

CHAPTER 23

Sustainability

ILLABO TO STOCKINBINGAL ENVIRONMENTAL IMPACT STATEMENT

ARTC

INLAND
RAIL

An Australian Government Initiative

Contents

23.	SUSTAINABILITY	23-1
23.1	Overview	23-1
23.2	Background	23-1
23.3	Scope of chapter	23-1
23.4	Secretary's Environmental Assessment Requirements	23-1
23.5	Legislative, policy, standards and guideline context	23-1
23.6	Approach to Sustainability on Inland Rail	23-3
23.7	Methodology	23-4
23.7.1	Infrastructure Sustainability Council of Australia Rating Scheme	23-4
23.7.2	Adoption of the Infrastructure Sustainability Council of Australia Rating Scheme during the planning phase	23-6
23.7.3	Preliminary weightings assessment	23-6
23.7.4	Previous studies relating to sustainability	23-6
23.7.5	Preliminary Performance Assessment	23-7
23.8	Sustainability management and measures	23-8
23.8.1	Sustainability Management Plan	23-8
23.8.2	Sustainability in Design	23-8
23.8.3	Future sustainability opportunities at program and proposal level	23-12
23.8.4	Broad-scale sustainability opportunities	23-13
23.8.5	Skills and legacy	23-13
23.8.6	Recommended mitigation measures	23-13
23.9	Conclusions	23-14

Figures

Figure 23-1:	ISCA IS rating scheme process	23-5
Figure 23-2:	Applicability of Infrastructure Sustainability version 1.2 ratings to different proposal phases	23-6

Tables

Table 23-1:	Legislative, policy and guideline context	23-2
Table 23-2:	Inland Rail sustainability commitments and the application of these on the proposal	23-3
Table 23-3:	Infrastructure sustainability rating levels	23-4
Table 23-4:	Sustainability in design measures implemented during the feasibility design phase	23-8
Table 23-5:	Sustainability opportunities that may be implemented during future phases of the proposal	23-12
Table 23-6:	Summary of sustainability mitigation measures	23-14

23. Sustainability

This chapter summarises the sustainability objectives, targets and commitments for the Inland Rail—Illabo to Stockinbingal project (the proposal).

23.1 Overview

Sustainability principles have been incorporated throughout the design development process. A Sustainability Management Plan would be prepared for the proposal to achieve the target of an ‘Excellent’ rating against the Infrastructure Sustainability (IS) rating scheme administered by the Infrastructure Sustainability Council of Australia (ISCA). This would require implementing identified sustainability initiatives specific to the proposal and program-wide opportunities during the detailed design, construction and operation phases of the proposal.

23.2 Background

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

The *Inland Rail Sustainability Strategy* (ARTC, 2020c) and *Inland Rail Environment and Sustainability Policy* (ARTC, 2021a) outlines the sustainability objectives, targets and commitments for the proposal. These targets and objectives would be achieved through detailed design and construction of the proposal. A Sustainability Management Plan would be prepared for the proposal, to achieve the target of an ‘Excellent’ rating for the proposal against version 1.2 of the Infrastructure Sustainability (IS) rating scheme administered by the Infrastructure Sustainability Council of Australia (ISCA).

A broad range of sustainability initiatives and opportunities were identified and incorporated during the development of the proposal, which demonstrate how this commitment is to be achieved.

23.3 Scope of chapter

This chapter summarises the sustainability aims and principles of the design, construction and operation of the infrastructure assets (not the rollingstock) of the proposal, including:

- ▶ defining sustainability within the context of Inland Rail and the proposal and how this has been considered during the feasibility design of the proposal
- ▶ describing the legislation, policies, standards and guidelines relevant to sustainability in the context of the proposal
- ▶ assesses the sustainability performance of the proposal based on the Feasibility Design and the environmental assessment undertaken as part of the EIS, and recommends a target IS rating for the proposal
- ▶ details the proposed Sustainability Management Plan requirements and identified sustainability initiatives that guide the detailed design, construction and operation of the proposal.

23.4 Secretary’s Environmental Assessment Requirements

The Secretary’s Environmental Assessment Requirements (SEARs) relevant to sustainability, together with where they are addressed in the EIS, are provided in Appendix A.

23.5 Legislative, policy, standards and guideline context

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 *Brundtland Report*, as well as the *National Strategy for Ecologically Sustainable Development* (Council of Australian Governments, 1992). The definition of 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”.

This definition is included in section 516A of the *Environment Protection and Biodiversity Conservation Act* (Cth) (EPBC Act), which requires Commonwealth organisations to report on how they ‘accord with and advance the principles of ecologically sustainable development’.

In NSW, one of the objectives of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) is to ‘... facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment’ and section 6(2) of the *Protection of the Environment Administration Act 1991* (NSW) states that the ecologically sustainable development requires ‘the effective integration of social, economic and environmental considerations in decision-making processes’.

The IS rating scheme was established in 2012. It provides a clear framework for embedding sustainability into the planning, design, construction and operation phases of infrastructure projects. In addition to the IS rating scheme, the legislation, policies and guidelines outlined in Table 23-1 have been used to guide the implementation of sustainability initiatives during the proposal’s feasibility design phase.

Table 23-1 should be read in conjunction with the regulatory context of technical disciplines such as ecology, hydrology, visual impact assessment and cultural heritage.

TABLE 23-1: LEGISLATIVE, POLICY AND GUIDELINE CONTEXT

Legislation, policy or guideline	Relevance to the proposal
Inland Rail Environment and Sustainability Policy (ARTC, 2021a)	Sets the priorities and direction for implementing sustainability initiatives during the planning, design and operation phases of Inland Rail.
Inland Rail Sustainable Procurement Policy (ARTC, 2018c)	Sets the priorities and direction for sustainable procurement in the context of Inland Rail.
Inland Rail Sustainability Strategy (ARTC, 2020c)	Sets out the delivery model for sustainability in the context of Inland Rail. It includes targets that are aligned with the Inland Rail Environment and Sustainability Policy.
NSW Sustainable Design Guidelines Version 4.0 (Transport for NSW (TfNSW), 2017a)	Framework for integrating sustainability into transport projects in NSW.
<i>Infrastructure Sustainability Scorecard Version 1.2</i> , April 2018 update (Infrastructure Sustainability Council of Australia (ISCA), 2018)	The proposal is pursuing an ‘Excellent’ rating against version 1.2 of the IS rating scheme.
Infrastructure Sustainability Planning Guidelines (ISCA, 2018a)	Details how the IS rating scheme may be applied to the planning phase of infrastructure projects, which occurs prior to the detailed design phase.
Environmental Planning and Assessment Act 1979 (EP&A Act) (NSW)	Section 1.7 includes—application of Part 7 of <i>Biodiversity Conservation Act 2016</i> (NSW) and Part 7A of the <i>Fisheries Management Act 1994</i> (NSW) encourages ecologically sustainable development.
NSW Infrastructure Skills Legacy Program’s training and employment targets (NSW Department of Industry (Dol), no date)	Sets targets for contributing to local economic and social advancement.
<i>NSW Climate Change Policy Framework</i> (NSW Office of Environment and Heritage (OEH), 2016b)	Framework for minimising carbon emissions through design.
National Greenhouse and Energy Reporting Act 2007 (Cth)	Outlines the approach for monitoring and reporting greenhouse gas (GHG) emissions, including a standard set of factors used to determine GHG footprints for liquid fuels and electricity.
NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (NSW Environment Protection Authority (EPA), 2014b)	Sets out the NSW Government’s position in relation to the waste avoidance, diversion from landfill, reuse and recycling.
NSW Government Resource Efficiency Policy (OEH, 2014b)	Provides guidance on how to maximise resource efficiency during the project lifecycle.
United Nations Framework Convention on Climate Change including Paris Agreement on climate change	Outlines the Australian Government’s commitments to international action on climate change.
Australian Standard AS5334:2013 Climate change adaptation for settlements and infrastructure: A risk-based approach (Standards Australia, 2013)	Guides how climate change risks should be assessed, as well as the development of effective adaptation measures.
<i>Sustainable Procurement Guide</i> (DAWE, 2021)	Sets the priorities and direction for sustainable procurement for Commonwealth Government agencies and organisations.

23.6 Approach to Sustainability on Inland Rail

The *Inland Rail Sustainability Strategy* (ARTC, 2020c) and *Environment and Sustainability Policy* (ARTC, 2021a) outline sustainability objectives, targets and commitments for the proposal. Table 23-2 demonstrates how these sustainability objectives, targets and commitments relate to specific credits within the IS rating scheme.

TABLE 23-2: INLAND RAIL SUSTAINABILITY COMMITMENTS AND THE APPLICATION OF THESE ON THE PROPOSAL

Sustainability commitments	Relationship with infrastructure sustainability credits
<p>No harm:</p> <ul style="list-style-type: none"> ▶ Our goal is that no-one is harmed at work or on our network. 	<ul style="list-style-type: none"> ▶ Community Health and Wellbeing (Hea-1)—contributing to the commitment of ‘no harm’ ▶ Crime Prevention through Environmental Design (Hea-2)—incorporating crime prevention measures in the design will reduce potential impacts on local communities.
<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 Inland Rail Program. 	<ul style="list-style-type: none"> ▶ Stakeholder and community engagement credits (Sta-1 through Sta-4)—encouraging, planning, implementing and monitoring stakeholder and community engagement with Inland Rail ▶ Heritage credits (Her-1 and Her-2)—recognising the role that the Aboriginal and non-Aboriginal community has in identifying heritage items and values.
<p>Promote long-term economic benefits within regional communities:</p> <ul style="list-style-type: none"> ▶ create opportunities for development of skilled local and Indigenous workers ▶ support local and Indigenous businesses; ensure they are provided with opportunities to participate ▶ Inland Rail is a catalyst for complementary private sector investment. 	<ul style="list-style-type: none"> ▶ Procurement credits (Pro-1 and Pro-2). ▶ Stakeholder and community engagement credits (Sta-1 through Sta-4)—encouraging, planning, implementing and monitoring stakeholder and community engagement with Inland Rail ▶ Heritage credits (Her-1 and in construction Her-2)—recognising the role that the Aboriginal and non-Aboriginal community has in identifying heritage items and values ▶ Community Health and Wellbeing (Hea-1)—identifying opportunities to supporting local communities.
<p>Protect the environment by mitigating potential impacts:</p> <ul style="list-style-type: none"> ▶ apply the principles of avoid, minimise, offset to manage potential impacts to receiving environments and ecological values ▶ minimise GHG emissions, waste generation and water consumption ▶ continually investigate opportunities to improve environmental values and minimise risk of pollution ▶ obtain and comply with all relevant environmental approvals and compliance obligations. 	<ul style="list-style-type: none"> ▶ Ecology (Eco-1 and Eco-2); Discharges to Land, Air and Water (Dis-1, Dis-2, Dis-3 and Dis-4); and Waste (Was-1 and Was-2)—identifying opportunities to reduce the environmental footprint of the proposal. ▶ Energy and Carbon (Ene-1)—identifying opportunities to reduce the carbon footprint of the proposal. ▶ Water (Wat-1)—minimising water consumption and Wat-2 ensuring that potable water consumption is reduced for water quality use fit for purpose. ▶ Materials (Mat-1)—identifying opportunities to reduce the material impact of the proposal; dematerialisation of the design; improving the service life of selected materials.
<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. 	<ul style="list-style-type: none"> ▶ Climate change (Cli-1 and Cli-2)—identifying potential climate change impacts and implementing adaptation and resilience measures ▶ Adaptability (Was-3)—considering future demand requirements and corridor uses in the current design.
<p>Base decisions on a balanced consideration of technical, economic, environmental and social issues:</p> <ul style="list-style-type: none"> ▶ adopt a consistent approach across the Program. 	<ul style="list-style-type: none"> ▶ Decision Making (Man-7)—using a multi-criteria approach when making critical decisions.
<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. 	<ul style="list-style-type: none"> ▶ Management and Governance credits (Man-1, Man-2, Man-3, Man-4, Man-5, Man-6)—recognising the importance of sustainability commitments, regularly reviewing progress against sustainability commitments (both by internal and external representatives), encouraging culture of continuous improvement through stakeholder and community engagement, and having senior members of the team responsible for the application of sustainability. ▶ Innovation (Inn-1)—identifying new and improved methods of achieving sustainability commitments.

Sustainability commitments	Relationship with infrastructure sustainability credits
<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. 	<ul style="list-style-type: none"> ▶ Management and Governance (Man-1, Man-3, Man-4, Man-5, Man-6)—monitoring and evaluating performance; implementing lessons learned from within and outside the proposal ▶ Innovation (Inn-1)—identifying new and improved methods of achieving sustainability commitments.

23.7 Methodology

The proposal has assessed the consideration and implementation of sustainability using the IS rating scheme version 1.2 developed by ISCA for the application and measurement of sustainable outcomes in infrastructure projects.

The scheme, which considers whole of life impacts and benefits has historically been used for the assessment of sustainability performance in both:

- ▶ the design of the asset (an IS Design rating)
- ▶ the final built asset before commencement of operation of the asset (an IS As-Built rating).

While version 2.0 of the IS rating scheme provides the option for a IS planning rating of the asset, this has not been adopted for the proposal; however, sustainability is being embedded early into the development by adopting the principles of the IS rating scheme during the planning phase. This will assist with the monitoring and reviewing of performance during delivery, and to stimulate the culture of continuous improvement.

23.7.1 Infrastructure Sustainability Council of Australia Rating Scheme

The IS rating scheme is made up of 44 credits grouped into the following six themes:

- ▶ management and governance
- ▶ using resources
- ▶ discharges to air, land and water
- ▶ ecology
- ▶ people and place
- ▶ innovation.

A varying degree of achievement ('levels') can be demonstrated for each of the 44 credits, which result in the allocation of up to 110 points and associated 'rating level' to determine the overall project performance. The proposal is pursuing a rating level of 'Excellent', corresponding to a score of between 50 to 74 points, as shown in Table 23-3. An 'Excellent' rating indicates that the proposal is achieving Australian best practice in terms of sustainability in both the design and construction of the asset.

TABLE 23-3: INFRASTRUCTURE SUSTAINABILITY RATING LEVELS

Score	Rating level
< 25	Not eligible for a certified rating
25 to 49	Commended
50 to 74	Excellent
75 to 110	Leading

In July 2018, ISCA released a new version of the rating scheme (version 2.0; however, the proposal has been assessed against version 1.2, in line with the registered the Inland Rail Program rating approach and the *Inland Rail Sustainability Strategy* (ARTC, 2020c)). Opportunities for the proposal to pilot some of the new credits associated with version 2.0 of the IS rating scheme have been identified in section 23.8.3.

The method of applying the IS rating scheme is represented schematically in Figure 23-1. Applying the IS rating scheme in this way will enable formal certification of the asset.

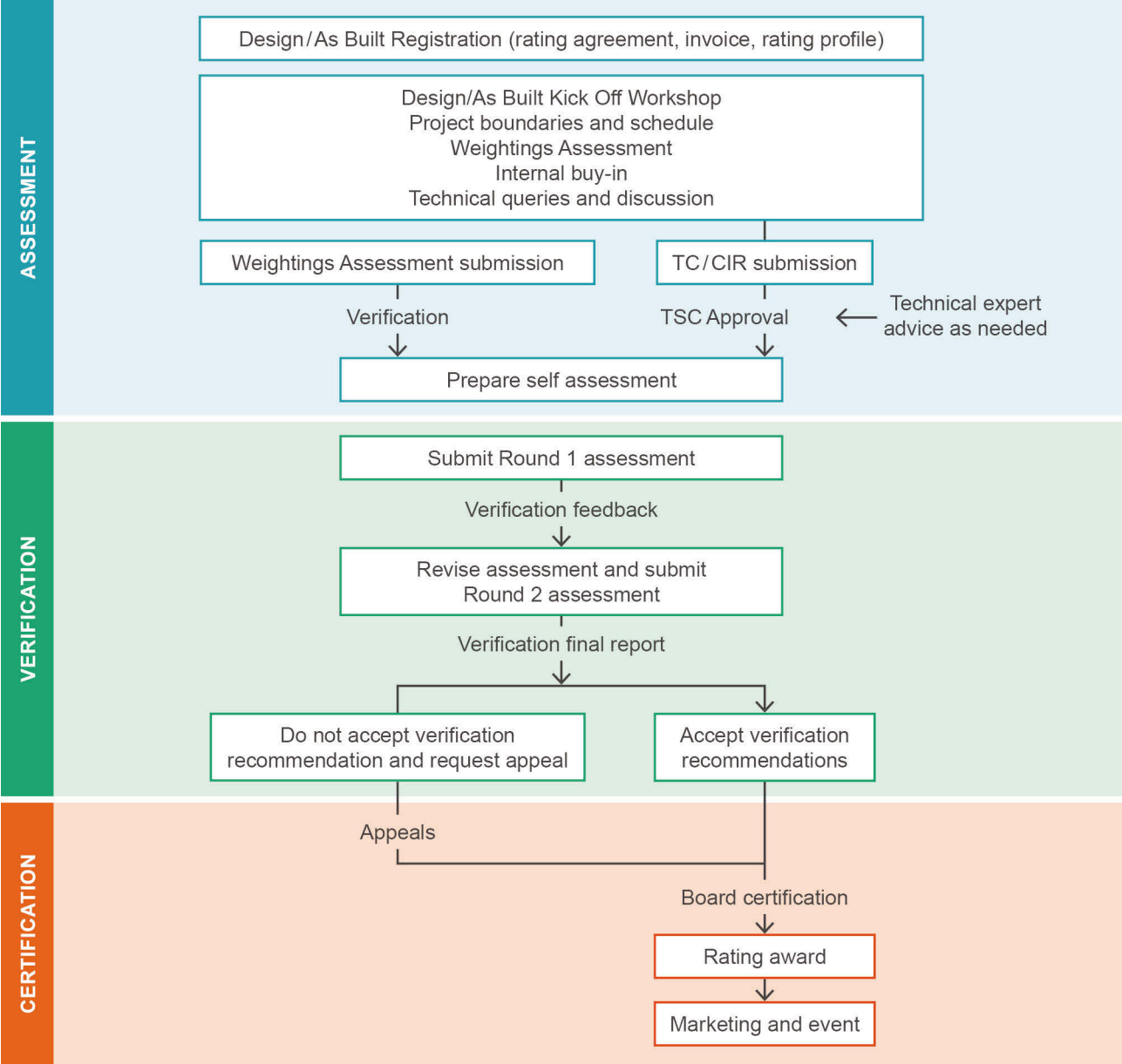


FIGURE 23-1: ISCA IS RATING SCHEME PROCESS

23.7.2 Adoption of the Infrastructure Sustainability Council of Australia Rating Scheme during the planning phase

The proposal is currently in the planning phase (i.e. EIS and feasibility design phase) as defined by ISCA. An IS rating cannot be formally verified during the planning phase against version 1.2 of the IS rating scheme. As stated in section 23.7, a formal verification for the proposal would be undertaken for an IS Design rating at detailed design, and an IS As-Built rating after construction and proposal completion. This is detailed in Figure 23-2.

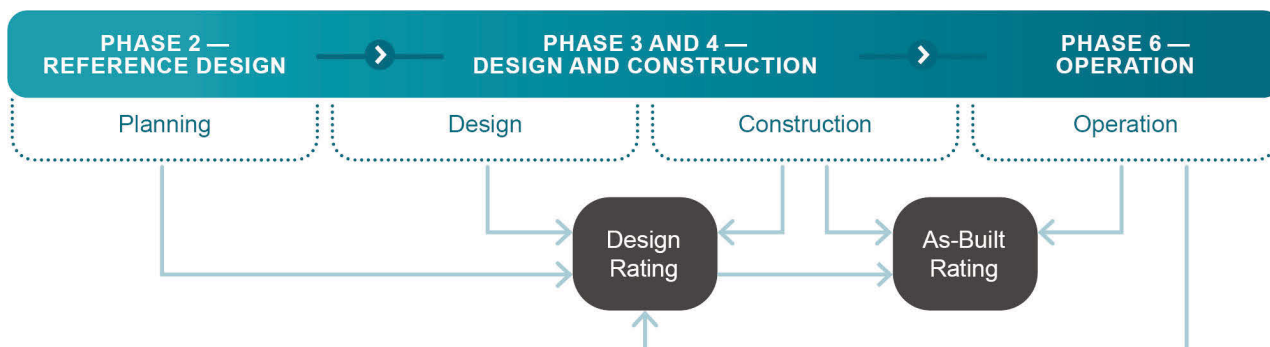


FIGURE 23-2: APPLICABILITY OF INFRASTRUCTURE SUSTAINABILITY VERSION 1.2 RATINGS TO DIFFERENT PROPOSAL PHASES

23.7.3 Preliminary weightings assessment

The IS rating scheme allows proposals to adjust the materiality (i.e. weighting) of the 44 credits with the IS scorecard (a tool to determine amount of ‘points’ that are available) based on the risk and opportunity profile of the proposal including factors such as the local/regional context, the scale and nature of the project. The process of adjusting the materiality of certain credits is known as a ‘Weightings Assessment’.

The *Infrastructure Sustainability Technical Manual* (Infrastructure Sustainability Council of Australia (ISCA), 2018a) presents three different approaches for undertaking the ‘Weightings Assessment’, including:

- ▶ stakeholder workshop
- ▶ proposal/asset team representing stakeholder views
- ▶ individual assessor.

A project ‘Weightings Assessment’ must be submitted to ISCA with accompanying evidence to justify any alternations to materiality of credits to suit the project—this process is referred to as verification. The formal verification process would commence during the detailed design.

A Preliminary Weightings Assessment has been completed for the proposal at the planning stage. The intent is that the Preliminary Weightings Assessment will be verified by ISCA once the detailed design phase commences—this is a mandatory step to gain a certified IS Design rating and IS As-Built rating.

23.7.4 Previous studies relating to sustainability

The proposed alignment has responded to engineering, environmental and community engagement considerations. Studies have been undertaken for a number of topics to inform the proposed alignment. The following chapters from this EIS outline sustainability aspects pertinent to the IS Weightings Assessment:

- ▶ Biodiversity: Chapter 10
- ▶ Traffic, transport and access: Chapter 11
- ▶ Hydrology and flooding: Chapter 12
- ▶ Water quality: Chapter 13
- ▶ Groundwater: Chapter 14
- ▶ Cultural heritage: Chapter 15
- ▶ Noise and vibration: Chapter 16
- ▶ Social and economic: Chapter 17
- ▶ Land use and property: Chapter 18
- ▶ Landscape and visual impacts: Chapter 19

- ▶ Soils and contamination: Chapter 20
- ▶ Waste: Chapter 21
- ▶ Climate change risk: Chapter 22
- ▶ Sustainability: Chapter 23
- ▶ Air quality: Chapter 24
- ▶ Health and safety (including hazardous materials): Chapter 25.

The following key issues, relevant to the Preliminary Weightings Assessment, were raised during stakeholder consultation activities:

- ▶ flooding
- ▶ stakeholder engagement
- ▶ impacts on the local economic activities (e.g. agriculture)
- ▶ impacts on surrounding ecological habitats and their connectivity
- ▶ level crossing safety
- ▶ potential impacts concerning wellbeing, noise, vibration and visual amenity
- ▶ impacts to properties, including severance and loss of productive land.

The above studies and key issues were used as evidence to support the Preliminary Weightings Assessment for the proposal and will be included as evidence in the submission of the Preliminary Weightings Assessment to ISCA for verification (as detailed in section 23.7.3).

23.7.5 Preliminary Performance Assessment

A Preliminary Performance Assessment has been prepared for the proposal. The Preliminary Performance Assessment uses version 1.2 of the IS rating scheme to assess the anticipated sustainability performance of the proposal. It draws on evidence and opportunities from the proposal's feasibility design phase, considering the likelihood that outcomes from the feasibility design phase will be carried forward to the detailed design phase, when a formal IS design rating will be pursued. The Preliminary Performance Assessment does not form evidence for the submission of an IS rating for the proposal but assists in monitoring and managing performance during design development.

The intent of the Preliminary Performance Assessment is to:

- ▶ document evidence to show how sustainability initiatives have been embedded into the feasibility design phase of the proposal, ensuring that initiatives to be carried forward to the detailed design, construction and/or operation phases are also captured
- ▶ document opportunities to minimise energy, water and material consumptions and reduce GHG emissions during construction and operation of the proposal
- ▶ identify cost-effective opportunities for innovation and leading practice during the construction and operation phases
- ▶ document how the design of the proposal has changed to mitigate potential environmental, social and economic impacts, and to improve future resilience
- ▶ inform the Infrastructure Sustainability verification process, which is expected to occur at the end of the detailed design phase.

The Preliminary Performance Assessment draws on evidence from the:

- ▶ Inland Rail Environment and Sustainability Policy
- ▶ Inland Rail Sustainability Strategy
- ▶ Inland Rail Program Environmental Management Plan
- ▶ ARTC and Inland Rail guidance documents, including the Basis of Design
- ▶ mitigation measures proposed as part of this EIS
- ▶ the current processes, practices and methodologies associated with the delivery of State significant infrastructure (SSI) in NSW.

23.8 Sustainability management and measures

23.8.1 Sustainability Management Plan

A Sustainability Management Plan will be developed to guide the design, construction and operation of the proposal, and will:

- ▶ demonstrate leadership and commitments to sustainability
- ▶ set targets for safety, local employment, materials, waste, procurement, ecological connectivity, GHG emissions and climate resilience in line with the Inland Rail objectives and targets
- ▶ establish the roles, responsibilities and resourcing requirements for the embedding of sustainability throughout the design, procurement and construction of the proposal
- ▶ 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 of an 'Excellent' level of performance, as measured against the requirements of version 1.2 of the IS rating scheme
- ▶ outline the documentation and reporting requirements necessary to demonstrate how sustainability has been incorporated into the proposal during design, construction and operation.

Prior to the commencement of operations, the design and construction phase Sustainability Management Plan will be reviewed and updated to focus on operations and maintenance aspects.

23.8.2 Sustainability in Design

Sustainability initiatives throughout the progression of design have been identified and captured in an opportunities register for the proposal. A summary of these measures, which have been implemented as part of the proposal as presented in this EIS, are provided in Table 23-4. This table does not include all management measures that form part of discipline-based measures presented elsewhere in this EIS. Where opportunities have been identified but have not been able to be implemented as part of the feasibility design and may be suitable for consideration as part of the detailed design phase, construction or operation, these have been presented in Table 23-5.

Sustainability initiatives that have been implemented during the feasibility design (planning phase) have been summarised in Table 23-4. The initiatives have been mapped to specific IS credits.

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

TABLE 23-4: SUSTAINABILITY IN DESIGN MEASURES IMPLEMENTED DURING THE FEASIBILITY DESIGN PHASE

Theme	Topic	Sustainability in design measures	Applicable IS credits
Governance	Making informed decisions	Investigate the use of a program-wide multi-criteria assessment that considers environmental, social and local economic impacts to evaluate preferred alignment for greenfield sections.	Man-7
		The proposed alignment has been developed to minimise environmental and social impacts via the multi-criteria analysis.	Eco-1, Eco-2, Dis-2, Dis-3, Man-7
		Knowledge sharing between proposal team to capture sustainability initiatives that have been applied on similar projects and applicable to the proposal.	Man-6
		Consideration of proposal-specific environmental constraints with design responses developed to minimise impacts of the proposal and to capture lessons learnt from previous design experiences. Refer to Chapter 6: Alternatives and proposal options for further details.	Man-6
	Climate response	Design considers future climate and weather events to avoid an increase in flood risk to neighbouring properties and the environment for extreme rainfall and weather events (including extreme rainfall events up to the 1 in 2,000 and in 10,000 event).	Lan-4, Dis-1, Dis-2

Theme	Topic	Sustainability in design measures	Applicable IS credits
		<p>Consideration of climate change in flood modelling used to inform design of drainage and waterways, including:</p> <ul style="list-style-type: none"> ▶ application of the latest Australian Rainfall and Runoff (ARR) data (https://data.arr-software.org/), (2019) and <i>the Interim Climate Change Guidelines</i> (Engineers Australia, 2016) ▶ assessment of impacts associated with the 1% annual exceedance probability (AEP) to determine the sensitivity of the design to potential changes in the rainfall intensity ▶ where new track is to be constructed in greenfield areas, track crossing and longitudinal drainage must have capacity to convey the 1% AEP without over topping formation where flooding is likely to have impact on sensitive receptors ▶ where enhancement or upgrading to existing track is to be undertaken, no worsening of the existing track flood immunity will occur. <p>Refer to Chapter 12: Hydrology and flooding for further details.</p>	Cli-1, Cli-2, Lan-4, Dis-1
		<p>The proposal has applied adaptation options associated with the direct and indirect impacts of climate change and natural disaster events to reduce the potential for service disruption. Refer to Chapter 22: Climate change risk for further details.</p>	Cli-1, Cli-2
Advancing local, regional and national economies	Supporting local and Indigenous businesses	<p>Consideration and preparation of local material sourcing strategies, including identifying opportunities for the use of local material sources, quarries and concrete suppliers. Refer to Chapter 17: Social and economic for further details.</p>	Ene-1, Mat-1, Dis-1, Dis-2, Lan-2, Was-3, Pro-2, Pro-3
Environmental protection	Biodiversity conservation	<p>Alignment options investigated ecological impacts, and additional mitigation measures were applied within the design, to avoid and protect environmentally and socially sensitive sites within the greenfield alignment. Refer to Chapter 6: Alternatives and proposal options for further details.</p>	Eco-1, Sta-3, Her-1
		<p>Alignment considers the reuse of previously disturbed land, thereby avoiding agricultural and native vegetation. Where possible, the alignment has been situated within the existing rail corridor to avoid impacting greenfield sites. Refer to Chapter 6: Alternatives and proposal options for further details.</p>	Lan-1
		<p>Consideration of landscaping and habitat rehabilitation measures. Refer to Chapter 10: Biodiversity for further details.</p>	Eco-1, Eco-2, Urb-1
		<p>Fauna crossings to maintain/enhance fauna connectivity for both terrestrial and aquatic species, such as:</p> <ul style="list-style-type: none"> ▶ consideration of arboreal crossing structures design to facilitate fauna crossings, and other types of structure for various different species ▶ consideration of fish passage requirements and increasing sizing within structural elements, where required. <p>Refer to Chapter 10: Biodiversity for further details.</p>	Eco-2
	Efficient use of resources	<p>During proposal development to date, consideration of structural requirements and surrounding factors, such as flooding design, sight lines and stock crossing provisions, to balance material efficiency alongside environmental constraints. Refer to Chapter 7: Proposal description—operation for further details.</p>	Mat-1, Ene-1, Wat-1
		<p>Optimisation of road and rail interfaces, considering bridge lengths, horizontal and vertical alignment and crossing angles. Refer to Chapter 7: Proposal description—operation for further details.</p>	Mat-1, Hea-2
		<p>Consideration of decommissioning in design. Refer to Chapter 7: Proposal description—operation for further details.</p>	Was-3

Theme	Topic	Sustainability in design measures	Applicable IS credits
		<p>Cut-and-fill balancing and minimisation of transport requirements for import/disposal of spoil are assessed as part of the design process:</p> <ul style="list-style-type: none"> ▶ maximisation of the use of onsite cut material during construction, including significant refinements to horizontal and vertical alignments to reduce the quantity of offsite fill required ▶ consideration of fill batter geometry to encourage cut-and-fill balancing ▶ earthworks materials assessment, including: topsoil stripping, unsuitable materials, material reuse, bulking factors, excavation ability and mass haul has been undertaken to reduce the net import of materials, export of waste and reduced transportation distances. <p>Refer to Chapter 8: Proposal description—construction for further details.</p>	Mat-1, Lan-2, Was-1, Was-2
		<p>Optimisation of formation designs to consider environment, use of local materials, reduced maintenance and ease of construction.</p> <p>Refer to Chapter 8: Proposal description—construction for further details.</p>	Lan-2, Dis-1, Dis-2, Dis-3, Eco-1, Mat-1
		<p>Consideration of opportunities to reduced volumes of offsite materials required for construction. This will reduce impacts on local road networks as fewer trucks will be required to transport materials. This will also result in fuel savings and GHG emission reductions.</p> <p>Refer to Chapter 8: Proposal description—construction for further details.</p>	Ene-1, Mat-1
		<p>Maximisation of the use of on-site cut materials during construction, including refinements to horizontal and vertical alignments. This will reduce the quantity of off-site fill required.</p> <p>Refer to Chapter 20: Soils and contamination for further details.</p>	Ene-1, Mat-1
		<p>Consideration of topsoil stripping and preservation for re-use within proposal and/or local area.</p> <p>Refer to Chapter 20: Soils and contamination for further details.</p>	Lan-2
		<p>Waste reduction has been investigated in the following ways during the feasibility design phase:</p> <ul style="list-style-type: none"> ▶ the cut-and-fill balance to minimise waste and transport requirements for import/disposal of spoil ▶ reuse of spoil from rail recondition, e.g. waste ballast ▶ identification of reduction, reuse and recycling options for all appropriate waste streams to reduce impacts of construction and operational waste. <p>Refer to Chapter 21: Waste for further details.</p>	Was-1, Was-2, Was-3, Mat-1, Ene-1
		<p>Bridges and waterway crossings are designed to minimise impacts to bed, banks and environmental flows.</p> <p>Refer to Chapter 12: Hydrology and flooding for further details.</p>	Lan-4, Dis-1
		<p>Consideration of flooding impacts on formation design.</p> <p>Refer to Chapter 12: Hydrology and flooding for further details.</p>	Mat-1
		<p>Consideration of design requirements to accommodate future loads and train lengths (30 tonne (t) axle loads and 3,600 metre (m) trains) to further reduce impact associated with road-based freight transit and the avoidance of future track redesign.</p> <p>Refer to Chapter 5: Strategic context and need for further details.</p>	Ene-1, Mat-1
	Surface water and groundwater	<p>Minimise adverse impacts to receiving water quality during construction and operation.</p> <p>Refer to Chapter 13: Water quality for further details.</p>	Dis-1

Theme	Topic	Sustainability in design measures	Applicable IS credits
Respect for people, communities and valued places		Waterway realignment/diversion design to include simulation of natural features. This may include meanders, pools, riffles, shaded and open sections, deep and shallow sections, and different types of sub-strata, depending on the pre-disturbance environmental values. Refer to Chapter 13: Water quality for further details.	Lan-4, Dis-1, Eco-1
		The design has been developed to minimise impacts to waterways, riparian vegetation and in-stream flora and habitats. This includes the: <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 ▶ sizing of bridges and arch structures to provide habitat connectivity ▶ aim to avoid, then minimise the extent of waterway diversions or realignments. Refer to Chapter 21: Waste for further details.	Eco-1, Eco-2, Dis-1
		Avoidance of discharges/impacts to hydrology associated with wetlands, including surface flows. Consideration of water quality design matters in response to impacts identified in the EIS. Refer to Chapter 13: Water quality for further details.	Dis-1
		Consideration of heritage (Aboriginal and non-Aboriginal) matters in design responses to address impacts identified during EIS assessments. Refer to Chapter 15: Cultural heritage for further details.	Her-1, Her-2
	Building relationships	Participation of local community and key stakeholders in heritage studies to further inform understanding of heritage values important to the community and most appropriate adaptation measures. Refer to Chapter 15: Cultural heritage for further details.	Her-1, Hea-1
		Consideration of regional and council plans associated with community health and wellbeing as defined by the IS rating scheme, including local economic development and business activities, cultural and community values, opportunities for skill development. Refer to Chapter 4: Engagement for further details.	Hea-1
		Early stakeholder engagement with community feedback and concerns considered within the early phases of the design process. Refer to Chapter 4: Engagement for further details.	Hea-1, Sta-1, Sta-2, Sta-3, Sta-4
	Community engagement, safety, health and wellbeing	Design mitigation measures applied to manage runoff and flooding, with a view to minimising the risk of net increase in flood risk: <ul style="list-style-type: none"> ▶ horizontal and vertical refinements to optimise creek crossings and to provide flood immunity ▶ establishment of flood resilience requirements, including greenfield designs, providing 1% AEP event without overtopping formation in areas with sensitive receptors. Refer to Chapter 12: Hydrology and flooding for further details.	Lan-4, Dis-1
		Changes to the track alignment resulting in reduced operational noise and vibration impacts to sensitive receivers. Refer to Chapter 16: Noise and vibration for further details.	Dis-2, Dis-3
		Consideration of impacts on sensitive receptors and identification of management and mitigation measures to minimise impacts. See Chapter 16: Noise and vibration for further details.	Dis-2, Dis-3
		Consideration of air quality design matters in response to impacts identified during EIS. Refer to Chapter 24: Air quality for further details.	Dis-4

Theme	Topic	Sustainability in design measures	Applicable IS credits
		Assessment of potential to disturb contaminated sites and associated risk assessed and impacts on the availability of locally sourced materials considered in proposal development. Refer to Chapter 20: Soils and contamination for further details.	Lan-3
		Engagement with stakeholders, including directly affected landholders, and provision of materials through the proposal's website. Refer to Chapter 4: Engagement for detail surrounding consultation.	Sta-1, Sta-2
		Agronomist input to accommodate surrounding landholder requirements within design to maintain productivity of agricultural activities. Refer to Chapter 18: Land use and property for further details.	Hea-1

23.8.3 Future sustainability opportunities at program and proposal level

A summary of potential future sustainability opportunities to improve sustainability performance for the proposal are summarised in Table 23-5. These opportunities were identified during the feasibility design phase but require further investigation during the detailed design, construction and/or operation phases.

TABLE 23-5: SUSTAINABILITY OPPORTUNITIES THAT MAY BE IMPLEMENTED DURING FUTURE PHASES OF THE PROPOSAL

Theme	Topic	Sustainability in design measures	Applicable IS credits
Governance	Making informed decisions	Consideration of environmental, social and economic impacts of design decisions throughout design decision-making processes.	Man-7
	Future proofing	Consideration the future asset requirements, including the ultimate corridor considerations, to minimise the potential for premature decommissioning of infrastructure, as part of upgrade works and future disruption to the environment and landowners.	Was-3
Advancing local, regional and national economies	Climate risk	Investigation of potential to further decrease flooding risk to adjacent property and surrounding community, to reduce future impact and enhance local flood resilience and local economy.	Lan-4
		Consideration of adaptation measures within future design to provide response to the proposal-specific climate risks identified.	Cli-2, Lan-4
Environmental protection	Biodiversity conservation	Minimise vegetation clearance within detailed design initiatives and construction practices.	Eco-1
		Explore opportunity for further corridor revegetation and offsets for both ecological benefit and carbon sequestration.	Eco-1, Ene-1
		Further explore design initiatives to maintain and enhance ecological connectivity.	Eco-2
	Efficient use of resources	Investigate design specifications and treatment methodologies to optimise the re-use of onsite or nearby material.	Mat-1, Ene-1, Inn-1
		Possible re-use of water bores that are no longer required by bore owners.	Wat-1, Mat-1
		Possible re-use of recycled water plant and surplus water supply from landowners.	Wat-1, Wat-2
		Incorporation of water-use reduction initiatives and replacement of potable water use where appropriate.	Wat-1, Wat-2
		Use of stand-alone solar power system for provision of power at the site offices.	Ene-2
		Use of biofuels in onsite combustion processes, e.g generator operations.	Ene-1
		Investigation of potential material reuse opportunities and sustainable material procurement options.	Pro-1, Pro-2, Pro-3, Pro-4, Mat-1, Mat-2

Theme	Topic	Sustainability in design measures	Applicable IS credits
		Consideration of opportunities for the incorporation of renewable energy sources or offsets, especially in signalling and site facility applications.	Ene-1, Ene-2
		Use of low carbon alternative for materials, where practicable, including increase Supplementary Cementitious Material (SCM) concrete, geopolymer concrete, Recycled Concrete Aggregate (RCA), recycled material products.	Mat-1, Mat-2
Respect for people, communities and valued places	Respecting heritage and cultural values	Consideration of opportunities available to promote local heritage values.	Her-1, Hea-1
	Building relationships	Early engagement with surrounding community to prepare and equip local workforce with skills required to engage with future works.	Hea-1

23.8.4 Broad-scale sustainability opportunities

Several sustainability opportunities that are applicable to the wider Inland Rail Program are being implemented for the program and will be applied to the proposal, including:

- ▶ establishment of a program-wide sustainability network to enable the sharing of lessons learnt between projects and within the broader industry
- ▶ establishment of a program-wide sustainability supply chain program, building on existing sustainability supply chain initiatives to encourage commercial availability of sustainable materials
- ▶ sourcing materials across project boundaries, including the exchanging of surplus fill, aggregates, pipe work and common use materials between projects
- ▶ use of already constructed sections of the Inland Rail network to assist with the transportation of materials, including rails and sleepers
- ▶ consideration of skills development and training partnerships with registered training organisations and schools, which enable apprentices, and vocational education and training students, to continue skills development beyond the life of the project
- ▶ partnering with key material providers (e.g. providers of rails and sleepers) to pursue innovation opportunities, including encouraging the uptake of environmental labelling schemes
- ▶ identify program-wide mitigation and adaptation strategies, including those associated with the operation phase.

23.8.5 Skills and legacy

As part of the *Inland Rail Environment and Sustainability Policy* and the *Social Performance Plan*, ARTC has committed to the promotion of economic benefits in regional communities. In line with the *NSW Infrastructure Skills Legacy Programs' training and employment targets*, ARTC has committed to:

- ▶ providing up-skilling opportunities to apprentices/trainees (subject to regulatory and other restrictions)
- ▶ developing a workforce management plan, including an Indigenous participation plan
- ▶ engaging with local businesses and residents to investigate options for flexible working arrangements
- ▶ working with local businesses to secure supply contracts and encourage local economic activity. Furthermore, ARTC should work with the Commonwealth, state and local governments to develop strategies to appropriately manage the likely draw of labour during the construction phase of the proposal.

23.8.6 Recommended mitigation measures

The measures outlined in Table 23-6 will be implemented to improve the sustainability performance of the proposal.

TABLE 23-6: SUMMARY OF SUSTAINABILITY MITIGATION MEASURES

Ref	Impact	Mitigation measure	Timing
SU-1	Sustainable procurement	Procurement would be undertaken in accordance with the <i>Inland Rail Sustainable Procurement Policy</i> (ARTC, 2018c), the <i>Sustainable Procurement Guide</i> (DAWE, 2021) and the <i>NSW Government Resource Efficiency Policy</i> (OEH, 2014b).	Detailed design/pre-construction
SU-2	Climate change risk management	Sustainability initiatives, particularly in relation to energy consumption and savings throughout the project lifecycle, must be incorporated into detailed design.	Detailed design/pre-construction
SU-3	Sustainability	Prior to operation commencing, a sustainability handover plan would be prepared, and relevant initiatives would be maintained and implemented through operational management and maintenance procedures.	Operation

23.9 Conclusions

Sustainability is an important consideration for the proposal, especially with regard to maximising resource efficiency, enhancing local economic activity, and mitigating potential environmental and social impacts. During the feasibility design phase of the proposal, a broad range of sustainability initiatives were identified and implemented. These have been used to assess the anticipated sustainability performance of the proposal, which is expected to achieve the equivalent of an 'Excellent' level of performance against version 1.2 of the IS rating scheme.