

CHAPTER

07

INLAND
RAIL 

Sustainability

CALVERT TO KAGARU ENVIRONMENTAL IMPACT STATEMENT


ARTC

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

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7. Sustainability

7.1 Summary

Sustainability is an important consideration for the Calvert to Kagaru Project (the Project). As part of the wider Inland Rail Program, the Project provides opportunities to:

- ▶ Maximise resource efficiency
- ▶ Enhance local economic activity
- ▶ Mitigate potential environmental and social impacts.

These key areas of focus align with the Australian Rail Track Corporation's (ARTC) *Inland Rail Environment and Sustainability Policy* (ARTC, 2018a), which outlines the sustainability objectives, targets and commitments for the Project. This policy is listed in Appendix F: Corporate Policies.

During the development of the design, a broad range of sustainability initiatives have been identified and incorporated into the Project. These identified opportunities and initiatives will contribute towards achieving an *Infrastructure Sustainability (IS) Rating Scheme* for the Project against version 1.2 of the *IS Rating Scheme* for the Inland Rail Program, which is administered by the Infrastructure Sustainability Council of Australia (ISCA). The Project's contribution will also form part of the Inland Rail Program's target of achieving an 'Excellent' rating.

7.2 Scope of chapter

This chapter provides a summary of the sustainability considerations in relation to the design, construction and operation of the Project including:

- ▶ Describing the legislation, policies, standards and guidelines relevant to sustainability in the context of the Project (refer Section 7.3)
- ▶ Defining 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 (refer Sections 7.4 and 7.7)
- ▶ Detailing the proposed Sustainability Management Plan requirements and identified sustainability initiatives that will guide the detailed design (refer Section 7.7), construction and operation of the Project (refer Section 7.8).

The early design stages capture the key design inputs required for the EIS and will provide the basis from which primary approval documentation will be developed. It will also advise the development of detailed designs as the Project progresses (refer Section 7.7).

7.3 Legislation, policies, standards and guidelines

The legislation, policies and guidelines outlined in Table 7.1 have been used to guide the implementation of sustainability initiatives during the current design phase, and in considering the whole-of-life of the Project. Table 7.1 should be read in conjunction with the regulatory context presented in the technical discipline studies such as ecology, hydrology, visual impact assessment and cultural heritage, which also focus on preservation of natural, social and built environments.

Full discussion on legislation of relevance to the Project is presented in Chapter 3: Project Approvals.

TABLE 7.1: REGULATORY CONTEXT

Legislation, policy or guideline	Relevance to the Project
Commonwealth legislation	
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	The EPBC Act promotes ecological sustainable development through the conservation and ecologically sustainable use of natural resources.
<i>National Greenhouse and Energy Reporting Act 2007</i> (NGER Act)	Outlines the approach to providing data and reporting in relation to greenhouse gas emissions and energy consumption and production.
State legislation	
<i>Environmental Protection Act 1994</i> (Qld) (EP Act)	Aims to protect the environment while allowing for ecologically sustainable development.
<i>State Development and Public Works Organisation Act 1971</i> (Qld) (SDPWO Act)	Establishes the framework for environmental assessment of declared coordinated projects in Queensland (QLD).

Legislation, policy or guideline	Relevance to the Project
<i>Planning Act 2016</i> (Qld) (Planning Act)	The purpose of the Planning Act is to establish an efficient, effective, transparent, integrated, coordinated and accountable system of land use planning, development assessment and related matters that facilitates the achievement of ecological sustainability in QLD.
Planning frameworks, strategies and statutory guidelines	
<i>National Strategy for Ecologically Sustainable Development (NSESD)</i> (Council of Australian Governments, 1992)	The <i>National Strategy for Ecologically Sustainable Development</i> sets out the broad strategic and policy framework under which governments will cooperatively make decisions and take actions to pursue ecologically sustainable development in Australia.
<i>United Nations Framework Convention on Climate Change</i> , including the Paris Agreement on climate change	Australia is a party to the Paris Agreement 2015. In August 2015, the Australian Government committed to reduce emissions by 26–28% below 2005 levels by 2030.
<i>Sustainable Procurement Guide</i> (Department of Environment and Energy, 2018)	Sets the priorities and direction for sustainable procurement for Australian Government agencies and organisations.
<i>Guide for sustainable procurement of services</i> (Eco-Buy Limited, 2013)	Sets the priorities and direction for sustainable procurement for Australian Government agencies and organisations.
<i>Infrastructure Sustainability Planning Guidelines</i> (ISCA, 2016)	Details how the <i>IS Rating Scheme</i> may be applied to the planning phase of infrastructure projects, which occurs prior to the detailed design phase.
<i>Infrastructure Sustainability Rating Scheme, IS Technical Manual</i> Version 1.2, April 2018 update (ISCA, 2018)	Inland Rail has adopted the <i>IS Rating Scheme</i> for guiding sustainability for all projects within the program.
<i>Queensland Climate Change Response, including the Climate Transition Strategy and Climate Adaptation Strategy</i> (Queensland Government, 2017b)	Provides guidance on the context for consideration of climate change mitigation and adaptation approaches in QLD.
<i>Crime Prevention through Environmental Design (CPTED)</i> (Queensland Government, 2007)	The fundamental idea of <i>Crime Prevention through Environmental Design</i> is to use knowledge and creativity to design built environments in ways that lessen or prevent the incidence of crime.
Program-related guidelines	
<i>Inland Rail Sustainable Procurement Policy</i> (ARTC, 2018b)	Sets the priorities and direction for sustainable procurement in the context of Inland Rail.
<i>Inland Rail Environment and Sustainability Policy</i> (ARTC, 2018a)	Sets the priorities and direction for implementing sustainability initiatives during the planning, design and operation phases of Inland Rail.

7.4 Definition of ecologically sustainable development

The pursuit of sustainable development has gained momentum since the release of *Our Common Future*, commonly referred to as the *Brundtland Report* (World Commission on Environment and Development, 1987). In the Australian context, the definition of sustainable development is based on the information contained in the *Brundtland Report*, as well as the *National Strategy for Ecologically Sustainable Development* (Council of Australian Governments, 1992). The *National Strategy for Ecologically Sustainable Development's* definition of ecologically sustainable development is:

'...using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

The Project, being part of the Inland Rail Program, meets the intent of the guiding principles for the *National Strategy for Ecologically Sustainable Development*, as shown in Table 7.2.

TABLE 7.2: GUIDING PRINCIPLES OF THE NATIONAL STRATEGY FOR ECOLOGICALLY SUSTAINABLE DEVELOPMENT AND RELEVANCE TO THE PROJECT

Guiding principle	Project response
<ul style="list-style-type: none"> ▶ Decision-making processes should effectively integrate both long- and short-term economic, environmental, social and equity considerations 	<ul style="list-style-type: none"> ▶ Multi-criteria analysis has been used as the decision-making process to assess potential economic, environmental, social and equity considerations consistently for the Project during design development ▶ Value engineering provides the key to achieving return on investment. The concepts of ESD and energy efficiency have been incorporated into each major decision from Project inception, through concept planning, design, construction, operation and decommissioning, thereby offering the opportunity to demonstrate whole-of-life benefits for the Project.
<ul style="list-style-type: none"> ▶ Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation 	<ul style="list-style-type: none"> ▶ The draft EIS and design have been developed with input from field studies, scientific modelling and results of technical assessments across all engineering, planning and environmental disciplines ▶ Technical investigations and mitigation strategies completed for the Project and design have been developed to be compliant with the ToR.
<ul style="list-style-type: none"> ▶ The global dimension of environmental impacts of actions and policies should be recognised and considered 	<ul style="list-style-type: none"> ▶ As discussed in Chapter 2: Project Rationale, Inland Rail will provide a long-haul freight solution that is time and cost competitive compared to road freight. Consequently, Inland Rail will replace some of the long-haul road freight task, resulting in reduced road congestion and fewer vehicular carbon emissions.
<ul style="list-style-type: none"> ▶ The need to develop a strong, growing and diversified economy that can enhance the capacity for environmental protection should be recognised 	<ul style="list-style-type: none"> ▶ The addition of a major asset like the \$10 billion Inland Rail Program will even the playing field between road and rail. This will enhance the competition between the two modes in Australia, driving innovation and efficiency in each competing sector (ARTC, 2015a) ▶ Other strategic benefits include the expansion and enhancement of the national standard gauge network, the removal of a large portion of expensive future road freight, and the greater regional economic development, particularly along the Inland Rail corridor ▶ It will better link producers, farmers and businesses to national and global markets. Almost 70 per cent of freight carried on Inland Rail will be household goods and groceries produced in Australia and consumed in our major cities.
<ul style="list-style-type: none"> ▶ The need to maintain and enhance international competitiveness in an environmentally sound manner should be recognised 	<ul style="list-style-type: none"> ▶ Perhaps the most basic benefit outlined in the report is that Inland Rail would improve the productivity and efficiency of the Australian economy, by providing a 'backbone link' in the eastern Australian rail and road network.
<ul style="list-style-type: none"> ▶ Cost effective and flexible policy instruments should be adopted, such as improved valuation, pricing and incentive mechanisms 	<ul style="list-style-type: none"> ▶ It is estimated that Inland Rail would provide savings of \$10 per tonne for Melbourne–Brisbane inter-capital freight and would also 'significantly improve' rail connections between eastern Australian regional areas and the east coast ports (ARTC, 2015a) ▶ The trickle-down effect of this is lower prices for consumers, which in turn reduces the cost of living—a key component of most quality of life metrics.
<ul style="list-style-type: none"> ▶ Decisions and actions should provide for broad community involvement on issues that affect them 	<ul style="list-style-type: none"> ▶ An extensive community consultation process has been undertaken to support preparation of the draft EIS and communicate findings and obtain input at key milestones. Consultation items raised and how these outcomes have been addressed is provided in Appendix C: Consultation Report ▶ Preparation of a Community and Stakeholder Engagement Plan is a proponent commitment for the Project. Refer Appendix R: Social Impact Assessment Report and Appendix E: Proponent Commitments. The Community and Stakeholder Engagement Plan will be reviewed and amended over the course of the Project to reflect the changing activities and needs of the Project.

7.5 ARTC policy and commitments

In recognition of the role the Inland Rail Program has in demonstrating sustainability leadership, ARTC has developed an *Inland Rail Environment and Sustainability Policy*. A copy of the policy is provided in Appendix F: Corporate Policies.

The sustainability commitments embedded into the *Inland Rail Environment and Sustainability Policy* have guided the Project's approach to sustainability and environmental protection and are supported by identified targets for Inland Rail projects as part of the Program-wide *Inland Rail Sustainability Strategy*. The *Inland Rail Sustainability Strategy* has been prepared to ensure consistent application of sustainability initiatives across the Inland Rail Program. The Sustainability Strategy will inform the Sustainability Management Plan prepared for the Project (refer Section 7.6) and be provided to the contractor to guide the identification of Project-specific initiatives. These commitments are summarised in Table 7.3.

TABLE 7.3: INLAND RAIL SUSTAINABILITY COMMITMENTS AND THE APPLICATION OF THESE ON THE PROJECT

Commitments	Application on the Project
<p>No Harm:</p> <ul style="list-style-type: none"> ▶ Our goal is that no-one is harmed at work or on our network. 	<p>Health and Community Wellbeing: In accordance with the Social Impact Management Plan (SIMP) and the Health and Community Wellbeing Action Plan, create a safe environment, developing programs and initiatives to improve safety outcomes for local communities (refer Chapter 16: Social).</p> <p>Crime Prevention through Environmental Design: Incorporate measures in design, construction and operation that reduce the likelihood of damage and injury to people and property and the impact these issues have on local communities and will investigate opportunities for designing temporary construction diversions and lighting to meet Crime Prevention through Environmental Design guidance.</p>
<p>Engage early and meaningfully with stakeholders, including Indigenous organisations, communities, industry and government:</p> <ul style="list-style-type: none"> ▶ Build effective working relationships and a shared understanding of the program and solutions. 	<p>Community and Stakeholder Engagement: Encourage, plan, implement and monitor stakeholder and community engagement in accordance with the SIMP and the Community and Stakeholder Engagement Action Plan (refer Chapter 16: Social).</p> <p>Heritage: Recognise the role that engagement with Indigenous and non-Indigenous communities has in identifying heritage items and values (refer Chapter 16: Social and Chapter 18: Cultural Heritage).</p>
<p>Promote long-term economic benefits within communities:</p> <ul style="list-style-type: none"> ▶ Create lasting opportunities for development of skilled local and Indigenous workers ▶ Support local and Indigenous businesses to ensure they are prepared for and provided with opportunities to participate ▶ Enable Inland Rail to be a catalyst for complementary private sector investment. 	<p>Procurement: Encourage sustainability throughout the value chain for goods and services used to build and operate Inland Rail.</p> <p>Community and Stakeholder Engagement: Encourage, plan, implement and monitor stakeholder and community engagement (refer Chapter 5: Stakeholder Engagement).</p> <p>Heritage: Recognise the role that engagement with the Indigenous and non-Indigenous community has in the identification of heritage items and values and investigate the opportunity to interpret heritage to promote local heritage values.</p> <p>Community Health and Wellbeing: Identify opportunities to support local economic benefits to local, regional, and Indigenous communities (refer Chapter 16: Social).</p> <p>Implement the SIMP and support Action Plans specifically relating to Workforce Management, Housing and Accommodation and Local Business and Industry Content (refer Chapter 16: Social).</p>
<p>Protect the environment by minimising the environmental footprint:</p> <ul style="list-style-type: none"> ▶ Apply the principles of avoid, minimise, offset to manage impacts to receiving environments and ecological values ▶ Reduce greenhouse gas emissions and minimise waste 	<p>Environment: Seek opportunities to reduce the environmental footprint of the Project.</p> <p>Waste: Seek opportunities to minimise waste generation and to reuse or recycle materials (refer Chapter 21: Waste and Resource Management).</p> <p>Energy and Carbon: Seek opportunities to reduce the carbon footprint of the Project by considering construction and operational greenhouse emissions.</p>

Commitments	Application on the Project
<ul style="list-style-type: none"> ▶ Minimise water use ▶ Continually investigate opportunities to improve environmental values and prevent pollution ▶ Obtain and comply with all relevant environmental approvals and compliance obligations. 	<p>Water: Seek opportunities to reduce the total amount of water used on the Project and to identify sources of water that reduce the demand on potable water supplies.</p> <hr/> <p>Resources and Embodied Energy: Seek opportunities to reduce the environmental impacts of materials used during construction and operation of the Project by encouraging dematerialisation of the design and improving the service life of materials.</p>
<p>Future-proof Inland Rail so it is efficient and effective in the long term:</p> <ul style="list-style-type: none"> ▶ Design for climate change resilience ▶ Incorporate the future demand requirements and corridor uses in the current design. 	<p>Climate Change: Consider climate change impacts and opportunities to reduce the risks to Inland Rail associated with a future climate.</p> <hr/> <p>Future-proofing: Considering the future demand requirements to reduce the potential for impacts to the natural and social environment associated with future upgrades to meet increased demand for freight rail.</p>
<p>Base decisions on a balanced consideration of technical, economic, environmental and social elements:</p> <ul style="list-style-type: none"> ▶ Adopt a consistent approach across the Program. 	<p>Decision Making: Consistently consider the environmental, social, economic and technical impacts during decision making and ensure such considerations are built into the decision-making process.</p>
<p>Regularly review and audit processes and performance:</p> <ul style="list-style-type: none"> ▶ Challenge the way we have always done things ▶ Ensure we are doing what we said we would do. 	<p>Leadership: Demonstrate sustainability leadership across the delivery of the Inland Rail Program and at the Project level.</p> <hr/> <p>Management and Governance: Recognise the importance of monitoring and reviewing progress to identify opportunities for continuous improvement.</p> <hr/> <p>Benefits Identification: Identify the benefits of the Project early so that the promised benefits can be assessed and reviewed during operation.</p>
<p>Drive a culture of continuous improvement:</p> <ul style="list-style-type: none"> ▶ Seek to improve, collaborate and value-add throughout delivery ▶ Continually improve our Environmental Management System to enhance environmental performance. 	<p>Management and Governance: Encourage improvement in the delivery of the Project and on the promises made to stakeholders and the community.</p> <hr/> <p>Innovation: Review the outcomes of the way things are done to find new and better ways of achieving the desired outcomes.</p>

7.6 Sustainability Management Plan

A Sustainability Management Plan will be developed by the contractor responsible for the delivery of the design and construction of the Project. The Plan will:

- ▶ Demonstrate leadership and commitment to sustainability
- ▶ Include targets or requirements for safety, local employment, materials, waste, procurement, ecological connectivity, greenhouse gas emissions and climate resilience in line with the Inland Rail objectives and targets
- ▶ Establish the roles, responsibilities and resourcing requirements for embedding sustainability throughout the design, procurement and construction of the Project
- ▶ Document the process for the identification, assessment and implementation of sustainability initiatives and opportunities, particularly those associated with the efficient use of energy, water and transport
- ▶ Document the process to be used to manage the assessment, monitoring and review of sustainability against achieving the requirements to contribute to an 'Excellent' rating under the *IS Rating Scheme*
- ▶ Outline the documentation and reporting requirements necessary to demonstrate how sustainability has been incorporated into the Project during design, construction and operation.

The plan will be reviewed and audited by ARTC as part of its management of the *IS Rating Scheme* it is pursuing, in line with the version 1.2 of the rating scheme.

Prior to operations, the Sustainability Management Plan will be reviewed and updated by ARTC to focus on operations and maintenance activities.

The development and implementation of the Sustainability Management Plan will align with the *Inland Rail Sustainability Strategy*, which is provided in Appendix F: Corporate Policies.

7.7 Sustainability in design

During design, frameworks were developed to identify sustainability initiatives and guide the development of the design. These frameworks have been captured under the governance theme in Table 7.4.

TABLE 7.4: DESIGN FRAMEWORK FOR SUSTAINABILITY INITIATIVES

Theme	Topic	Sustainability initiatives
Governance	Making informed decisions	Development of a Sustainability Management Plan that guides the design and primary approvals processes of the Project to provide sustainability outcomes that support the <i>Inland Rail Environment and Sustainability Policy</i> .
		Use of safety in the design process that provides a comprehensive framework to avoid or minimise risk and enhance safety to support design objectives.
		Use of multicriteria assessment that considers environmental, social and local economic impacts to evaluate alignment options (refer Chapter 2: Project Rationale).
		Constructability assessment that identifies all processes from start to finish during the construction phase to inform how the Project will be built.
		Implementation of a value management process that highlights potential opportunities for defining, maximising and achieving efficiencies.
		Use of Consultation Manager to record stakeholder feedback for all phases of the Project (refer Chapter 5: Stakeholder Engagement).
		Alignment changes from the original Southern Freight Rail Corridor (SFRC) have been made in five locations: <ul style="list-style-type: none"> ▶ Sandy Creek, where the alignment has been moved to the east to minimise impacts on vegetation and habitat values along the riparian corridor including reducing the length of the bridge across the creek and to minimise potential impacts on cultural heritage sites ▶ Washpool Road, where the alignment has been moved to reduce the potential for interfaces between the road and the rail infrastructure and to reduce impacts to properties. The revised alignment also provides an opportunity to reduce the potential flooding impacts in the Purga Creek flood area associated with the 1% Annual Exceedance Probability (AEP) flood event. A reduction in the radius of the bend leading into the Washpool Road by 300 m has reduced the earthworks required ▶ Teviot Range, where the alignment has moved approximately 1.5 km north of the original SFRC corridor to reduce the potential for heritage impacts on known cultural heritage sites following consultation with the Traditional Owners. The new alignment also reduces the impact on environmentally sensitive sites, which include protected vegetation and habitats ▶ Where the Project joins the adjacent project alignment, Helidon to Calvert, running parallel to the QR West Moreton Line, starting at Ch 2.2 km. The location of the alignment was determined by the requirement to maintain vertical clearance for formation and structures over the Western Creek floodplain and Waters Road, and to achieve the required design speeds ▶ Connections at the Sydney to Brisbane Interstate Line will be provided to the north towards Brisbane and Acacia Ridge, via a dual-gauge track connection, and to the south towards Bromelton via a standard-gauge track fork connection. The track geometry proposed for these turnouts will limit the speed of vehicles travelling through this section to 50 km/h for safety reasons (refer Chapter 2: Project Rationale).

Theme	Topic	Sustainability initiatives
Governance (continued)	Future-proofing	<p>The alignment has considered future asset requirements, including ultimate corridor considerations to minimise the potential for premature decommissioning of the infrastructure as part of upgrade works and future disruption or impacts to the environment and landholders.</p> <p>In particular, the following were considered:</p> <ul style="list-style-type: none"> ▶ Additional earthworks and property required to accommodate extended crossing loops for trains up to 3,600 m in length ▶ Structures designed to accommodate 30-tonne axle load (TAL) ▶ Track structure and formation designed to suit 30 TAL ▶ Connections to existing operating rail via turnout connections to Inland Rail. <p>The design has endeavoured not to preclude opportunities for adjacent land use or business to access the Inland Rail corridor in the future (refer Chapter 6: Project Description and 8: Land Use and Tenure).</p>
	Climate response	<p>Consideration of climate change in modelling used to inform the design of drainage and waterways including:</p> <ul style="list-style-type: none"> ▶ Application of the Australian Rainfall and Runoff Interim Climate Change Guidelines (Engineers Australia 2014) ▶ Assessment of impacts associated with the 1% AEP to determine the sensitivity of the design to potential changes in rainfall intensity ▶ Where new track is to be constructed in greenfield areas, track crossing and longitudinal drainage with capacity to convey the 1% AEP without overtopping formation ▶ Where enhancement or upgrading to existing track is to be undertaken, no worsening of the existing track flood immunity ▶ Adoption of afflux design limits of 0.01 m for the building floor envelope and neighbouring infrastructure that are already flooded, unless agreed otherwise with affected stakeholders for the 1% AEP (refer Chapter 13: Surface Water and Hydrology). <p>Consideration and implementation of treatment and adaptation options associated with the direct and indirect impacts of climate change and natural hazards to reduce the potential for service disruption (refer Chapter 20: Hazard and Risk).</p> <p>Identification of climate change risk and mitigation in accordance with industry standards, including <i>AS5334 Climate change adaptation for settlements and infrastructure—A risk-based approach</i>.</p> <p>Design mitigation measures applied to manage runoff and flooding to sensitive receptors (refer Chapter 13: Surface Water and Hydrology).</p> <p>Establishment of flood resilience requirements, including greenfield designs providing the 1% AEP event without overtopping the rail formation (refer Chapter 13: Surface Water and Hydrology).</p> <p>Consideration of extreme frequency flood events to improve flood immunity, including consideration of the 1-in-100-year and 1-in-2000-year annual exceedance probability flood events (refer Chapter 13: Surface Water and Hydrology).</p> <p>Consideration of long duration flood events (i.e. three-day inundation) on infrastructure components, including embankments (refer Chapter 13: Surface Water and Hydrology).</p> <p>Implementation of changes to horizontal and vertical alignment of the infrastructure to accommodate proposed bridges over floodplains to minimise hydrological impacts to adjoining properties (refer Chapter 13: Surface Water and Hydrology).</p>

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 are identified in Table 7.5 under the themes of:

- ▶ Advancing local, regional and national economies
- ▶ Environmental protection
- ▶ Respect for people, communities and valued places.

TABLE 7.5: SUSTAINABILITY IN DESIGN INITIATIVES

Theme	Topic	Sustainability initiatives
Advancing local, regional and national economies	Supporting local and Indigenous businesses	Implementation of a Sustainable Procurement Policy and strategy to ensure supply opportunities are available to local business.
		ARTC Business Development Manager has engaged with local businesses to identify opportunities to develop and promote local business participation (refer Chapter 5: Stakeholder Engagement).
		Consideration of local material sourcing strategies, including the use of existing borrow pits and identifying opportunities for using local material sources, quarries and concrete suppliers.
		Commitment to develop a clear and efficient process for people to seek information about employment opportunities and to register their interest in Inland Rail (refer Chapter 5: Stakeholder Engagement).
Environmental protection	Biodiversity conservation	Working with local communities and government stakeholders to identify education and training pathways, and employment opportunities for local residents during and after construction (refer Chapter 16: Social).
		The Project considers the reuse of previously disturbed land, including existing rail corridors and non-productive land to minimise impacts to agricultural land and native vegetation.
		The rail corridor has been positioned to align with roads and property boundaries, where possible, to reduce impacts to habitat, fauna passage and remnant vegetation (refer Chapter 2: Project Rationale and Chapter 11: Flora and Fauna).
		Where culverts are to be replaced or constructed, in addition to fish passage considerations, the opportunity for dry fauna passage is not precluded.
		Design has identified and implemented measures to maintain connectivity for fauna, including the use of fencing and dedicated crossings associated with the three main terrestrial biodiversity corridors and fish passages (refer Chapter 11: Flora and Fauna).
		Design has been developed to minimise impacts to waterways, riparian vegetation and in-stream flora and habitats, including: <ul style="list-style-type: none"> ▶ Adoption of a crossing structure hierarchy (e.g. bridges preferred to culverts), as applicable and relevant to local conditions and constructability ▶ Aim to avoid, then minimise, the extent of waterway diversions or realignments ▶ Avoidance of discharges/impacts to hydrology, including surface flows ▶ Consideration of water quality design matters in response to impacts identified through the EIS (refer Chapter 13: Surface Water and Hydrology).
Efficient use of resources and minimisation of carbon footprint		Reuse of local sources of aggregate and treated dispersive and reactive materials to improve mass haul.
		Reuse of material excavated below the rail embankment for less critical parts of infrastructure.
		Reuse of excavated material as a stabilised structural fill.
		The number, width and depth of cuts has been optimised to avoid the generation of material that would be considered surplus to project requirements.
		Investigating the viability of the potential reuse of ballast as high-quality general fill or structural fill to minimise the import of rock amount.

Theme	Topic	Sustainability initiatives
Environmental protection (continued)	Efficient use of resources and minimisation of carbon footprint (continued)	Maximising the use of onsite materials through reuse of spoil to minimise the disposal and transportation of materials.
		Implementation of a geotechnical program to inform the design and minimise the extent of: <ul style="list-style-type: none"> ▶ Structural fill required ▶ Cuttings expected to require blasting ▶ Imported non-dispersive soil to embankments.
		Refining the horizontal and vertical design and alignments to minimise the quantity of off-site fill required.
		The Project has been aligned to avoid, where possible, steep terrain and topographical constraints to minimise earthworks and provide for more efficient track geometry and grade.
		Co-location with existing transport corridors and alignment with property boundaries, wherever practically possible, to minimise land severance and loss of productive agricultural land (refer Chapter 8: Land Use and Tenure).
		Use of existing brownfield operating rail environments minimising land-take impacts.
		During pre-construction, engage with the Department of Agriculture and Fisheries to identify opportunities for State forest timber salvage to supply local timber mills prior to commencement of construction.
		Consideration of the shape and size of batters to encourage cut and fill balancing.
		Completing an assessment of the availability, quality and volume of materials that are readily accessible using standard construction equipment onsite or close by.
		Adopting the intent to preferentially reuse material, identifying ways to treat or ameliorate materials that would normally be considered unsuitable for use (refer Chapter 21: Waste and Resource Management).
Respect for people, communities and valued places	Being a good neighbour	The rail corridor has been positioned to align with roads and private property boundaries where possible to reduce impacts to limit property severance, including consideration of the SFRC (refer Chapter 8: Land Use and Tenure).
		Consultation with landholders to ensure that a satisfactory level of access between adjoining properties is maintained, and to identify action that will minimise or offset changes to connectivity or changes to water flows that affect their properties.
		Minimising vegetation clearing and land disturbance to that required for safe construction and operation of the rail network to maintain the rural character of the area (refer Chapter 11: Flora and Fauna).
		Evaluating the use of landscape treatments on embankments to soften their visual impact (refer Chapter 10: Landscape and Visual Amenity).
	Respecting heritage and culture values	Continued engagement with registered Aboriginal parties in accordance with the Cultural Heritage Management Plans for the Project, ensuring ARTC's commitments in fulfilling its duty of care under the <i>Aboriginal Cultural Heritage Act 2003</i> (Qld) occurs in a manner that is endorsed by the relevant parties.
		Location of proposed permanent and temporary infrastructure and activities to minimise impacts to locations of cultural heritage value (refer Chapter 18: Cultural Heritage).
		Alignment options assessment has sought to reduce the proximity of the Project to non-Indigenous cultural heritage (refer Chapter 2: Project Alternatives).
	Building relationships	Incorporation of community and stakeholder feedback into alignment and design decision making, and identification of management measures.

Theme	Topic	Sustainability initiatives
Respect for people, communities and valued places (continued)	Community safety, health and wellbeing	Optimisation of road and rail interfaces for public roads to minimise safety risks, consider wait times and maintain a high level of local accessibility.
		Consulting with landholders to identify specific measures that will reduce impacts on farm management, connectivity or amenity, including consideration of the level of existing lighting, noise levels and visual amenity within the area and the location and design and of the Project to reduce impacts (refer Chapter 5: Stakeholder Engagement).
		Watercourse crossing structures (including culverts and bridges) have been designed to minimise the need for ongoing maintenance and risk of blockage (refer Chapter 13: Surface Water and Hydrology).
		Temporary, construction facilities, for example, laydowns, flash-butt welding, have been positioned to avoid, where practically possible, sensitive receptors to noise.
		Permanent alignment selection for rail and road infrastructure, such as the SFRC, has considered the proximity of sensitive receptors to potential noise, air quality and vibration impacts.
		Future controls through the safety in design process are incorporated into the design to address key safety risks throughout the Project life cycle.

7.8 Future sustainability opportunities

A summary of future sustainability opportunities for the Project are summarised in Table 7.6. These opportunities were identified during the design phase, but require further investigation during the detailed design, construction and/or operational phases.

The future sustainability opportunities identified in Table 7.6 will be investigated and implemented as appropriate. This will enable the key deliverables identified in the *Inland Rail Sustainability Strategy* (refer Appendix F: Corporate Policies) to be achieved.

TABLE 7.6: SUSTAINABILITY OPPORTUNITIES THAT MAY BE IMPLEMENTED DURING FUTURE PHASES OF THE PROJECT

Theme	Area	Sustainability opportunities
Governance	Sustainability leadership	Create a culture within the delivery team for the Project where implementation of sustainability initiatives is inherent in all business activities
		Commit to being a responsible and attractive employer
		Maintain a high level of safety and security through the development of management systems.
	Monitoring and evaluating performance	Maintain dialogue with supply chain stakeholders and report transparently about environmental performance
		Require the contractor to report against sustainability targets on a monthly basis.
Making informed decisions		Build an internal environmental management system that collects sustainability data in a consistent and reliable format
		Create a robust sustainability reporting framework that supports decision making against sustainability strategy.
Future-proofing		Embed the principles of sustainability and environmental benefits into rail asset management programs including: <ul style="list-style-type: none"> ▶ Resource consumption (energy, water, fuel, chemicals) ▶ Equipment efficiency ▶ Procurement of environmentally friendly and socially friendly materials and suppliers ▶ Triple bottom line reporting into asset risk analysis including potential for environmental damage, negative social impacts and regulatory compliance issues from asset failures ▶ Review of sustainability impacts from asset disposal.

Theme	Area	Sustainability opportunities
Governance (continued)	Encouraging innovation	Apply precautionary approaches to environmental challenges and support initiatives, projects and new technologies for further improved environmental performance
		Partnering with key material providers (e.g. providers of rails and sleepers) to pursue innovation opportunities.
	Learning from our experiences/ continuous improvement	Establish a Program-wide sustainability network to enable the sharing of lessons learnt between projects and with the broader industry
		Identify environmental risks and processes across ARTC and support new ways of acting to reduce these
Advancing local, regional and national economies	Supporting local and Indigenous businesses	Include specific details on opportunities for local and Indigenous business participation in the Project's implementation plan for ARTC's Sustainable Procurement Policy
		Pursue opportunities identified in the SIMP (refer Chapter 16: Social).
	Job creation and skills development	Work with government agencies to assist the local workforce to adjust to construction employment opportunities through: <ul style="list-style-type: none"> ▶ Workforce upskilling ▶ Engagement of small business ▶ Liaison with education and training providers ▶ Development of procurement and tendering processes for local business and suppliers ▶ Development of a 'work-life balance policy' that includes outreach to women
		Focus on local impacts and communities through better understanding and engagement of local plans and assets
Contribute to regional skills capacity including opportunities for apprentices, as well as vocational education and training students to continue skills development beyond the life of the Project they were originally engaged on		
Respect for people, communities and valued places	Stimulating sustainable procurement	Have a clear and efficient process for people to seek information about employment opportunities and to register their interest in Inland Rail
		Continue engaging with communities, representative organisations and service providers to develop new local businesses.
		Engage with suppliers and contractors to ensure they recognise and understand their role in supporting ARTC's sustainable objectives
		Adopt strategies to avoid unnecessary consumption and manage demand
Respect for people, communities and valued places	Building relationships	Select products and services that have lower environmental impacts across their life cycle compared with competing products and services, in the context of whole-of-life value for money
		Foster a viable market for sustainable products and services by supporting businesses and industry groups that demonstrate innovation in sustainability
		Support suppliers who are socially responsible and adopt ethical practices.
		Establish a community reference group to ensure a representative selection of the community: <ul style="list-style-type: none"> ▶ Are afforded the opportunity to provide feedback and are involved in the Project ▶ Have an increased understanding about the Project ▶ Contribute to a more effective response from the Project team to community issues and concerns
Respect for people, communities and valued places	Building relationships	Implement communication mechanisms that will be maintained by ARTC throughout the approval, pre-construction and construction phases
		Have ongoing engagement with health, community and emergency services to develop joint arrangements for responses to Project-related demands.

Theme	Area	Sustainability opportunities
Respect for people, communities and valued places (continued)	Community safety, health and wellbeing	Reduce local impacts on air quality, noise and facilitate opportunities for improved road safety by moving freight competitively by rail, taking long-haul truck traffic off roads
		<p>Explore the use of closed-circuit television monitoring systems that address rail trespass and road vehicle incursions specifically targeting:</p> <ul style="list-style-type: none"> ▶ Fire detection and response ▶ Remote monitoring of tracks and unattended or secure locations ▶ Video surveillance and analysis ▶ Train schedule monitoring ▶ Track maintenance and detection of damage or obstructions ▶ Railway crossing management and detection of objects on the line ▶ Detection and recognition of over speeding ▶ Detection of objects protruding from moving trains <p>Investigate possible re-use of temporary project areas and infrastructure.</p>
Environmental protection	Biodiversity conservation/ ecological integrity	<p>Investigate opportunities to work with local environmental groups to implement a program of supplementary planting of habitat corridors</p> <p>During detailed design, continuing to refine and optimise alignment designs to minimise the corridor footprint on environmentally sensitive areas</p> <p>Evaluate technically feasible options to re-vegetate soils on steep slopes and maintain this cover as protection from ongoing erosive flows</p> <p>Adopt waterway design principles to promote natural flow through culverts and 'wet areas'</p> <p>Use endemic species in site restoration that retard weed spread and require minimal maintenance wherever practically possible.</p>
		<p>Using energy, water and material resources efficiently</p> <p>Explore opportunities for material delivery and haulage via the existing rail networks</p> <p>Promote the selection of fuel- and energy-efficient plant and equipment used during construction. During detailed design:</p> <ul style="list-style-type: none"> ▶ Identify opportunities to change batter slopes and save earthworks where not adversely impacting bulk earthworks or material re-use ▶ Review vertical alignment to determine potential earthworks volumes and culvert design savings ▶ Assess culverts with low afflux at rail property boundaries to achieve potential culvert optimisation ▶ Identify potential earthworks savings by reverting from reinforced concrete pipes to reinforced concrete box culverts to reduce cover requirements <p>Investigate the refinement of earthworks and substructure quantities through:</p> <ul style="list-style-type: none"> ▶ Potential re-use of dispersive soils over the outer part of embankments using lime and specialist revegetation detailing ▶ Re-use high plasticity clay soils ▶ Use geogrids and stabilisation to reduce the volume of subgrade treatment ▶ Use low embankments providing the opportunity to omit rock protection (subject to hydraulic assessment) <p>During construction, investigate using:</p> <ul style="list-style-type: none"> ▶ LiDAR aerial surveying for accurate knowledge and control of cut and fill requirements ▶ Alignment designs capable of taking into account available materials ▶ Prefabricated solutions for structures ▶ Mobile crushing plants and materials handling ▶ Positioning of pre-casting and manufacturing locations to reduce transport footprint

Theme	Area	Sustainability opportunities
Environmental protection (continued)	Using energy, water and material resources efficiently (continued)	Investigate the opportunity to balance the use of materials across project boundaries, including exchanging surplus fill, aggregates, pipe work and common use materials between projects
		Investigate the use of prefabricated project components throughout the construction life cycle.
	Pollution prevention and minimising carbon footprint	Consider the use solar power systems, including stand-alone systems, for the provision of power at site offices and for permanent infrastructure associated with signalling
		Investigate the implementation of signalling control systems that automatically adjust control and speed profiles so that the train arrives at target destinations on time, while minimising energy consumption
		Invest in practical methods to address waste minimisation, energy- and water-saving technologies and practices during construction, operation and maintenance.

7.9 Conclusion

Sustainability is an important consideration for the Project, especially for maximising resource efficiency, enhancing local economic activity and improving potential environmental and social outcomes for the Project. During the design, a broad range of sustainability initiatives were identified. These initiatives have either already been implemented or are subject to further development during detailed design.

Further sustainability initiatives to be explored and adopted by the Project have been identified during technical investigations and stakeholder engagement activities undertaken for the Inland Rail Program and the Project. These initiatives will be investigated during detailed design, construction and/or operation and, where feasible, implemented by the Project.

The design and future sustainability initiatives identified during the preparation of the draft EIS 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 that is currently being progressed separately as a registered project with the Infrastructure Sustainability Council of Australia.