 kilometres in length, connecting the existing Queensland Rail West Moreton System rail corridor with the existing Interstate Line at Kagaru.

Chapter 6 describes the key components and the design features of the Project.

Project overview

The Project starts within the Queensland Rail (QR) West Moreton System rail corridor to the east of Calvert where it heads to the south-east, traversing through Lanefield, Rosewood, Lower Mount Walker, Ebenezer, Willowbank, Purga, Peak Crossing and Washpool. It then traverses the Teviot Range, through Undullah until it joins the existing Interstate Line at Kagaru.

The Project is located within the Ipswich City Council, Logan City Council and Scenic Rim Regional Council local government areas in South East Queensland. It provides a link between the adjacent Inland Rail projects of Helidon to Calvert in the north-west, and Kagaru to Acadia Ridge and Bromelton to the south-east.



Want to know more?

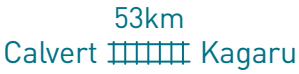
See the following Environmental Impact Statement chapters:

- **Chapter 6: Project Description (Binder 01)**

Calvert to Kagaru

KEY PROJECT FEATURES

Start and finish point
Calvert and Kagaru



Length of alignment
53km total length

Local government areas
Ipswich City, Logan City and Scenic Rim

Rail infrastructure

- 1,015m tunnel through the Teviot Range.
- 4 crossing loops at Ebenezer, Purga Creek, Washpool Road and Undullah.
- 27 new rail bridges to accommodate topography and cross waterways and other infrastructure.
- Tie-ins to the West Moreton Railway Line and the Sydney to Brisbane Interstate railway line.
- Allowance for a future connection to the Ebenezer Industrial Area at Willowbank.
- Maintenance sidings and signalling infrastructure to support the Advanced Train Management System.
- Rail crossings, including level crossings, grade separations and road overbridges, occupational and private crossings, fauna crossing structures, signage and fencing.
- Significant embankments and cuttings along the length of the alignment.
- Ancillary works, including road and public utility crossings and realignment (excluding enabling works).
- Construction worksites, laydown areas and access roads.

Train infrastructure

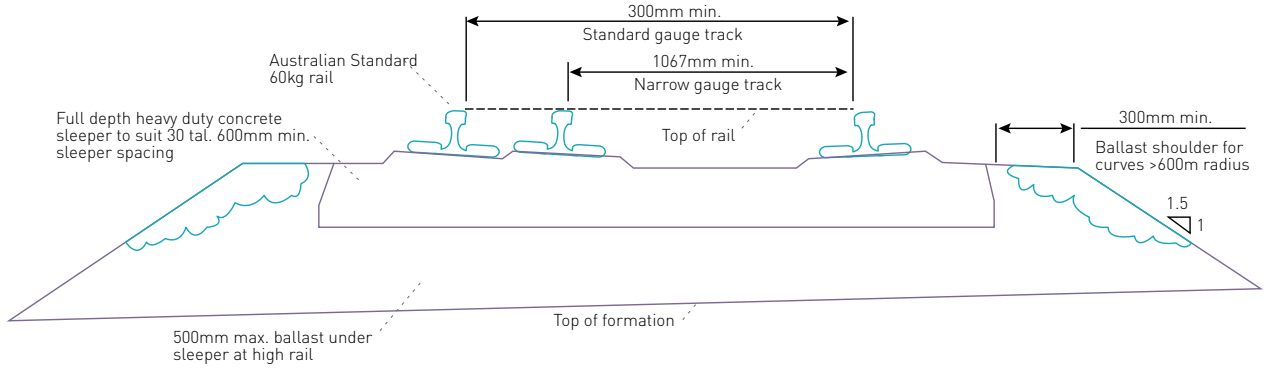
- **Train length:** Initially constructed for up to 1,800 metres long double stacked trains, with potential for future accommodation of 3,600 metres length.

Employment

- **Construction employment:** At peak, up to 620 full-time employees, with the average number of personnel on site across the full construction period planned to be 271 personnel.
- **Operational employment:** Approximately 20 full-time employees.

Track design

The Project is designed to support up to 30 tonne axle loads and will consist of 60 kilograms/metre steel rail installed at the standard gauge track spacing of 1.435 millimetres. The track will be supported by heavy duty concrete sleepers at 600-millimetre spaces, resting on an approximately 300-millimetre-thick bed of ballast rock.



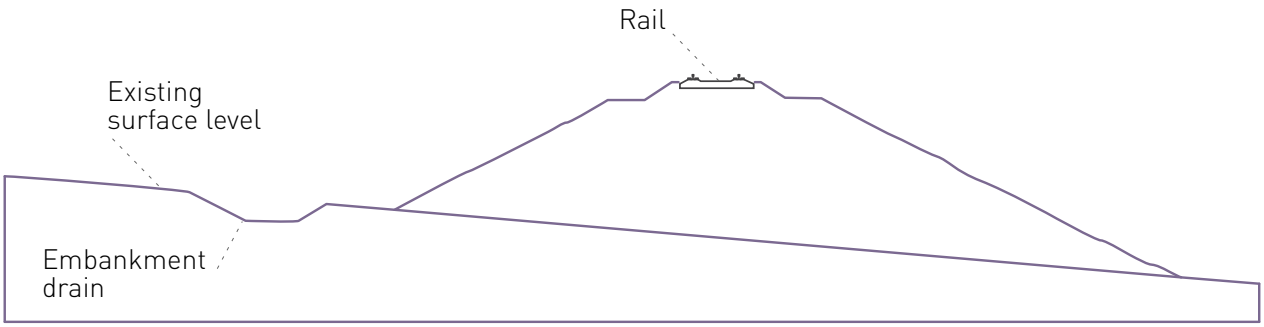
Typical dual-gauge ballasted track cross section

Track drainage

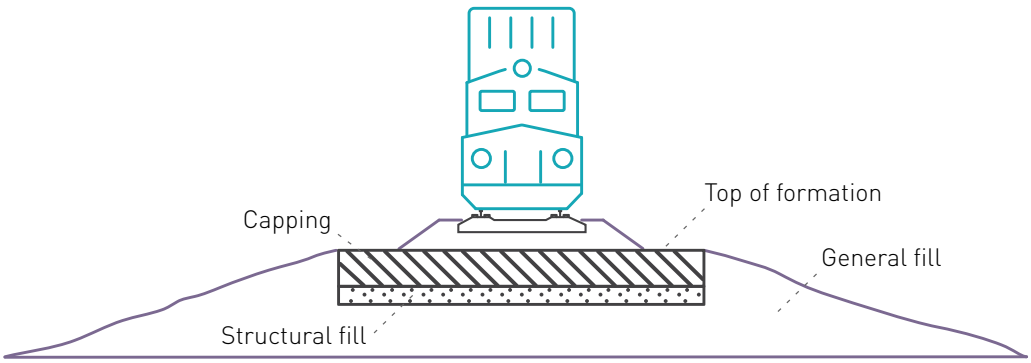
Two types of track drainage are currently proposed:

1. embankment drains are proposed within the permanent footprint, adjacent to the track
2. catch drains are proposed within the permanent footprint, on the uphill side of cuttings.

Due to topographical constraints, track drainage is not required along the entire length of the alignment but is proposed at specific locations where the gradient is steep enough to divert surface runoff to the nearest bridge or culvert location.

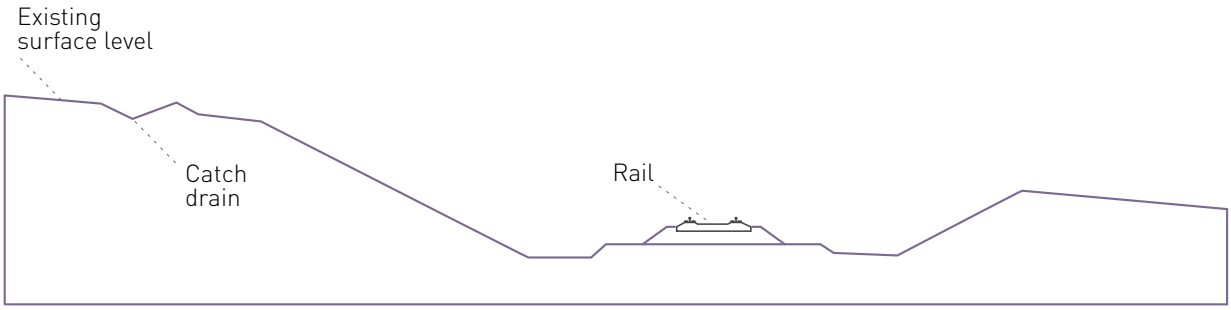


Indicative embankment drain design



Structure of the formation and embankment

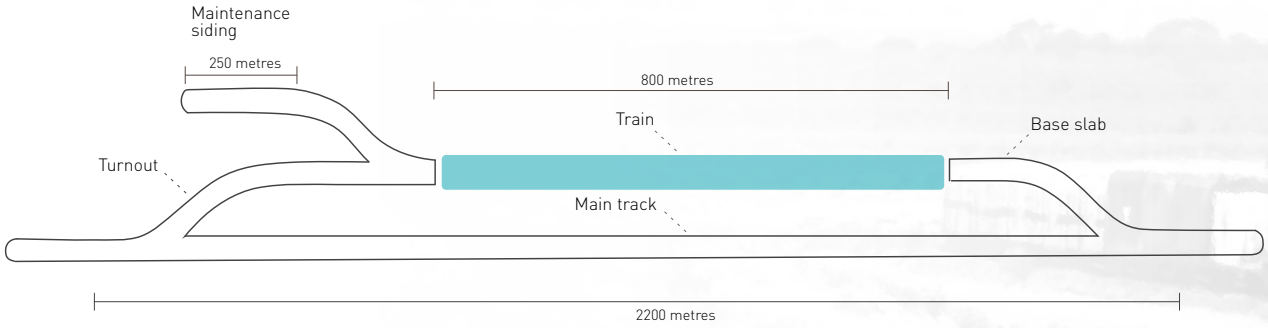
As with culverts, the design and location of track drainage will be refined during detailed design in order to minimise potential impacts. Both types of track drainage may be lined with grass to prevent erosion.



Indicative catch drain design

Crossing loops

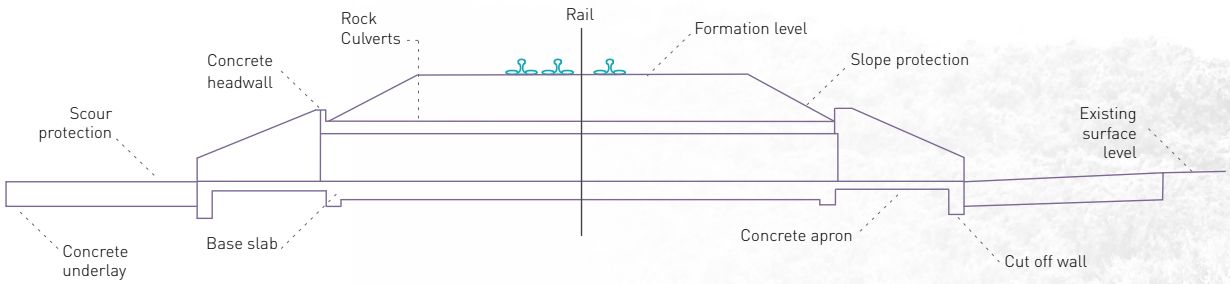
Crossing loops are places on a single-line track where trains travelling in opposite directions can pass each other. The crossing loops for the Project are double-ended and are connected to the main track at both ends. In operation, one train enters a crossing loop through one of the turnouts and idles at the other end, while the other train continues along the mainline track to pass the stationary train. Four crossing loops are proposed.



Indicative design for crossing loop and maintenance siding

Cross drainage culvert

Cross-drainage structures, including culverts, have been incorporated into the design where the alignment intercepts existing drainage lines and watercourses. These structures have been designed to meet the 1% Annual Exceedance Probability event criteria. Culverts allow water, either in a watercourse or drainage line, to pass under the rail alignment and ensure no permanently ponded areas are created upstream of the Project. Culverts also help maintain overland flow paths for surface water.



Typical section of a cross drainage culvert


SCT
001
SCT001

Timing and operation

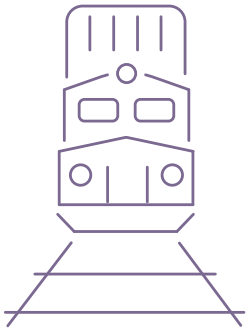
Subject to approval of the Project proposal, construction is planned to commence in 2021 and complete in 2026. This will be followed by a six months testing and commissioning phase.

Train services will be provided by a variety of operators and are not expected to commence until all 13 sections of Inland Rail are complete.

2026

33 trains per day

Transporting 3 million tonnes per year

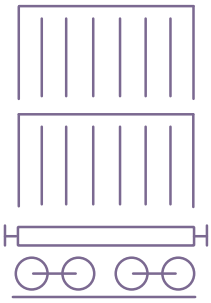


2040

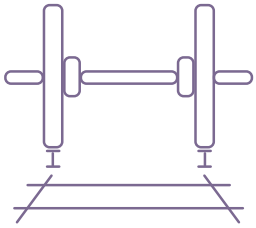
47 trains per day

Transporting 59 million tonnes per year

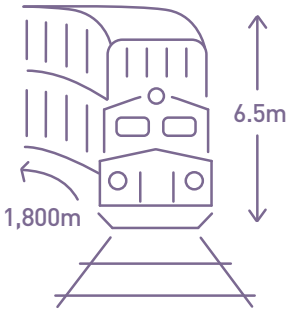
PROJECT DESIGN TO SUPPORT



DOUBLE-STACKED CONTAINERS

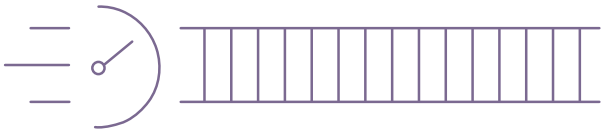


21–25 TONNE AXLE LOADS

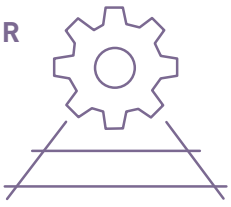


UP TO **1,800 METRES** LONG AND **6.5 METRES** HIGH

TRAIN SPEEDS 80KM/HR TO 115KM/HR



FUTURE-PROOFED FOR



30 TONNE AXLE LOAD INTERMODAL TRAINS

3,600 METRES LONG

6.5 METRES HIGH

TRAVELLING AT **80KM/HR**

Construction activities

Construction activities for the Project will include:

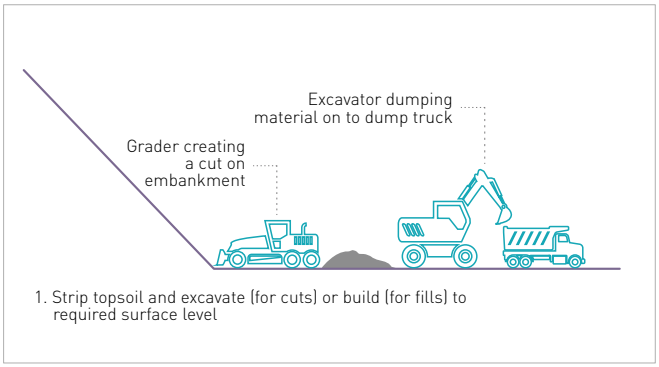
- site set out and pegging, including establishing clearing limits
- establishment of laydowns and compounds, including vehicle inspection/workshops and washdown facilities as required
- clearing—using dozers, chainsaws, excavators, trucks and similar equipment
- bulk earthworks—major cut-to-fill operations include the winning of suitable construction material from sections of cut along the railway alignment or from borrow areas external to the site
- construction of drainage infrastructure—cut-off drains, table drains and culvert structures
- construction/installation of concrete railway bridges and culverts
- ballast—supply, delivery and installation
- concrete sleepers—supply, delivery and installation
- installation of rail track and other items of rail infrastructure using rail-mounted equipment
- installation of railway signalling and communications equipment
- construction of tunnel maintenance facilities, administration and amenities buildings, car and truck parking and bulk fuel provisioning and storage areas
- other miscellaneous activities to complete the works such as reinstatement and rehabilitation of temporary works areas and landscaping in accordance with the Project landscape design.

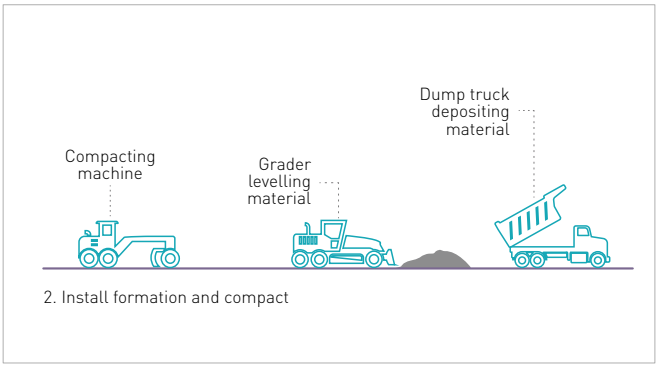
Workforce and accommodation

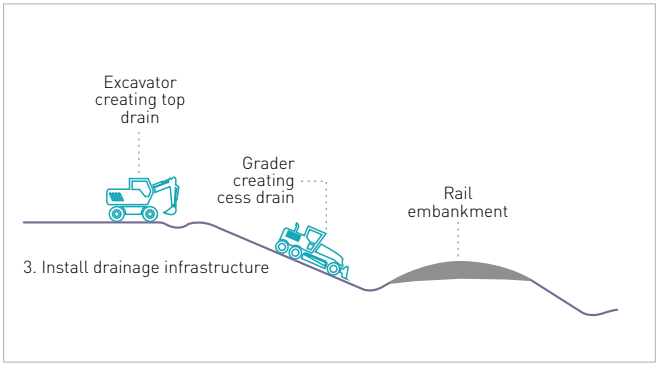
Construction of the Project is expected to require a workforce of up to 620 personnel. The core construction workforce will consist of professional staff, supervisors, trades workers and plant operators, with earthworks crews, bridge structure teams, capping and track-works crews working at different periods though the construction phase.

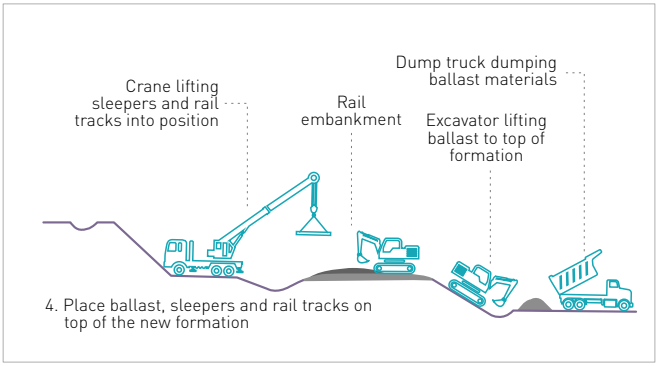
Accommodation camps are not proposed because it is anticipated that the construction and operation workforce will be sourced locally or accommodated in the Logan, Ipswich and Scenic Rim regions.

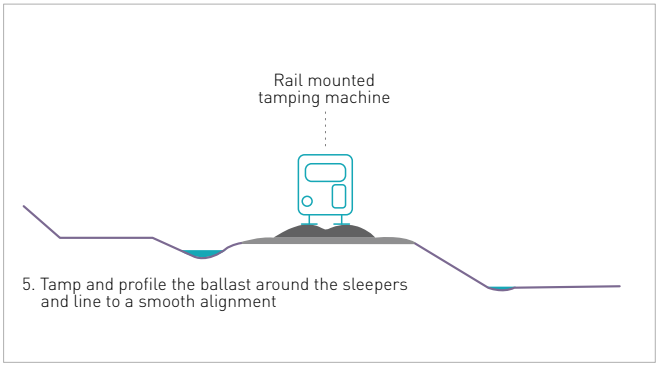
Construction activities

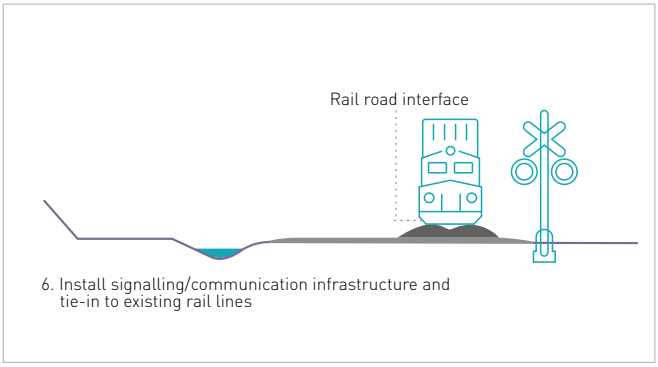












Construction traffic

During the construction phase, transporting materials, equipment and personnel will mainly occur via existing State-controlled roads and local government roads. Most construction material will be delivered to the key laydown area delivery points along the rail alignment. From these locations, construction material will be distributed by road to the surrounding construction laydown areas.

Clean-up and restoration

All construction sites, compounds and access routes will be reinstated or rehabilitated progressively and will include:

- demobilising site compounds and facilities
- removing all materials, waste and redundant structures from work sites
- forming and stabilising of spoil mounds, where required
- decommissioning all temporary work site signs
- removing temporary fencing
- establishing permanent fencing, where needed
- decommissioning site access roads that are no longer required
- restoring disturbed areas as required, including revegetation.

Commissioning

Testing and commissioning of the rail line and communication and signalling systems will ensure that all systems and infrastructure are designed, installed and operating according to ARTC's operational requirements.

For the connections to the existing QR and ARTC networks, the Testing and Commissioning Plan will address the existing signalling system.

Commissioning of the track works will require completed inspection and test plans, clearance reports, weld certification, rail stressing records, as-built documentation and track geometry reports.

Operation

Operation activities will include:

- the use of the railway for freight purposes
- operation and maintenance of tunnel ventilation and safety systems
- signalling
- general track and infrastructure maintenance.

Standard ARTC maintenance activities will be undertaken during operations, including:

- minor maintenance works, such as bridge inspections, culvert cleanout, sleeper replacement, rail welding, rail grinding, ballast profile management, track tamping and clearing/slashing rail corridor
- major periodic maintenance such as ballast cleaning, formation works, reconditioning of track, adjustment, turnout replacement and correction of track level and line.

Construction water

Water will be required for dust control, site compaction and reinstatement during construction. A number of potential water sources have been investigated, including extraction of groundwater or surface water, private bores, recycled water and watercourses.

Sources of construction water will be finalised during the detailed design and construction phase and will depend on:

- climatic conditions in the lead up to construction
- confirmation of private water sources made available by landholders under private agreement
- confirmation of access agreements with local governments for sourcing water mains for concrete batching.

The hierarchy of preference for accessing of construction water is as follows:

- public surface water storages, i.e. dams and weirs
- recycled water, where appropriate
- permanently (perennial) flowing watercourses
- privately held water storages, i.e., dams or ring tanks, under private agreement
- existing registered and licensed bores
- mains water.

These options will be further explored prior to construction in consultation with regulatory agencies, local councils and landowners. Where water is not available, it will be transported to the site via tanker truck and stored in temporary storage tanks. Portable water for human consumption will be supplied by portable water tanks or bottled water, as necessary.

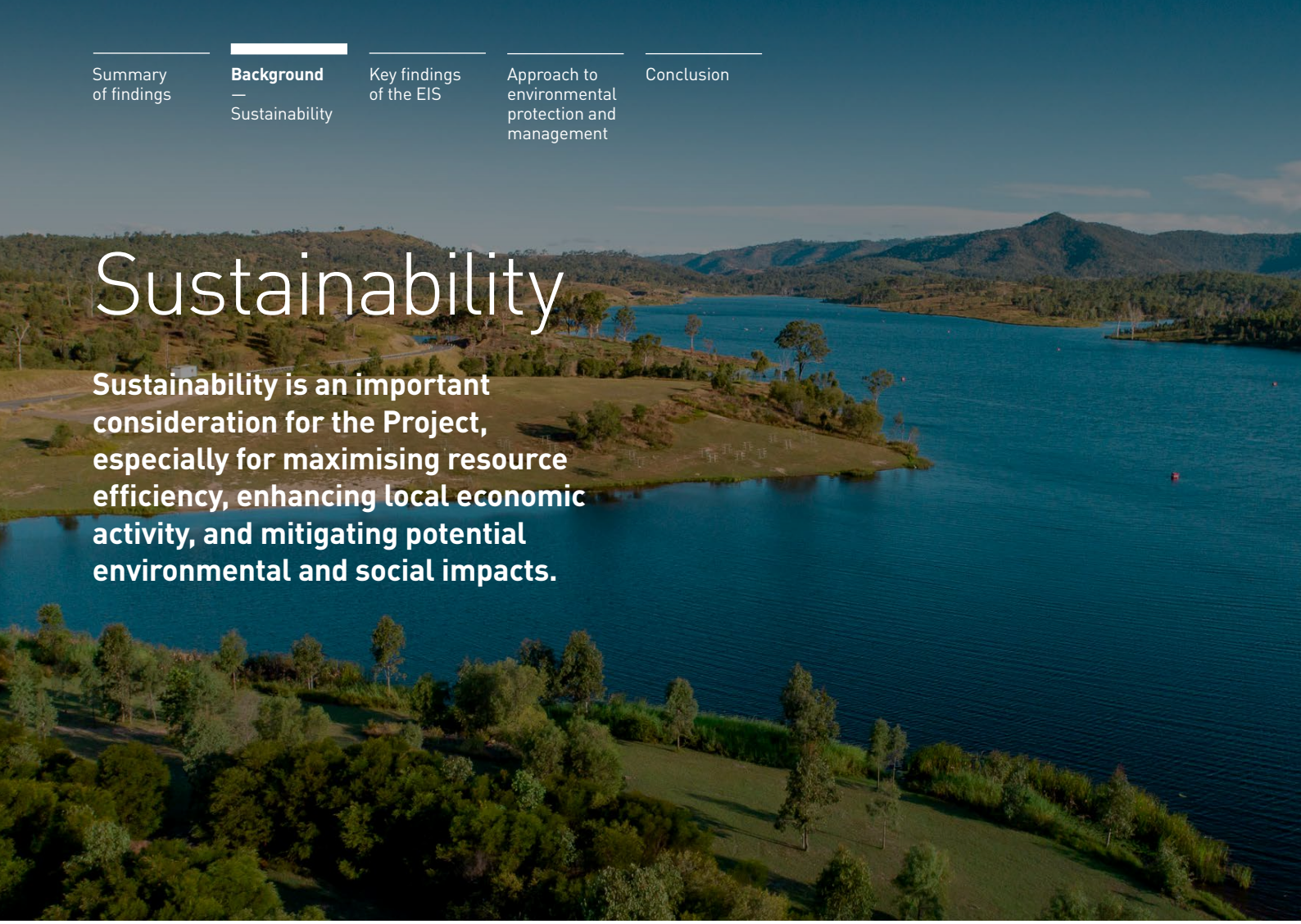
Typical project construction hours

- Monday to Friday 6.30am–6.00pm
- Saturday 6.30am–1.00pm
- no work Sundays and public holidays

Sources of construction water

The hierarchy of preference is anticipated to be:

- public surface water storages i.e. dams and weirs
- recycled water, where appropriate
- permanently (perennial) flowing watercourses
- privately held water storages, i.e. dams or ring tanks, under private agreement
- existing registered and licensed bores
- mains water.



Sustainability

Sustainability is an important consideration for the Project, especially for maximising resource efficiency, enhancing local economic activity, and mitigating potential environmental and social impacts.

Chapter 7 provides a summary of the sustainability considerations in relation to the design, construction and operation of the Project.

During the design phase of the Project, a broad range of sustainability initiatives were identified and implemented, and these have been used to assess the anticipated sustainability performance of the Project. It is expected that these initiatives will contribute to the achievement of an 'Excellent' rating of performance against version 1.2 of the IS Rating Scheme for the Inland Rail Program.

The EIS describes:

- the legislation, policies, standards and guidelines relevant to sustainability in the context of the Project
- defines ARTC's approach to sustainability within the context of the wider Inland Rail Program, and how this has been considered during the early stages of design of the Project
- details the proposed Sustainability Management Plan requirements and identified sustainability initiatives that will guide the detailed design, construction and operation of the Project.

The Project has embraced the three main aspects of sustainability: consideration of the economic, environmental and social impacts and opportunities. The sustainability initiatives that have been identified, documented and implemented during design in accordance with these principles under the themes of:

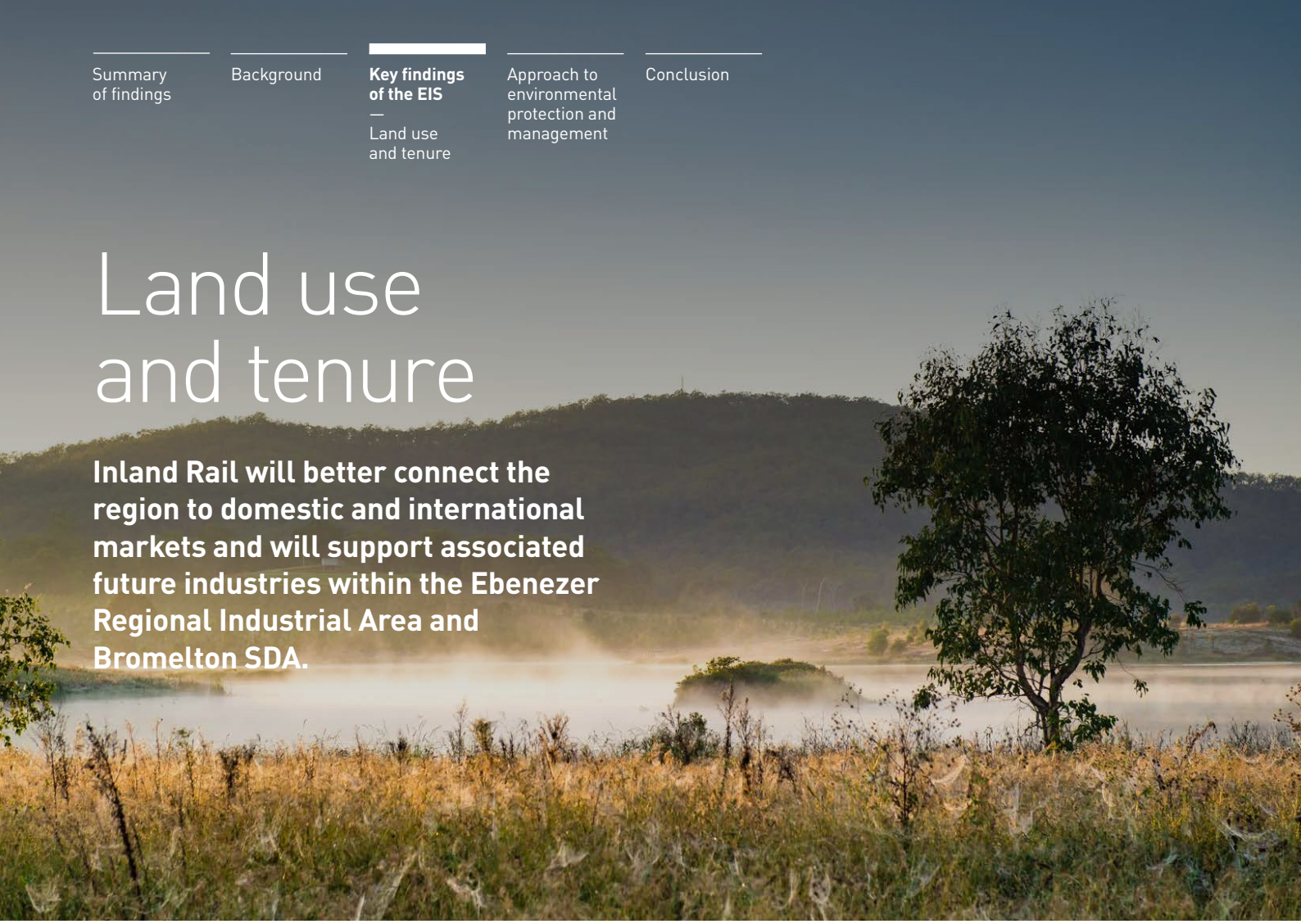
- advancing local, regional and national economies
- environmental protection
- respect for people, communities and valued places.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 7: Sustainability (Binder 01)**
- **Appendix F: Corporate Policies (Binder 03)**

Land use and tenure



Inland Rail will better connect the region to domestic and international markets and will support associated future industries within the Ebenezer Regional Industrial Area and Bromelton SDA.

Chapter 8 assesses the Project's compatibility with and potential impacts on land use and tenure.

Land use

Land use around the Project is mostly grazing land, with other ancillary agricultural uses including irrigated cropping, grazing and modified pastures, and irrigated modified pastures.

The study area and close vicinity includes:

- protected and sensitive land uses (Gum Tips Nature Refuge, Purga Nature Reserve and biodiversity corridors)
- one known recorded underground historic colliery located at Ebenezer
- key resource area (Purga) and coal resource area (coal deposits at Bremer View East)
- multiple road crossings and utility interactions.

Other nearby notable land uses include:

- Ipswich Motorsport Precinct and Bentonite Quarry at Willowbank
- Ivory's Rock Convention and Events Centre near Peak Crossing
- sand and soil Quarry at Kagaru.

The study area also includes:

- land that is burdened by easements along the alignment and some land that is subject to depth restrictions at the Ebenezer coal mine
- a Carbon Abatement Interest located at Purga
- mineral resource and petroleum and gas resource interests (one ML, two ATPs, 2 PCAs and one PL (Moonie to Brisbane pipeline).

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 8: Land Use and Tenure (Binder 01)**
- **Appendix G: Impacted Properties (Binder 03)**

Tenure

Tenure within the land use study area is summarised in the table below.

	Permanent disturbance footprint			Temporary disturbance footprint		
Type of tenure	**No. of land parcels**	**Area(ha)**	**% of land within permanent disturbance footprint**	**No. of land parcels**	**Area(ha)**	**% of land within temporary disturbance footprint**
Freehold	171	687.98	91.1	185	204.93	92.3
Lands Lease	3	11.16	1.5	3	2.71	1.2
Reserve	1	0.40	0.1	1	0.20	0.09
State land	0	0.00	0.0	1	0.02	0.0
Road type parcel	-	52.30	6.9	-	14.41	6.3
Watercourse	-	2.89	0.4	-	0.97	0.2
Total	**175**	**754.73**	**100.0**	**190**	**220.09**	**100**

Potential impacts to land use and tenure

The construction and operation of the Project has the potential to result in direct and permanent impacts to land use and tenure within the land use study area, with the majority of impacts likely occurring immediately on commencement of land acquisition and construction of the Project. These include:

- change in tenure and loss of property (in part or whole) via land acquisition processes
- change in land use, including:
  - impacts on agricultural uses and activities through acquisition or land fragmentation and disruption to access and stock route networks
  - improved connections and access for the region to domestic and international markets
  - change to notable land uses
  - sterilisation of mineral and petroleum resources
  - development activity
- accessibility:
  - impacts on road network
  - impacts to property access
- impacts on services and utilities (disruptions and relocations)
- opportunities to support future industry development, particularly at Ebenezer, Bromelton and Willowbank.

Land use within the Project area is:

- mostly grazing land
- irrigated cropping
- grazing modified pastures
- irrigated modified pastures

At a glance

Key impacts and opportunities

Potential impacts on land use and tenure include:

- changes in tenure and loss of property
- disruption to land over which native title claims have been made
- temporary and permanent changes in land use, including the loss of agricultural land and disruption to agricultural practices
- impacts to accessibility, including impacts on the road network and to private property access
- disruption, relocation and modification to services and utilities.

The Project is also likely to result in a number of benefits to land use, including supporting future industries, improving access to and from regional markets, and acting as a catalyst for development in the area.

Proposed mitigation measures

- Further refine the disturbance footprint during detailed design to a size required to safely construct, operate and maintain the Project, and minimise land acquisition, severance and disruption to land use, tenure and transport networks.
- Where feasible, detailed design and construction planning will minimise alterations to the surrounding road and transport network and maintain legal property accesses.
- Develop and implement a Reinstatement and Rehabilitation Plan for areas within the disturbance footprint that are temporarily disturbed during construction.
- Landscaping and rehabilitation of disturbed areas will be undertaken in accordance with the Project's landscape design, Reinstatement and Rehabilitation Plan and the Landscape and Rehabilitation Management Plan, which will define performance criteria required from rehabilitation.

Southern Freight Rail Corridor

The Project will generally be located within the Southern Freight Rail Corridor (SFRC), which was gazetted in November 2010 as future railway land under the *Transport Infrastructure Act 1994* (Queensland).

Extensive public consultation and technical, environmental and cultural heritage studies were undertaken before the SFRC was gazetted. The SFRC forms the basis for the EIS investigation corridor.

Potential mitigation measures

Potential mitigation measures are summarised below:

Property

- Detailed design to further refine the project disturbance footprint identified and assessed in the EIS, to that which is required to safely construct, operate and maintain the Project.
- Minimise property acquisition requirements, property severance and disruption to land use and transport networks.
- Surveying and clearly defining Project clearing extents.
- Consultation is to occur with the resource tenement holders.

Access

- Detailed design and construction planning;
  - minimises alterations to the surrounding road and transport network
  - maintains legal property accesses
- Develop site-specific traffic management plans with key land uses and businesses adjoining, or within close proximity of, the Project disturbance footprint to minimise business operations disruptions during construction (e.g. businesses that rely on access to Undullah Road).
- Road–rail interface detailed design to be undertaken in consultation with road/rail authority.

Reinstatement and rehabilitation

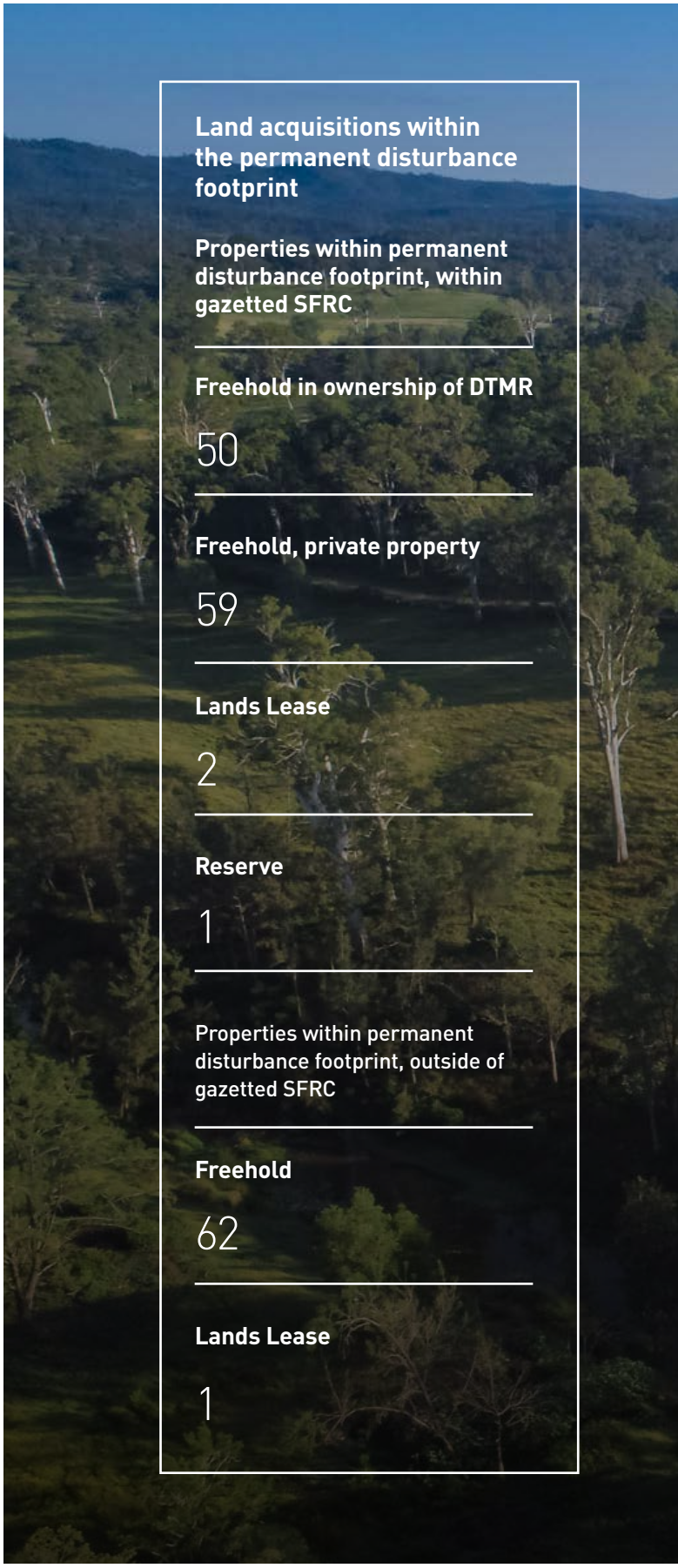
- A Reinstatement and Rehabilitation Plan will be developed for areas within the disturbance footprint that do not form part of the permanent works (e.g. construction compounds, laydown areas, temporary access and some temporary erosion and sediment controls). The Plan will include and clearly specify:
  - location of areas subject to reinstatement and/or rehabilitation
  - rail safety operational requirements and constraints
  - details of the actions and responsibilities, performance criteria and monitoring frameworks to progressively rehabilitate, regenerate, and/or revegetate areas no longer active.
- A Landscape and Rehabilitation Management Plan must be developed to define progressive and post construction installation of the Project landscape design, its establishment and ongoing maintenance and monitoring requirements in addition to construction contract completion criteria for areas defined in the landscape design and/or identified in the Reinstatement and Rehabilitation Plan.

Utilities

- The location of utilities, services and other infrastructure identified through design processes to date will be further documented during detailed design to confirm requirements for access to, diversion/relocation, protection and/or support.
- Interface arrangements with impacted public utility providers will be finalised prior to relevant construction activities commencing.

Fencing

- Where practicable, permanent Project boundaries are to be fenced in accordance with Inland Rail fencing standards.



Land acquisitions within the permanent disturbance footprint

Properties within permanent disturbance footprint, within gazetted SFRC

Freehold in ownership of DTMR

50

Freehold, private property

59

Lands Lease

2

Reserve

1

Properties within permanent disturbance footprint, outside of gazetted SFRC

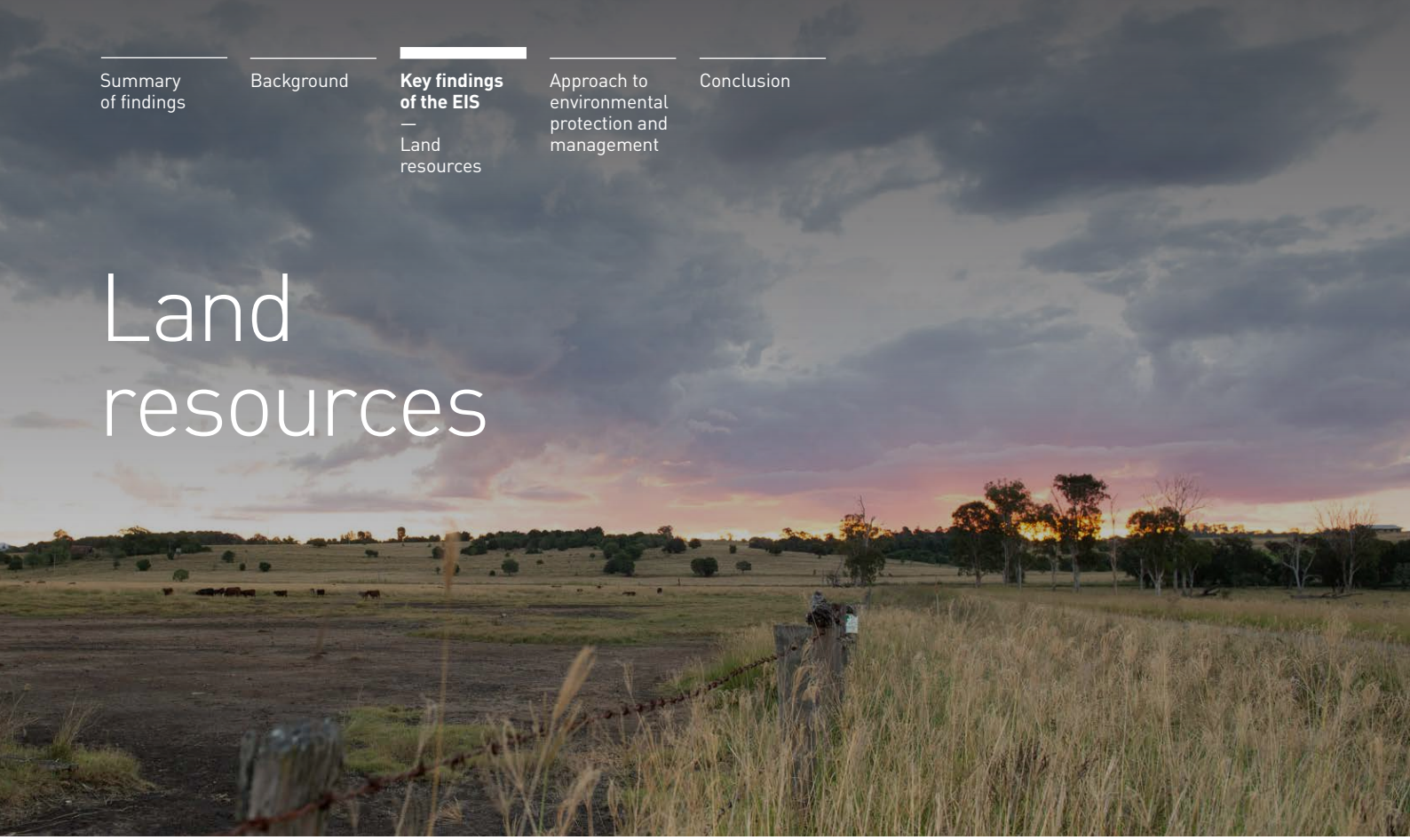
Freehold

62

Lands Lease

1

Land resources



Chapter 9 of the EIS assesses the Project's impact on land resources. This assessment includes an evaluation of the existing environment to identify and assess the risks arising from the disturbance and excavation of land and the disposal of soil or unsuitable spoil material.

A desktop assessment of the existing land resources was undertaken, supplemented by field assessments of soil for salinity, acid sulfate soils, and sodic, dispersive and cracking clay soils. A quantitative and qualitative risk assessment of soil properties, including agricultural and problematic soils and contaminated land was undertaken.

The land resources study area broadly consists of three distinct topographical areas: the western lowlands, the central ranges (Teviot Range), and the Beaudesert Basin. The landscape reflects the underlying geology with a central anticline, forming rugged sandstone hills, and flanking synclines containing coal, sedimentary and igneous rocks that form gently undulating lowlands. The lowlands are traversed by numerous ephemeral and perennial watercourses that have given rise to several wide floodplains.

The assessment identified:

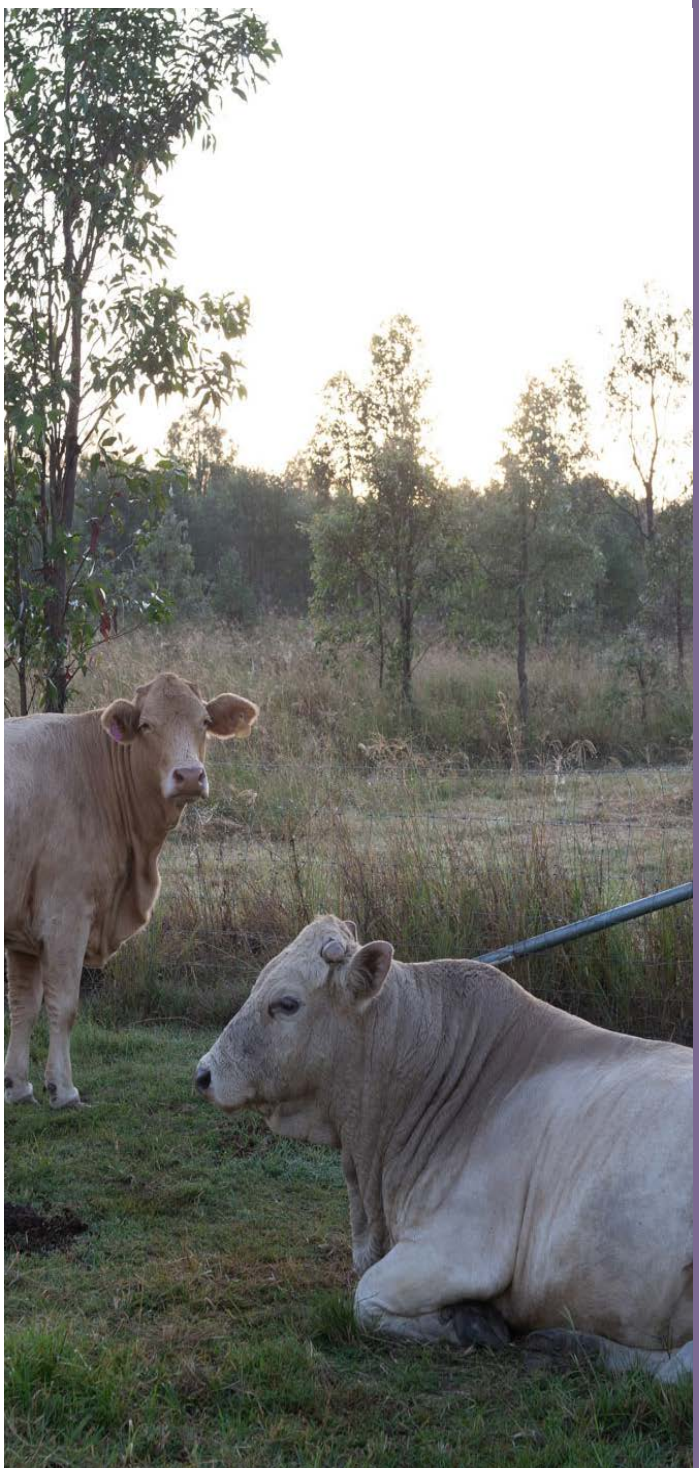
- five distinct soil types occur in the land resources study area: vertosols, sodosols, dermosols, chromosols and rudosols. Sodosols, chromosols and dermosols are the most susceptible to dispersion and have the potential for severe erosion along hillsides
- no acid sulfate soils or acid rock were found
- there is a medium-to-high potential hazard of salinity
- areas of Class A and Class B agricultural land featured in small patches in the study area. Agricultural land classified as Class A or Class B land is the most productive land in QLD, with soil and land characteristics that allow successful crop and pasture production
- The study area intersects two Important Agricultural Areas (IAA) at Peak Crossing and Kagaru. IAAs are defined as land that has all the requirements for agriculture to be successful and sustainable, is part of a critical mass of land with similar characteristics and is strategically significant to the region or the State.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 9: Land Resources (Binder 01)**
- **Appendix H: EMR Searches and Laboratory Certificates (Binder 0) (Binder 03)**

Potential sources of land contamination in the vicinity of the alignment include agricultural activities, quarries, landfilling and waste disposal, the existing rail corridor, and road crossings. Additionally, 17 properties within the land resources study area (which includes 11 properties within the disturbance footprint) are listed on the Environmental Management Register as potential sites for other types of contamination.



At a glance

Key impacts

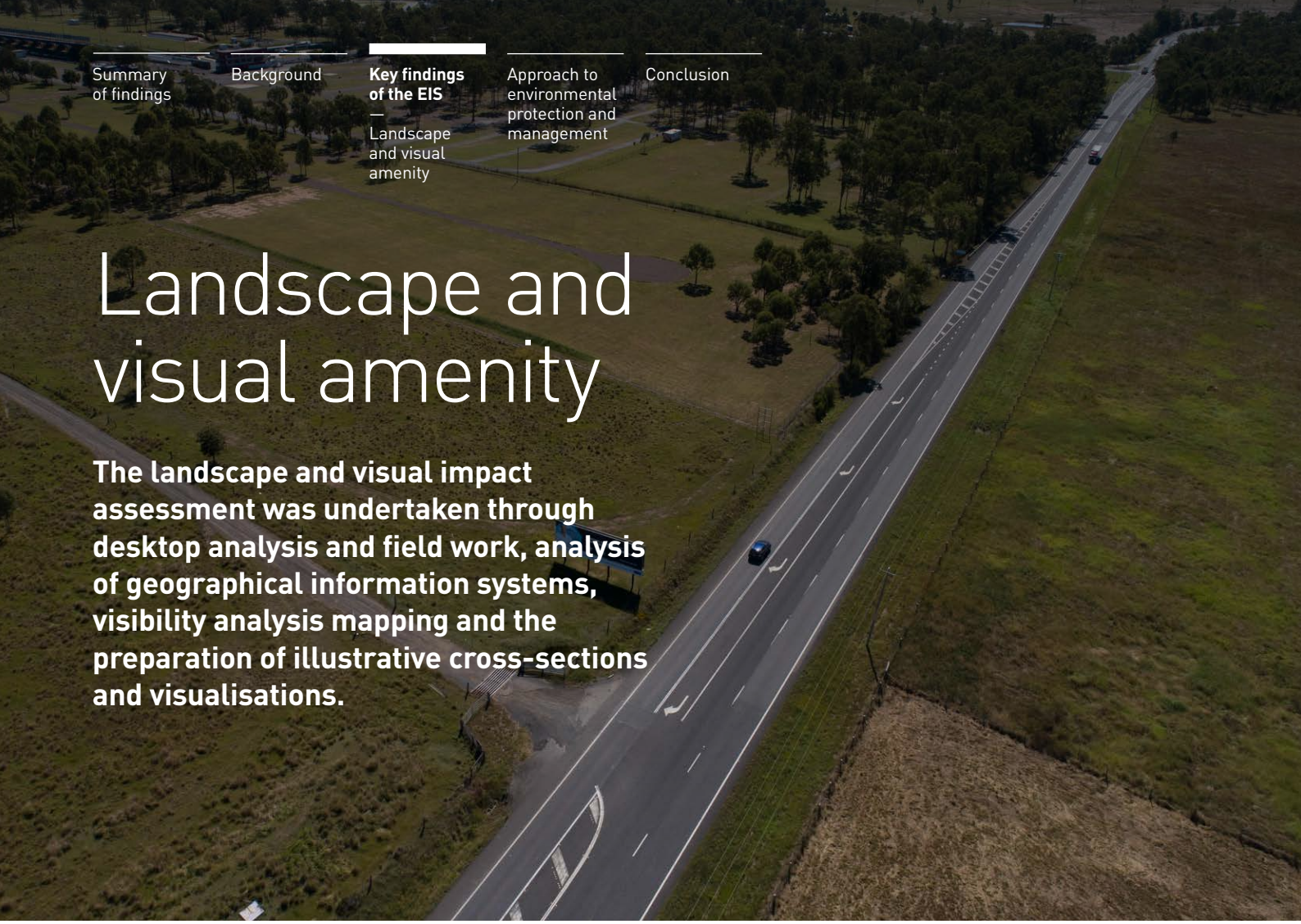
Potential impacts to land resources include:

- permanent changes to landforms and topography, which will influence how soil retains and moves water within catchment systems
- loss of soil-related natural resources including agricultural areas
- unexpectedly encountering acid sulfate soils or acid rock
- degrading soil resources through invasive flora and fauna
- increased salinity causing water table salting, irrigation water salting and erosion scalding
- disturbance of existing contaminated land
- creation of new contaminated land resulting from Project activities.

Residual impacts of the Project on land resources are anticipated to be low, except for changes to landform and topography, loss of soil resources and the potential for disturbance of existing contaminated land.

Proposed mitigation measures

- Further refine the disturbance footprint during detailed design to a size required to safely construct, operate and maintain the Project, and minimise impacts to land resources, including potential fragmentation and sterilisation of Class A agricultural land, Class B agricultural land and IAAs.
- Undertake further geotechnical and soil surveys during detailed design to characterise soil and ground conditions across the disturbance footprint.
- Develop and implement:
  - Contaminated Land Management Strategy
  - Erosion and Sediment Control Plan
  - Construction Environmental Management Plan
  - Construction Spoil Management Plan
  - Reinstatement and Rehabilitation Plan.



Landscape and visual amenity

The landscape and visual impact assessment was undertaken through desktop analysis and field work, analysis of geographical information systems, visibility analysis mapping and the preparation of illustrative cross-sections and visualisations.

Chapter 10 assesses the impact of the Project on the various landscape character types in the region.

The landscape between Calvert and Kagaru is highly varied, comprising intensive irrigated agriculture, dry croplands and pastures interspersed with a network of rivers and creeks, and set against the distinctive backdrop of forested hills created by the Teviot and Little Liverpool Ranges.

For much of the area, there are relatively few visual receptors with the landscape comprising isolated farmsteads set on large private farms.

Visual impacts are typically contained by the presence of vegetation, including along creek lines, and localised undulations in landform. Elevated and panoramic views over the alignment are also available from the Forested Uplands, particularly from walking trails around Flinders Peak. Elsewhere, there are fairly open views across the rural landscape from the network of local roads and highways, including the Cunningham Highway, Rosewood–Laidley Road and Ipswich–Boonah Road.

There are ten landscape character types (LCTs) within the study area, of which eight are potentially affected by the Project. These are:

- **LCT A:** Vegetated watercourses – rivers
- **LCT B:** Vegetated watercourses – creeks and channels
- **LCT C:** Irrigated croplands
- **LCT D:** Dry croplands and pastures
- **LCT E:** Vegetated grazing
- **LCT F:** Rural settlement
- **LCT G:** Transitional landscapes
- **LCT H:** Forested uplands.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 10: Landscape and Visual Amenity (Binder 01)**
- **Appendix I: Landscape and Visual Impact Assessment Technical Report (Binder 03)**

Twelve representative viewpoints were used to assess the potential landscape and visual impacts of the Project on a range of 'visual audiences', including:

- local residents and workers in towns and rural settlements
- local residents and workers on rural and acreage properties
- travellers on main and local roads
- tourists on roads including users of 'scenic drives' and staying in tourist accommodation
- recreational users of the landscape.

> For much of the area, there are relatively few visual receptors with the landscape comprising isolated farmsteads set on large private farms.

At a glance

Key impacts

- Key landscape and visual impacts of the Project relate to the removal of vegetation, the raising of embankments and creation of new rail bridges.
- Ten landscape character types were identified within the landscape and visual impact assessment study area, of which eight are potentially affected by the Project. A significant impact is anticipated on **LCT H**: Forested Uplands due to extensive cut-and-fill and tunneling within the forested landscapes of the Teviot Range, south of Flinders Peak.

Proposed mitigation measures

- Key mitigation measures include landscape design, and implementation of the Reinstatement and Rehabilitation Plan and the Landscape and Rehabilitation Management Plan.

Visualisation showing the proposed Wild Pig Creek Road level crossing.

Viewpoint 1: Visualisation showing the proposed rail bridge over the Rosewood–Warrill View Road looking north-east.

Viewpoint 3: Visualisation showing the proposed road over rail at Cunningham Highway looking south-east to Flinders Peak.

Viewpoint 5: Visualisation showing the proposed rail bridge over Ipswich–Boonah Road looking north-east.

Potential impacts

Visual

The key visual impacts of high significance identified relate to the presence of railway infrastructure (bridges) as viewed from:

- **Viewpoint 1:** Rosewood–Warrill View Road looking north-east
- **Viewpoint 3:** Cunningham Highway looking south-east to Flinders Peak.
- **Viewpoint 5:** Ipswich–Boonah Road looking north-east.

Other visual impacts during both construction and operation are of lower significance, typically relating to views experienced by relatively small numbers of homesteads or with lower modification to visual amenity.

Landscape

Construction impacts on landscape character are temporary resulting from the removal of vegetation, which will persist into the operational phase.

Impacts of up to high significance are anticipated on **LCT H:** Forested Uplands, and up to moderate significance on **LCT C:** Irrigated Croplands, **LCT D:** Dry Croplands and Pastures and **LCT E:** Vegetated Grazing.

Lighting

As there is limited Project lighting proposed, most of the viewpoints are not anticipated to be affected by night lighting. The lighting assessment concludes that the proposed alignment and associated infrastructure is unlikely to create any obtrusive lighting impacts of greater than low significance on the external environment during typical night-time scenarios.

Mitigation measures

Landscaping and rehabilitation of disturbed areas will be undertaken in accordance with the Project's landscape design, Reinstatement and Rehabilitation Plan and the Landscape and Rehabilitation Management Plan, which will define performance criteria required from rehabilitation.

Disclaimer: Project visualisations are for illustrative purposes and not to scale. Please note, the reference design may change as a result of further investigations, government approvals or during detailed design.

Flora and Fauna

The ecology assessment included desktop analysis, field assessments and predicted habitat mapping and an assessment following Commonwealth and State guidelines to determine if the Project will have a significant impact on prescribed environmental matters.

Chapter 11 examines the impact of the Project on native flora and fauna and outlines the steps taken to assess, understand and mitigate impacts.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 11: Flora and Fauna (Binder 01)**
- **Appendix J: Terrestrial and Aquatic Ecology Technical Report (Binder 04)**
- **Appendix J: Terrestrial and Aquatic Ecology Technical Report Appendices (Binder 05)**
- **Appendix K: Matters of National Environmental Significance Technical Report (Binder 06)**
- **Appendix K: Matters of National Environmental Significance Technical Report (Binder 07)**

Local environmental groups and community members highlighted concerns about the impact of the Project on flora and fauna. They were also concerned about how local environmental knowledge, such as survey findings, could be captured in the Project's impact assessment.

A series of flora and fauna-specific workshops were held with local environmental groups and the Project's ecologist. These workshops detailed the study methodology and identified additional stakeholders to include in future consultation.

To support and facilitate the inclusion of local environmental groups' survey findings into the Project, ARTC arranged for an independent technical specialist to train the groups on how to use the WildNet database. WildNet contains information on more than 21,000 species and supports Queensland's biodiversity and protected areas by providing information that underpins conservation policies, programs and management responses.

A sensitive environmental receptor is a feature, area or structure that may be affected by direct or indirect changes to the environment.

Matters of national environmental significance (MNES) relevant to the Project include threatened flora, fauna and vegetation communities protected under the *Environment Protection and Biodiversity Conservation Act 1999*. It also includes for migratory species.

Matters of state environmental significance (MSES) include certain environmental values that are protected under Queensland legislation, and include regulated vegetation, wetlands, essential habitat, protected areas, protected wildlife habitat and connectivity areas.

Regional context

Moving from west to east, the landscapes within the Calvert area (western study area) are characterised by very high levels of anthropogenic disturbance and present a highly fragmented environment dominated primarily by pasture grasses, isolated trees and areas of woody regrowth.

Areas around Ebenezer (east of Calvert) are typically characterised by a highly fragmented and anthropogenically impacted (i.e. subject to land clearing for agricultural purposes) landscape. However, areas of woody regrowth vegetation (i.e. Category C regulated vegetation) are more abundant compared to the western portion of the alignment, particularly those areas to the south of the Project.

The areas south of Purga towards Peak Crossing and Washpool are largely rural landscapes dominated by pasture species. However, within these areas, woody regrowth and remnant vegetation in the form of intact ecosystems are increasingly common to the east of the ecology study area, particularly around Peak Crossing and Washpool.

Throughout the Woolooman area and the Teviot Range, the terrain is rugged and there is minimal development. The existing nature of the topography and vegetation within the Teviot Range, enhances its ability to function as a fauna movement conduit, facilitating wildlife movement in a north-south direction. The eastern portion of the alignment (areas around Kagaru) is characterised by largely non-remnant vegetation communities and agricultural land.

Stakeholder engagement

The training on how to use WildNet resulted in new records from these groups being included in the database. Based on these new records, ARTC updated Project reporting to better reflect the impact of the Project on local flora and fauna species.

Existing environment

Flora

- Desktop assessment identified five specimen-backed records of threatened or near threatened flora.
- Field assessments identified two threatened flora species:
  - Swamp Tea-tree (Melaleuca irbyana)
  - Lloyd's Olive (Noteloea llaydii).

Regional ecosystems and vegetation communities

- Desktop analysis indicated the ecology study area contains Category 6 (remnant vegetation) and Category C (high value regrowth) regulated vegetation.
- A single theathened ecological community (TEC) (protected under the EPBC Act) being the Swamp-tea tree (Melaleuca irbyana) Forect of the South East QLD exists within the western portion of the ecology study area.

Fauna

- The threatened or near-threatened species are identified from the ecology study area consist of the following:
  - Koala (Phascolarctos cinereus) with direct observation of individuals and identification via scats
  - Glossy-black Cockatoo (Calyptorhynchus lathami)
  - Powerful Owl (Ninox strenua) detected via call play-back sampling.
- In addition to these species two non-threatened migratory species listed under the EPBC Act were observed within the ecology study area:
  - Rufous Fantail (Rhipidura rufifrons)
  - Glossy Ibis (Plegadis falcinellus).

Predicted habitat modelling

- Predicated habitat mapping for threatened, near-threatened, migratory and special least concern species indicates that potentional habitat exists for 9 flora and 33 fauna species.

Potential impacts

The Project has the potential to impact on sensitive environmental receptors, predominantly during the construction phase, via:

- habitat loss and degradation from vegetation clearing and removal
- fauna species injury or mortality
- reduction in biological viability of soil to support growth due to soil compaction
- displacement of flora and fauna species from invasion of weed and pest species
- reduction in the connectivity of biodiversity corridors
- edge effects
- habitat fragmentation
- barrier effects
- noise, dust, and light
- increase in litter (waste)
- aquatic habitat degradation
- erosion and sedimentation.

Mitigation and residual impacts

Proposed mitigation measures for the Project were identified to reduce the significance of the potential impacts on the sensitive environmental receptors. Following the application of the mitigation hierarchy (i.e. avoid, minimise, mitigate), which included a range of measures and management plans, the residual impacts to the identified sensitive environmental receptors were generally reduced.

However, some project activities may have cumulative, irreversible or permanent impacts on some sensitive environmental receptors, even with environmental management measures. For example, additional mitigation measures are not likely to significantly reduce impacts associated with the loss of vegetation as a result of clearing or removal, resulting in residual impacts.

Assessment of sensitive environmental receptors against the relevant Commonwealth or State significant impact assessment criteria indicates the following are subject to significant residual impacts as a result of the Project:

- Matters of State Environmental Significance
  - Swamp Tea-tree (Melaleuca irbyana) Forest of South East Queensland TEC
  - **flora:** Lloyd's Olive (Notelaea lloydii)
  - **fauna:** Spotted-tail Quoll (Dasyurus maculatus maculatus), Australian Painted Snipe (Rostratula australis), Collared Delma (Delma torquata), Swift parrot (Lathamus discolor), Red goshawk (Erythrotriorchis radiatus), Brush-tailed Rock-wallaby (Petrogale penicillata), Koala (Phascolarctos cinereus), Grey-headed Flying-fox (Pteropus poliocephalus).
- Matters of State Environmental Significance
  - endangered or of concern (Regional Ecosystems) regulated vegetation Category B (other than grassland) within a defined distance from the defining banks of a relevant watercourse or relevant drainage feature)
  - remnant vegetation intersection with a VM Act wetland
  - essential habitat
  - connectivity areas
- protected wildlife habitat for the following species:
  - Bailey's Cypress Pine (Callitris baileyi)
  - Slender Milkvine (Marsdenia coronata)
  - Swamp Tea-tree (Melaleuca irbyana)
  - Glossy-black Cockatoo (Calyptorhynchus lathami)
  - Powerful Owl (Ninox strenua).

Offsets

Provisions of offsets for the matters of national environmental significance with significant residual impacts will be required under the EPBC Act Offsets Policy. For matters of state environmental significance, impacts to prescribed matters that are considered to constitute significant residual impacts will need to be offset in accordance with the *Environmental Offsets Act 2014* (Qld). The EIS includes a draft Environmental Offset Strategy for the Project. ARTC proposes to provide its offset obligation post-EIS, following the Project's detailed design phase.

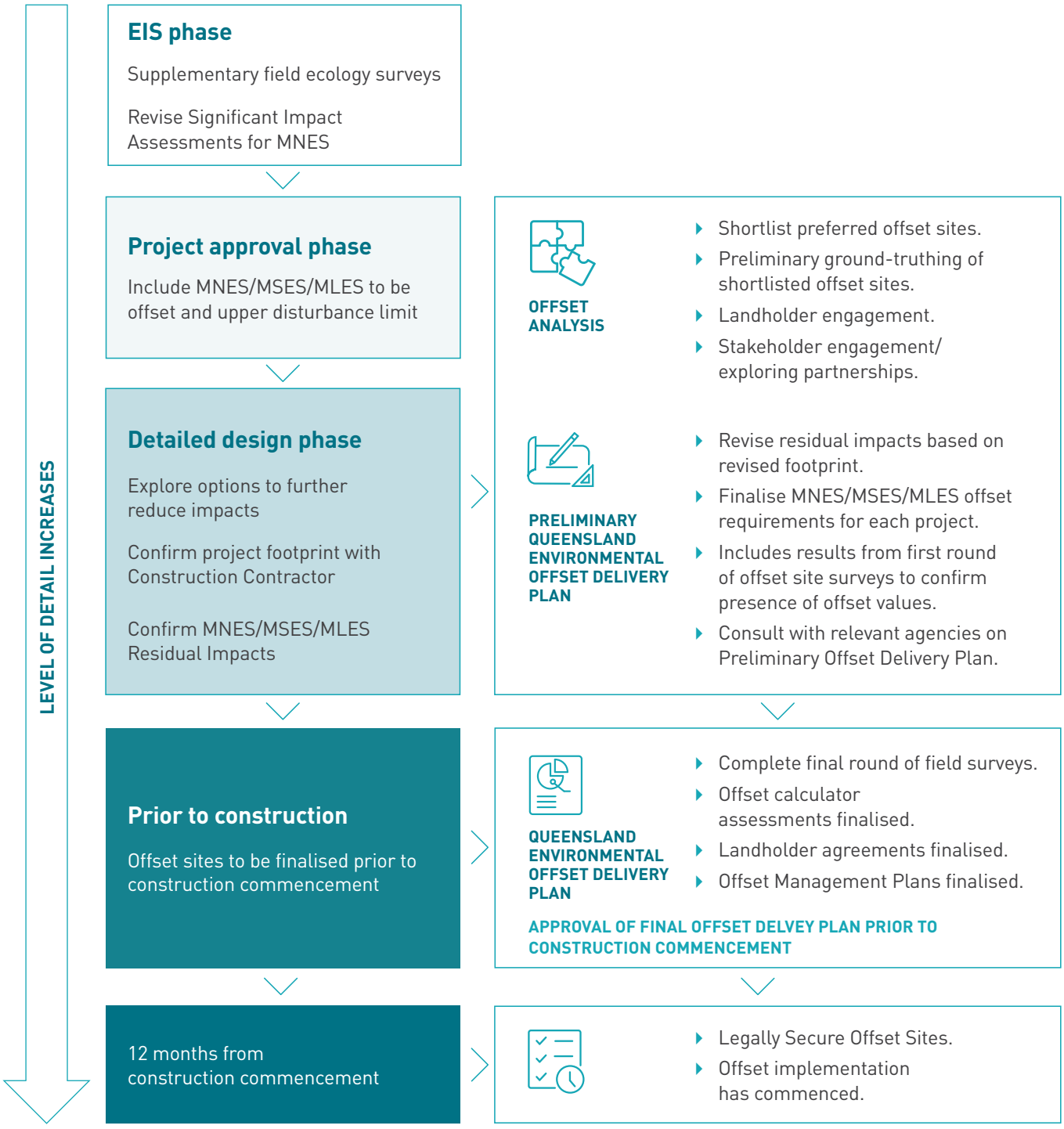
ARTC is committed to achieving enduring and meaningful conservation outcomes through the delivery of environmental offsets in the local regions where impacts occur. ARTC will seek to establish and foster working partnerships with key organisations who can assist in the delivery of environmental offsets and provide value adds such as social benefits by involving local communities.

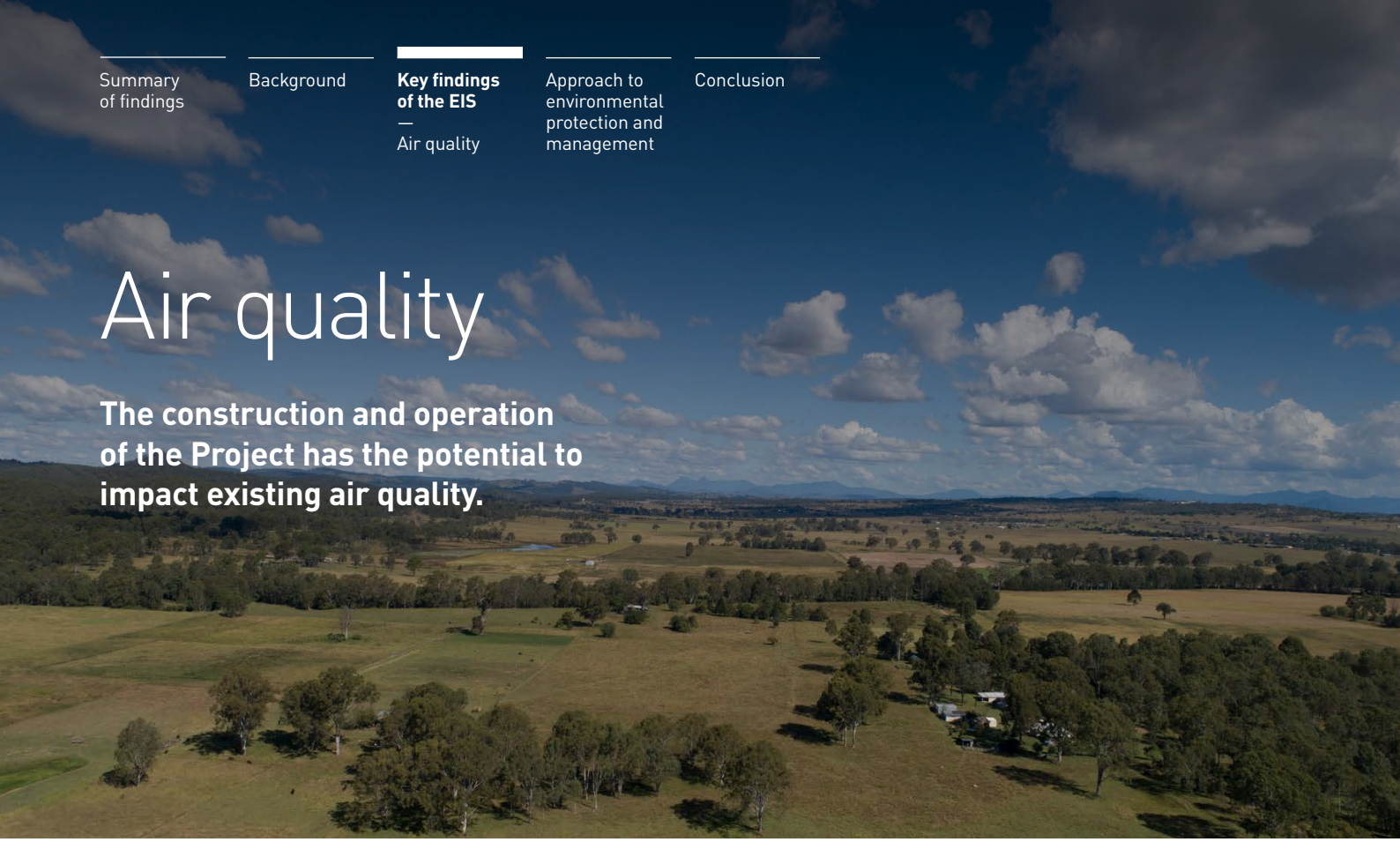
Partnerships may include:

- securing and managing land for conservation
- revegetation and restoration
- targeted pest and weed management programs
- education and raising awareness of key biodiversity values in the local regions of the project
- research associated with key threatened species and or vegetation communities.

Options for offset partnerships are being explored. ARTC is also seeking to maximise the social and community benefits of the environmental offset investments by working with relevant Indigenous group, local government, community groups, Natural Resource Management Catchment Groups and conservation organisations to support both the site selection process, and the ongoing management and monitoring of these offset sites. ARTC has commenced consultation with stakeholder groups and will continue to do so through the project approval and offset process to explore these opportunities.

Offset delivery plan stages





Air quality

The construction and operation of the Project has the potential to impact existing air quality.

Chapter 12 assesses the potential impacts arising from the Project on air quality and identifies mitigation measures to manage potential impacts.

Predicted air emissions from the construction phase of the Project were assessed qualitatively and dispersion modelling assessed line source emissions – operational emissions from freight trains travelling along the track.

Pollutants of concern

The air pollutants expected to be generated during the construction and operation phases of the Project include:

- total suspended particulates (TSP)
- particulate matter less than 10µm in diameter (PM10)
- particulate matter less than 2.5µm in diameter (PM2.5)
- oxides of nitrogen (NOx)
- nitrogen dioxide (NO2)
- carbon monoxide (CO)
- volatile organic compounds (VOCs)
- odour
- polycyclicaromatic hydrocarbons (PAHs)
- trace metals including arsenic, cadmium, lead, nickel and chromium VI
- sulfur dioxide (SO2)
- ozone.

Sensitive receptors

The Project is located in a predominantly rural setting, a significant distance away from major population centres.

There are 548 sensitive receptors within the air quality study area (being a 2km buffer either side of the rail alignment). Of the 548 receptors, 159 are located within 350m of the disturbance footprint, and 7 of the 159 receptors are located less than 20m away.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 12: Air Quality (Binder 01)**
- **Appendix L: Air Quality Technical Report (Binder 08)**

Surfaces

The primary sensitive receptor types in the study area are residential dwellings. Surfaces that lead to portable water tanks are also considered sensitive receptors.

At a glance

Key impacts

Potential impacts to land resources include:

- in the construction phase of the Project, dust sources will be variable and transitory in nature and the potential for impacts depend on the proximity to sensitive receptors
- assessments show that during the operation phase, compliance for all pollutants is predicted for all traffic-volume scenarios, if veneering is used. Without veneering, the annual objectives are predicted to be exceeded. Therefore, it is expected that veneering will be required. No other mitigation measures are proposed
- during operations, no exceedances of drinking water guidelines were identified due to tank water quality.

Proposed mitigation measures

Proposed mitigation measures for the construction phase as part of the Project design and CEMP include:

- water sprays reduce dust emissions from the excavation and disturbance of soil and materials, vehicle travel on unsealed roads, and loading and unloading of materials
- rehabilitation of exposed areas
- minimum separation distances for the location of fuel storage tanks.

Before operational activities involving coal transport starts, ARTC will consult existing stakeholders and members of the South West Supply Chain about coal dust management and monitoring practices.

Operations

Dispersion modelling was undertaken for the operational phase. The assessment of the operational phase assumed that a number of the operational management measures already required by the QR West Moreton System (required by the South West Supply Chain (QR West Moreton System) Coal Dust Management Plan), will apply to the Project when used for coal transport. For example, 'veneering' of coal wagons is currently required on the QR West Moreton System.

Tank water quality

Domestic rain water tanks are common within the vicinity of the Project. Rainwater stored in tanks has the potential to be contaminated and become a hazard to human health. The potential for the operation of the Project to impact tank water quality collected via roof catchment was investigated. At the worst-affected receptor, the Australian Drinking Water Guidelines were met by a significant margin.

Managing operational air quality

When the Project is operational, measures that may be used to eliminate, minimise or manage air quality impacts include:

- managing train operations, such as optimising train speed based on wagon class and axle loading
- ensuring freight operations adhere to regulatory standards or industry practice for transporting cargo likely to impact air quality
- removing dust from ballast and tracks
- ensuring tunnel ventilation designs meet technical standards
- communicating with the community and stakeholder to raise awareness of dust-reduction initiatives
- wagon washing to reduce dust during unloaded return trips
- correctly separating and maintaining vehicles and equipment.

Managing coal dust

While ARTC is responsible for construction and maintenance of Inland Rail, users of the rail line will be private operators. Dust and air quality management measures will apply to third-party freight train operators as part of network access agreements and in line with Queensland legislation. Access agreements will require operators to prepare environmental management plans to include clear performance requirements and traceable corrective measures.

Typically, this will include:

- washing coal and sections of coal wagons
- profiling or flattening the coal load within the wagons
- applying a veneer to coal loads to prevent dust from being released.

ARTC will conduct air quality monitoring to understand air quality and the operational impacts to determine if dust mitigation measures are effective.

Inland Rail may temporarily impact the air quality of nearby sensitive receptors including residences, schools and hospitals during construction and operations.

These impacts include:

- dust or emissions from earthworks and construction activities
- gas from diesel combustion of train exhausts
- dust from cargo and movement of train wagons on the tracks
- dust or emissions from operational maintenance activities.

Construction

Air emissions from large linear infrastructure projects, such as Inland Rail, are difficult to estimate due to the broad range and temporary nature of construction activities. Also, construction sites are spread across a large area. As such, emissions from the Project during construction were assessed qualitatively through a review of anticipated construction activities, plant and equipment.

The highest proportion of construction emissions are generated by mechanical activity, e.g. material movement or mobile equipment activity, which typically generate coarser particulate emissions (PM10 and TSP). In addition to construction dust, odour and VOCs will be emitted as fugitive emissions from fuel tanks located at laydown areas.

The qualitative impact assessment found that unmitigated emissions due to construction activities, plant and equipment pose a low risk to human health, but a 'medium' risk in terms of dust deposition.

Dispersion modelling was used to estimate emissions during the operational phase. Assessments show that during the operation phase, compliance for all pollutants is predicted for all scenarios, if veneering is used. Veneering involves applying a biodegradable, non-toxic binding agent onto the surface of loaded coal wagons, which forms a crust over the coal that minimises coal dust lifting off in transit.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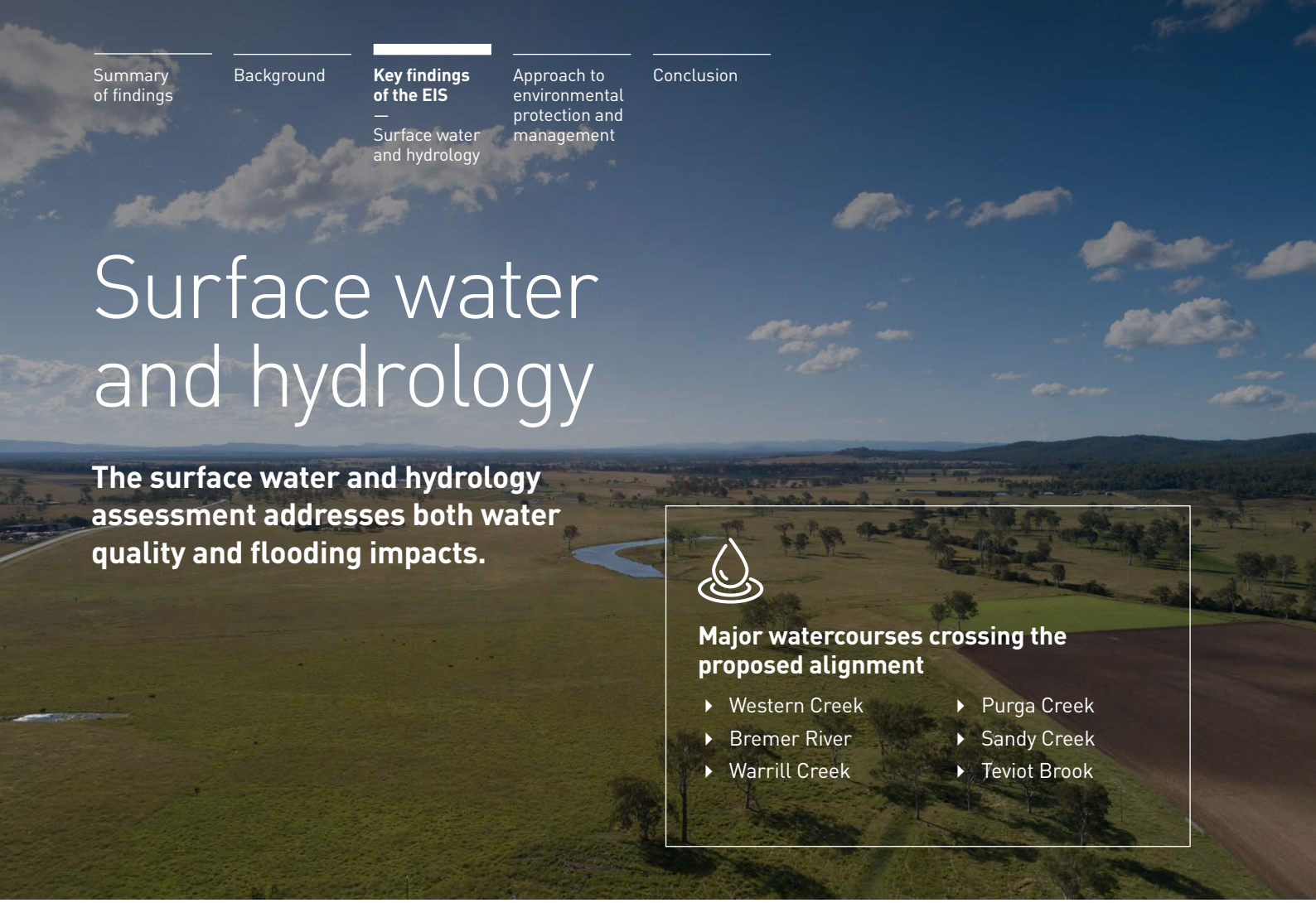


Surface water and hydrology

The surface water and hydrology assessment addresses both water quality and flooding impacts.

Major watercourses crossing the proposed alignment

- Western Creek
- Bremer River
- Warrill Creek
- Purga Creek
- Sandy Creek
- Teviot Brook

Chapter 13 includes a description of the surface water quality impact assessment and the hydrology and flooding impact assessment undertaken for the Project.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 13: Surface Water and Hydrology (Binder 02)**
- **Appendix M: Surface Water Quality Technical Report (Binder 09)**
- **Appendix N: Hydrology and Flooding Technical Report (Binder 10)**

Existing environment

The Project is located within the Bremer River and Logan River catchments, with several sub-catchments intersecting the alignment. A number of defined watercourses (refer pop-out box above) and unmapped waterways and waterbodies (natural and artificial/constructed dams) occur within the water quality study area.

There are no wetlands of international importance (Ramsar) within 10km of the water quality study area. Several ecologically significant wetlands are present within the study area, however are not located within the disturbance footprint and therefore will not be directly impacted. No springs were observed during field assessments or desktop analyses.

Water quality sampling was undertaken across the numerous sites in the study area. Many sites show patterns of degradation indicating potential for existing anthropogenic influences. Historical and EIS sampling results show that the existing water quality does not meet all water quality objectives for the protection of aquatic ecosystems.

A desktop salinity assessment identified that sections of the Project alignment intersect moderate-to-high salinity hazard rating areas.

Surface water quality

Potential impacts

- Introduction of contaminants from a variety of sources during construction and operations, including accidental spills and leaks of chemicals or fuels.
- Increased erosion and sedimentation causing changes to water quality.
- Construction activities may increase salinity, turbidity and sedimentation within watercourses.
- Indirect surface water quality changes may occur downstream as a result of increased turbidity and sedimentation with potential to directly impact surface water quality values and indirectly impact aquatic ecosystem values.
- Altered water quality from point discharge at culverts and at the Teviot Range tunnel during operations.
- Increased debris along Project alignment due to conveyance through overland flow pathways.
- Inadequate rehabilitation may exacerbate the above impacts.

Management of impacts

- Design has, where possible, avoided (and if not possible, further minimised impacts) to watercourses and drainage features.
- A Water Quality Monitoring Program is proposed to monitor the effectiveness of mitigation measures for surface water quality before and throughout construction. During operations, it is expected monitoring will be limited to monitoring discharge from the water treatment plant into Purga Creek. The surface water monitoring framework will outline water quality objectives, standards and parameters to measure any changes to water quality.
- Design to refine temporary and permanent stormwater, erosion and sediment/pollution control measures. Construction to be undertaken in line with Erosion and Sediment Control Plans.
- Rehabilitation to be undertaken in line with a Reinstatement and Rehabilitation Plan.

Flooding and hydrology

Flooding is a key concern for communities along the Project's alignment. The Project alignment passes near the localities Calvert, Lanefield, Lower Mount Walker, Ebenezer, Mutdapilly, Purga and Washpool. A number of these localities, including properties and infrastructure, and the QR rail line, are sensitive to flood conditions with flood sensitive receptors identified along the Project alignment. Flood models have been developed and informed by community input and landowners to 'ground truth' the modelling.

Flooding and hydrology key terms

- **AEP (Annual Exceedance Probability):** the chance of a flood of a particular size occurring in a particular. For example, the 1% AEP flood is a flood that has a 1% chance of occurring, or being exceeded, in any one year.
- **Peak water level:** the highest level at which water reaches during a flood event
- **Velocities**: the speed at which water moves.
- **Flood flow distribution:** the spread or area in which flow is dispersed.
- **Change in duration:** the duration of which areas are wet.
- **Probable Maximum Flood (PMF):** the largest flood that could conceivably occur at a particular location.
- **Flood immunity:** the level of flood protection provided by a structure. The rail line is required to have a 1% AEP flood immunity with 300 mm freeboard to formation level. The tunnel portals have a 1 in 10,000 AEP immunity.

Modelling

A detailed hydraulic assessment was undertaken, establishing the existing case (i.e. base case without the Project), followed by modelling which considered the proposed works. Project drainage structures were also refined to minimise potential impacts to acceptable levels.

Different flood events were modelled, including the 20%, 10%, 5%, 2%, 1%, 1 in 2,000, 1 in 10,000 AEP and PMF events.

Localised hydraulic models were developed for each major waterway crossing, for Bremer River, Warrill Creek, Purga Creek, and Teviot Brook.

Flood impact objectives have been established and relate to change in peak water levels, change in duration of inundation, flood flow distribution, velocities, extreme events and sensitivity testing.

Existing case

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

- rainfall over the waterway catchment areas upstream of the Project alignment
- backwater from downstream major systems, e.g. in the vicinity of the Project alignment, Teviot Brook is affected by flooding on the Logan River system.

Stakeholder engagement

Community engagement with landholders has been undertaken with landholders to discuss existing 1% AEP flood levels, predicted 1% AEP levels, potential impacts to houses and potential mitigation options. The consultation has been instrumental in informing the development of the hydrologic and hydraulic models and during the model calibration process. Engagement with DTMR, ICC and SRRC has also been undertaken to discuss potential impacts on State and local government controlled assets.

ARTC will continue to work with landholders throughout the detailed design, construction and operational phases of the Project.

Summary of modelled results

Bremer River

- Project design includes for three rail bridges and five culvert banks.
- Except for two locations, peak water levels and the time of submergence duration under 1% AEP complies with flood impact objectives.
- Minimal impacts on flood flow distribution.
- Velocity changes are negligible.

Warrill Creek

- Project design includes for one rail bridge.
- Except for one location, peak water levels and the time of submergence duration under 1% AEP complies with flood impact objectives.
- Minimal impacts on flood flow distribution.
- Changes in velocity are minor.

Purga Creek

- Project design includes for seven rail bridges and eight culvert banks.
- Except for five locations, peak water levels and the time of submergence duration under 1% AEP complies with flood impact objectives.
- Minimal impacts on flood flow distribution.
- Changes in velocity are generally minor. Changes do not exceed 0.7 m/s.

Teviot Brook

- Project design includes for nine rail bridges and two culvert banks.
- Except for two locations, peak water levels and the time of submergence duration under 1% AEP complies with flood impact objectives.
- Minimal impacts on flood flow distribution.
- Changes in velocity are minor.

The predicted impacts on the flood regime generally comply with the Project's flood impact objectives. Acceptable localised impacts will ultimately be determined during detailed design on a case-by-case basis, in consultation with stakeholders and landholders using the flood impact objectives as a guide.

The Project has been designed to achieve a 1% AEP flood immunity, while minimising unacceptable impacts on existing flooding and drainage regime.

At a glance

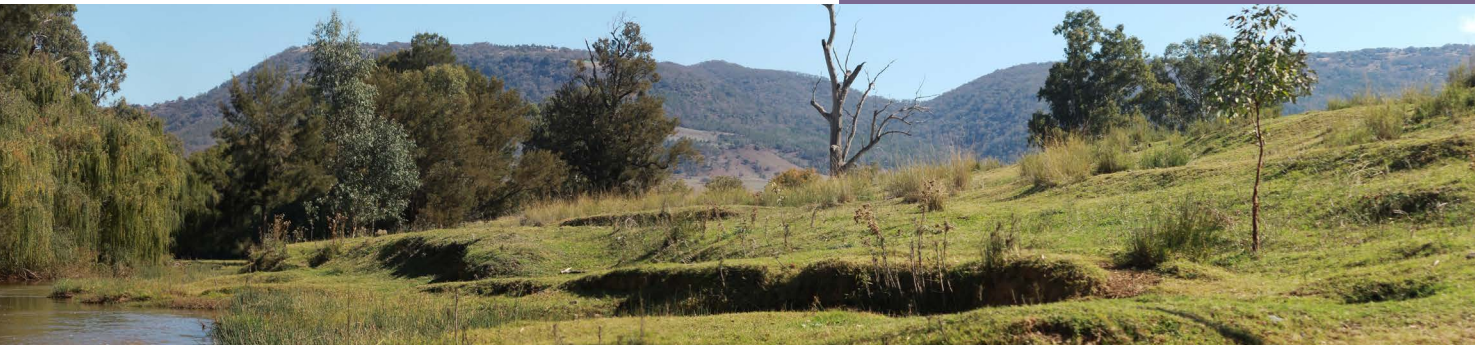
Key impacts

- Construction activities may increase salinity, debris, contaminants, erosion and sedimentation within watercourses.
- Water discharged from the Teviot Range tunnel may affect water quality.
- The Project may cause changes to the existing flooding regime, such as changes in peak water levels and inundation, concentration of flows, redirection of flows, increased velocities, and changes to duration of inundation or increased depth of water.

Proposed mitigation measures

- A Construction Environmental Management Plan (CEMP), an Erosion and Sediment Control Plan, a Reinstatement and Rehabilitation Plan, and a construction water quality monitoring program will be developed.
- A surface water monitoring framework will be developed as part of the CEMP and the construction water quality monitoring program.
- The Project has been designed to achieve a 1% AEP flood immunity. Bridges and culverts have been designed and located to maintain existing surface water flow paths and flood flow distributions, and to avoid unacceptable increases in peak water levels, flow distribution, velocities and duration of inundation.
- The predicted impacts on the flood regime generally complies with the flood impact objectives.

Upon implementation of mitigation measures, residual impacts on water quality are anticipated to be of low significance.



Groundwater

The groundwater assessment for the Project included a desktop review, geotechnical and hydrogeological site investigations, assessment of potential short and long-term impacts and an assessment of the significance of these impacts.

At a glance

Key impacts

Key impacts on groundwater include:

- loss of, or damage to, registered bores
- changes to groundwater level and flowpaths from embankment loading
- reduced groundwater levels due to seepage into cuttings and Teviot Range Tunnel
- changes to groundwater quality from spills and uncontrolled releases, or from acid rock drainage
- subsidence/consolidation due to groundwater extraction, dewatering or loading
- vegetation removal and surface alteration
- affecting recharge/discharge and increasing associated salinity risks.

Proposed mitigation measures

- Potential drainage and dewatering impacts associated with the tunnel through the Teviot Range will be further investigated to inform monitoring during construction and operation.
- The proposed groundwater monitoring network will be reviewed to ensure monitoring locations are accessible. Baseline groundwater data will confirm seasonal variation and inform detailed design. A comprehensive bore monitoring regime will be implemented.
- Sources for construction water will be confirmed with stakeholders, including landholders and occupants, before construction.
- After mitigation measures are implemented, residual impacts are expected to be low.
- Moderate residual impacts may occur on altered or reduced groundwater levels and acid rock drainage on environmental values.

Existing environment

The groundwater within the vicinity of the Project is important for stock watering and for aquatic ecosystems. The water table is typically a subdued version of the topography, with the depth to groundwater increasing under topographic highs (e.g. the Teviot Range), and is shallower in lower-lying reaches such as close to surface water drainage lines. 65 registered groundwater bores (post 2002) are within one kilometre of the alignment.

Modelling assessed potential groundwater ingress and drawdowns associated with a free-draining (unlined) Teviot Range Tunnel, portals and cuts.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 14: Groundwater (Binder 02)**
- **Appendix O: Groundwater (Binder 10)**

Chapter 14 describes the existing hydrogeological environment, the potential impacts and proposed mitigation measures.

Potential impacts and mitigation measures

The proposed alignment and disturbance footprint will influence groundwater resources and quality.

Potential impacts to groundwater include wall failure, flood heave, and reduced availability at sensitive locations where the groundwater level is higher than the base level of cuts. There is a risk of groundwater being discharged into surface water features. Depending on the groundwater quality, this could adversely impact on surface water quality.

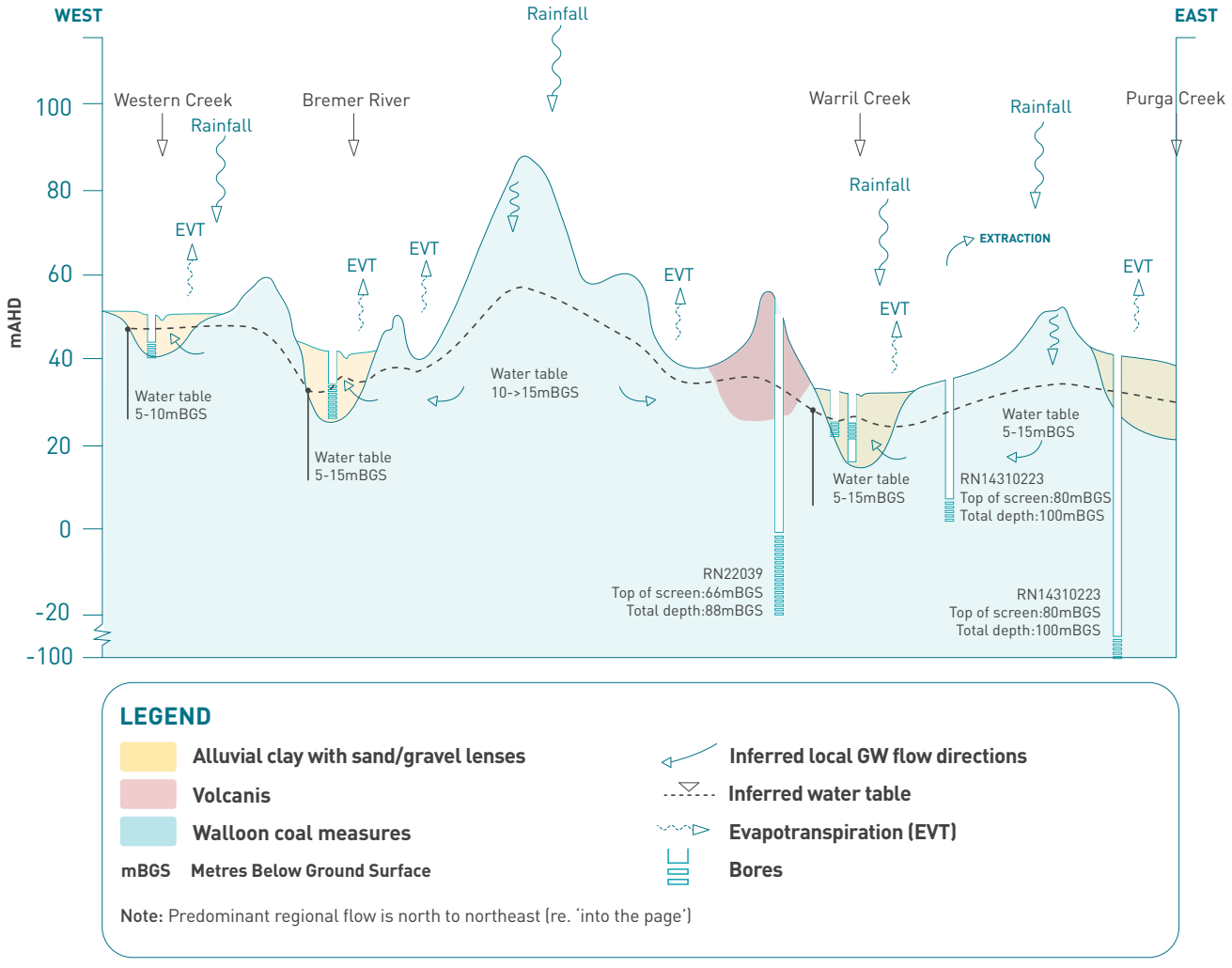
Other potential impacts include loss of registered groundwater bores; subsidence due to groundwater extraction or dewatering; altered groundwater levels or flow regime; contamination; vegetation clearing affecting groundwater recharge/discharge and increased salinity; impacted water quality and/or flow from discharge of tunnel and cut drainage.

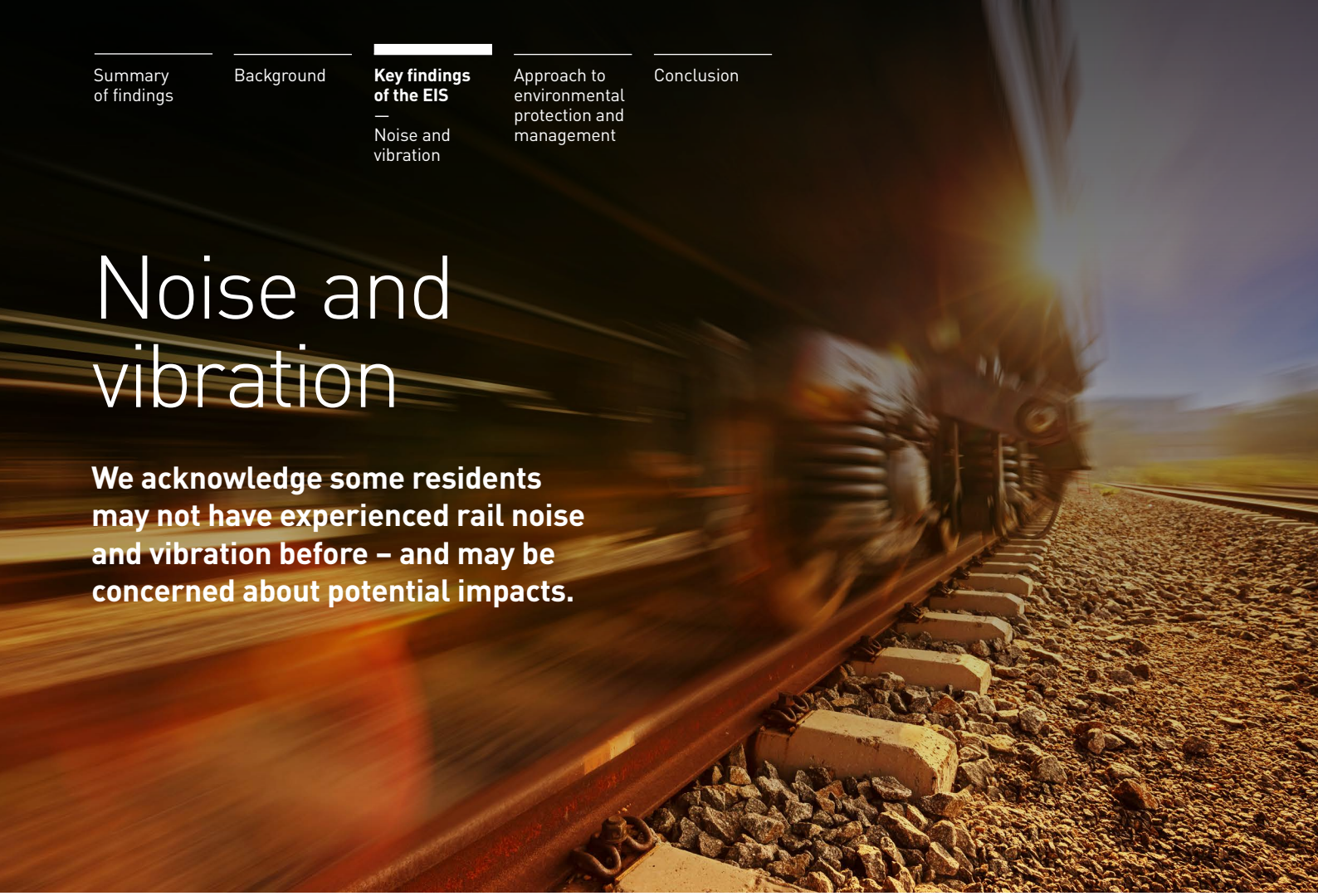
Moderate impacts to groundwater users were identified due to the lowering of groundwater levels associated with permanent seepage from the free draining (i.e. unlined) Teviot Range Tunnel and deep cuts associated with construction.

Further investigations have been recommended at key sections, including areas of significant embankments overlying alluvial sediments with shallow groundwater, the Teviot Range Tunnel, and drawdowns and inflow rates to deep cuts that intersect groundwater.

Before construction starts, groundwater baseline monitoring will provide more information on seasonal variation and ensure there are no impacts on the groundwater resources. Requirements for monitoring during the operational phase will be established during detailed design.

Teviot Range hydrogeology





Noise and vibration

We acknowledge some residents may not have experienced rail noise and vibration before – and may be concerned about potential impacts.

Chapter 15 considers both construction and operational railway noise and vibration impacts on the surrounding environment.

When the Project is operational, it will have the potential to generate noise from the movement of freight during the day time and night-time. Noise and vibration have the potential to impact sensitive receptors and the surrounding environment.

In assessing potential noise and vibration impacts, management levels were established. Where there is the potential for the adopted management levels to be triggered, reasonable and practicable measures are considered to reduce potential impacts.

A total of 1,350 sensitive receptors were found within the noise and vibration study area – within 2 kilometres either side of the project alignment. Noise and vibration data was gathered from a range of locations along the proposed alignment.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 15: Noise and Vibration (Binder 02)**
- **Appendix P: Non-operational Noise and Vibration Technical Report (Binder 12)**
- **Appendix Q: Operational Railway Noise and Vibration Technical Report (Binder 12)**

Examples of sensitive noise receivers

- residential dwellings
- hospitals
- places of worship
- schools
- childcare centres
- open space – passive use (e.g. parkland, bush reserves)
- open space – active use (e.g. sports field, golf courses)

Detailed noise modelling based on the reference design alignment (horizontal, vertical), civil earthworks (embankments, cuts) and key rail infrastructure (main line, loops, bridges, turn outs) was undertaken.

Noise

Construction noise

Targeted measured will be adopted to reduce construction impacts on communities, buildings, structures and sensitive receivers. Noise from construction activities will be short-term and localised in specific work areas. We will work with contractors to ensure targeted community and stakeholder engagement is undertaken before and during any high intensity noisy works, night works and/or 24-hour construction periods. A Construction Noise and Vibration Management Plan will guide the delivery of construction works and mitigate, where possible, impacts and our response to issues.

Some construction activities result in elevated noise emissions. The assessment shows noise levels exceed the external noise limits at a number of locations. This includes up to 781 sensitive receptors predicted to exceed the 15-minute noise goal - with earthwork activities having the highest level of potential impact. However, it is important to note that the predictions are the worst-case scenario for a 15-minute period of construction activity when construction equipment is closest to the noise receptor. The exceedances are not ongoing and will not be experienced at a location on a day-to-day basis over an extended period.

Particularly noisy activities, such as piling or jack-hammering, will not be undertaken across the whole project, but are only expected to the undertaken for short periods (at targeted areas identified pre-construction commencement). In addition, distances will vary between the construction activities and sensitive receptors.

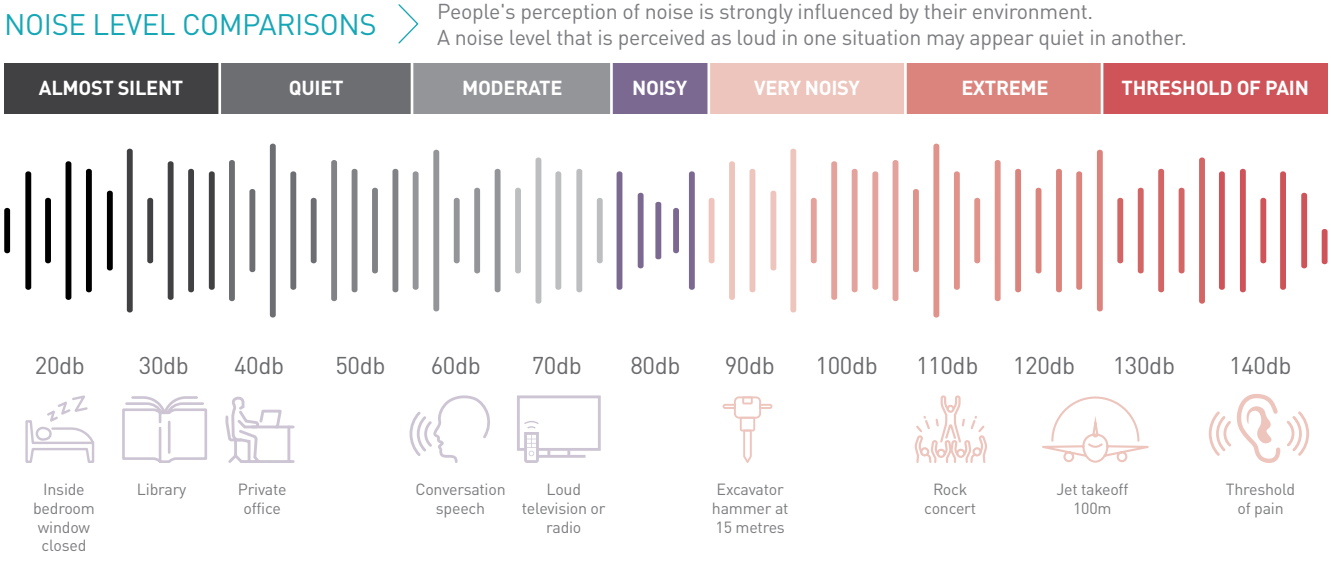
The majority of construction works will move along the rail alignment, rather than be located in a construction compound at a static point. Exposure to noise for specific receptors will reduce as the works progress along the alignment. The construction of the tunnel is not expected to exceed acceptable levels of vibration or ground-borne noise for any sensitive receptor locations.

Construction noise and vibration management measures will include the use of temporary noise barriers, monitoring, appropriate selection and maintenance of equipment, scheduling of works respite periods, construction traffic management, and situating construction plant in less noise-sensitive locations.

The management of any residual construction noise impacts will be undertaken in consultation with both the community and affected residents.

Noise and vibration from Inland Rail operations is being assessed and mitigated in a consistent and equitable manner. For all residents and all community members.

During operations, noise and vibration will be pro-actively managed and monitored. We will address legacy matters, concerns raised and emerging issues.



NOISE LEVEL COMPARISONS

Noise levels assessed

- Airborne noise.
- Construction vibration.
- Ground-bourne vibration.
- Tunnel related noise.
- Ground-bourne noise.
- Construction noise.

Operational noise

Our operational noise includes noise and vibration caused by:

- trains passing, changing speeds, braking or idling
- locomotive and wagons – exhaust, engine, wheel/rail
- operation of bells and alarms at level crossings and the use of train horns by train operators.

Modelling examined potential noise impacts at the following points in time:

- existing rail noise levels
- on opening of the completed Inland Rail between Melbourne and Brisbane
- When Inland Rail is operating at full capacity (full capacity is likely in 2040).

The operational noise and vibration assessment will be reviewed, and where necessary, updated to reflect and/or inform the detailed design. These works will include incorporation of potential noise or vibration treatments. Operational noise and vibration will be monitored when the Project is operational. ARTC will investigate reasonable and practicable measures to be considered as part of detailed design including:

- **source controls** – mitigation measures applied to the railway infrastructure to control the emission of noise and vibration at its source. Measures include rail dampers, track lubrication (for control of curving noise), identification of rollingstock causing discrete high noise events or lower noise emission alarm bells.
- **pathway controls** – measures to impede and limit the propagation of railway noise to the sensitive receptors and typically constructed within the rail corridor. Measures can include railway noise barriers, low height noise barriers or earth mounding.
- **receptor controls** – measures to mitigate noise and vibration levels or manage potential noise and vibration impacts at the sensitive receptor properties and land-uses. Measures can include architectural acoustic treatment of property, property construction/relocation, upgrades to existing property fencing or negotiated agreement with landowners.

At opening, 32–33 train movements a day on the Project have been forecast. Over time, there will be a gradual increase in the number of trains using C2K, with a forecast of approximately 46–47 train movements per day by 2040.

The operational noise assessment considered train movements in each daytime and night-time period. Whole trains were adopted, which meant movements for each service were rounded up to the nearest whole number. This was a conservative approach that resulted in the daily train numbers being slightly higher than the forecast movements for the Project.

During operation, a total of 59 sensitive receptors are predicted to be above ARTC's adopted operational noise management levels when trains start running in 2026, if no mitigation is put in place. By 2040 an additional six sensitive receptors were identified as exceeding the assessment criteria, totalling 65 sensitive receptors triggering an investigation of noise mitigation.

Up to 38 sensitive receptors are predicted to trigger the maximum noise management level for a greenfield development during the night-time period in 2040.

Final mitigation options (including available at-property treatments) will be determined through detail design of the Project. This will include review and refinement of the assessment, analysis of engineering and environmental constraints, consultation with directly-affected landowners.

- Verification of railway noise levels will also be undertaken once Inland Rail operations commence on the Project.
- We have developed the Inland Rail Noise and Vibration Strategy to guide the management of noise and vibration levels across the program.
- Our approach is aimed at limiting potential impacts – in a fair and sustainable manner.

Noise levels assessed


airborne noise


ground-bourne vibration


ground-borne noise


vibration


related noise


noise

Vibration

Construction vibration

Vibration-intensive work is likely to be undertaken as part of construction, such as the use of piling works (percussive/impact) and vibratory rolling activities.

Currently, specific locations of vibration intensive construction works are not known. Vibration impacts at up to 71 vibration sensitive receptors have the potential to exceed the adopted human comfort limit – during non-standard construction hours.

Thirteen sensitive receptors were identified as being buildings of special value or significance as part of the heritage assessment, with nine of the heritage sensitive receptors located in the Project temporary disturbance footprint. Six of these sensitive receptors are also occupied dwellings.

Each heritage receptor has the potential to be particularly sensitive to vibration, so minimum setback distances for construction activities have been applied.

Operational vibration

The construction methodology near any sensitive receptors will established and implemented on a case-by-case basis. When C2K is operational, vibration impacts are not expected to travel further than 25 metres from the outer rail line, which will mostly be confined within the rail corridor.

Notwithstanding, the predicted levels are relatively low at the sensitive receptors adjacent to the Project, ground-borne noise levels may be at or above the more conservative night-time criteria at three individual receptors.

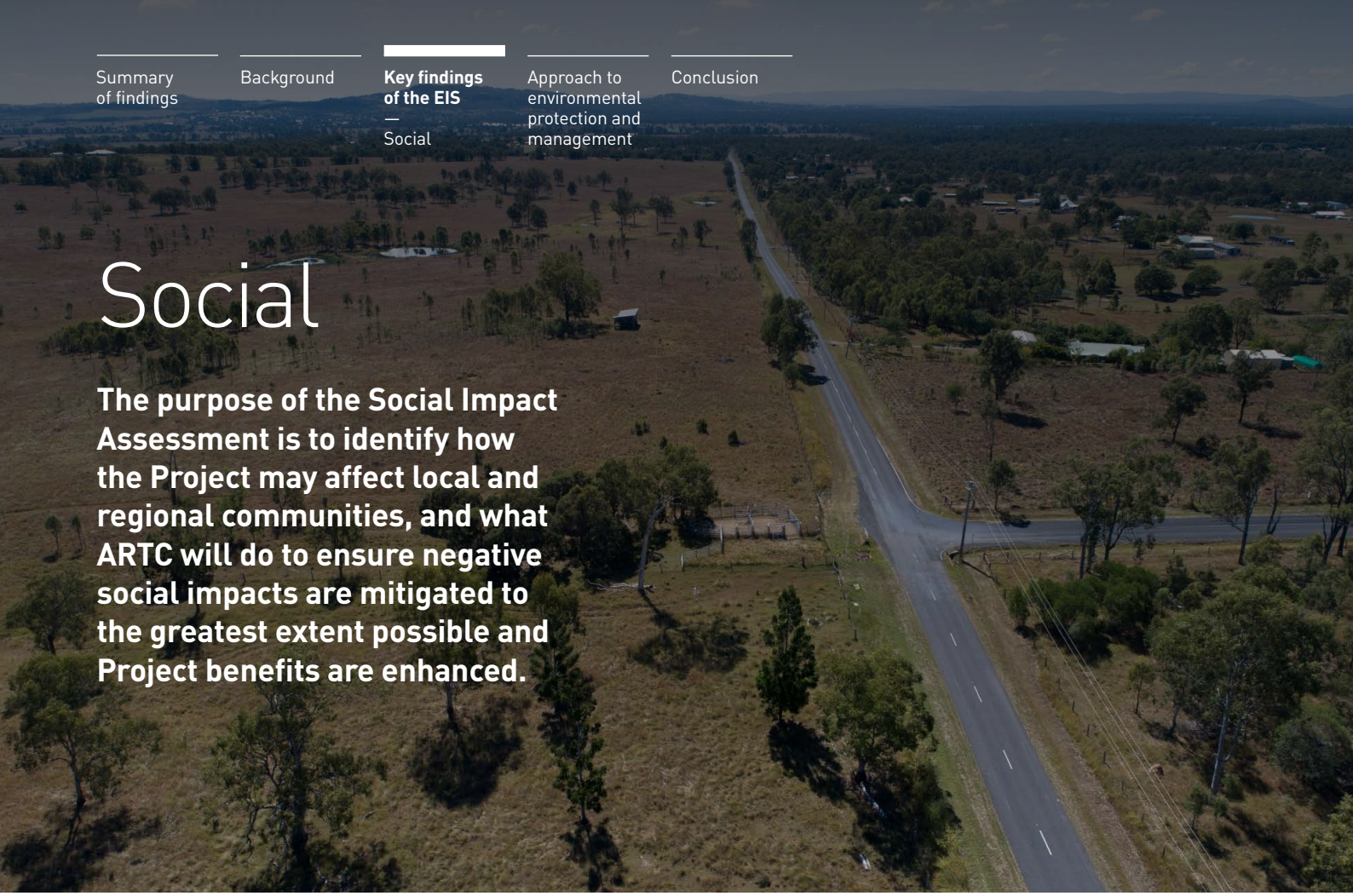
At a glance

Key impacts

- **Construction:** construction noise has the potential to exceed Project criteria at some sensitive receptors. However, most of the construction works will be mobile and will move along the rail alignment, reducing the temporary levels of noise as the works progress along the alignment.
- **Operation:** noise emissions from railway operations (rollingstock, crossing loops and level crossings) will meet the ARTC conservatively set noise management levels at the majority of assessed existing sensitive receptors. Predicted operational noise levels triggered a review of reasonable and practicable measures for up to 59 sensitive receptors at the project opening and at 65 sensitive receptors (an additional six sensitive receptors) at the design year (2040).

Proposed mitigation measures

- **Construction:**
  - during detailed design, the construction noise and vibration assessment will be reviewed to help determine the final location of construction sites, activities, scheduling and work methods.
  - building-condition surveys will be undertaken for vibration-sensitive locations, structures or areas of interest.
  - residual impacts will be managed in consultation with the affected landholders.
- **Operation:**
  - during detailed design, operational road traffic noise will be reviewed to inform upgrades, realignments, closures and incorporations or suitable treatments.
  - once the Project is commissioned and operational, a monitoring program will be undertaken within the first six months to verify and validate received noise levels.
  - review and, if necessary, update the operational noise and vibration assessment to reflect/inform the detailed design.
  - the following treatments will be considered as part of detailed design: source controls; pathway controls; receptors controls.
  - additional mitigation and management measures will be considered where noise or vibration levels.



Social

The purpose of the Social Impact Assessment is to identify how the Project may affect local and regional communities, and what ARTC will do to ensure negative social impacts are mitigated to the greatest extent possible and Project benefits are enhanced.

Chapter 16 identifies affected communities, considering all potential social impacts throughout the Project life-cycle.

Potential impacts

As for all major projects located near human settlements, adverse social and impacts may be experienced by residents living near the proposed alignment. Potential impacts during the construction phase include:

- an estimated 60 households would need to relocate as the result of land acquisitions
- concern that the Project's land acquisitions or potential impacts on amenity may impact on property values
- community cohesion may be reduced through displacement of residents, physical severance between properties, disruption to the road network and potentially, community conflict
- construction noise will affect properties near the disturbance footprint whilst construction activities are conducted nearby, with the number affected at any one time depending on the type of works and progress of works along the alignment
- whilst track construction works would progress along the corridor, any noise, dust or increased traffic related to laydown areas and bridge construction may affect residential amenity for extended periods during construction
- tourism or event visitation could be affected by impacts on the road network or changes to scenic amenity in the disturbance footprint
- construction works, road re-alignments and closures, and delays at level crossings are likely to delay traffic on roads directly impacted by the Project
- emergency services or community support services in the Project region may experience increased demands.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 16: Social (Binder 02)**
- **Appendix R: Social Impact Assessment Technical Report (Binder 12)**

Potential impacts during the operations phase include:

- the amenity of properties and lifestyles of residents near the Project may be impacted by rail freight noise
- there is potential for railway noise to be audible in the Purga Nature Reserve whilst trains are passing
- level crossings will result in periodic traffic delays, including potential to delay emergency vehicles during operation
- the presence of a freight rail line may increase the risk of road-rail accidents, resulting in social impacts for individuals, families, communities and rail staff.

Communities in the social impact assessment study area have experienced a long period of severe drought, with effects on mental health and financial wellbeing, community resilience and business vitality. It is therefore particularly important that the Project's impacts are minimised and benefits for local communities are maximised.

At a glance

Key impacts

Locally, social impacts include:

- land acquisition and severance of productive agricultural land
- community conflict, which may affect community cohesion and family networks
- amenity impacts due to noise, vibration, dust, changes to the landscape and increased traffic
- traffic delays during construction of bridges, level crossings and other infrastructure
- periodic traffic delays at level crossings during operations, potentially delaying emergency service vehicles.

Regionally, social impacts include:

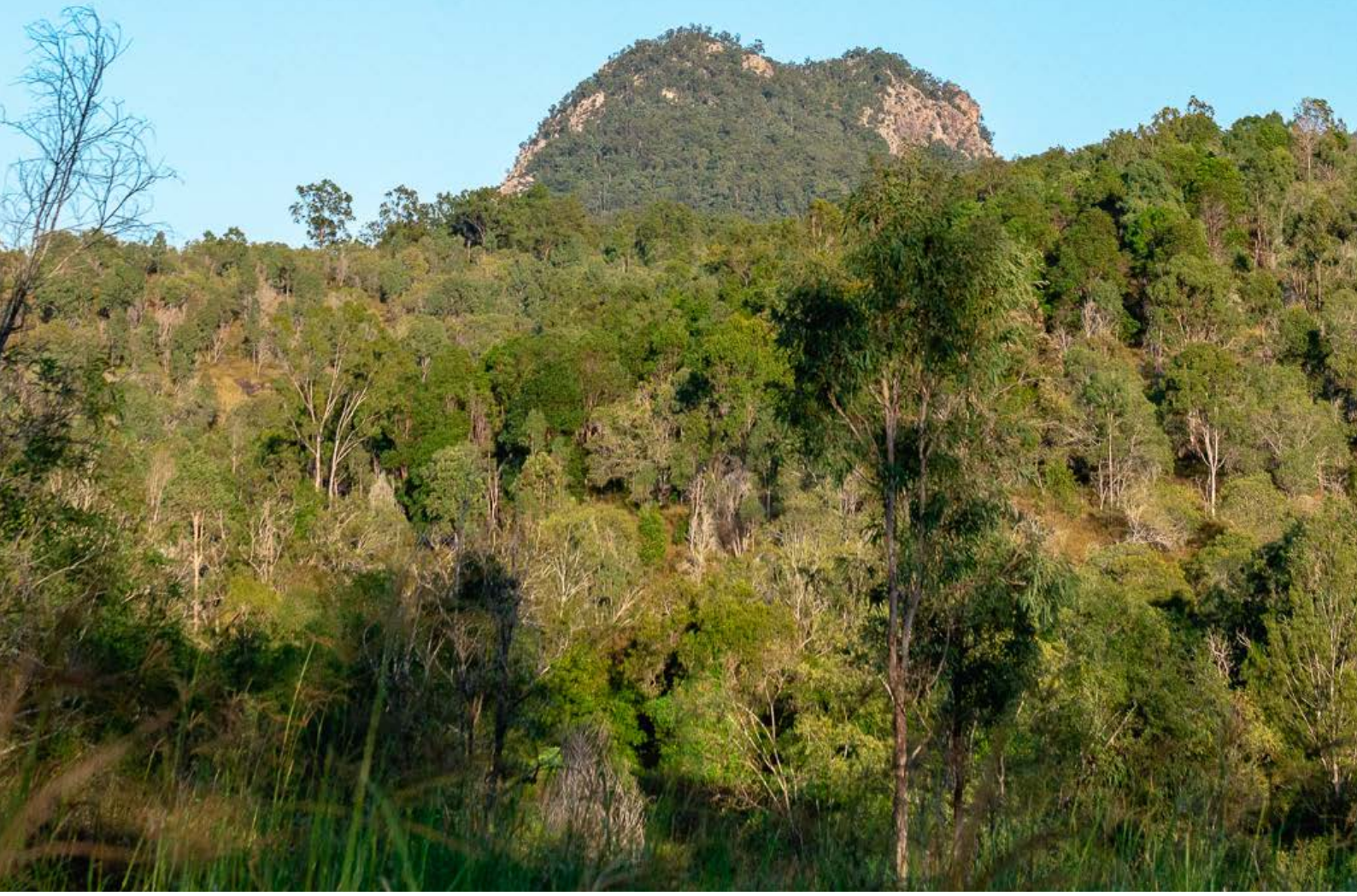
- draw on trades and construction labour if multiple infrastructure projects are constructed simultaneously
- increased demand for local health and emergency services during the construction phase
- The Boonah to Ipswich Trail and its connectivity with the Flinders Peak Conservation Park may be disrupted.

Benefits include:

- employment for up to 620 people over the construction period
- training opportunities and skills development, such as implementation of the Inland Rail Skills Academy
- local businesses will have opportunities to supply fuel, equipment, quarried material, and services including fencing, electrical installation, rehabilitation and landscaping, maintenance and trade services.

Proposed mitigation measures

- The Social Impact Management Plan will help guide the mitigation of negative impacts and enhancement of positive impacts. Its development incorporates stakeholder inputs on strategies. Additionally it describes ARTC's approach to partnership development with key stakeholders and communities.
- ARTC recognises that ongoing engagement with landholders, traditional owners, communities and other stakeholders that will be impacted by, or stand to benefit from Inland Rail, is central to the Project's success. Stakeholder engagement will continue to inform detailed design and the development of mitigation measures as the Project progresses.



A Social Impact Management Plan (SIMP) has been prepared as part of the EIS and includes five action plans (community and stakeholder engagement, workforce, housing and accommodation, health and community wellbeing, and local business and industry).

A monitoring strategy is also provided in the EIS which will enable the Project to report on the delivery and effectiveness of the SIMP. The action plans are described below.

Community and stakeholder engagement

- Establish and maintain engagement mechanisms that build relationships between ARTC is stakeholders, and enable adaptive management of impacts on amenity, connectivity and community values during construction.
- Support adaptive management of impacts on amenity, connectivity and values during construction.
- Support mitigation of impacts on amenity, community cohesion and local character through stakeholder engagement and in partnership with community and government stakeholders.

Workforce management

- Enable residents of nearby communities and the Project region to access the Project's construction and operational employment opportunities.
- Facilitate and support workforce training and development pathways to build labour force skills.
- Minimise impacts on employment in other industries.
- Provide a safe and healthy workplace for all personnel.
- Manage workforce behavior to avoid impacts on community safety and community values.

Housing and accommodation

- Avoid adverse impacts on the availability of local housing and short-term accommodation.

Health and community wellbeing

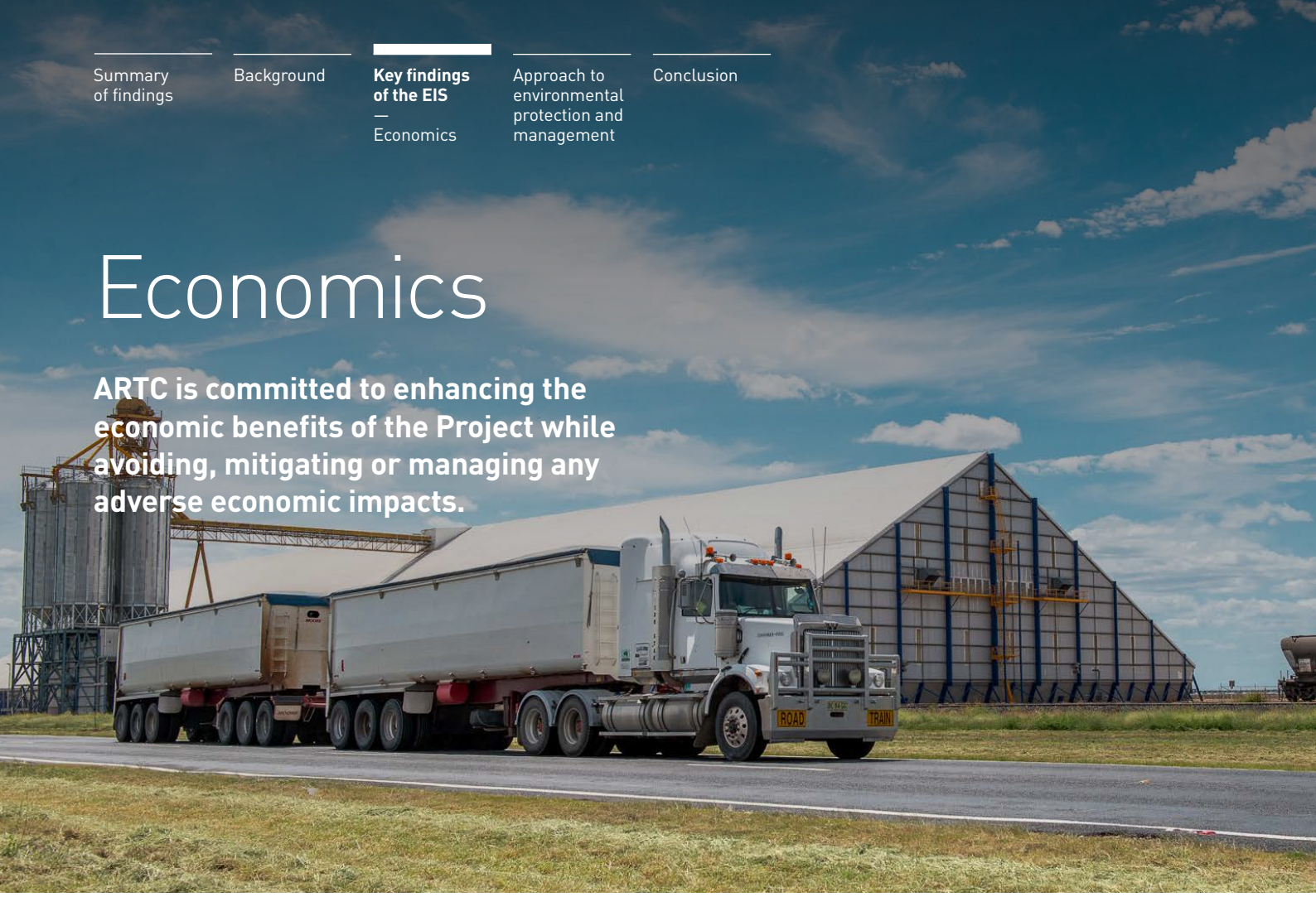
- Avoid and minimise impacts that may affect community wellbeing including mental health.
- Provide a framework for communication with social infrastructure providers and Government agencies to minimise Project impacts on social infrastructure.
- Maximise communication and co-operation with local stakeholders to address impacts on quality of life or community wellbeing.
- Include a focus on vulnerable community members in Project engagement and social investment.

Local business and industry

- Minimise impacts on farming, agribusiness, tourism businesses and businesses in towns.
- Create local business awareness about supply opportunities and registration and contracting processes for the Project and build relationships with local businesses to support their involvement in the Project.
- Provide the framework for full, fair, and reasonable opportunity for local, regional and;
- Indigenous businesses to participate in the supply chain and integrate this framework in construction.

Economics

ARTC is committed to enhancing the economic benefits of the Project while avoiding, mitigating or managing any adverse economic impacts.



Chapter 17 includes an economic impact assessment which examines the existing economic environment and local context to form the basis to measure the economic impacts and benefits.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 17: Economics (Binder 02)**
- **Appendix S: Economic Impact Assessment Technical Report (Binder 13)**

The economic impact assessment undertaken for the draft Environmental Impact Statement established and examined the existing economic environment and local context to form the basis to measure the economic impacts. It identified and assessed potential economic benefits and impacts on affected local and regional communities and businesses. It also assessed the economic significance of the Project on the regional, state and national economies through computable general equilibrium modelling and evaluated the potential cumulative impacts on local and regional economies resulting from the construction and operation of related projects, including adjacent Inland Rail Projects.

It is noted that the economic impact assessment was largely completed before the economic shock associated with the 2020 Q2 market conditions. In particular, the baseline representation of the economy does not account for the 2020 Q2 market conditions.

The Project will support regional and local development through:

- opportunities to encourage, develop and grow local businesses, including Indigenous businesses, supplying resources and materials for the construction and operation of the Project
- opportunities in secondary service and supply industries, such as retail, hospitality and other support services, for businesses close to the Project. Expansion in construction activity is also likely to support temporary flow-on demand and spending from the construction workforce in the local community

- the potential to unlock the construction of ancillary and complementary infrastructure, industrial development and logistics operations within the local area. Specifically, the Project may act as a significant catalyst for development in the planned and existing industrial areas at the Ebenezer Regional Industrial Area, Willowbank Industrial Estate, and the Bromelton State Development Area
- offering opportunities to support the local agricultural industry by driving savings in freight costs, improving market access, and reducing the volume of freight vehicles on the region's road network.

The Project is forecast to provide a total $166.22 million* in incremental benefits. 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 Greater Brisbane region. Using labour market trends and projected construction sector activity, it is likely that the labour market conditions that will prevail during the construction phase will be closer to those characterised by a 'slack' labour market scenario. Under this scenario, the real Gross Regional Product over the construction phase is projected to be $355 million* higher than the baseline level. Under a slack labour market scenario, the Project is expected to create a peak of 620 full-time equivalent jobs during construction*.

ARTC is committed to enhancing the economic benefits of the Project while avoiding, mitigating or managing any adverse economic impacts. The Social Impact Management Plan outlines the actions that ARTC will undertake or require its contractor to undertake to manage the social and socio-economic impacts of the Project, while enhancing the Project benefits and opportunities. The Social Impact Management Plan includes a Local Business and Industry Action Plan.

**2015 Inland Rail Business Case*

At a glance

Key impacts

- The Project is expected to generate $166.22 million* in incremental benefits at a 7 per cent discount rate.
- Benefits include improved freight productivity, reliability and availability, and reduced accidents, environmental externalities and road congestion.
- Under the slack labour market scenario, during the construction phase, real Gross Regional Product is projected to be $355 million* higher than the baseline level.
- The Project is expected to create a peak of 620 full-time equivalent jobs during construction*
- In addition to the economic benefits created by the Project, there will be disruption to agricultural landholders from loss of agricultural land, disruption to access, land fragmentation and Infrastructure and alterations to stock routes. There will also be disruption to local tourism businesses and industry from changes in amenity and rural character.

Proposed mitigation measures

- ARTC is committed to enhancing the economic benefits of the Project while avoiding, mitigating or managing any adverse economic impacts. The Social Impact Management Plan outlines the actions that ARTC will undertake or require its contractor to undertake to manage the social and socio-economic impacts of the Project, while enhancing the Project benefits and opportunities. The Social Impact Management Plan includes a Local Business and Industry Action Plan.

Economic benefits

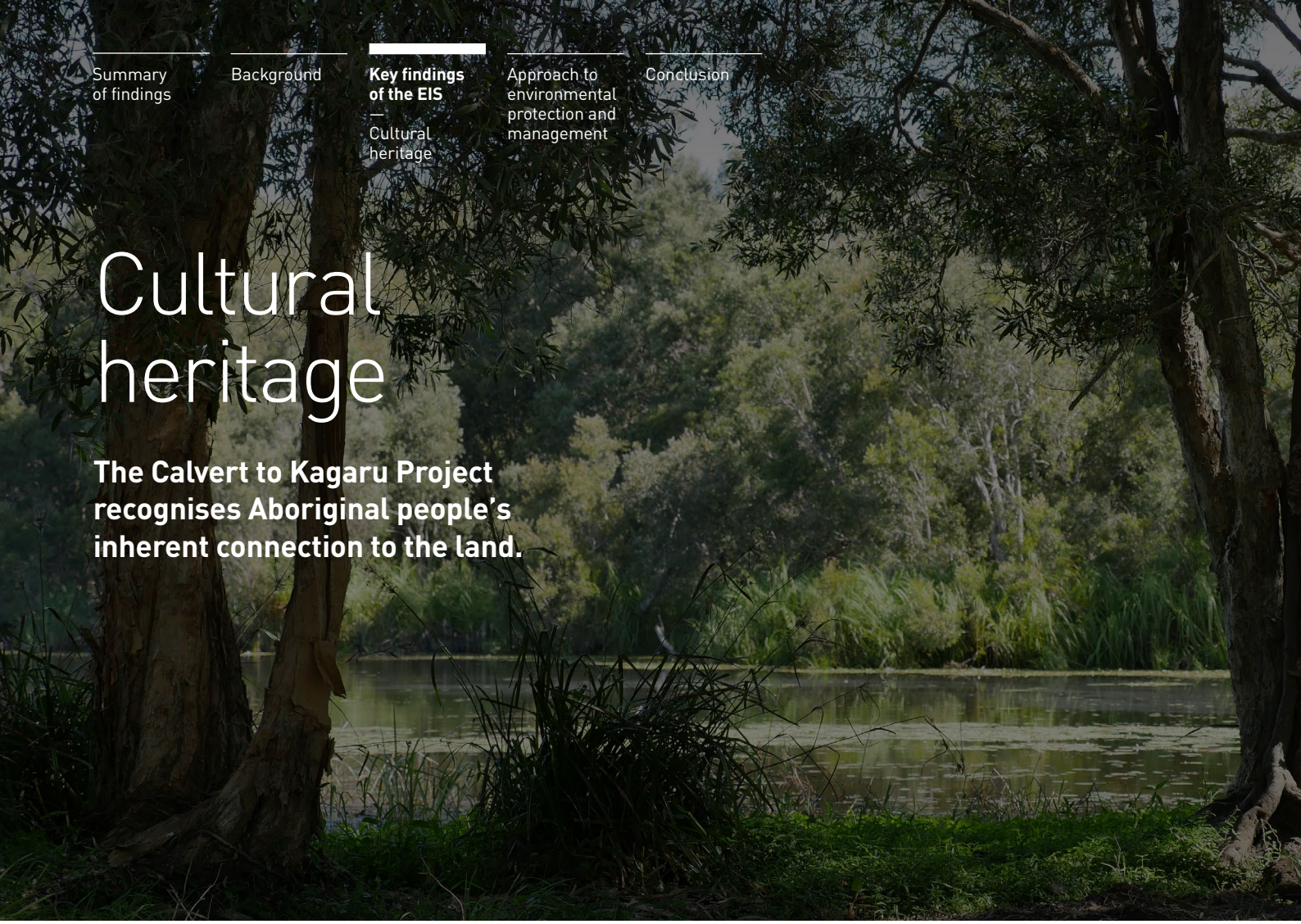
Freight

$126.76 million*

Community

$39.46 million*

It is noted that the economic impact assessment was largely completed before the economic shock associated with the 2020 Q2 market conditions. In particular, the baseline representation of the economy does not account for the 2020 Q2 market conditions.



Cultural heritage

The Calvert to Kagaru Project recognises Aboriginal people's inherent connection to the land.

Chapter 18 identifies potential Project impacts on cultural heritage, considering both Indigenous and non-Indigenous cultural heritage in the assessment.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 18: Cultural heritage (Binder 02)**
- **Appendix T: Non-Indigenous Heritage Technical Report (Binder 13)**

Indigenous cultural heritage

The Project will be built and operated on the traditional land of the Jagera Daran People and Yuggera Ugarapul People.

ARTC has developed Cultural Heritage Management Plans (CHMPs) in consultation with the Jagera Daran People and the Yuggera Ugarapul People to:

- undertake cultural heritage surveys
- determine a process for including the Traditional Owners in assessment of Indigenous cultural heritage values and the protection of heritage
- create a process for dispute resolution
- develop a process for mitigating, managing and protecting identified cultural heritage and objects during both construction and operation.

Details of the Cultural Heritage Management Plans are confidential to the signatories and no further information will be provided.

Non-Indigenous cultural heritage

An assessment of non-Indigenous heritage values and impacts was undertaken using a combination of register searches and historical and archival research. The assessment identified 13 Areas of Interest within the cultural heritage study area, including five registered local heritage places, which were inspected and assessed against the relevant criteria.

Ten of the 13 Areas of Interest were assessed as having local heritage significance, meaning that they have 'aesthetic, historic, scientific or social value for past, present or future generations'. These Areas of Interest were mostly related to local pastoral and dairying industries and include yards, huts, creameries and dwellings.

Direct impacts to non-Indigenous places as a result of the Project are most likely to occur during site preparation as part of the construction phase. Clearing and stripping activities may impact heritage values within the disturbance footprint. Indirect impacts may occur during any phase of the Project, when construction, operation, or decommissioning activities result in excessive dust, noise or vibration that damages heritage structures.

Seven of these places were identified as being at risk of direct impacts, with the other six places identified at risk of indirect impact.

At a glance

Key impacts

- Impacts and risks associated with Indigenous cultural heritage will be managed in accordance with the Cultural Heritage Management Plans (CLH017009).
- Direct impacts to non-Indigenous places are most likely to occur during site preparation as a part of the construction phase.
- Indirect impacts may occur during when construction, operation, or decommissioning activities result in excessive dust, noise or vibration that damages heritage structures.

Proposed mitigation measures

- Impacts to Indigenous cultural heritage will be identified, assessed and managed under the Cultural Heritage Management Plans under the Aboriginal Cultural Heritage Act 2003.
- A Heritage Management Sub-plan will be developed and implemented.
- ARTC staff and contractors will learn about the Aboriginal cultural heritage and non-Indigenous heritage associated with delivery of the project.
- Clearing extents will avoid previously undisturbed areas as far as possible.
- Project works will avoid direct and indirect impacts (e.g. vibration) to identified items, sites, and areas of Aboriginal heritage significance, historic and natural heritage significance, where possible.
- Building condition surveys will be undertaken at all vibration-sensitive receptors, which may include structures of heritage value.
- The Construction Environmental Management Plan will be implemented.
- For non-Indigenous heritage, mitigation measures may include archival recording, archaeological surveys and excavations, and relocation of heritage items.
- The assessment found that, with appropriate mitigation measures, the Project impacts could be reduced to neutral or slight for identified sites.

Traffic, transport and access

The traffic and transport assessment evaluated potential impacts of construction and operation of the Project on surrounding transport infrastructure and its users.

The overall aim during construction and operation of the Project is to:

- maintain the safety and efficiency of all affected transport modes for the Project workforce and other transport system users
- avoid or mitigate impacts to the condition of transport infrastructure
- ensure any required works are compatible with existing infrastructure and future transport corridors.

Chapter 19 identifies the potential impacts arising from the Project on road, rail, active transport and airports/ports during construction and operation.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 19: Traffic, transport and access (Binder 02)**
- **Appendix U: Traffic Impact Assessment Technical Report (Binder 14)**

Key findings

The assessment examined the potential traffic and pavement impacts from the movement of materials, workforce and equipment on the surrounding road network. The assessment included the following findings.

Existing operational conditions

- Three state-controlled roads have been identified that will interface with the proposed rail alignment, and four state-controlled roads within the traffic, transport and access study area are expected to see construction traffic exceed 5 per cent of the background traffic.
- 37 local government roads have been identified that are expected to see construction traffic exceed 5 per cent of the background traffic; however, the impact to many of these roads is expected to be minimal as the high percentage of construction traffic is a function of low existing traffic volumes.
- Six cycle routes are identified that might be impacted by construction traffic, however only Warwick Road between Cunningham Highway and Saleyards Road is expected to experience construction traffic in excess of 5 per cent of the background traffic. There is no impact to cycle routes expected during operations.
- Three existing public transport services may be impacted by construction traffic and/or proposed and existing road/rail crossings. Given that only one road (Warwick Road) along the routes is expected to have construction traffic exceed 5 per cent of background traffic, combined with the relatively low frequency of these services, the impact is expected to be negligible during the construction and operational phases.

- 12 existing school bus routes that are likely to be impacted by construction traffic have been identified using data sourced from TransLink, of which only 6 are expected to experience construction traffic in excess of 5 per cent of the background traffic. Given the low frequency of school bus services, it is expected that there will be minimal impact to services as a result of the construction of the Project.
- Three existing long-distance coach services might be impacted by construction traffic. However, the impacts on these long-distance coach services are expected to be minimal due to the low frequency of the services.
- No stock routes within the traffic, transport and access study area would be impacted by the Project.
- Construction of connections to existing rail network is planned to occur during routine maintenance periods. Therefore, impacts to the existing rail network are not expected.

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.

Traffic impact assessments

- The Project-related traffic consists of traffic generated by both construction and operational activities. It is anticipated that the impacts would primarily be during the construction phase.
- Certain road sections will generate construction related traffic volumes in excess of 10 per cent of the background traffic during the construction phase. The results of the level of service comparison between the 'with' and 'without' development scenarios indicated that the Project may potentially cause a minor change in level of service for some road sections during each year of construction.
- Based on the level of service comparison, the Project is not expected to generate the need to upgrade the road network for such a short duration of impact, but adequate traffic and road use management strategies and mitigation measures would be required.

At a glance

Key impacts

- 4 State-controlled roads and 37 local government roads within the study area are expected to exceed 5 per cent of the background traffic. The impact to many of these roads is expected to be minimal as the high percentage of construction traffic is a function of low existing traffic volumes.
- During the operational phase, impacts to the road network are expected to be negligible. Small maintenance crews may need to inspect the track and conduct routine maintenance activities once per month. However, traffic movements will mostly be confined to the rail corridor.

Proposed mitigation measures

- A Construction Traffic Management Plan and a Road Use Management Plan will be developed and implemented as part of the CEMP.
- A Rail Maintenance Access Road strategy has been developed as a part of the design for emergency service vehicles access to the rail corridor during construction and operation.
- ARTC has been able to identify suitable road access alternatives for all formed roads (impacted during construction and operation) in consultation with emergency services, landholders, local governments and Department of Transport and Main Roads (DTMR).

Preferred options for formed public road–rail interface treatments currently applied over the length of the Project include a mix of active and passive level crossings, crossing consolidation, realignments or diversions, and grade separation.

Public road-rail interfaces

The Project intersects with a number of State-controlled roads and local government roads managed by Ipswich City Council, Scenic Rim Regional Council and Logan City Council.

The appropriate road-rail interface treatment has been assessed on a case-by-case basis for design purposes, with consideration given to current and future usage of the existing asset, its location relative to other crossings of the rail corridor and the road and rail geometry at the crossing location.

Private road-rail interfaces

The Project interfaces with 96 private (occupational) accesses. The impact on each individual property will differ and ARTC will continue engaging with landholders to find ways to minimise disturbance to properties, which includes access to properties.

The design and layout of occupational crossings will be based on considerations including feedback from consultation, specific property requirements, stock movements, rail design and landform, safety standards and vehicle access requirements (e.g. farm machinery).

Typical treatments will include:

- underpasses for stock passage or multiple-use vehicles, subject to topography
- at-grade level crossings
- diversion to adjacent public roads or public road crossings.

> Level of service (LOS) is defined by Austroads as a measure for ranking operating road and intersection conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort and convenience.

Issues raised during consultation

As a result of the consultation process, additional investigations and research was undertaken to better inform the traffic, transport and access impact assessment, including:

- additional road traffic counts were undertaken to ensure accuracy of the data used and to validate the traffic impact assessment modelling
- additional studies and investigation were undertaken on level-crossing design to validate recommended crossing treatments
- emergency access and fire and life-safety requirements for the Project were confirmed
- future road planning requirements were incorporated into the Project design (for example, Cunningham Highway upgrades)
- design ensuring that rail access is not precluded for proposed adjoining third-party industrial hubs.

Interface treatments

Grade separation

Roads 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.

Passive level crossing

Static warning signs, for example stop signs or give-way signs that are visible on approach. This signal is unchanging with no mechanical aspects or light devices.

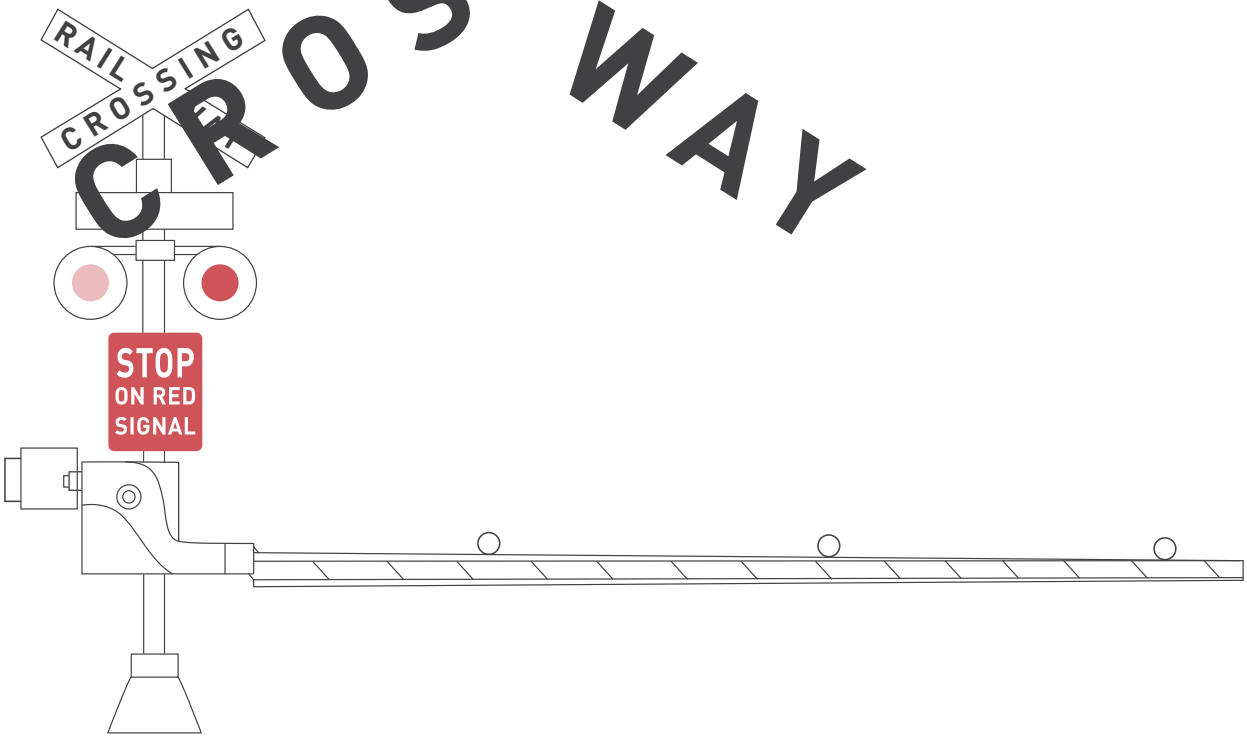
Active level crossing

Have flashing lights and some have boom barriers for motorists and automated gates for pedestrians.

Other

Crossing consolidation, relocation diversion or realignment.

Active level crossing



Passive level crossing

Hazard and Risk

ARTC has a strong commitment to implementing and maintaining appropriate safety practices throughout the project lifecycle.

Chapter 20 assesses the Project's risk of adverse impacts from both natural and Project-associated hazards by evaluating the risks and hazards in the existing environment, and identifying and assessing the potential risks to people, property and the environment that might be associated with the construction and operation of the Project.

Risk assessment process

Hazards were identified for each of the Project phases (design, construction, commissioning, operations). The likelihood and consequence of each hazard was determined to identify the initial risk without application of mitigation measures (i.e. a hazard of moderate consequence and possible likelihood is a medium risk).

These hazards were then evaluated to determine residual risks after the implementation of risk management strategies and mitigation measures.

A residual risk of medium will be considered tolerable if ARTC demonstrates they are reduced so far as reasonably practicable. If the residual risk rank remains high or very high, the risk will not be deemed tolerable. Intolerable risks will not be accepted by the Project.

Natural hazards

Natural hazards include aspects such as flooding, wildlife, sudden subsidence, biosecurity, bushfire, landslide or related to climate conditions.

The design will maintain appropriate access for first response firefight, safe evacuation routes and access to water supply for firefighting purpose. Design will continue to be refined in response to hydraulic modelling, considering peak water levels, flow distribution, velocities and duration of inundation. Batter slopes and scour protection incorporated into design will mitigate risks of landslide and sudden subsidence. The design considers further climatic conditions for operating in extreme temperatures such as elastic fasteners or heavier sleepers to reduce risk of track buckling.

Construction will be undertaken in line with ARTC's Fire Prevention Management Procedure, Total Fire Bans Procedure. A Soil Management Plan, Flora and Fauna Sub-plan, Biosecurity Management Plan and Erosion and Sediment Control Plans will be developed and implemented. Residual risks for natural hazards are low risk, with the exception of bushfire, flooding and climatic conditions which are medium.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 20: Hazard and Risk (Binder 02)**

Consequence

Likelihood	Not significant	Minor	Moderate	Major	Extreme
Almost certain	Medium	Medium	High	Very high	Very high
Likely	Low	Medium	High	Very high	Very high
Possible	Low	Low	Medium	High	High
Unlikely	Low	Low	Low	Medium	Medium
Rare	Low	Low	Low	Low	Medium

Project hazards

Project hazards include those relating to the construction, commissioning or operation of the Project, and can include employee fatigue/heat stress, respirable silica and other airbourne contaminants, rail accidents caused by increased rail movements, increased use of road vehicles for the Project, increased number of interfaces between live trains and road users, interaction with existing services (underground and overhead), potential abandoned mines, contaminated land, interference with emergency access and use of the tunnel.

ARTC proposes wide-ranging mitigation measures to lower the risk rating of these hazards, most of which are discussed in the discipline-specific chapters relating to traffic, land use, air quality and contamination.

Residual risks for these project hazards are medium risk.

Dangerous goods and hazardous chemicals

Specific hazards include the storage and use of dangerous goods and hazardous chemicals for construction purposes, and the transportation of dangerous goods and hazardous chemicals as freight during operations.

The majority of chemical requirements are Class 3 flammable liquids and combustible liquids such as diesel fuel that have the potential to cause fires or escalate the risk of bushfires, although their high flash points (temperature at which the chemical will ignite in air) reduce the potential for small incidents to create significant consequences. Generally, low volumes of hazardous chemicals would be stored in laydown areas within the disturbance footprint for construction near to points of use.

It is expected that explosives will be used for the construction of the tunnel through the Teviot Range. Explosives will not be transported as freight. Chemical spillage and loss of containment has a low residual risk. Remaining risks (explosives and freight of dangerous goods) have a medium residual risk.

At a glance

Key impacts

Hazards with the highest level of residual risk (medium risk) are:

- **natural:** bushfire, flooding, severe weather events, natural events exacerbated by climatic conditions, impacts from greenhouse gas emissions
- **project hazards:** employee fatigue/heat stress, emergency access, contaminated land, bridges, tunnel use/construction, utilities, rail accidents, increased road vehicles, train and road user interface
- transport of dangerous goods freight, and potential use of explosives for construction.

Proposed mitigation measures

- ARTC's Emergency Management Procedure (provides a systematic approach to incident response, recovery and investigation) will be applied to both Program and Project. The Emergency Management Procedure will be used for emergency management including response and planning.
- An Incident Management Plan will be developed to detail procedures and resources with which emergencies will be responded to and managed.
- Consultation will continue to be developed with relevant emergency management authorities to ensure external support will be provided in an emergency event.

Waste and resource management

Waste will be managed through waste avoidance and mitigation strategies to minimise potential impacts on surrounding environmental values and sensitive receptors, in accordance with the 2018 National Waste Policy and Waste Reduction and Recycling Act 2011.

Chapter 21 of the EIS provides an assessment of the waste management requirements for the Project, including the identification of the applicable regulatory framework, waste management strategies and expected waste stream composition and quantity.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 21: Waste and Resource Management (Binder 02)**
- **Appendix V: Spoil Management Strategy (Binder 14)**

The Project is expected to generate the following waste types:

- **commercial and industrial** – wastes produced by business and commerce. Potential project source: site offices
- **construction and demolition** – includes materials such as brick, timber, concrete and steel. Potential project sources: demolition/removal of existing structures, construction work fronts, demobilization of construction facilities
- **general** – comprise putrescible waste (easily decomposed, treated by composting) and non-putrescible waste (not easily decomposed, may be recycled). Potential project sources: site offices, construction work fronts, laydown areas, and clean excess spoil
- **green** – includes grass clippings, tree/bush/shrub trimmings, branches and other similar material resulting from landscaping activities. Potential project sources: clearing and grubbing, site preparation works
- **recyclables** – wastes that can be reconditioned, reprocessed or re-used. Potential project sources: site offices, construction work fonts, laydown areas
- **regulated** – wastes that require specific controls or actions as defined by legislation. Listed hazardous, regulated, controlled or trackable wastes typically have unique handling and disposal requirements. Potential project sources: used containers and resides of hazardous chemicals and dangerous goods, demolition/removal of existing structures.

Existing environment

Established waste management facilities close to the Project are located at Swanbank, Willowbank, New Chum, Greenbank and Logan. These facilities were assessed for their potential to service the Project. The capacity of these waste facilities is sufficient to accommodate waste generated from the Project.

Construction

Construction phase wastes are likely to include vegetation clearing and grubbing, topsoil, rock, spoil, site office waste, steel, treated timber sleepers, ballast, in-situ concrete, pre-cast concrete, and spent pavement and hardstand material.

Waste at a broad category level that comprises less than 10 per cent of current waste generation within the region for that category, is deemed to be insignificant and able to be managed under current waste management arrangements within the region.

With the exception of spoil, no significant waste streams have been identified for the project. As waste streams are not considered significant, they have been categorised at a broad level and will be managed in accordance with standard industry practice and accommodated within the capacity of existing waste management arrangements close to the Project.

Operations

Waste generation during the operational phase of the Project is expected to be minimal, and would mainly be a result of track maintenance, weed control and litter which is deposited within the rail corridor.

Waste types

Commercial and industrial	Wastes produced by business and commerce. Potential project source: site offices.
Construction and demolition	Includes materials such as brick, timber, concrete and steel. Potential project source: demolition/removal of existing structures, construction work fronts, demobilation of construction facilities.
General	Comprise putrescible waste (easily decomposed, treating by composting) and non-putrescible waste (not easily decomposed, may be recycled). Potential project sources: site offices, construction work fronts, laydown areas, and clean excess spoil.
Green	Includes grass clippings, tree/bush/shrub trimmings, branches and other similar material resulting from landscaping activities. Potential project sources: clearing and grubbing, site preparation works.
Recyclables	Wastes that can be reconditioned, reprocessed or re-used. Potential project sources: site offices, construction work fronts, laydown areas.
Regulated	Waste that require specific control or actions as defined by legislation. Listed hazardous, regulated, controlled or trackable wastes typically have unique handling and disposal requirements. Potential project sources: used containers and residues of hazardous chemicals and dangerous goods, demolition/removal of existing structures.

Mitigation measures

- ARTC will use a hierarchical approach to waste management, aligning with the waste management hierarchy, from the most preferable (avoid or reduce, re-use, recycle, recover energy and treat) to the least preferable (disposal) and prioritise waste management strategies to avoid generation. Where waste cannot be avoided, waste materials will be segregated by type for collection and removal by licensed contractors.
- A Waste Management Sub-plan will be developed as part of the Construction Environmental Management Plan.
- A Spoil Management Strategy has been prepared as part of the EIS.
- All wastes that are generated will be stored, handled and transferred in a proper and efficient manner to mitigate against potential environmental impacts on the surrounding environment and sensitive receptors.
- The volume of waste generated by each of the waste streams will be further refined during detailed design (post-EIS) to more accurately assess the receiving waste management facilities and waste disposal options for the Project.

At a glance

Key impacts

- The construction phase of the Project will generate the majority of waste through vegetation clearing, topsoil stripping, excavation and the demolition of existing structures. Municipal solid waste will be generated by activities at construction locations and on multiple work fronts.
- The Project design calculates that 5,859,671 m^3 of cut material will be produced during construction, primarily from surface works, of which 4,237,167 m^3 of this cut material is estimated to be suitable for immediate re-use as general earth fill, as per ARTC's Earthworks Material Specification. A calculated excess of 1,622,504 m^3 of spoil will be managed or treated with the potential for re-use.

Proposed mitigation measures

- Cut-and-fill balance and minimisation of transport requirements for import/disposal of spoil to be further refined during detailed design by implementing the spoil management hierarchy.
- Establish waste reduction targets for design and construction and undertake a waste reduction review to identify opportunities to meaningfully achieve the waste reduction targets through detailed design and construction of the Project.
- Establish waste reporting requirements for the pre-construction, construction and commissioning phases of the Project for incorporation into the Waste Management Sub-plan.
- Develop and implement a Waste Management Sub-plan as part of the CEMP.
- When construction timing is confirmed, waste acceptance criteria and available and permissible annual disposal rates will be determined in consultation with the waste facility operators.

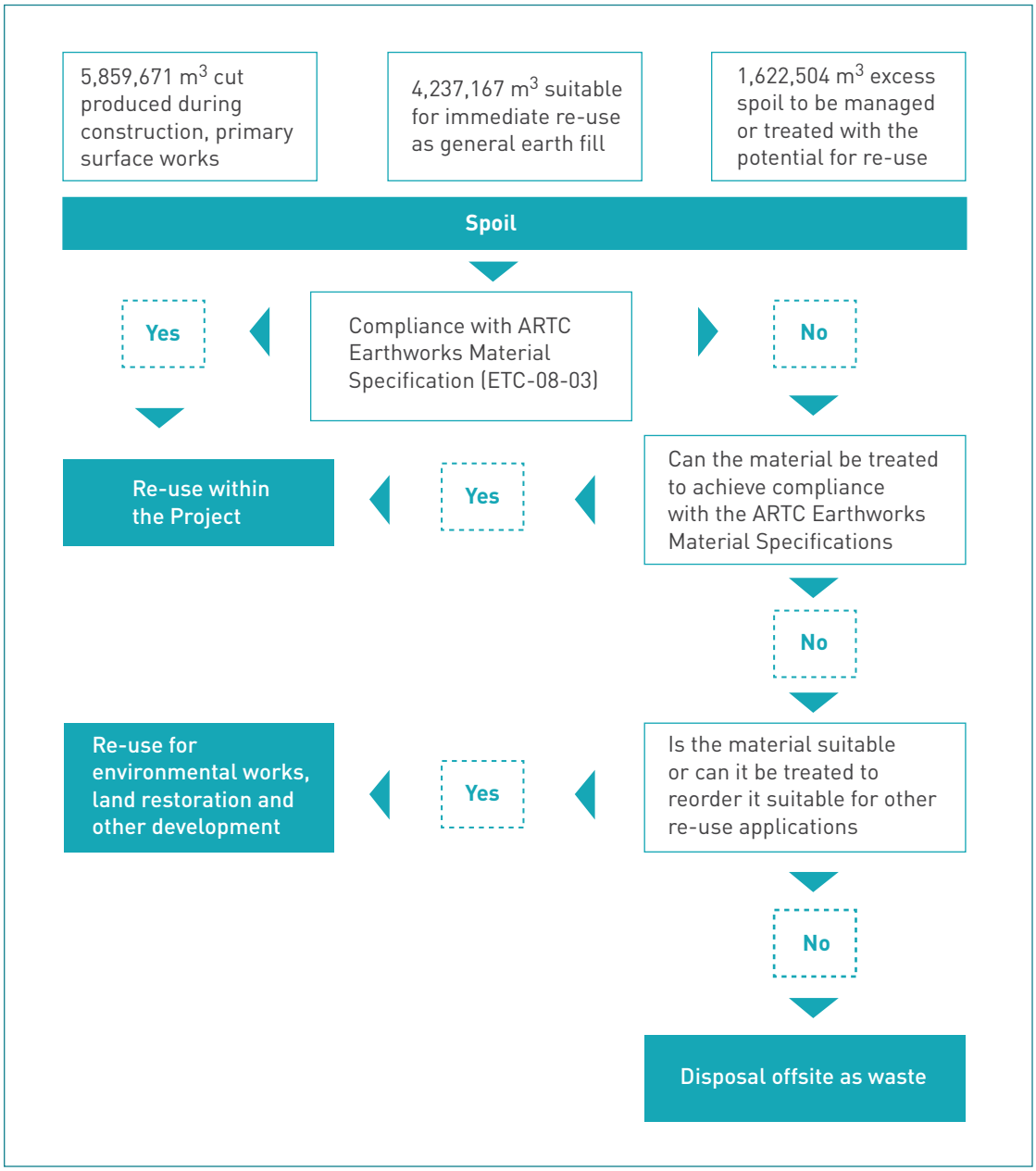
The Project has endeavoured to achieve a net balance of cut to fill to minimise the need for the offsite disposal of spoil. Where possible, materials from excavation such as cuttings, will be re-used as general earth fill.

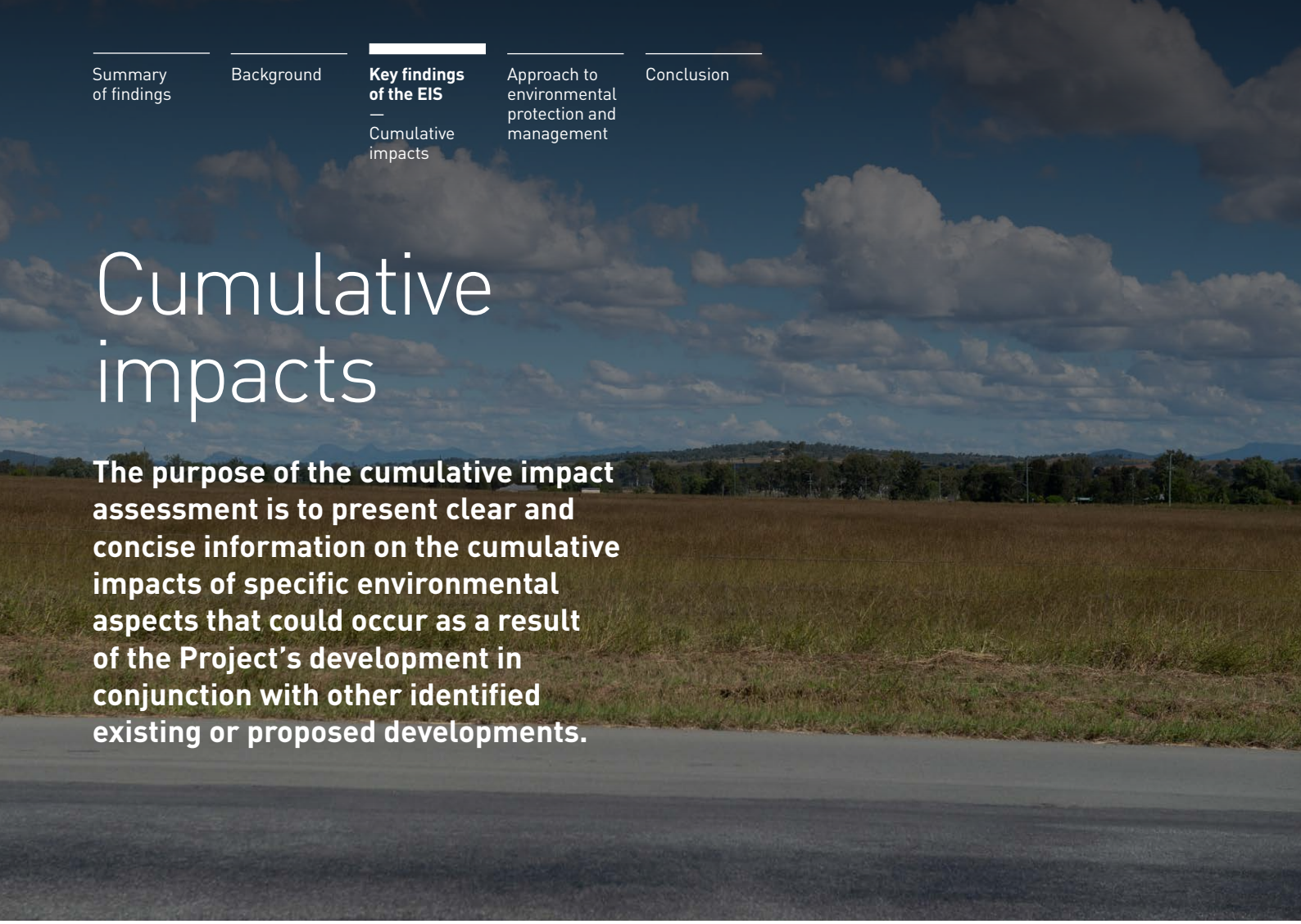
Some materials may be unsuitable for re-use within the engineered embankments without treatment. The Project design calculates that 5,859,671 m^3 of cut material will be produced during construction, primarily from surface works, of which 4,237,167 m^3 is estimated to be suitable for immediate re-use as general earth fill. A calculated excess of 1,622,504 m^3 of spoil will be managed or treated with the potential for re-use.

Spoil will be transported by trucks, with temporary construction access roads along the Project. Local spoil haulage may also involve transport on public roads. The traffic assessment provides detailed information on the haulage routes used for the Project, assuming a worst-case scenario of 1,622,504 m^3 of spoil to be transported by road to end-of-life mines located along Ipswich Rosewood Road (Ebenezer Mine and New Hope West Moreton) approximately 80km from the furthest point of spoil generation.

In practical terms, this is unlikely to occur and re-use within the Inland Rail Program will be pursued as the highest and best use of spoil material arising from the Project.

Spoil management process





Cumulative impacts

The purpose of the cumulative impact assessment is to present clear and concise information on the cumulative impacts of specific environmental aspects that could occur as a result of the Project's development in conjunction with other identified existing or proposed developments.

Chapter 22 provides a summary of the cumulative impact assessment (CIA) undertaken for the Project.

When a number of projects are being undertaken at the same time in a similar location, they can cause 'cumulative impacts'. The cumulative impact assessment relies on publicly available information, and depending on the level of information available, conservative assumptions about a project's impact have been adopted (e.g. area of vegetation to be cleared).

The cumulative impact assessment included the following projects:

- related Inland Rail projects:
  - Kagaru to Acacia Ridge and Bromelton (K2ARB)
  - Helidon to Calvert (H2C)
- Greater Flagstone Priority Development Area
- Bromelton State Development Area
- Ripley Valley Priority Development Area
- South West Pipeline: Bulk Water Connection to Beaudesert
- Royal Australian Air Force (RAAF) Base Amberley future works
- Cross River Rail
- Remondis Waste to Energy Facility.

Want to know more?

See the following Environmental Impact Statement chapters:

- **Chapter 22: Cumulative impacts (Binder 02)**

Cumulative impacts may:

- differ from those of an individual project when considered in isolation
- be positive or negative
- differ in severity and/or duration depending on the spatial and temporal overlap of projects occurring in an area.

Cumulative impacts can:

- occur at a local, regional or national level
- accumulate over time
- exacerbate the intensity, scale, frequency or duration of impacts in isolation or in combination with other known existing or planned projects.

The CIA includes consideration of:

- projects that have been approved but construction has not commenced
- projects that have commenced construction
- projects that have completed construction since 16 June 2017, when the Project was declared a 'coordinated project' under the provisions of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act)
- projects that are currently being assessed as coordinated projects.

Potential cumulative impacts on environmental aspects are considered to be of low significance, except the potential cumulative impacts on the following environmental aspects:

- landscape and visual amenity
- flora and fauna
- cultural heritage
- waste and resource management
- skilled labour supply
- traffic and transport.

Potential cumulative impacts associated with the loss of biodiversity and cultural heritage aspects within the respective areas of interest are common to all projects in the cumulative impact assessment; therefore, these impacts are cumulative by nature. Similarly, projects in the landscape and visual amenity cumulative impact assessment are likely to exacerbate impacts from the Project through combined, successive and sequential views of adjoining projects.

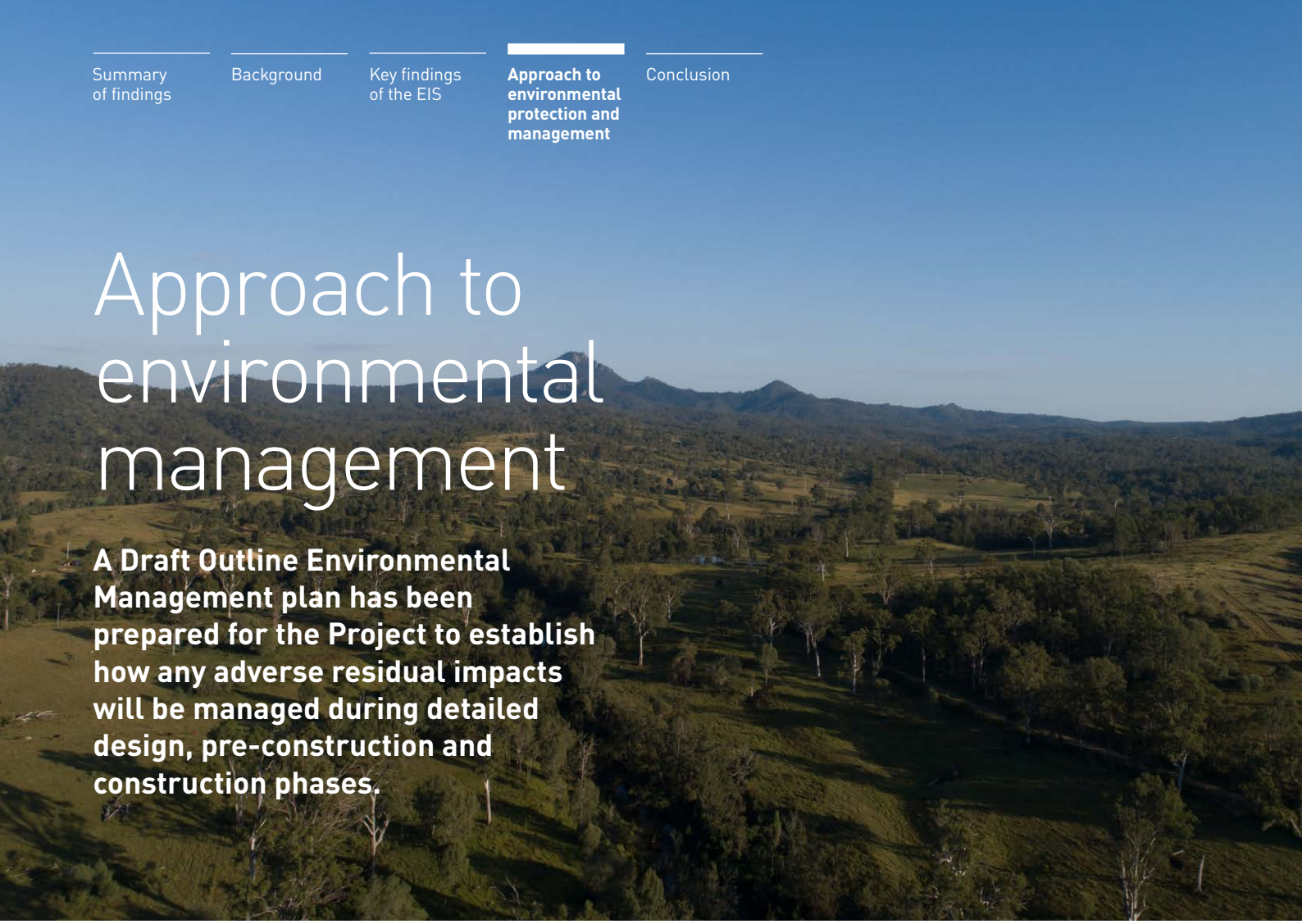
The potential cumulative impacts associated with spoil disposal is recognised as being greater than of low significance. However in the detailed design and execution phases, the adjacent Inland Rail projects will coordinate spoil management and reduce the volumes required to be disposed outside the project areas.

The expansion in construction activity and employment within the region, with a subsequent increase in temporary and non-resident population, has the potential to increase demand for a range of local infrastructure and services, including housing, health care, childcare, and education. Further, spending on consumer-orientated products by the construction workforce has the potential to benefit local retail businesses by increasing their trading levels.

All projects examined in the cumulative impact assessment have overlapping construction schedules. This is likely to increase traffic and congestion on certain roads, as well as decrease the availability of skilled labour in the short term.

It is anticipated assessment of potential cumulative impacts will occur for all of these projects considered in the cumulative impact assessment. That is, each of projects will be required to mitigate and manage potential cumulative impacts to acceptable levels.

The expansion in construction activity and employment within the region, with a subsequent increase in temporary and non-resident population, has the potential to increase demand for a range of local infrastructure and services.



Approach to environmental management

A Draft Outline Environmental Management plan has been prepared for the Project to establish how any adverse residual impacts will be managed during detailed design, pre-construction and construction phases.

Chapter 23 addresses ARTC's approach to environmental management and the development of post-EIS environmental management sub-plans.

A Draft Outline Environmental Management Plan has been prepared for the Project to:

- provide an environmental management framework to enable the identified environmental and social outcomes to be achieved for the detailed design, pre-construction, construction and commissioning
- establish the subsequent process for the preparation and implementation of the Outline Environmental Management Plan and Construction Environmental Management Plan.

The Draft Outline Environmental Management Plan includes discipline-specific sub-plans, drawing on the outcomes of the environmental assessments documented in the draft Environmental Impact Statement. The Draft Outline Environmental Management Plan establishes the framework for the outline Construction Environmental Management Plan and the Construction Environmental Management Plan. The draft Outline Environmental Management Plan identifies:

- environmental outcomes
- performance criteria
- proposed mitigation measures
- monitoring requirements.

Want to know more?

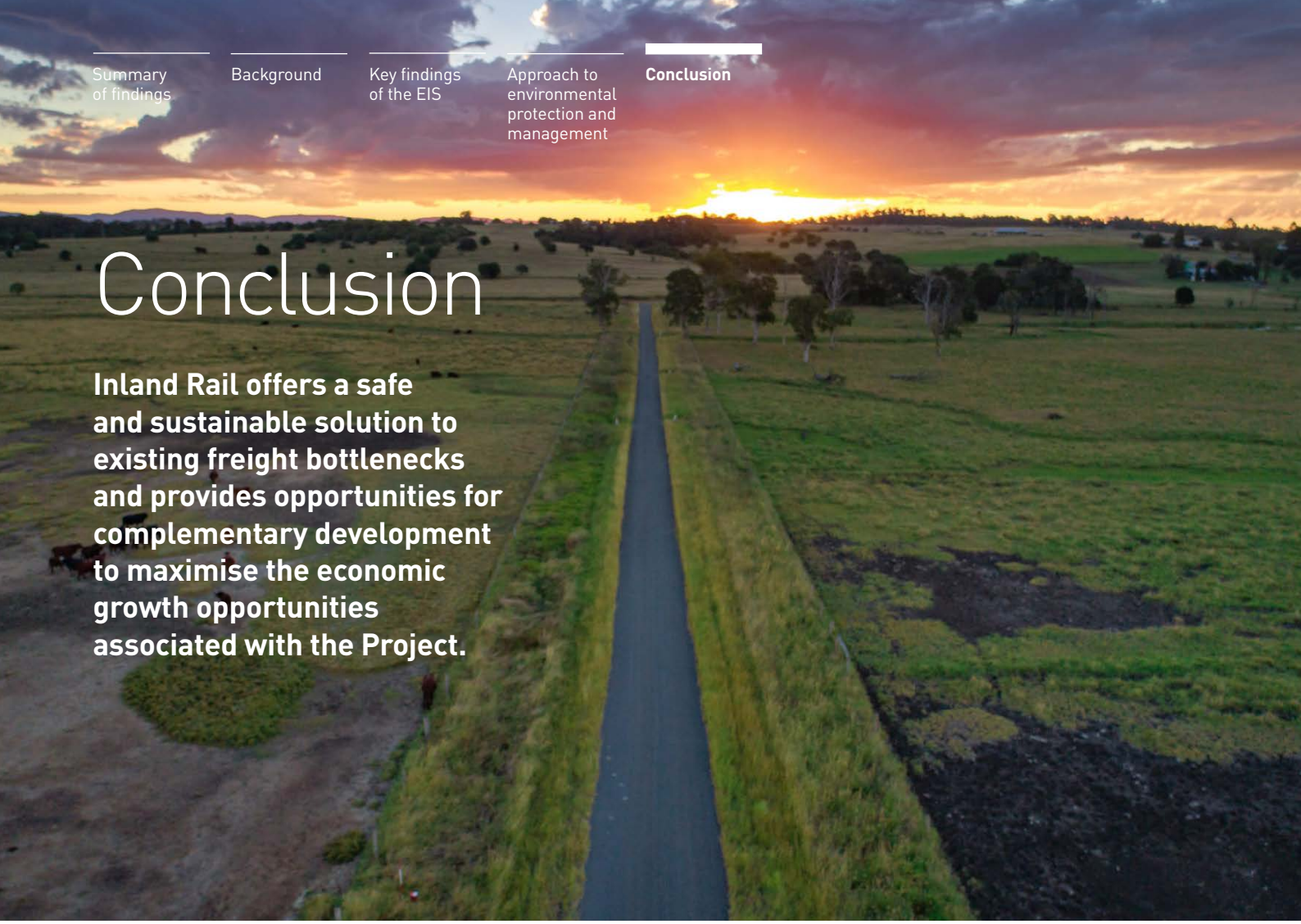
See the following Environmental Impact Statement chapters:

- **Chapter 23: Draft Outline Environmental Management Plan (Binder 02)**
- **Appendix E: Proponent Commitments (Binder 03)**

Aspects addressed in the draft Outline Environmental Management Plan include: land use and tenure; land resources; landscape and visual amenity; flora and fauna; air quality; surface water and hydrology; groundwater; noise and vibration; cultural heritage; traffic, transport and access; hazard and risk; waste and resource management. Social and economic matters are addressed under the Social Impact Management Plan.

Any conditions imposed by the Coordinator-General in the Environmental Impact Statement evaluation report or by the Australian Government Minister for the Environment (or delegate) will need to be incorporated into future versions of the Outline Construction Environmental Management Plan and the Construction Environmental Management Plan to ensure that all works are authorised and consistent with those conditions.

The Draft Outline Environmental Management Plan includes discipline-specific sub-plans, drawing on the outcomes of the environmental assessments documented in the draft Environmental Impact Statement.



Conclusion

Inland Rail offers a safe and sustainable solution to existing freight bottlenecks and provides opportunities for complementary development to maximise the economic growth opportunities associated with the Project.

The Project, and the Inland Rail Program as a whole, provides a 'step change' opportunity to revolutionise the capacity and mode of freight travel in Australia.

As part of the wider Inland Rail Program, the Project will help relieve pressure on existing road and rail corridors by providing part of a continuous rail freight route between Melbourne and Brisbane. The Inland Rail service offering will be competitive with road freight (i.e. a Melbourne to Brisbane transit time of less than 24 hours, with a reliability of 98 per cent), and will better connect regional farms with domestic and international export markets.

The Project is consistent with the objectives of the *Environment Protection and Biodiversity Conservation Act 1999*, including providing for the protection of matters of national environmental significance. The Project aligns with the core objectives and the guiding principles of Ecologically Sustainable Development, is consistent with the Queensland Freight Strategy, the Inland Rail Business Case and Australian Government expectations.

The EIS has undertaken a conservative and 'worst case' approach to identifying the potential impacts of the Project, including cumulative impacts. This demonstrates the adoption of the precautionary principle. Where environmental impacts have been identified through the assessment process, efforts have, in the first instance, been made when practicable to avoid or minimise those impacts through development of the design. Where attempts to avoid or minimise impacts through design have been of limited effect, further mitigation measures have been nominated for implementation during future phases of the Project. This demonstrates the integration of the principle of conservation of biological diversity and ecological integrity in the impact assessment process.

With regards to intergenerational equity, as part of the wider Inland Rail Program, the Project would benefit existing and future generations by providing a safer, more efficient, means of transporting freight between Melbourne and Brisbane. Conversely, should the Project (and therefore Inland Rail) not proceed, the principle of intergenerational equity may be compromised. Future generations would experience increasingly worse safety and environmental impacts due to continued growth in road transport between Melbourne and Brisbane.

The principle of improved valuation, pricing and inventive mechanisms requires that environmental factors should be included in the valuation of assets and services. It is difficult to place a monetary value on the Project's environmental impacts. However, the value placed on environmental resources within and surrounding the alignment is recognised in the environmental investigations undertaken to inform the Project design and mitigation measures. The estimated costs associated with environmental design and mitigation measures have also been built into the overall Project cost.

Opportunities have also been identified through the assessment to maximise the potentially significant economic and social benefits of the Project, through local employment, local industry participation and opportunities for complementary investment that provides for continued community benefit.

Overall the Project, and the wider Inland Rail Program, provides significant opportunity to deliver long-term and substantial economic benefits for Australia's future, by connecting regional and urban markets to buyers and increasing the capacity of the existing passenger and road network.

The delivery of the Project will provide a safe and sustainable solution to Australia's freight challenge, while seeking to minimise adverse environmental, social and economic impacts. The EIS demonstrates that the residual impacts and benefits can be appropriately managed and therefore it is recommended that the Project should proceed, subject to reasonable and relevant conditions.

Overall the Project, and the wider Inland Rail Program, provides significant opportunity to deliver long-term and substantial economic benefits for Australia's future, by connecting regional and urban markets to buyers and increasing the capacity of the existing passenger and road network.