

# CHAPTER TEN

## SUSTAINABILITY ASSESSMENT



## CHAPTER 10

### SUSTAINABILITY ASSESSMENT

#### CHAPTER SUMMARY AND CONCLUSIONS:

- A sustainability assessment was conducted to identify and document sustainability considerations relevant to the CRR Project.
- Nine sustainability principles were used to complete the sustainability assessment, with the CRR Project rated as follows:
  - Connected to the wider system: Advanced rating
  - Fit for the future (resilient and adaptive): Moderate rating
  - Biodiversity: Basic rating
  - Reduced resource use: Moderate rating
  - Social and community benefits: Advanced rating
  - Equity: Moderate rating
  - Local and regional context: Advanced rating
  - Economic advancement: Advanced rating
  - Innovation: Moderate rating.
- The sustainability assessment demonstrates that the CRR Project will contribute to positive economic, environmental and social outcomes. All sustainability principles scored a rating of 'moderate' or higher (with the exception of biodiversity which scored a 'basic' rating), indicating the Reference Project is 'increasing project sustainability'.

#### 10.1 Purpose and Overview of this Chapter

The purpose of this chapter is to identify sustainability considerations relevant to the CRR Project. A sustainability assessment was conducted in order to understand and mitigate immediate and long-term impacts. Undertaking a sustainability assessment also assists in documenting the economic, social and environmental impacts of the CRR Project, not just its financial performance.

This chapter outlines the:

- approach taken to complete the sustainability assessment for the CRR Project
- results of the sustainability assessment, presented under nine headings to demonstrate the impacts of the CRR Project on key economic, environmental and social dimensions.

A comprehensive environmental management framework has also been prepared and captured in the CRR Request for Project Change Draft Outline Environmental Management Plan (RfPC EMP). The RfPC EMP is the key reference document for the management of potential impacts of project construction and operation. It also outlines sustainability considerations.




## 10.2 Approach

The sustainability assessment for the CRR Project considered the extent and nature of consequences and opportunities relating to the following sustainability principles: connected to the wider system, fit for the future, biodiversity, reduced resource use, social and community benefits, equity, local and regional context, economic advancement and innovation.

The sustainability assessment indicates how well the CRR Project achieves the sustainability principles according to the levels in Table 10.1.

SUSTAINABILITY ASSESSMENT RATING	
LEVEL	CRITERIA
<b>Advanced</b>	<ul style="list-style-type: none"> <li>Generates significant additional value and new opportunities not previously evident, such as changing a liability into an asset.</li> <li>'Designs out' the problem up-front rather than relying on managing impacts later.</li> <li>Solutions generate flow-on benefits outside the project boundary.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>Solutions to significant issues result in multiple benefits through economic, social and/or environmental outcomes.</li> <li>Meets immediate community and user needs and will be resilient and efficient into the future.</li> <li>Incorporates significant innovation and leading practice into the project.</li> </ul>
<b>Basic</b>	<ul style="list-style-type: none"> <li>Avoids harm and negative effects.</li> <li>Solutions create project efficiencies.</li> <li>Solutions have an immediate or short-term focus.</li> </ul>
<b>Compliant</b>	<ul style="list-style-type: none"> <li>Meets legislative and regulatory requirements.</li> </ul>
<b>Poor</b>	<ul style="list-style-type: none"> <li>Fails to meet legislative and regulatory standards.</li> <li>Solutions may result in disbenefits and negative effects.</li> </ul>



Increasing project sustainability

It is assumed that all projects will meet this level. Sustainable solutions are therefore expected to go beyond regulatory compliance.

Table 10.1: Sustainability Assessment Ratings



### 10.3 Sustainability Assessment

The outcomes from the sustainability assessment for the CRR Project are presented in Table 10.2.

CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES	
DEMONSTRATE HOW THE CRR PROJECT FULFILS THE FOLLOWING SUSTAINABILITY PRINCIPLES.	ACHIEVEMENT LEVEL OF THE PRINCIPLE (INDICATE LEVEL ACHIEVED): ADVANCED, MODERATE, BASIC, COMPLIANT, OR POOR
<p><b>1. Connected to the wider system</b></p> <p>All infrastructure projects sit within a broader context and should be planned, designed and operated to connect with the wider system (including other infrastructure, economic activity, population hubs and movements, flows of resources, materials, goods and people). This could occur at neighbourhood, town, city, region or state scales.</p> <p><b>What are the key elements and interrelationships of the wider system or network for this project that are fundamental to its long-term effectiveness?</b></p> <ul style="list-style-type: none"> <li>Changes and predicted conditions in the wider demographic, economic and social systems that make up the SEQ region are the core drivers of the CRR Project.</li> <li>From a demographic perspective, the region continues to evolve rapidly. The SEQ population is forecast to increase by 1.45 million people by 2036. Much of this growth is set to occur outside Brisbane in areas such as the Gold Coast, Ipswich, Moreton Bay, Logan and the Sunshine Coast. At the same time, 45 per cent of the region’s jobs growth is forecast to occur within Brisbane. This demographic profile will generate significant economic activity, culminating in the movement of people between population areas and employment hubs. These movements will be concentrated in peak periods and, on average, will involve longer distances than today. Overall, the region’s forecast demographic characteristics and resulting travel demand are the key drivers of the CRR Project.</li> <li>Strategically, rail is the mode best suited to cater for the region’s future travel patterns. Demand on the rail system is set to triple by 2036. The current rail system does not have the capacity to cater for this increase in demand. A rail system unable to meet demand will negatively impact the broader transport system and, ultimately, the economy.</li> <li>The CRR Project is designed to integrate with the regional rail network, ensuring seamless operations between the project and the broader system in which it functions.</li> </ul> <p><b>How will the project connect with, or respond to these elements?</b></p> <ul style="list-style-type: none"> <li>Inner-city capacity is constrained, with capacity limits expected to be reached in some areas by 2021 and progressively worsen. Network reliability reduces as this capacity threshold is approached. Beyond this threshold, the network will be unable to cater for demand, nor expand into new growth areas. The implications of not addressing this constraint go beyond the regional rail network: road network congestion will worsen, impacting on road freight and the already constrained bus network.</li> <li>By unlocking the crucial inner-city core, capacity will be released across the whole SEQ rail network. This will allow the network to expand into new growth areas and connect new communities with places of employment, education, recreation and community facilities.</li> <li>The CRR Project will enable the rail network to meet long-term demand forecasts for the region. It will become a critical link between existing and new communities and places of employment.</li> <li>The CRR Project will seamlessly integrate with existing regional rail operations and control systems, as well as TransLink’s ticketing system.</li> </ul>	<p><b>Advanced</b></p>



**CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES**

**2. Fit for the future (resilient and adaptive)**

Design infrastructure to be resilient and adaptive in response to long-term environmental, social and economic change. Focus on longer term use and outcomes so that the infrastructure leaves a positive (not negative) legacy.

**Moderate**

How will the infrastructure be resilient to climate change, including extreme weather events?

- While many uncertainties remain, climate change presents a risk to rail network infrastructure and operations, both above ground and underground. With a large part of the project located underground, the impacts of climate change have been considered, such as extreme weather events, and protection measures developed.
- Design components will reduce the level of risk for climate change impacts. These are based on information known at the time and include the following:
  - Planning and designing the project alignment to avoid areas of major, high-risk flooding, where possible. Vulnerability of the CRR Project to extreme events, particularly flooding, has been assessed through the environmental assessment and mitigation measures have been identified where necessary.
  - Locating and designing station entry points to ensure protection of underground infrastructure in the event of local flooding and more ‘extreme’ river flooding events. An example is the inclusion of dedicated flood-protection measures at Albert Street station to protect against extreme river flood events.
  - Using platform screen doors to maintain temperatures within station environments and facilitate the efficient use of cooling systems.
- While design measures have already been incorporated into the concept design, further actions may be considered in detailed design to enhance the sustainability aspects of the CRR Project, both during construction and operation.
- One expected project outcome is reduced greenhouse gas emissions through reduced private vehicle use, ultimately contributing to managing climate change. The economic assessment has quantified the saving in greenhouse gas emissions at \$24 million over the 30-year operating period adopted for the economic analysis, using a discount rate of seven per cent (further detail on the quantification method is provided under principle 4 below).

**How can the project respond to the most significant (i.e. those with greatest impact and most probable) drivers of change over the next two decades?**

- The CRR Project has been planned within a longer term planning framework and directly responds to major long-term drivers of change. This is important as rail infrastructure generally has a life of more than 100 years. The CRR Project is a proactive response to anticipated long-term trends and changes, such as a doubling of public transport demand, social evolution (with a highly mobile and interconnected population) and environmental issues (such as a push to reduce greenhouse gas emissions and local air pollution associated with road traffic).



**CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES**

**3. Biodiversity**

Conserve or improve the condition of biodiversity and ecological integrity of terrestrial, aquatic or marine environments.

**Basic**

**How can the project not just avoid or minimise damage but maintain or improve the presence, condition and extent of vegetation, fauna and ecosystems?**

- The CRR Project has been designed primarily as a tunnel system, running deep underground through Brisbane’s inner city and CBD. Surface connections are mostly contained within existing rail corridors or highly urbanised areas. These areas are generally considered to be of low natural habitat value and integrity, with most flora and fauna considered common and widespread in Brisbane.
- Most areas with some ecological or habitat value along the corridor have been avoided (for example, by tunnelling beneath them).
- An indirect benefit of the CRR Project is reduced demand for road travel and associated new road infrastructure. While difficult to quantify, these offset road infrastructure requirements may help maintain the presence, condition and extent of regional vegetation, fauna and ecosystems. Much of the demand catered for by the CRR Project involves longer journeys (e.g. from the Gold Coast) where road infrastructure expansion would potentially compromise existing interurban breaks (areas of green space).
- The CRR Project will also encourage redevelopment and densification of urban areas surrounding the corridor. This densification reduces pressure to expand the urban fringe into areas of greater environmental sensitivity through greenfield development.
- The previous CRR Project was designated a ‘coordinated project’ (requiring an environmental impact statement (EIS)) under the *State Development and Public Works Organisation Act 1971* and completed an Environmental Impact Statement (EIS). (This means the project met the legislative requirements for impact assessment, which includes detailed consideration of biodiversity impacts.) The impact assessment has been updated through the CRR Request for Project Change and in June 2017 the Coordinator-General released the Coordinator-General’s change report, including new conditions of approval.

**4. Reduced resource use**

Achieve a low environmental footprint by reducing use of non-renewable resources, materials, water, energy, greenhouse gas emissions and reducing or avoiding waste.

**Moderate**

**What is the plan to reduce materials, water and non-renewable energy inputs?**

- The CRR Project has registered for an infrastructure sustainability (IS) rating through the Infrastructure Sustainability Council of Australia. A core aim of applying the IS rating system is the potential identification of a reduced environmental footprint through reduced use of materials, resources, water, energy and generation of waste. This applies to both construction and operational phases.

**How will greenhouse gas emissions be minimised?**

- On a per-person basis, electrified rail travel offers a much lower carbon footprint than low-occupancy private vehicles. As a public transport project, the CRR Project will help reduce greenhouse gas emissions by encouraging more people to swap their car for the train and reducing road congestion.
- As a result of the CRR Project and a shift towards public transport use, it is forecast that there will be a reduction in private vehicle kilometres travelled, thus a reduction in private vehicle greenhouse gas emissions. The economic analysis has found that the benefits of reduced environmental externalities as a result of the CRR project are estimated at \$116 million present value.
- Other opportunities exist to minimise construction and operational emissions. For example, selecting a spoil placement site closer to construction worksites would result in less emissions and overall total truck kilometres travelled. An indirect opportunity could stem from materials selection (e.g. low-carbon concrete). These will be explored through the detailed design phase – applying the IS rating tool may also assist in identifying opportunities.



## CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES

**5. Social and community benefits**

Contribute to vibrant, connected and liveable communities now and into the future.

**Advanced****How will the project respond to the expected changes in the community over the next decade?**

- The CRR Project is a direct response to anticipated demographic changes in the community over the next decade and beyond. Specifically, the expected 1.9 million additional people in SEQ by 2036 will triple the rail demand of 2015<sup>56</sup>.
- Rail is one of the most efficient and sustainable forms of mass transit. Investment in a rail network is an investment in the form and function of a city and its residents. Rail has a lifespan of more than 100 years and is therefore the frame around which a city grows and evolves.
- The CRR Project will improve accessibility for passengers. For example, pedestrian access (e.g. pedestrian paths, underpasses, ramps and bridges) and new stations will meet the *Disability Discrimination Act 1992* compliance standards. Social and community benefits will stem from the use of universal accessibility design principles.

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<sup>56</sup> CRR Project model 2016



## CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES

### How will the project contribute to community connectivity and liveability?

- The CRR Project will strengthen community connectivity and enhance the region's lifestyle by enabling people to move more quickly and easily between places of residence, community facilities, employment and entertainment.
- Long-term beneficial social and community effects will be realised through better access and connections for the community (including more vulnerable groups such as children, the elderly and those that do not own cars) to district and regional-level social infrastructure such as:
  - major medical and health care facilities such as the Royal Brisbane and Women's Hospital, Princess Alexandra Hospital, Mater Hospital and Lady Cilento Children's Hospital
  - sport and entertainment facilities such as The Gabba and Brisbane Showgrounds
  - education facilities such as the Queensland University of Technology and The University of Queensland
  - major open spaces such as the City Botanic Gardens and Roma Street Parkland.
- The CRR Project will also make it easier to access community service organisations within Brisbane's inner city, particularly for clients from outer-northern and southern suburbs and the wider SEQ region.
- The CRR Project is of a sufficient scale to affect regional growth in SEQ. It will support the development of SEQ regional areas by connecting activity centres and residential growth hotspots by rail to Brisbane's CBD. The CRR Project addresses a number of key SEQ regional growth management strategies, including the following:
  - Infill development: The CRR Project will influence land-use patterns and development activity in an efficient and sustainable manner by enhancing the SEQ rail network. The cycle of transport supply and accessibility will encourage residential activity near railway stations, necessitating development activity that supports higher density dwelling outcomes. This, in turn, will help achieve infill dwelling outcomes sought by ShapingSEQ, the Queensland Government's regional planning framework.
  - Inner-city employment expansion: The CRR Project will directly support inner-city growth projections by providing additional transport capacity into key employment growth areas.
  - Connecting new cities and regional centres: Development of strategic regional development areas such as Caloundra South, Flagstone, Fitzgibbon, Coomera and Yarrabilba will occur within the rail catchments supported by the CRR Project. Without the additional regional rail network capacity provided by the CRR Project, the ability to connect these new areas to principal activity centres by high-quality transit will be compromised. The result will be car-dependent communities, which significantly contributes to continued growth in demand for road space and increased congestion.
  - Urban renewal around station precincts: The CRR Project will act as a catalyst for urban renewal in precincts surrounding stations and passenger catchment areas. Each station is located within precincts that are undergoing or will undergo significant redevelopment over the next 20 years. The CRR Project will facilitate this development by increasing the scale of development and shortening the timeframe for the broader precinct development outcomes to be achieved.





## CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES

**6. Equity**

Share the benefits and costs of infrastructure development in a fair and equitable way.

**Moderate****Who are disadvantaged or made vulnerable through this project? How is this being addressed?**

- As with all major transport projects, some local communities will be temporarily disrupted during the construction phase by impacts such as changes to traffic, pedestrian access and increased noise, dust and vibration. These short-term impacts are considered to be outweighed by the long-term benefits. The environmental assessment presented in the CRR Request for Project Change outlines possible mitigation measures to ensure any impacts are managed to the extent possible and that consultation is undertaken with affected areas.
- Queensland Rail projects and works operate under Queensland Rail's environment, planning and management framework. This framework provides targeted processes and plans to help individual projects manage environmental impacts, including construction disruption to sensitive receptors, throughout the implementation of works.
- The CRR Project requires the whole or partial acquisition of some properties for surface works and volumetric acquisition of properties above the tunnel alignment. The general project strategy for property is to clearly inform property owners whose properties may be directly affected. In some cases, this may result in the early purchase of property. The aim is to provide certainty and flexibility for these property owners in relation to property decisions.
- The CRR Project is not likely to disadvantage or increase the vulnerability of particular segments of the community in its operational phase. In fact, the CRR Project will improve access to public transport for many parts of the community. An example is the 7.7 per cent of Greater Brisbane households that do not own a private vehicle, or those not yet at driving age. These segments of the community will benefit from improved public transport options and accessibility to economic and social opportunities.

**How are the benefits shared equitably?**

- The CRR Project significantly boosts social infrastructure within the corridor. It encourages community cohesion by enhancing connections between individuals, groups, businesses and neighbourhoods.
- The new underground stations will comply with requirements of the *Disability Discrimination Act 1992* to ensure equitable and improved access for people with disabilities as well as the wider community. People with mobility difficulties will be able to easily and safely access rail services and travel opportunities.

**7. Local and regional context**

Be responsive to the local and regional heritage and sense of place and contribute to local character and amenity.

**Advanced****How is the local or regional 'sense of place' and identity shaped, maintained or improved by the project?**

- Sense of place refers to the relationship between people and their environment and denotes the existence of special characteristics that define the character and identity of a place. In the inner city, these features such as landscape elements, buildings, topographical features, aesthetic or character qualities are evolving as Brisbane grows and matures.
- These features were considered in a local context for the CRR station precincts. Station precinct planning and urban design is being undertaken to provide a 'vision' of how the stations and surrounding areas could look once fully developed. This process uses criteria that ensure unique characteristics in each area are enhanced, not lost. In addition, direct community engagement has occurred and will continue to inform this process, ensuring project outcomes match the local and regional context.
- As outlined, rail infrastructure is the frame around which a city grows. The CRR Project will contribute to city-building outcomes and ultimately to the evolution of place, character and amenity in key areas of Brisbane's inner city.



## CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES

**8. Economic advancement****Advanced**

Contribute to economic development, diversity and growth.

**How will the project contribute to improving economic development and diversity at the local or regional scales?**

- During the construction phase, economic modelling indicates that the CRR Project will contribute a total of \$1,030 million to Queensland's gross state product (present value, seven per cent discount rate).
- During operations, the CRR Project will contribute a total of \$2,251 million to Queensland's gross state product (present value, seven per cent discount rate).
- Changes to the features of an urban economy can result in wider economic benefits. Direct gains attributable to the CRR Project can be magnified as they pass through the broader economy. These possible changes and impacts include the following:
  - Agglomeration effects from transport bringing activities and people closer together and raising the effective density of economic activity. This can result in more efficient labour markets.
  - Imperfect competition effects where companies that benefit from transport improvements experience lower costs, which can be converted to increased turnover. These effects tend to be more important for improvements that deliver significant time and cost savings to travellers in the course of work.
  - Additional labour supply due to improvements in travel times and reduced travel costs acting as an incentive to work. Reducing the cost of accessing jobs and improving accessibility can encourage non-participants, typical potential second-earners or family members with child-care responsibilities to take up employment.
  - More productive jobs, with better access to city centres and growth in employment in highly productive locations.
- The total wider economic benefits estimated for the CRR Project are \$1,209.2 million (present value, seven per cent discount rate).
- Integration of land-use and transport infrastructure planning and development is a significant consideration for the CRR Project. The CRR Project will increase the capacity of the inner-city rail network, strengthening the viability of the broader SEQ rail network and facilitating the region's continued growth and economic development. The CRR Project is strategically located within the urban footprint. It will integrate with high-growth residential and employment areas that have intense economic activity and high-trip-generating land uses. This includes the Woolloongabba PDA, Boggo Road Urban Village and Brisbane's CBD.

**How will small and medium businesses benefit and be able to take full advantage of the opportunities?**

- By better connecting residential areas to Brisbane's CBD and principle activity centres, the CRR Project will give small and medium-sized businesses greater access to the region's pool of workers and support greater agglomeration outcomes.
- Opportunities exist to stimulate the local economy in retail and commercial precincts through the CRR Project, particularly around stations. Co-locating public transport infrastructure adjacent to retail and commercial precincts makes it easy for patrons to use local businesses without an extra car trip. The new stations will be integrated with surrounding land uses such as commercial, retail and green open space areas.



**CROSS RIVER RAIL SUSTAINABILITY ASSESSMENT OUTCOMES**

**How will the project help create stable, long-term local or regional employment opportunities?**

- The CRR economic analysis found that during construction, the CRR Project will generate a large demand for skilled workers as well as general civil construction labour. It will directly and indirectly generate an average of approximately 1,547 jobs (full-time equivalent (FTE)) annually over the construction period. The peak level of direct and indirect employment during the construction period is 2,932 FTEs. This level of employment is short term for the construction phase.
- During operation, the estimated direct and indirect contribution to employment from the CRR Project is an average of approximately 576 FTEs per annum, with a peak of 1,255 FTEs.
- The CRR Project is key to maintaining access to expected employment in the Brisbane CBD for workers from across the region. Without the CRR Project, access to these employment opportunities will be compromised, either resulting in relocation of jobs to other areas or stifled economic activity.
- The CRR Project will apply principles contained in Queensland Government policies about procurement, employment and training for major public construction projects to stimulate the local economy and job growth opportunities.

**9. Innovation**

Encourage innovative approaches and solutions that address the main project challenges and result in multiple benefits that not only improve efficiency, but also the project’s overall effectiveness.

**Moderate**

**How are relevant global trends and leading practice likely to influence similar infrastructure in the future incorporated into the project?**

- The tunnelling industry is rapidly evolving, with experience being gained on similar projects across the world. Recent trends and leading practice in tunnelling technology will be adopted in the construction of the CRR Project. The concept design has been developed by a leading global engineering consultancy firm and includes application of international expertise.
- The CRR Project will incorporate European Train Control System Level 2, representing a significant development in rail signalling technology for the SEQ rail network. The system will replace the need for lineside signalling, thus reducing the space required for rail tunnels and improving train system reliability and safety.

**Where are opportunities to apply innovative thinking to design out problems up-front rather than rely on managing impacts later?**

- Techniques were applied as the concept design was planned and developed to deliver the best outcome while maintaining constructability and minimising environmental impacts. This has partly been driven by the need to identify and manage impacts in a timely manner (as the CRR Project is a ‘coordinated project’ under the *State Development and Public Works Organisation Act 1971*, requiring an EIS). An iterative process has existed between impact assessment and design.
- The procurement phase will seek innovation through a competitive tender process that drives innovation from bidders.

**Table 10.2: CRR Project Sustainability Assessment Results**

