



The Coordinator-General



Cross River Rail project

Coordinator-General's report on the
environmental impact statement

December 2012

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Synopsis

The Queensland Department of Transport and Main Roads (TMR) (the proponent) proposed to construct the Cross River Rail (CRR) project (the project), extending from Bowen Hills to Salisbury via the Brisbane Central Business District (CBD), Woolloongabba, Dutton Park and Yeerongpilly. This proposal was declared a significant project in March 2010 and an environment impact statement (EIS) was prepared by TMR.

This evaluation report represents a formal statutory step in the process of assessing the project that was submitted by the proponent to the Coordinator-General. It concludes the process as required under the *State Development and Public Works Organisation Act 1971* (SDPWO Act).

I note from the outset however that the current state Government has not endorsed the full Cross River Rail proposal as put forward by the proponent in the EIS or funding for the project.

The proposed infrastructure includes:

- two 10-kilometre rail tunnels with entrances (portals) at Victoria Park and Yeerongpilly
- a ventilation and emergency access building at Fairfield
- surface rail infrastructure, including bridges, viaducts and stabling facilities
- four new underground stations at Roma Street, Albert Street, Boggo Road and Woolloongabba
- two new surface stations at the RNA Showgrounds and Yeerongpilly
- upgraded stations at Moorooka and Salisbury
- associated infrastructure, including electricity feeder stations, road upgrades and pedestrian access
- two additional surface tracks between Spring Hill and the Mayne Rail Yard
- two additional surface tracks between Yeerongpilly and Rocklea and one additional surface track between Rocklea and Salisbury
- an upgrade to Clapham Rail Yard.

Construction is expected to take approximately five-and-a-half years.

Constraints in rail capacity through inner Brisbane are being experienced, especially during morning and afternoon peak periods across the Brisbane River. There are also conflicts between freight and commuter services, as passenger services are prioritised over freight services during times of high demand.

The project proposes to address these existing capacity constraints, improve service reliability and travel times for commuters, provide opportunities for commercial development in and around new stations and increase the capacity for rail freight travelling to the Port of Brisbane.

The 'reference design' defines the scope of the project for the purposes of this environmental impact statement (EIS) assessment. The reference design also defines the proposed construction methodology and operations strategy for the project.

On 26 March 2010, the Coordinator-General declared CRR a 'significant project' under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The CRR EIS was released for public comment from 30 August to 21 October 2011, and 112 submissions were received. The proponent's supplementary information to the EIS (SEIS) was provided to agencies between 4 July and 30 August 2012.

In this report I have:

- imposed conditions under section 54B of the SDPWO Act on potential project matters requiring control for which no other statutory mechanism is available (Appendix 1) and nominated the entities responsible for those conditions (Appendix 2)
- stated conditions (Appendix 3), as appropriate, where subsequent approvals have been identified as being required under other legislation
- made general recommendations on other matters for which enforceable conditions would be inappropriate (Appendix 4).

Land use and planning

The main rail component of the CRR project is exempt development under the current Brisbane City Council (BCC) planning scheme. However, development approvals would be required for buildings and for ancillary work not captured by the land use definition, including construction depots, road construction signage, ventilation facilities and parking areas.

In the longer term, the project may lead to changes in the pattern of development and densities along the study corridor, particularly surrounding the new stations. In the short-term, the project could affect some land uses near construction sites.

The EIS reported that the project may result in the loss of up to 107 industrial lots across the corridor, which would negatively impact the supply of industrial land in inner Brisbane. I have made a general recommendation that BCC and the Department of State Development, Infrastructure and Planning (DSDIP) should develop options to mitigate this loss.

Post-construction land use

Following completion of construction, worksite land would become available for redevelopment. The CRR project could strongly influence redevelopment by providing increased accessibility and amenity. Large locations with the most notable redevelopment potential include the Albert Street and 'Gabba' Station sites and the 13.4-hectare Yeerongpilly construction site.

Redevelopment of the Gabba Station worksite would enable integration with the busway. I have made a recommendation that TMR and BCC undertake more detailed design work on the integration of the proposed Gabba Station with the Woolloongabba

Bus Station before the procurement documentation is finalised for the construction of that part of the project.

I also recommend that BCC and DSDIP undertake a separate planning process to determine future land use on and surrounding the project construction sites at Yeerongpilly and Albert Street. This process should be concluded at least one year before construction is completed on those sites.

Interface agreements

TMR and the construction and operational entities will need to ensure that all construction and operational activities for this project are integrated with the requirements on lands surrounding the key project sites. I have therefore:

- imposed a condition requiring the proponent to implement infrastructure agreements with the relevant entities and for the relevant matters covered by the *Transport Infrastructure Act 1994* or the *Transport (Rail Safety) Act 2010*
- noted a commitment by the proponent that, for matters falling outside the scope of those two Acts, voluntary (commercial) interface agreements be negotiated that address joint commercial opportunities or points where potential conflict might arise over multiple development proposals.

One key example of the need for an interface agreement is with the Royal National Agricultural and Industrial Association of Queensland (RNA) over the Showgrounds site.

Noise and vibration

Given the project would be located close to residences and businesses, and due to the nature of the construction activities, it is inevitable there would be potential noise and vibration impacts arising from the construction of the project. To ensure the appropriate management of these potential impacts, I have imposed conditions specifying:

- construction working hours limits under the range of project circumstances that may arise
- limits on construction and operations noise and vibration, including circumstances where special arrangements must apply
- that noise and vibration management plans be implemented as part of the project construction environmental management plan (CEMP) and the operations EMP (OEMP)
- that the Queensland Rail *Code of Practice for Railway Noise Management* (the Queensland Rail Noise Code) only applies to this project where construction occurs within an existing rail corridor, more than 100 metres from the construction sites identified in the EIS
- triggers for the implementation of mitigation measures.

Operational noise and vibration matters of principal interest are underground and surface operations of passenger and freight trains. Ground-borne noise and vibration levels are predicted to be well below required limits during operation at all nearest sensitive receptors, except for potential exceedence of the vibration limit at buildings

with special vibration sensitive equipment (for example, the transmission electron microscope at the Ecosciences Precinct).

Potential exceedence of the operational airborne noise criteria is predicted at the southern end of the surface rail corridor and will be mitigated where required in accordance with the Queensland Rail Noise Code.

The predicted changes in freight train traffic on the surface tracks between the portals should not lead to exceedence events once proposed mitigation measures are implemented. I have required operational noise monitoring to verify this. There are no predicted exceedence events of operational noise limits for road traffic arising from changes to roads.

Transport

Future planning

The capacity for future expansion of the South East Queensland (SEQ) rail network would be significantly enhanced if the CRR project is implemented.

The EIS has not generally addressed the consequences of the project for future integration of bus, pedestrian and cycle transport planning. Therefore, I have imposed conditions on TMR that will require additional planning for:

- bus systems around Yeerongpilly
- the park 'n' ride network
- bus service planning and integration in the CBD and Woolloongabba.

Spoil haulage and materials delivery

The EIS identified potential haulage routes to the proposed spoil sites at Swanbank. Since some of the major roads on the haulage routes already experience peak period congestion, adding haulage traffic could create issues for truck movements and may have unacceptable impacts on general traffic.

I am satisfied with the proposal that spoil be placed at Swanbank and spoil transported by road along the route defined in the reference design.

Given the scale and potential impacts of the project, a comprehensive approach to heavy vehicle management is required. I have therefore imposed conditions requiring:

- the preparation of transport management plans that include all traffic monitoring and mitigation requirements
- a ban on spoil haulage during peak hours from the Albert Street, Roma Street and Woolloongabba construction sites, and on Cornwall Street, Buranda during peak hours
- other limitations and management requirements for spoil haulage.

Pedestrians, traffic and transport

While I am generally satisfied that the impacts on cyclists and pedestrian movements during construction of the project should be minor, I have imposed conditions to ensure that these matters are appropriately managed.

Extensive sections of rail construction for the CRR project would be carried out in or close to areas where passenger and freight rail services operate, especially south of the tunnel portal at Yeerongpilly and north of the portal at Victoria Park. Therefore construction access arrangements to the rail corridor are required to be carefully managed to avoid disruption to existing passenger and freight services.

Project surface construction works would result in minor impacts to the road network that should be adequately managed by the implementation of TMR's commitments. However, I have imposed a condition to ensure that the safety and capacity of the Lucy Street/Ipswich Road intersection is maintained during the construction of the project.

Beaudesert Road level crossing closure

The proponent proposes to close the Beaudesert Road level crossing for safety reasons. As the crossing was a key evacuation route for residents during the 2011 floods, TMR proposes to install an emergency access gate onto Beaudesert Road southbound. While I accept that the proposed access gate can provide an acceptable flood evacuation alternative to the level crossing, I recommend that TMR seek a better solution during the project detailed design and procurement process, such as providing direct northbound access onto Beaudesert Road.

Car parking

I consider that there is potential for greater conflict with the local communities surrounding each construction site than predicted in the EIS if parking is not effectively planned and managed. Therefore, I have imposed a condition requiring workforce parking to be implemented in accordance with a plan, to be approved by BCC, that:

- addresses safety, access and amenity for both workers and the local community
- describes any proposals to shuttle workers to or from other sites
- identifies any parking control arrangements suggested for implementation by BCC
- takes practical measures to avoid workers parking in streets within 500 metres of construction sites
- includes the capacity for review and updating as worksite demands change.

Air quality

The key focus of air quality for this EIS has been management of dust during construction. While dust levels would generally be below the required limits (50 micrograms per cubic metre for particulates smaller than 10 microns in diameter), there is potential for short-term activities at a small number of locations to exceed this limit if not properly managed. Proponent commitments and conditions that I have imposed will require:

- air quality monitoring, including at locations representative of potential 'worst case' air quality impacts
- documentation of mitigation measures to be implemented, including special alert and rapid response systems near health facilities
- an effective complaints management system
- protection of sensitive air intake systems at the Ecosciences Precinct

- protection of public safety with respect to underground station and tunnel air quality during train operations
- monitoring of dust (including coal dust) on the operational freight lines between Tennyson and Dutton Park.

Topography, geomorphology, geology and soils

The geotechnical information presented in the EIS did not identify any major obstacles to the general feasibility of the CRR project or any major discrepancies in the proposed tunnel alignment or station locations. Nonetheless, I note that the geotechnical survey information presented in the EIS is insufficient to complete a detailed design of a project of this magnitude, given its sensitive location and significance.

Consequently, I have imposed a condition that an additional, more detailed geological survey program be undertaken before procurement of construction for the tunnel. I also require that this information be reviewed by a suitably qualified, independent expert who advises the Coordinator-General whether the information is adequate to proceed to the detailed design phase of the project.

I have also imposed a condition requiring additional controls to adequately manage the risks during construction arising from acid sulfate soils, settlement and soil erosion.

Contaminated land

A total of 74 land parcels within the project construction footprint and on adjacent land parcels were identified as containing potential soil and/or groundwater contamination.

The EIS listed approvals, licensing conditions and permits required for the identification and management of contaminated land and materials, and I have reinforced this with a stated condition that would attach to subsequent approvals required to deal with these matters.

Lighting and visual amenity

Measures proposed in the EIS appear adequate to prevent the minor risks of inappropriate lighting at construction sites or finished structures of this project. While there would inevitably be some negative impact on local visual amenity during construction, the long-term visual amenity at several sites across the study corridor is likely to be significantly improved (especially Albert Street, Woolloongabba and Yeerongpilly).

I have imposed conditions requiring the proponent to implement measures in line with current urban design and lighting standards.

Indigenous cultural heritage

I am satisfied that the level of impact on Indigenous cultural heritage is expected to be low, provided the proponent complies with its legislative obligations and implements a cultural heritage management plan (CHMP). I have recommended some matters that should be considered in the preparation of the CHMP required to be developed for the project under the *Aboriginal Cultural Heritage Act 2003*.

Non-Indigenous cultural heritage

The CRR project would be constructed near some registered cultural heritage places. The most notable of these are structures on the RNA Showgrounds, through the CBD and the Boggo Road Gaol. Most of the demolition of heritage structures at the showgrounds required for this project has been previously approved as part of the master plan for the redevelopment of the showgrounds. The effects of vibration and settlement on heritage places are anticipated to be either undetectable or acceptable at most of these locations. Nonetheless, there is a requirement for pre and post-construction condition surveys for those places in close proximity to construction, and close monitoring, especially of vibration, during construction.

While it appears likely that, other than for those buildings being removed on the RNA Showgrounds, proposed construction methods will prevent all damage to heritage structures, I have imposed conditions to both govern this and ensure that any (unlikely) damage is repaired at the proponent's expense.

Social impacts

The CRR project would deliver long-term local and regional social benefits by facilitating improved public transport access to key destinations and areas of urban growth within Brisbane's inner city. Nonetheless, the CRR project could also generate short and long-term changes to the physical and social environment of local neighbourhoods along the route of the railway that will need to be managed during the construction period.

Consultation undertaken on the project prior to the preparation of the SEIS was comprehensive and inclusive of potentially affected groups. I note that the management measures proposed by the proponent in the EIS should be sufficient to effectively manage impacts and I do not consider it necessary to impose conditions on these measures.

Economic impacts

There could be localised, short-term, adverse economic impacts due to the close proximity of construction to properties, especially where some businesses could be displaced. Therefore, I have required the proponent to work closely with DSDIP, BCC and affected businesses to minimise these impacts and assist with any necessary business relocation. Nonetheless, CRR has a positive benefit/cost ratio. It would also deliver broader economic benefits including more effective development densities, better access to employment, improved labour supply, and more efficient public transport and road networks.

Hazard and risk

The need to evacuate the underground tunnel and stations in the event of an emergency during construction was assessed as having the highest risk level. The potential need to remove asbestos prior to demolishing buildings is a matter that will require further investigation.

The EIS commits the proponent to implement an emergency response plan, which provides training for staff in the appropriate use, handling, storage and transportation of

dangerous goods and hazardous substances and would also require monitoring of compliance of personnel with safety procedures. I have imposed conditions to ensure these plans are implemented in consultation with the Department of Community Safety and emergency services agencies prior to the commencement of construction.

The risks associated with the operation of the project will be controlled by the rail safety regulator under transport legislation. The commissioning phase of the project will be used to test all relevant operational systems in consultation with each of the emergency services agencies.

Water

Groundwater

Impacts on groundwater resources from the CRR project could occur due to dissolved contaminants in drawdown from contaminated lands neighbouring the tunnel seeping into the tunnel water management system, or groundwater drawdown causing ground settlement. However, the inflow rates of groundwater are predicted to be very low, and these potential risks would be minimal or manageable. No significant groundwater-dependent ecosystems would be threatened by this project.

The network of monitoring bores established during the EIS will allow baseline groundwater conditions to be established, so guideline levels against which monitoring during the construction and operation phases of the project can be undertaken.

Water releases

I have imposed conditions to ensure that limited proposed discharges of captured ground and surface waters during the construction and operation of the project meet specified strict limits as determined by the Department of Environment and Heritage Protection.

Surface water

Potential impacts on surface waters from the construction of the project might arise from changes to surface water flow, sedimentation in surface water run-off, disturbance of potential acid sulfate soils and contaminated land, and introduction of litter or toxicants from spills. However, the proponent has committed to a comprehensive range of management measures that should adequately mitigate against any harm to the surface water environment arising from this project and I have imposed conditions to give force to these commitments.

Flooding

The community has expressed a strong interest in flood management matters for the CRR project as it traverses several parts of Brisbane that have a prominent history of flooding. I consider that the flood modelling conducted in the EIS is adequate and I note that this is the first significant project in SEQ for which flood models were recalibrated to incorporate the outcomes of the January 2011 Brisbane floods.

TMR has committed to adopt all relevant findings and recommendations of the *Queensland Floods Commission of Inquiry: Final Report* and I consider it necessary to reinforce this commitment with a condition.

Eight project construction sites occur in locations that could be inundated at an annual exceedence probability (AEP) of less than 1 in 100. The reference design standards adopted to ensure the protection from flooding appear to be satisfactory. These standards are 1 in 20 AEP during construction, 1 in 100 AEP for fixed engineering floodwater protections at all sites during operation and 1 in 10 000 AEP for the floodgate operations at Albert St and the Yeerongpilly portal and for the engineering integrity of all other project structures. I have imposed conditions to govern the flood protection measures.

Impacts of the reference design structures on flood inundation levels in small areas along Moolabin, Stable Swamp and Rocky Waterholes creeks and on the western margin of the expanded Clapham Rail Yards are all predicted to be less than four to nine centimetres in the 'worst case' across a wide range of flood scenario events modelled.

Waste

While the project will generate a substantial amount of waste, both during construction and operation, this waste should be managed in accordance with existing legislation, policies and regulations, and I have imposed conditions to provide guidance on this.

Cumulative impacts

I am satisfied the EIS adequately investigated the cumulative impacts of CRR to the extent possible at this stage of the project's development.

The project is likely to be located in close proximity to other construction projects and in communities suffering from construction fatigue. It is inevitable that it would partially contribute to negative noise, dust, traffic, visual and access problems in the study corridor. Nonetheless, I consider that, following construction, the net benefits of the project would offset the cumulative negative impacts, provided that the proposed mitigation measures, committed to by the proponent and required by the imposed conditions of this report, are fully implemented.

EMPs

I have imposed conditions to ensure the EMPs and sub-plans meet all necessary requirements and the commitments made in the EIS to ensure that:

- the proponent provides the plans to the relevant nominated entities and consultative bodies for review
- any comments from those bodies are taken into account in finalising the plans
- the proponent provides tangible and timely evidence to the community that those plans meet the requirements of my conditions
- can be independently verified if required by the Coordinator-General.

The monitoring and verification processes I have imposed for the CRR project are less prescriptive and more outcome focussed than recent significant urban infrastructure

projects. They also rely more on proponent demonstration of self-regulation and compliance through broader, more transparent and higher frequency public reporting, unless evidence of non-compliance with conditions emerges.

Conclusion

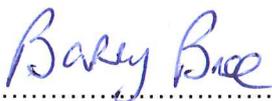
The CRR project could deliver a major boost to public transport capacity as well as city-building and economic benefits to the city of Brisbane. It would improve rail commuting in Brisbane by reducing capacity constraints on the rail network and improving service frequency and reliability.

I conclude that the impacts can be avoided or acceptably minimised and mitigated, provided that all conditions and requirements described in this report are fully implemented.

I note the major impediments to the delivery of the CRR project are funding and the level of State Government support for the proposal.

Should any future changes be proposed to the reference design for the CRR project, upon which this evaluation report is based, these could be assessed under the 'change report' process in accordance with Division 3A, Part 4 of the SDPWO Act.

This report and all conditions and requirements contained within it remain current for a period of 4 years.



Barry Broe
Coordinator-General

20 December 2012

1. Introduction

This Coordinator-General's report evaluates the environmental impact statement (EIS) and supplementary information to the EIS (SEIS), that were prepared by the Department of Transport and Main Roads (TMR) (the proponent) for the Cross River Rail (CRR) project (the project).

This Coordinator-General's report represents the formal conclusion of the Queensland Government's environmental impact assessment process. For information on the EIS process, including details of the organisations and individuals who commented on the proponent's EIS, refer to Section 3.5 of this report (page 14).

There are numerous references in this report to the term 'reference design' (summarised and illustrated in Figure 2.3). This means the design of the full project as described in the EIS documents, unless otherwise modified by the SEIS or clarified in this evaluation report. The evaluation presented in this report is based on the description and potential impacts of the reference design, not any variation of it such as a scaled down project.

I note that the Queensland Government has not committed funding to proceed or supported the full proposal (i.e the reference design).

Any future changes proposed to the project could result in changes that trigger a subsequent change process under Division 3A, Part 4 of the *State Development and Public Works Act 1971* (SDPWO Act).

Where possible, conditions have been written in terms of the outcome required. This is part of a general trend to adopt more outcome focused conditions, and away from prescriptive ones.

2. About the project

2.1. The proponent

The proponent for the project is TMR, which is responsible for state road, rail, air and sea networks in Queensland and has extensive experience in planning and constructing rail and transport infrastructure in Queensland. It is responsible for regulating rail safety in Queensland under the provisions of the *Transport (Rail Safety) Act 2010* (Qld) (TRS Act).

2.2. Project description

The project consists of a new north–south passenger rail line, extending from Bowen Hills in the north over 18 kilometres to Salisbury in the south.

The project comprises two 10-kilometre-long parallel tunnels, extending from Victoria Park at Spring Hill to Yeerongpilly, via the Brisbane Central Business District (CBD), Woolloongabba and Dutton Park. It would include new underground stations at Roma Street, Albert Street, Woolloongabba (to be known as the ‘Gabba Station’) and Boggo Road and new surface stations at the RNA Showgrounds (to be known as the ‘Ekka Station’) and Yeerongpilly. Some older technical documents within the EIS refer to the Gabba Station as ‘Woolloongabba’ and the Ekka Station as ‘Exhibition’. Existing stations at Moorooka and Rocklea would also be upgraded.

North of the tunnel portal (opening) at Spring Hill, the project includes two additional tracks between Spring Hill and Mayne Rail Yard, with the tracks on an elevated structure within Mayne Rail Yard.

South of the tunnel portal at Yeerongpilly, the project provides two additional surface tracks between Yeerongpilly and Rocklea and one additional surface track between Rocklea and Salisbury. Clapham Rail Yard would be upgraded to allow 27 six-car trains or 15 nine-car trains to be stabled during off-peak periods.

Underground stations would generally be located at depths ranging from approximately 25 metres to approximately 31 metres below existing surface level, and would incorporate platforms approximately 220 metres long, to accommodate nine-car train sets in the future. Each underground station would have air conditioning, platform screen doors for passenger comfort and safety, communication and information systems, and safety and security measures such as closed circuit television monitoring.

Ventilation would be required for the tunnels and underground stations to control the temperature of the stations, to prevent heat build up in the tunnels and to manage smoke in the event of a fire in a tunnel or station. Air from the stations and tunnels would be vented via outlets at each of the underground stations. An intermediate ventilation outlet would also be required at Railway Road, Fairfield due to the length of the tunnels between the Boggo Road Station and the southern tunnel portal at Yeerongpilly.

The tunnels and stations would also be equipped with fire and life safety measures, such as cross-passages and emergency egress to the surface.

Flood protection measures would be provided at underground stations, ventilation outlets and the southern tunnel portal. These include automated floodgates at the Albert Street Station and the southern portal to protect the tunnel infrastructure against a 1-in-10 000-year flood event.

Capital expenditure for the project is estimated to be \$6.4 billion (2010 dollars), and the project is expected to generate 2200 construction jobs (peak), and 230 operational jobs (excluding central office functions). The reference design is for construction to commence in 2015 and for project operation to start in 2020.

2.2.1. Project infrastructure

The key project infrastructure required for the project includes:

- tunnel infrastructure, including rail tunnels, tunnel portals and dive structures and the ventilation and emergency access building
- surface rail infrastructure, including bridge structures, viaducts and stabling facilities
- stations, including underground stations, station entrances and surface stations
- associated infrastructure, including feeder stations, road upgrades and pedestrian access.

2.2.2. Construction

Construction of the project would involve both surface and underground works across 13 general locations on 33 individual 'construction sites' across the study corridor. Construction sites are the individual polygons defined in the EIS Volume 2, Reference Design Drawings 'Construction Worksite Plans', except where modified by 'Boggo Road Station underground works construction site (Revised December 2011)', CRR-BGO-W-5000 (Rev D) of the SEIS.

The distribution of construction sites across the project locations is provided in Table 2.1.

Table 2.1 Project ‘construction sites’ at each project location

General construction location	Number of ‘construction sites’
Mayne Rail Yards	3
RNA / O’Connell Terrace	7
Victoria Park	1
Roma Street Station	5
Albert Street Station	2
Woolloongabba	1
Boggo Road Station	2
Fairfield ventilation outlet	1
Yeerongpilly	1
Clapham Rail Yards / Moorooka Station	4
Rocklea	3
Salisbury	2
Coopers Plains	1
Total	33

Construction is expected to take approximately 5.5 years, and would involve the following:

- detailed design and worksite establishment (approximately 12 months)
- major underground construction and tunnelling (approximately 4.5 years)
- surface rail infrastructure works (approximately five years)
- fit-out of stations and tunnels (approximately two years)
- testing and commissioning (approximately six months).

Specific detail on the timing, duration, location and impacts of relevant worksites are described in Section 6 of this report (Environmental impacts).

2.3. Project rationale

2.3.1. National infrastructure priorities

In 2009, the Australian Government committed \$20 million toward the detailed feasibility phase for the project, through Infrastructure Australia (IA).

The project addresses the priorities established by IA—that is, ensuring national infrastructure investment addresses current and future challenges for Australian communities to achieve sustainable economic growth and environmental sustainability, improved quality of life and reduced social disadvantage.

Seven themes for action to meet these challenges have been identified by IA as the most important infrastructure objectives for the nation. Those relevant to the project include:

- competitive international gateways—developing more effective ports and associated land transport systems to more efficiently cope with imports and exports
- a national freight network—development of our rail networks so that more freight can be moved by rail
- transforming our cities—increasing public transport capacity in our cities and making better use of existing transport infrastructure but also the need to develop coordinated long term integrated infrastructure plans, improved governance and stronger participation from industry and the community.

IA identified that improving transport networks is crucial for economic growth and the liveability of our cities. In particular, inadequate transport networks and congestion of road and public transport networks threaten quality of life, damage the local and global environment and act as a significant brake on future economic growth.

Public transport in cities is identified as a priority, with comprehensive public transport networks essential for the long-term liveability of Australia’s cities. IA considers that these networks should be planned alongside land use strategies, so that new residential and employment areas are well served by public transport.

2.3.2. State infrastructure priorities

Chapter 2 of the EIS demonstrated the project’s consistency with several Queensland Government strategies and plans to manage growth and guide future development across the state and in South East Queensland (SEQ). These strategies include:

- the *South East Queensland Regional Plan 2009–2031* (SEQ Regional Plan)
- the *South East Queensland Infrastructure Plan and Program 2010–2031* (SEQIPP)
- *Connecting SEQ 2031: An Integrated Regional Transport Plan for South East Queensland* (Connecting SEQ 2031),

All of which support the need for improvements to the inner city public transport network, including:

- a large increase in cross-river mass transit capacity
- better mass transit coverage of the CBD and inner-city development precincts
- reduced reliance on arterial roads and city streets.

The project is the flagship initiative in Connecting SEQ 2031’s strategy for rail network growth, and is identified as the enabler of long-term viability of the rail network.

2.3.3. Project benefits

Chapter 2 of the EIS described the range of transport, economic and land-use benefits that the CRR project would deliver. It is predicted to address rail capacity constraints on the existing rail network, improve service reliability and travel times for commuters, provide opportunities for commercial development in and around new stations and increase the capacity for rail freight travelling to the Port of Brisbane.

Strong population growth is expected to continue to be a key driver of rising demand for public transport services in Brisbane and SEQ.

The EIS reported that passenger crowding is already experienced by commuters on the rail network, and that the situation is expected to worsen as the percentage of rail users increases in line with population and employment growth. Without the project, the number of weekday rail users is expected to increase by an average of 73 per cent by 2021 (when compared with 2009 patronage). Total rail patronage will be significantly higher with the project. By 2031, the total number of weekday rail trips would be over double current levels.

Significant capacity constraints are already experienced at key points on the rail network, particularly for services travelling from the south. Congestion is experienced in both the morning and afternoon peaks on the Merivale Bridge, and single platforms at key stations can mean long waiting times for commuters. There are also conflicts between freight and commuter services, since passenger services are prioritised over freight services in the morning and afternoon peaks; and when freight services are required to cross the path of passenger services. Figure 2.1 shows the main capacity constraints on the current rail network.

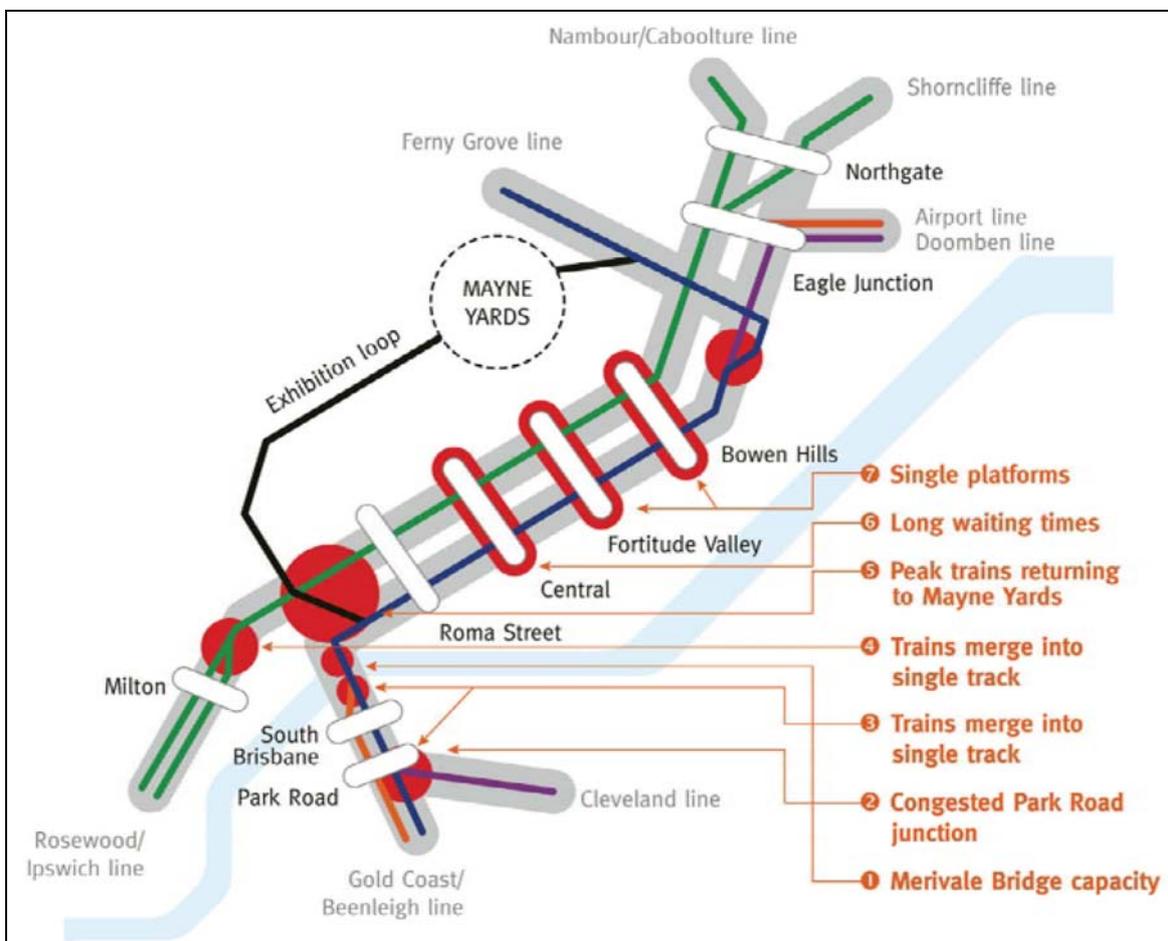


Figure 2.1 Capacity constraints on the existing Brisbane rail network¹

¹ SKM Aurecon CRR Joint Venture, *Cross River Rail Environmental Impact Statement Executive Summary*, Department of Transport and Main Roads, Brisbane, 2011, p. 36.

In addition to the benefits to commuters and improvements to the reliability of the network, the project also has the potential to deliver wider economic benefits. Some of these include:

- agglomeration effects—where transport brings activities and people closer together and effectively raises the density of economic activity, which can result in more efficient labour markets
- imperfect competition effects, where companies that benefit from transport improvements would experience lower costs, which in turn can be converted to increased turnover.
- additional labour supply, as the result of improved time and reduced cost in getting to a place of work
- more productive jobs, with better access to city centres and growth in employment in a highly productive location.

2.4. Project alternatives

Chapter 3 of the EIS described the rationale for the project, and the options explored as part of the pre-feasibility and feasibility phases. A range of heavy rail options was assessed as part of the *Inner City Rail Capacity Study Pre-Feasibility Report*,² (ICRCS) with the study recommending further consideration of three options to address medium-term (2016) requirements as well as three options to address longer-term (2026) requirements.

In determining the study corridor, the recommended ICRCS options, along with five other potential heavy rail options, were assessed. The study corridor identified for investigation for the detailed feasibility phase was based around the straight line options (SL2 and SL3, described in further detail in Chapter 3 of the EIS, pp. 3–7).

The study corridor extended 19 kilometres from Woolloowin in the north to Salisbury in the south, via the Brisbane CBD and Woolloongabba (refer to Figure 2.2). The corridor became the focus for exploring detailed alignment and station options to develop the reference design.

² Queensland Transport 2008, *Inner City Rail Capacity Study Pre-Feasibility Report*, Queensland Government, Brisbane, viewed 28 February 2012, <<http://www.tmr.qld.gov.au/Projects/Name//Inner-City-Rail-Capacity-Study.aspx>>.

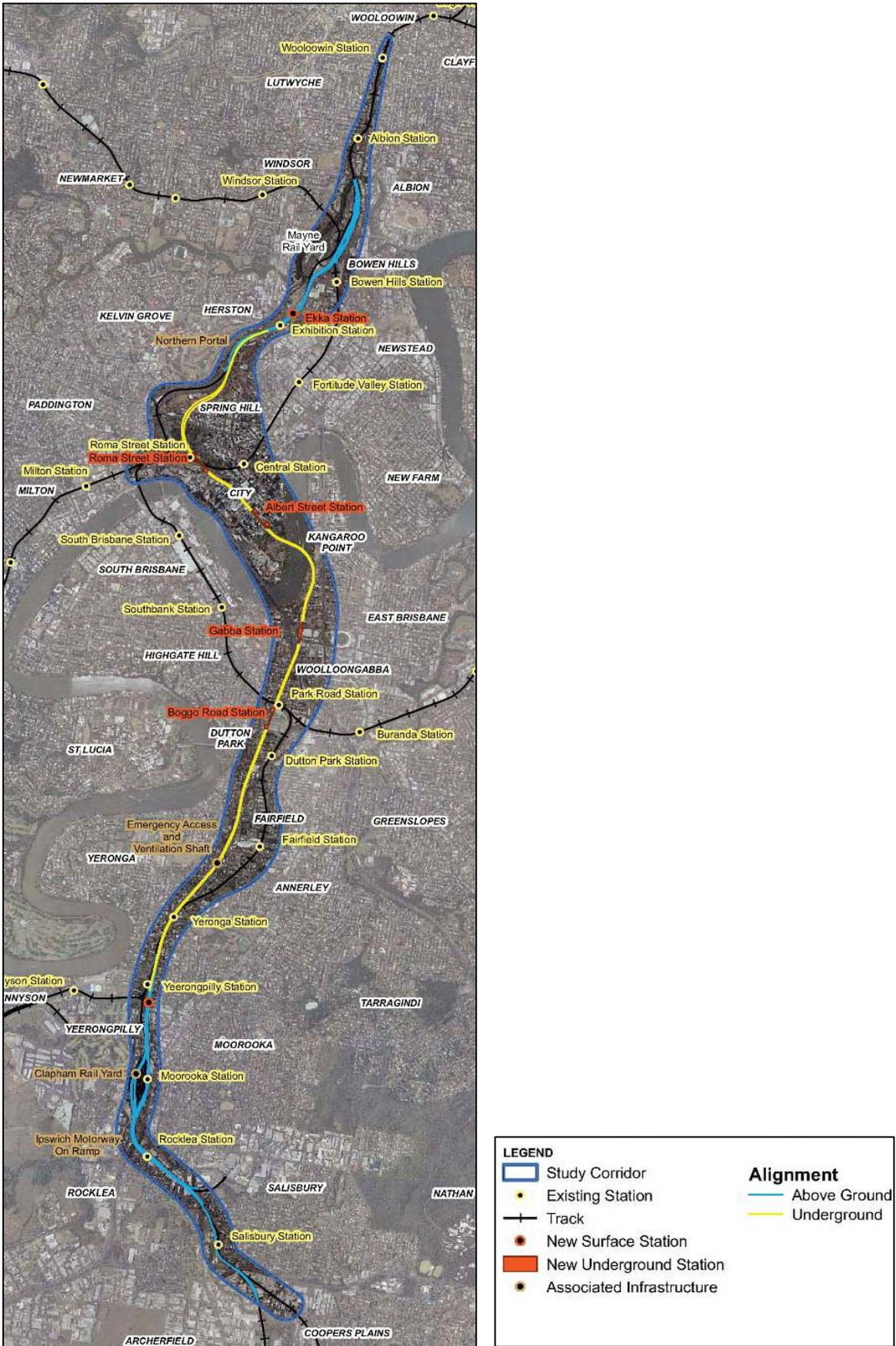


Figure 2.2 CRR study corridor

2.4.2. Reference design

The reference design defines the scope of the project for the purposes of the EIS assessment, including the tunnel alignment and portals, stations, surface tracks and associated infrastructure. The design also defines the proposed construction methodology and operations strategy for the project. Section 3.3 of the EIS details the factors considered in developing the original reference design within the study corridor. In developing the design, the following elements were considered:

- strategic station locations
- tunnel alignment
- station entrances
- portal locations
- associated tunnel infrastructure relating to flood protection, ventilation and emergency access
- surface work elements.

Design changes

In November 2010, TMR consulted with a range of residential and commercial stakeholders on the reference design. Several issues were raised in relation to the potential impacts associated with the location, design and construction of the Yeerongpilly Station and southern portal.

Following this consultation process, four sub-options of the November 2010 reference design were identified, aimed at reducing the Yeerongpilly station footprint, residential property impacts, and the construction risks associated with the dive structure and portal between Crichton Street and School Road. After assessing the sub-options, the November 2010 reference design was modified. The chosen option (SP05, detailed in Chapter 3 of the EIS, pp. 18–19) modified the reference design as follows:

- relocated the southern portal 110 metres south
- included a new Yeerongpilly station within the industrial area at Station Road, south of the existing station
- modified the track arrangement through the station, to provide the CRR tracks on the west and suburban tracks to the east.

The revised reference design provided greater overall benefits, including:

- reducing property and other community impacts, due to the Yeerongpilly station being relocated further south in industrial land
- reducing construction risks and shallow tunnelling impacts
- enabling the floodgate to be incorporated in the tunnel portal structure, avoiding the need for a separate floodgate building and construction site at the end of School Road, Yeronga.

The modified reference design also relocated the Yeerongpilly worksite, and this was considered to provide greater opportunity for redeveloping the site as a transit oriented development, post-construction. The final reference design is shown in Figure 2.3.

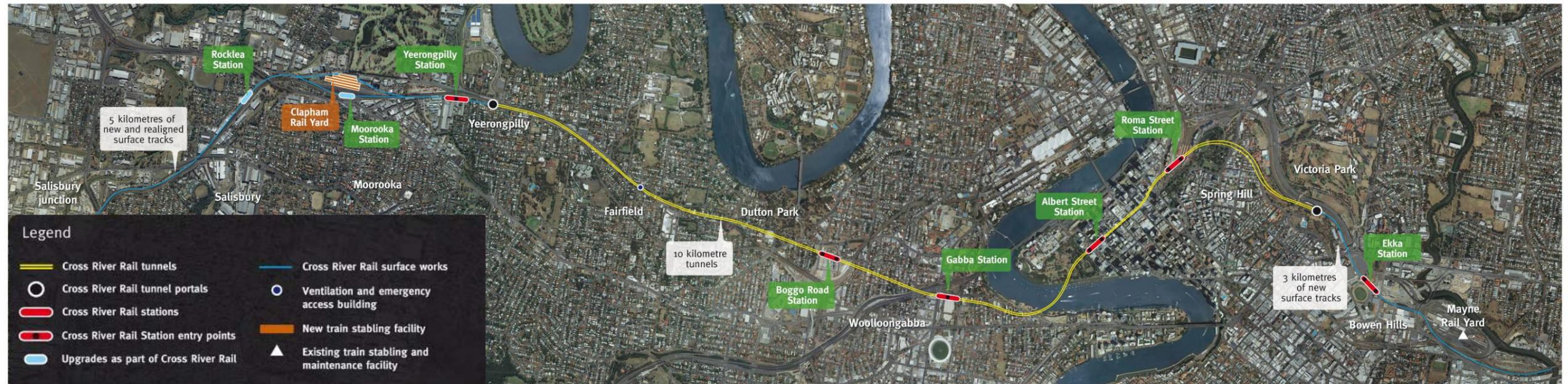


Figure 2.3 CRR final reference design

2.5. Independent panel review of the project

In the second quarter of 2012, the state government commissioned an expert panel to review the general CRR proposal (outside of this EIS process). The panel consisted of:

- Mr Michael Scanlan, independent consultant
- Mr Scott Lennon, Partner, PriceWaterhouse Coopers, Economics and Policy Group
- Mr Barry Broe, Queensland Coordinator-General.

The purpose of the review was to:

- analyse and confirm the problems facing the Brisbane rail system
- consider and test a range of short-term options to overcome rail capacity problems, which would be feasible in the constrained fiscal environment
- analyse CRR in the context of all the options considered
- assess and report on the business case prepared for CRR
- make a final recommendation on whether the project should proceed.

The results of the panel's analysis were published in the report *Independent Panel Review: Cross River Rail*.³ The panels recommendations included that:

- the priority delivery of short-term options to increase rail capacity until a long-term solution can be constructed
- the priority delivery of the 'core' CRR project, consisting of the tunnels, four underground stations and connections to the existing rail network
- the Coordinator-General's evaluation of the EIS be concluded
- federal funding be sought for the construction of CRR.

³ M Scanlan, S Lennon and B Broe, *Independent Panel Review: Cross River Rail*, Department of Transport and Main Roads, Brisbane, 2012, viewed 17 September 2012, <http://www.tmr.qld.gov.au/~media/6f68be02-ad5a-41fc-86a6-fb5660d32375/independentpanelreviewcrossriverrailfull.pdf>.

3. Impact assessment process

3.1. Overview

This section details the steps involved in the project's EIS assessment process. For a detailed explanation of the EIS process, refer to www.dsdip.qld.gov.au/coordinator-general

In undertaking this evaluation, I have considered the following:

- initial advice statement (IAS)
- EIS⁴
- submissions on the EIS
- SEIS⁵
- *Cross River Rail Geotechnical Interpretive Report*⁶
- advice from advisory agencies (see tables 3.2 and 3.3 for full details).

Table 3.1 shows the dates of key milestones in the project's EIS process.

Table 3.1 Overview of EIS process

Date	Process
11 January 2010	Final initial advice statement and request for project declaration received
26 March 2010	Project declared 'significant project' by Coordinator-General
10 April 2010 to 17 May 2010	Public consultation on draft terms of reference (TOR)
28 July 2010	Australian Government determined project is not a 'controlled action' subject to it being undertaken in a 'particular matter'.
19 August 2010	Final TOR released
28 July 2011	EIS approved for release by Coordinator-General
30 August 2011 to 21 October 2011	Public consultation on EIS
20 December 2011	SEIS provided to Coordinator-General for evaluation
4 July 2012 to 30 August 2012	Advisory agency submissions invited on SEIS

3.2. Significant project declaration

On 26 March 2010, the Coordinator-General declared this project to be a 'significant project' under section 26(1)(a) of the SDPWO Act. This declaration initiated the

⁴ SKM Aurecon Joint Venture, *Cross River Rail environmental impact statement*, Department of Transport and Main Roads, Brisbane, 2011, viewed 17 September 2012, http://www.crossrivrail.qld.gov.au/index.php?option=com_content&view=article&id=141&Itemid=175.

⁵ SKM Aurecon Joint Venture, *Cross River Rail: Environmental impact statement – Supplementary Report*, Department of Transport and Main Roads, Brisbane, 2012, viewed 17 September 2012, <http://www.dsdip.qld.gov.au/resources/project/cross-river-rail/crr-seis.pdf>.

⁶ Department of Transport and Main Roads, *Cross River Rail Geotechnical Interpretive Report 29 June 2012*, Department of Transport and Main Roads, Brisbane, 2012 (internal document).

statutory environmental impact evaluation procedure of Part 4 of the Act, which requires the proponent to prepare an EIS for the project.

3.3. Matters of national environmental significance

On 28 July 2010, the Commonwealth Environment Minister determined the project is not a 'controlled action'⁷ under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act), provided the project is undertaken in a 'particular manner', to avoid impacts on wetlands of international importance and some Commonwealth land (EPBC project reference 2010/5247). The 'particular manner' provisions include:

- placing spoil at Swanbank
- the proposed tunnel alignment must not be closer than 200 metres from the boundary of any of the following buildings:
 - Commonwealth Law Courts, 119 North Quay, Brisbane
 - Victoria Barracks, 83–129 Petrie Terrace, Brisbane (heritage listed property)
 - General Post Office, 261 Queen Street, Brisbane (heritage listed property)
 - Naval Offices, 3 Edward Street, Brisbane (heritage listed property).

The EIS confirmed the project reference design does not impact on any of the properties listed above, and that Swanbank will be used as the spoil disposal site. Therefore, there is no requirement for the project to be assessed under the EPBC Act.

3.4. Terms of reference for the EIS

The draft TOR for the EIS was released for public and advisory agency comment on 10 April 2010. Table 3.2 summarises the comments made by private and public submitters. The final TOR was released on 19 August 2010.

⁷ For a definition of 'controlled action', refer to the Glossary on page 195 of this report.

Table 3.2 Comments on the draft TOR for the CRR project EIS

Submitter	No. submissions	Issues
Queensland Government	10	<ul style="list-style-type: none"> • Emergency access and egress • use of excavated rock and soil as construction material • road closures/traffic disruption • land tenure • social impacts • human health impacts • heavy vehicle movements in local streets
Private organisations/ community groups	4	<ul style="list-style-type: none"> • Impacts on rail freight network • relationship with other projects • Impact on traffic congestion • procurement methodology
Private individuals	33	<ul style="list-style-type: none"> • Property impact of location of southern portal • dust impacts • pedestrian access during construction • impact on heritage properties • alternative design options • scope of study corridor
Total	47	

3.5. Review of the EIS

One hundred and twelve submissions were received on the EIS. Table 3.3 summarises the issues raised.

Table 3.3 Public and agency comments received on the EIS

Agency/organisation	No. submissions	Issue
<p>Queensland Government</p> <ul style="list-style-type: none"> • Workplace Health and Safety Queensland • Department of Environment and Resource Management • DEEDI • Queensland Police Service • Department of Communities • Queensland Health • Department of Public Works • Department of Community Safety • Princess Alexandra Hospital • Transport and Main Roads • Translink • Department of Local Government and Planning • The Hon. Simon Finn MP, State Member for Yeerongpilly 	<p>13</p>	<ul style="list-style-type: none"> • Air quality • construction management • flood mitigation • heritage properties • increase in rail freight • land contamination • noise and vibration • post-construction land use • project design • property impacts (residential and commercial) • sedimentation and runoff • spoil removal • traffic and transport • transport modelling
<p>Local Government</p> <ul style="list-style-type: none"> • Brisbane City Council • Councillor Steve Griffiths • Councillor Nicole Johnston • Councillor David Hinchcliffe 	<p>4</p>	<ul style="list-style-type: none"> • Air quality • associated road works • construction management • expansion of study corridor • flood mitigation • heritage properties • property impacts • spoil removal • traffic and transport • Victoria Park impacts • visual amenity

Table 3.3 Public and agency comments received on the EIS, continued

Agency/organisation	No. submissions	Issue
<p>Private organisations/community groups</p> <ul style="list-style-type: none"> • Annerley Neighbourhood Watch • Bicycle Queensland • Brothers St Brendan’s Football Club • Business Southbank • The Church of Jesus Christ of Latter Day Saints • Construction Training Centre • Dollis Autos • Lend Lease • Pacific National Queensland • Peet Limited • Port of Brisbane Corporation • Qld Transport and Logistics Council • Rail, Tram and Bus Union (Qld Branch) • Rebco Pty Ltd • Rivercity Motorway • RNA • Royal on the Park Hotel • Tennyson Residents’ Association • The Roman Catholic Archdiocese of Brisbane • Toll Intermodal • TTM Consulting • Urbis Pty Ltd (on behalf of Leighton Properties Pty Ltd) • Vision Australia • Yeronga District Residents’ Association • Queensland Rail 	<p>25</p>	<ul style="list-style-type: none"> • Active transport • air quality • car parking (construction and operation) • compliance and complaints management • construction management • design development • economic benefits • hours of construction work • impacts on rail freight network • noise and vibration • property damage during construction • spoil removal • transport modelling • visual amenity

Table 3.3 Public and agency comments received on the EIS, continued

Agency/organisation	No. submissions	Issue
Private individuals	70	<ul style="list-style-type: none"> • Air quality • car parking (construction and operation) • closure of Beaudesert Rd level crossing • compliance and complaints management • construction management • construction noise and vibration • design development • hours of construction work • operational noise (increased frequency of freight train pass-bys) • property damage during construction • spoil removal • transport modelling • visual amenity.
TOTAL	112	

Note: The names and responsibilities of some state government agencies changed following the state government election in March 2012. For details of the new departments, refer to Appendix 5 (page 191).

3.6. Supplementary information to the EIS

After analysing submissions received on the EIS, I requested TMR submit a SEIS to address some matters raised. The SEIS proposed several changes to the project's construction methodology, including:

- not using the site at 45 O'Connell Terrace Bowen Hills as a construction worksite (the site is required for the construction of the toll road control centre for the Legacy Way project)
- modifying the layout of the Victoria Park construction worksite to exclude two mature fig trees from the worksite boundary, avoid direct impacts on the dog off-leash area, and realign the pedestrian and cycle path to avoid the worksite (thereby addressing concerns about potential conflicts between the cycle path and children's playgroup facilities)
- refining the construction worksite layout at Boggo Road to relocate 30 car parks, site offices and workshop/store further south-east along Peter Doherty Street
- modifying the inbound spoil haulage route for the Boggo Road worksite, to reduce impacts at the intersection of Cornwall Street and Ipswich Road and impacts on the Princess Alexandra Hospital.

The SEIS was not released for public consultation. However, a small group of advisory agencies and stakeholders were invited to comment. Table 3.4 summarises the issues raised by agencies and stakeholders.

Table 3.4 Agency and stakeholder comments received on the SEIS

Agency/organisation	Issue
Brisbane City Council	<ul style="list-style-type: none"> • Traffic and transport impacts in O'Connell Tce (Bowen Hills), and near Roma Street, Albert Street and Yeerongpilly stations • pedestrian movements • car parking at Yeerongpilly • bus-rail interchange opportunities at Yeerongpilly • concerns regarding 24-hour spoil haulage in CBD and at Woollongabba Station • impacts on Victoria Park • social impact assessment management plan
Department of Communities, Child Safety and Disability Services (formerly Department of Communities)	<ul style="list-style-type: none"> • Impacts on departmental properties
Department of Community Safety	<ul style="list-style-type: none"> • Flood, bushfire and landslide impacts
Department of Environment and Heritage Protection	<ul style="list-style-type: none"> • Conditions covering ancillary project works • environmental leadership of the project • appointment of an independent community liaison representative and an environmental management representative for the construction phase • contaminated land • air quality • specific and adaptive measures to minimise environmental nuisance
Department of Housing and Public Works	<ul style="list-style-type: none"> • Impacts on affordable housing residents • Unavailability of Lot 1 at Boggo Road Urban Village for use as a worksite
Queensland Health	<ul style="list-style-type: none"> • Air quality impacts on the community, particularly for those with medical conditions that make them more susceptible to dust • impacts on affordable housing residents • impacts on departmental property

Table 3.4 Agency and stakeholder comments received on the SEIS, continued

Agency/organisation	Issue
Queensland Rail	<ul style="list-style-type: none"> • Project governance responsibilities and interface agreements • design of stations and platforms (including consideration of dual platforms) • impacts on Mayne rail yard • advancing the development of Clapham rail yard • impacts on commercial rail freight during construction • procurement of new generation rolling stock • fire and life safety within tunnels • community engagement
Rail, Tram and Bus Union	<ul style="list-style-type: none"> • Recommends a strategic view of planning for rail infrastructure • construction impacts on rail freight
RNA	<ul style="list-style-type: none"> • Dust/noise/traffic/amenity impacts on the RNA Showgrounds and surrounding areas • potential impact on development potential in and around the RNA Showgrounds
Urbis, on behalf of Lendlease	<ul style="list-style-type: none"> • Property impacts in the Boggo Road Urban Village precinct and impacts on future development opportunities

Note: The names and responsibilities of some state government agencies changed following the state government election in March 2012. For details of the new departments, refer to Appendix 5 (page 191).

4. Project approvals

4.1. Overview of approvals regime

This Coordinator-General's report provides the whole-of-government assessment of the EIS. Outcomes of the EIS process may be used for decisions in respect of the project by other entities, under other legislation. The proponent must obtain all relevant subsequent approvals under other legislation. For example, for applications for development approval for a material change of use (MCU), the EIS process replaces the information and referral and notification stages of the Integrated Development Assessment Scheme (IDAS) under SPA.

4.2. Approvals and permits required

4.2.1. Development approvals

The project is defined as a 'utility installation' under the current BCC planning scheme (City Plan 2000) which is exempt development in City Plan. However, MCU development approvals are required for approvals for buildings and for ancillary work not captured by the definition, including depots, road construction signage, ventilation facilities and parking areas.

It is noted that City Plan exempts ancillary works for development involving the construction, maintenance or operation of roads and busways, and things associated with roads and busways by or on behalf of or under contract with BCC or the Queensland Government. I recommend that a planning scheme amendment be undertaken in the short term, to also exempt rail.

BCC is currently developing the new City Plan which is likely to commence between 2013 and 2014. This planning scheme will comply with the Queensland Planning Provisions (QPP) and will be based on zones and defined uses in the QPP. The QPP includes a definition for 'utility installation' which is defined as:

Premises used to provide the public with the following services:

- supply of water, hydraulic power, electricity or gas;
- sewerage, drainage or stormwater services;
- transport services including road, rail or water;
- waste management facilities;
- network infrastructure.

The use includes maintenance and storage depots and other facilities for the operation of the use.

The level of assessment and approvals required for the project may change under the new City Plan.

The key IDAS development approvals required for the project are shown in Table 4.1 on page 22.

4.2.2. Other approvals

There are requirements for other approvals in accordance with other legislation and the proponent will be required to apply directly to the relevant entity for these, in accordance with standard legislative processes, once the necessary detail required for applications is finalised. These other approvals include, but are not limited to, those shown in Table 4.2.

Table 4.1 IDAS approvals and permits required for the CRR project

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Development Permit for an MCU of Premises on contaminated land	<i>Sustainable Planning Act 2009</i>	The department in which that Act is administered	Making an MCU on a property identified on the Environmental Management Register (EMR) or Contaminated Land Register (CLR)	All land on the EMR/CLR that would be subject to Project works. Refer to Chapter 8 Land Contamination for details of properties.	Proponent	Prior to undertaking works on EMR/CLR listed properties
Development Permit for an MCU of Premises for an Environmentally Relevant Activity	<i>Sustainable Planning Act 2009</i> <i>Environmental Protection Act 1994</i>	The department in which that Act is administered	Undertaking an activity that is identified as being 'environmentally relevant' (ERA) under Chapter 4 of the <i>Environmental Protection Act 1994</i> . ERAs could include: <ul style="list-style-type: none"> • 8 Chemical Storage • 21 Motor Vehicle Workshop Operation • 38 Surface Coating • 43 Concrete Batching • 58 Regulated Waste Treatment • 63 Sewage Treatment • 64 Water Treatment Registration Certificate for the ERAs would be required prior to their commencement.	Likely at large construction sites, such as Yeerongpilly and Woolloongabba. Possible at smaller construction sites.	Proponent	Prior to undertaking any ERA

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Development Permit for Operational Works for Taking or Interfering with Water from a Watercourse	<i>Sustainable Planning Act 2009</i> <i>Water Act 2000</i>	The department in which that Act is administered	Taking or interfering with water within a watercourse	Moolabin Creek and Rocky Waterholes Creek	Proponent	Prior to undertaking works within a watercourse
Development Permit for Operational Works for the Removal of Quarry Material from a Watercourse	<i>Sustainable Planning Act 2009</i> <i>Water Act 2000</i>	The department in which that Act is administered	Removing quarry material from a watercourse	Moolabin Creek and Rocky Waterholes Creek	Proponent	Prior to removing quarry material from a watercourse
Development Permit for Operational Works for Constructing or Raising a Waterway Barrier	<i>Sustainable Planning Act 2009</i> <i>Fisheries Act 1994</i>	The department in which that Act is administered	Undertaking works that would, or could potentially, create a barrier to the upstream or downstream movement of fish	Moolabin Creek and Rocky Waterholes Creek	Proponent	Prior to establishing a barrier to the upstream or downstream movement of fish
Development Permit for Operational Works for the Removal, Destruction or Damage of a Marine Plant	<i>Sustainable Planning Act 2009</i> <i>Fisheries Act 1994</i>	The department in which that Act is administered	Any works that involve removal, destruction or damage to marine plants	Works interfering with marine plants within Breakfast Creek	Proponent	Prior to removing, destroying or damaging marine plants
Development Permit for an MCU	<i>Sustainable Planning Act 2009</i> <i>City Plan 2000</i>	Brisbane City Council (BCC)	Buildings	Fairfield and construction sites	Proponent	Prior to undertaking works

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Development Permit for an MCU	<i>Sustainable Planning Act 2009</i> <i>City Plan 2000</i>	BCC	Ancillary works	Whole of project	Proponent	Prior to undertaking works
Development Permit for Operational Works for Prescribed Tidal Works	<i>Sustainable Planning Act 2009</i> <i>Coastal Protection and Management Act 1995</i>	BCC	Undertaking works below the high water mark within a tidal waterway	Works within the high water mark at Breakfast Creek/Brisbane River	Proponent	Prior to undertaking works within the higher water mark
Development Permit for Operational Works – Filling and Excavation	<i>Sustainable Planning Act 2009</i> <i>City Plan 2000</i>	BCC	Filling or excavation greater than 1m	Whole of project	Proponent	Prior to undertaking works
Development permit for reconfiguring a lot	<i>Sustainable Planning Act 2009</i> <i>City Plan 2000</i>	BCC	Where not exempt development	Whole of project	Proponent	Prior to undertaking works

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Development permit for Building works	<i>Sustainable Planning Act 2009</i> <i>Building Act 1975</i>	Private certifier	Assessment under the Building Act	Whole of project	Proponent	Prior to undertaking works
Development permit for Building work, operational work or reconfiguring a lot on the site of a Heritage Place or within a Heritage Precinct	<i>Sustainable Planning Act 2009</i> <i>City Plan 2000</i>	BCC	Planning approval for development onsite or within a heritage precinct	Whole of project	Proponent	Prior to undertaking works
Development permit for MCU	<i>Sustainable Planning Act 2009</i> <i>Ipswich Planning Scheme 2006</i>	Ipswich City Council (ICC)	Landfill	Swanbank	Proponent	Prior to undertaking works
Development Permit for Operational Works – Filling and Excavation	<i>Sustainable Planning Act 2009</i> <i>Ipswich Planning Scheme 2006</i>	ICC	Filling or excavation	Swanbank	Proponent	Prior to undertaking works

Table 4.2 Non-IDAS approvals required for the project

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Construction						
Licence for an Apparatus or Spectrum (s99 and Chapter 3, Part 3.2)	<i>Radiocommunications Act 1992</i>	Application made to the Australian Communications and Media Authority	Radiocommunications devices must be licensed	Radiocommunication devices may be used on construction sites	Proponent	Prior to using radiocommunication devices
Cultural heritage management plan (CHMP) (s. 87)	<i>Aboriginal Cultural Heritage Act 2003</i>	Department of Environment and Heritage Protection (DEHP)	An approved CHMP is required for projects requiring an EIS	Whole of project	Proponent	Must be prepared and approved prior to the commencement of construction
Registration Certificate for an Environmentally Relevant Activity (s. 73D)	<i>Environmental Protection Act 1994</i>	DEHP	Registration certificate must be obtained prior to the commencement of an Environmentally Relevant Activity	At all locations that require a development permit for an ERA	Proponent	Within a month of obtaining approval for the relevant ERA

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Development by the State on a Queensland Heritage Place (s. 104)	<i>Queensland Heritage Act 1992</i>	Heritage Council (DEHP)	Undertaking works on, or adjacent to, a property listed on the Queensland Heritage Register. Approval would not be required if works are undertaken by the State or an exemption notice has been issued.	Victoria Park, Roma Street station, Boggo Road Gaol Division 1 and 2, RNA	Proponent	Prior to undertaking works within listed properties
Water Licence (ss. 808 and 206(5))	<i>Water Act 2000</i>	DEHP	Required for taking or interfering with water from a watercourse	Moolabin Creek and Rocky Waterholes Creek	Proponent	Prior to taking or interfering with water from a watercourse
Disposal Permit (s. 424)	<i>Environmental Protection Act 1994</i>	DEHP	Required for the removal and treatment or disposal of contaminated soil removed from a property listed on the EMR or CLR	Depends on location	Proponent	Prior to removing and treating or disposing of contaminated soil from an EMR/CLR listed property

Permit/approval/ requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Agreement of the chief executive to carry out road works on, or to interfere with the operation of, State-Controlled Roads (s. 33)	<i>Transport Infrastructure Act 1994</i>	Department of Transport and Main Roads	Any works that would impact on the road structure or the intended operation of the State controlled road. Would be required for the any works undertaken to the Pacific Motorway and associated on and off ramps.	Woolloongabba/ Kangaroo Point	Proponent	Prior to interfering with State Controlled Road
Road corridor permit	<i>Transport Infrastructure Act 1994</i>	Department of Transport and Main Roads	Advertisement exhibited on a state controlled road	State controlled road	Proponent	Prior to erecting signage
Approval of railway manager to interfere with a railway (s. 255)	<i>Transport Infrastructure Act 1994</i>	Railway manager	Any works that would impact on the railway or the intended operation of the railway	Locations where works interfere with the existing network	Proponent	Prior to impacting the existing railway network
Rail Feasibility Investigators Authority (s. 114(2))	<i>Transport Infrastructure Act 1994</i>	Department of Transport and Main Roads	Allows investigator entry and re-entry onto land to investigate potential and suitability as a rail corridor	Locations that require further investigation	Proponent	Prior to gaining entry onto land

Permit/approval/ requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Approval from chief executive for Ancillary Works and Encroachments	<i>Transport Infrastructure Act 1994</i>	Department of Transport and Main Roads	Required to construct, maintain, operate or conduct ancillary works and encroachments on a State-controlled road	Works encroaching into the Pacific Motorway	Proponent	Prior to undertaking relevant works
Sales permit or authorisation	<i>Forestry Act 1959</i>	Department of Natural Resources and Mines	Administration and sale of state owned quarry material	Swanbank	Proponent	Prior to undertaking relevant works
Approval for the Storage of Flammable and Combustible Substances (Regs 82 and 84)	<i>Dangerous Goods Safety Management Act 2001</i> Dangerous Goods Safety Management Regulation 2001 Building (Flammable and Combustible Liquids) Regulation 1994	BCC	Required for the storage of flammable or combustible substances	Construction sites	Proponent	Prior to storing flammable and combustible substances
Temporary road closure permits (s. 96)	<i>Transport operations (Road Use Management) Act</i>	BCC/ Queensland Police Service	Certificate of assessment	Whole of project	Proponent	Prior to undertaking works
Permanent road closure (s. 99)	<i>Land Act 1994</i>	Department of Natural Resources and Mines	Permanent closure	Locations which have been identified in the EIS/SEIS	Proponent	Prior to undertaking works

Permit/approval/ requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Plumbing and Drainage	<i>Sustainable Planning Act 2009</i>	BCC	Seal off/repair/ reconnections of existing services along the project corridor and new services at construction sites	Whole of project	Proponent	Prior to undertaking works
Permit to interfere with controlled vegetation	<i>ULDA Vegetation Management By Law</i>	Urban Land Development Authority (ULDA)	Removal of controlled vegetation	Within Urban Development Areas (UDAs)	Proponent	Prior to interfering with vegetation
Operation						
Australian Government						
Reporting of GHG emissions, abatement and energy consumption and production activities by corporations	<i>National Greenhouse and Energy Reporting Act 2007</i>	Clean Energy Regulator	Where project exceeds 50 kilotonnes in CO2 equivalent of GHG emitted or consumes/produces 200 terajoules of energy	Whole of project	Proponent	Queensland Rail currently reports on activities it undertakes – and would be required to include additional activities of the project

Permit/approval/ requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Reporting of energy efficiencies	<i>Energy Efficiency Opportunities Act 2006</i>	Department of Resources, Energy and Tourism	Corporations that use more than 0.5 petajoules of energy annually undertake an assessment of their energy efficiency opportunities and report publicly on the outcomes of that assessment	Whole of project	Proponent	Once operational , transport operator to include project in annual reporting
State Government						
Accreditation of Rail Transport Operator	<i>Transport (Rail Safety) Act 2010</i>	Department of Transport and Main Roads	Required for the management of rail infrastructure and rolling stock	NA	Proponent	NA
Implementation of Safety Management Systems	<i>Transport (Rail Safety) Act 2010</i>	Management plans are issued to Department of Transport and Main Roads	The Safety Management Systems must be established for works managed by the Rail Transport Operator	NA	Proponent	NA

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Risk Management Plan for a Security-Identified Surface Transport	<i>Operation Transport Security (Counter-Terrorism) Act 2008</i>	Department of Transport and Main Roads	A risk management plan must be prepared and issued to the Chief Executive prior to the prescribed date if the project is declared by the Chief Executive as a Security-Identified Surface Transport Operation	NA	Proponent	NA
Local Government						
Compliance Permit for Plumbing and Drainage Work (s. 78)	<i>Plumbing and Drainage Act 2002</i>	BCC	Required for the installation of any permanent facilities, such as toilets, showers, etc	Stations	Proponent	Prior to the installation of any permanent facilities

Permit/approval/requirement	Legislation	Assessing authority	Trigger/relevant aspect of project	Location	Responsibility	Timing
Local Law Permits	<i>City of Brisbane Act 2010</i> <i>Local Government Act 2009</i>	Local Government	Approvals from the BCC under relevant local laws or provisions of the <i>Local Government Act 2009</i> may be required prior to the commencement of such activities. Local Law no 1 - control of advertisements Natural Assets Local Law Health Safety and amenity local law 2009	Various locations	Proponent	Prior to undertaking activities that require local law approval

Coordinator-General's conclusion

As for any project, I accept that that the nature of the procurement process and detailed design phases for the CRR project could alter the project and the impacts of the project, which in turn could change the approvals required. The EIS process under the SDPWO Act does not obviate the need for the proponent to obtain all relevant subsequent approvals, licences and permits under other legislation.

To provide clarity, I have made a general recommendation to BCC that City Plan be amended in the short term, to add rail to the list of exempt ancillary developments. (Appendix 4, Recommendation 8). This should reduce any uncertainty about future approvals required from the BCC and the number of approvals that would be required.

The key IDAS development approvals required for the project are shown in Table 4.1.

To reduce uncertainty regarding IDAS project approvals, I recommend that the CRR project be listed in Table 5, Schedule 4 of the Sustainable Planning Regulation 2009 (refer to Appendix 4, Recommendation 9 of this report). Schedule 4 of the regulation lists development that cannot be declared to be development of a particular type.

5. Planning

5.1. Overview

5.1.1. Context

The CRR project would generate city-wide and local benefits by facilitating improved public transport and transport integration at key locations in Brisbane's inner suburbs and by providing an accessible and efficient public transport system.

In the longer term, the project may lead to changes to the pattern of development and densities along the corridor, particularly surrounding the new stations while, in the short-term, the project may impact land uses nearest to construction activities.

5.1.2. EIS findings, submissions and analysis

Land use and development in the study corridor is guided by both state and local government policies and legislation. At a state level, land use and development is directed by:

- SPA, which provides the legislative framework for planning and development within Queensland
- state planning policies (SPPs), which protect matters of state interest
- *South East Queensland Regional Plan 2009–2031* (SEQ Regional Plan), which identifies the regional planning context for South East Queensland (SEQ), including areas of growth and development and the *South East Queensland Infrastructure Plan and Program 2010–2031* (SEQIPP), which outlines the future infrastructure requirements to meet the population and growth targets identified in the SEQ Regional Plan
- *Urban Land Development Authority Act 2007* (ULDA Act), which identifies key development sites and is the overarching legislation that guides the Urban Land Development Authority (ULDA), the authority responsible for developing these sites, priority infrastructure and development assessment⁸
- *Connecting SEQ 2031: An Integrated Regional Transport Plan for South East Queensland*, which guides the planning and framework development for transport projects in line with the desired outcomes of the SEQ Regional Plan.

At a local level, land use and development within the study corridor is guided by:

- City Plan, which guides and controls land use and development within the Brisbane City Local Government Area (LGA). This establishes strategic planning direction for the LGA as well as localised development direction through local and neighbourhood plans
- BCC local laws, which govern and regulate certain activities within the LGA such as parking, noise and vegetation

⁸ The powers of the ULDA and the existing Urban Development Area Planning Schemes will transition to Brisbane City Council by November 2013.

- a range of planning strategies that manage development and growth within specific local areas such as the River City Blueprint.

Chapter 9 of the EIS outlined the land use and tenure considerations for the project. This section of my evaluation report focuses on key planning decisions which have commenced during the EIS process.

City Plan is currently undergoing a review and will be replaced by the new City Plan. The new planning scheme, likely to be adopted in 2013/2014, will guide development in the city for the next 10 years and is being drafted in accordance with the Queensland Planning Provisions. It will guide how land in Brisbane can be used and developed and helps plan for infrastructure to support growth and create a more diversified economy.

The Queensland Government has committed to a more effective and efficient planning and development system. These changes will be implemented through legislative amendments to SPA. At planning reform forums in May to July 2012, local governments, the development industry and environmental sector representatives identified that a number of concepts and processes within Queensland's planning and development system could be improved. This information is being used to identify priorities for change over the next 6 to 24 months. Reform agenda objectives include:

- removing unnecessary red tape
- simplifying and streamlining state planning requirements
- establishing a single state assessment and referral agency (SARA)
- reducing the number of SPPs through the single SPP
- supporting/empowering local governments to make planning decisions.

The Queensland Government is establishing a new approach to SPPs that simplifies and clarifies the state's interests. The new approach means that one single SPP will be developed to replace the various current state planning policies in existence.

DSDIP will provide a central point for development assessment by the state under the new SARA model. DSDIP will not receive development applications relating to building matters for non-government entities or replace the responsibilities of the local government in the development assessment process.

The ULDA Act provides for particular parts of the state to be declared as urban development areas (UDAs) and established the ULDA to manage and carry out development within defined UDAs. There are two UDA development schemes within the study corridor:

- (1) Woolloongabba
- (2) Bowen Hills.

Both development schemes include specific requirements regarding the CRR project and exemption for the project from development assessment.

DSDIP is in the process of delegating the ULDA's development assessment and relevant administration powers to BCC as a pilot project. The ULDA will continue to assess properly made development applications lodged with the ULDA prior to the delegation, as per the requirements of the ULDA Act. However, development applications lodged after the date of delegation will be assessed by BCC. Changes to

ULDA-issued approvals, compliance assessment and plan sealing will continue with the ULDA for 12 months from commencement of the delegations on 30 November 2012.

The ULDA approved the development application for the RNA Showgrounds, which involves demolishing some existing buildings and adding between 310 000 to 340 000 square metres of gross floor area of mixed-use development. A new street network is proposed to facilitate improved access through the site. This includes a north-south link which connects St Pauls Terrace and Gregory Terrace (Grand Parade), as well as a plaza linking Gregory Terrace and the existing Exhibition Station, south of Show Ring No. 1. A range of mixed-use precincts are proposed around the street edges, specifically O'Connell Terrace, Exhibition Street, the proposed Grand Parade, Costin Street and Constance Street. The next stage of the development application process requires the RNA to submit several applications for compliance endorsement.

5.2. Land use and tenure

5.2.1. Context

The CRR study corridor comprises a broad mix of land uses that reflect its CBD and inner-city location, including residential, commercial, industrial, community and open-space land uses. Properties directly affected by the project comprise a mix of tenure types, including leasehold, freehold and reserve.

5.2.2. EIS findings, submissions and analysis

City Plan sets out desired environmental outcomes for each area, which identifies the pattern of intended development. City Plan then uses area classifications to provide intent and guide development through the use of codes and levels of assessment.

Chapter 9 of the EIS summarised the area classifications which occur through the project corridor and also the local/neighbourhood plans which occur. Chapter 9 also discussed the main land uses which are currently present in the study corridor. The project corridor includes a number of major community uses including the RNA Showgrounds, Queensland University of Technology, Mater Hospital, Princess Alexandra Hospital and the Gabba Stadium.

Overall, the project is broadly consistent with the intent of increasing densities within key inner city locations and increasing commercial opportunities in the CBD, Bowen Hills, Woolloongabba and Boggo Road Urban Village (BRUV), by improving access to public transport as outlined in state and local government statutory planning documents and policies. The project integrates land-use planning, with transport and infrastructure planning and will facilitate redevelopment around station sites.

The project will require a minor loss of open space and greenspace along the corridor for permanent use. These areas were identified in Chapter 9 of the EIS. The project will rehabilitate some locations and improve the amenity of station sites and the corridor. These issues are discussed further in Section 6.13 of this report.

Numerous submissions raised the issue of surplus land after project construction. The project does not propose to change the zoning of land occupied by construction worksites not required for the project once it is constructed. These sites would become available, where appropriate, for redevelopment in accordance with the relevant planning scheme and SPPs. Any redevelopment of these sites would be undertaken separately from the project.

Queensland Health (QH) raised the matter of project alignment with Herston Health Precinct Smart Community Plan project in its submission. This is not specifically managed in the community consultation draft CEMP (EIS Chapter 24).

Yeerongpilly

Numerous submissions raised concern over the post-construction development of surplus land at the Yeerongpilly construction site, which is 13.4 hectares in area. Given the site's proximity to the new Yeerongpilly Station and improved transport access, the area surrounding the Yeerongpilly worksite and new station may experience pressure for redevelopment to high density residential or mixed-use commercial. This would require a change to the existing land use designation of this site and subsequent revision of the City Plan.

The redevelopment of surplus land at Wilkie Street would need to consider the requirements of BCC's planning scheme, including issues such as privacy, building height and density, and local character and amenity to ensure that impacts on surrounding residents are avoided or appropriately managed. Development applications to redevelop surplus land would also need to be publicly notified in accordance with SPA where impact assessable.

The project would require the resumption of 107 industrial lots along the study corridor. The occupation of those industrial lots by the construction of this project and other infrastructure projects could negatively impact the supply of industrial land in inner Brisbane. Industrial land close to the inner city provides economic benefits through jobs and services and supports small- and large-scale businesses, which provide employment. Some lots could be reinstated or reconfigured for industrial use after the construction of the project. As this is an important land use issue, I recommend that BCC and the planning section of DSDIP undertake a study of the impact of this potential loss and consequential options to manage industrial land supply for inner Brisbane (Appendix 4, Recommendation 1).

Submissions on the EIS also raised amenity issues during construction, especially at Yeerongpilly. The draft outline EMP sets out the approach to design and environmental management for the project and includes performance criteria and a hierarchy of controls to protect the environmental values of the study corridor. The EMP states that specific management plans, which address the management and mitigation of construction impacts including noise and dust, will be developed and implemented prior to construction.

Mayne Rail Yards

Submissions raised the issue of providing greenspace at the Mayne Rail Yards. While the planning for this study is outside the scope of CRR, the provision of greenspace at

this location would provide a good outcome in light of the planned increases in residential density in this area. As resident and worker numbers increase in the area, there will be greater demand for greenspace. The joint BCC/DSDIP project's *River City Blueprint – Public Space* report identified the location as high need and access constrained.

The Mayne Rail Yards are not only critical to the delivery of the CRR project, they are also vital to the future business development of Queensland Rail. While the future use of the rail yards has not been considered for greenspace as part of the CRR project, the potential future uses of this site should be subject to a future planning process. I have therefore made a general recommendation that the proponent, together with BCC and DSDIP undertake a detailed greenspace planning exercise at this location in close consultation with Queensland Rail (Appendix 4, Recommendation 2).

Boggo Road Urban Village

BRUV is located on the 9.5-hectare site of the old Boggo Road Gaol, and is home to the Queensland Government's new Ecosciences Precinct. The Department of Public Works coordinated development of the site.

The BRUV preliminary approval was approved in 2005. The development consists of subdividing the site into 11 lots and the creation of new roads. The preliminary approval is supported by a structure plan (A001636484) which divides the site into four sub-precincts—centre, mixed-use, residential and public open space.

In 2011, the Department of Housing and Public Works (DHPW) and Leighton Properties Pty Ltd signed a project deed to develop parts of the BRUV site for a mixed-use development. This includes lots 1, 5, 6 and 7 on SP 217441 and parts of lots 3 and 4 on SP 217441.

Submissions received raised concern about direct impacts of the project on the development of these sites. It is acknowledged that the designation of the project as a 'future public transport corridor' requires development applications over this corridor to be referred to the chief executive of TMR as a concurrence agency.

While I encourage the proponent to consider the potential of commercial interface agreements to address such matters (refer to Section 5.4 of this report), I consider it inappropriate to provide any direction to TMR with respect to it representing its normal portfolio responsibilities in existing planning processes under SPA.

Property, tenure and land title

The majority of the project corridor consists of freehold land. The existing railway corridor is held as leasehold land. There are reserves (such as the City Botanic Gardens and road reserves) throughout the corridor and BCC owns some sites which mostly consists of parkland and open space.

As described on page 13, the Australian Government determined the project is not a 'controlled action' as long as the rail tunnels do not pass within 200 metres of the Commonwealth Law Courts, Victoria Barracks, Naval Offices and the General Post Office in Queen Street. The CRR reference design conforms to these EPBC Act 'particular manner' requirements.

There are existing infrastructure corridors through the site, consisting of bus corridors, road corridors, electricity easements, sewer and water pipelines. Chapter 9 in the EIS provided detail on the tenure for the entire corridor.

A total of 411 properties would be resumed if the reference design for the CRR project is fully delivered. This includes 108 properties for surface works and the volumetric resumption on 303 properties for underground works where the project passes below the property. While the final number of properties to be resumed will need to be reviewed during detailed design of the project, I am satisfied that this general quantum of properties are needed for the project.

The majority of the lots that would be acquired for surface works are in the southern portion of the corridor and includes land for the southern portal and the Yeerongpilly construction site.

Properties affected by resumption are comprised of a number of tenure types. It is expected that freehold and leased land would be acquired by the state and converted to unallocated state land. This would probably be subleased for transport corridor purposes.

State land temporarily required for construction purposes would be freed from the existing parcel (this can occur through the exemptions for Reconfiguring a lot, Table 3, Schedule 4, Sustainable Planning Regulation 2009). Following construction, surplus lots will be returned to the existing tenure arrangement.

Freehold land acquired for construction purposes would be subleased to the railway manager. Following construction, surplus land would probably be sold and returned to freehold tenure, but this may first be subject to further planning work discussed in more detail in Section 5.3 of this report.

In the CRR project study corridor, there are two native title claims under the Commonwealth *Native Title Act 1993*. These claims have been made by the Jagera and Turrbal people over broader areas covering Brisbane. As the project will be located on state land, section 24KA of the *Native Title (Queensland) Act 1993* (Qld) would apply. This means native title rights would continue to exist and would not be extinguished. As a result of section 24KA, traditional owners have been notified of the project and will be consulted when preparing the cultural heritage management plan (CHMP). Further discussion on Indigenous cultural heritage is provided in Section 6.7 of this evaluation report.

5.2.3. Coordinator-General's conclusion

Overall, the CRR project is consistent with the BCC planning scheme and UDA planning schemes for Bowen Hills and Woolloongabba.

As the project may result in the loss of up to 107 industrial lots across the corridor, I recommend (Appendix 4, Recommendation 1) that BCC and DSDIP undertake a study of the impact of this potential loss and identify consequential options to manage industrial land supply for inner Brisbane.

I also recommend that TMR, together with BCC and DSDIP undertake a detailed parks planning exercise of the Mayne Rail Yard in consultation with Queensland Rail and the

local community, with the aim of effectively integrating the future rail development of the yard with parks opportunities along its western margin.

The CRR reference design conforms to the necessary EPBC Act requirements.

5.3. Post-construction land use and tenure

5.3.1. Context

Following completion of construction, worksite land would become available for redevelopment in accordance with relevant planning instruments. The project will influence redevelopment in some locations, by providing increased accessibility through public transport infrastructure and increased amenity through station design and development.

5.3.2. EIS findings, submissions and analysis

Locations that would provide surplus land at the end of construction include:

- the majority of the Victoria Park/Northern Portal construction site
- the southern Albert Street Station underground works construction site
- the Gabba Station underground works construction site
- the Boggo Road Station underground works construction sites
- Yeerongpilly Station underground works construction site.

The EIS indicates that surplus land in Albert Street could be developed for high density commercial and residential uses. The reference design for the project provides capability for the development of an 80-storey tower over that station and along the rail corridor through the CBD.

Redevelopment of the Gabba Station worksite would enable integration with the busway. Future development is expected to include mixed-use development, commercial, residential and open-space uses. The EIS does not provide precise design proposals for the integration of the proposed Gabba Station with the existing or future upgraded Woolloongabba Bus Station. Therefore, I recommend that TMR and BCC undertake more detailed design work on this aspect before the procurement documentation is finalised for the construction of that part of the CRR project.

The Boggo Road Station will include a public plaza and part of the site may be available for redevelopment. Any surface redevelopment will need to be in accordance with the approved structure plan for the BRUV and be coordinated with the DHPW and its development partners, in consultation with the Ecosciences Precinct and surrounding community.

The Yeerongpilly Station is currently designated 'General Industry' in City Plan. Given the site's proximity to the Yeerongpilly Station, pressure for high order uses such as mixed-use development, commercial and residential uses may occur. I recommend that, if the project proceeds, BCC, together with DSDIP commence a separate planning process for this site, outside of this CRR project scope.

5.3.3. Coordinator-General's conclusion

As the EIS does not provide sufficient design detail for the integration of the proposed Gabba Station with the Woolloongabba Bus Station, I recommend that TMR and BCC undertake more detailed design work on this aspect prior to finalisation of the procurement documentation for the construction of that part of the CRR project (refer to Appendix 4, Recommendation 3).

I recommend that BCC and DSDIP commence a separate planning process, in close consultation with the surrounding communities, to determine future recommended land use on and surrounding the project construction sites at Yeerongpilly and Albert Street. This planning process could commence any time after the start of CRR project construction at those sites and be concluded at least one year prior to the finish of construction on those sites (refer to Appendix 4, Recommendation 4).

5.4. Interface agreements

5.4.1. Context

Interface agreements, commonly applied to the governance of construction and operation interface matters, are defined under:

- sections 71 to 80 of the TRS Act, as they relate to the safety of persons on rail and road transport development and operation
- Chapter 15A of the *Transport Infrastructure Act 1994* (TIA), as they relate to busway and light rail development and operation.

TMR has developed the *Guidance Manual – Establishing Rail and Road Crossing Interface Agreements*⁹ and an interface agreement template¹⁰ to assist rail and road infrastructure managers in establishing interface agreements.

This approach can be broadened for the CRR project to include agreements on a range of infrastructure, environmental management, property development and event management matters on lands contiguous¹¹ with key project sites.

The use of properly structured and managed interface agreements can establish a consultation process for the design and construction of the CRR project works, especially where joint commercial opportunities exist or points of potential conflict might arise over multiple development proposals. Such agreements also enable external stakeholder relationships and expectations on large urban infrastructure projects to be better managed. For underground railway stations, volumetric development on the land or airspace above the station may also necessitate an interface agreement.

Interface agreements offer a mechanism to efficiently manage major events that occur on or around several of the key CRR project sites. The most prominent example highlighted during this EIS process of the need to coordinate CRR construction and

⁹ Department of Transport and Main Roads, *Guidance Manual – Establishing Rail and Road Crossing Interface Agreements*, Department of Transport and Main Roads, Brisbane, 2011, viewed 16 November 2012, <http://www.tmr.qld.gov.au/~media/Safety/Rail%20safety/GuidanceManual130911V5.pdf>

¹⁰ <http://www.tmr.qld.gov.au/~media/Safety/Rail%20safety/InterfaceAgreement190911V4.pdf>

¹¹ The definition of 'contiguous' applied in this report will be that used for state-controlled roads in section 283ZT(4) of the *Transport Infrastructure Act 1994* (i.e. within 100 metres of the construction site).

operation with events management has been with respect to the Royal National Agricultural and Industrial Association of Queensland (RNA) Showgrounds, which hosts many large events each year in addition to the annual Royal Queensland Show ('the Ekka'). Other examples of the need to coordinate CRR project delivery and operation with event management include:

- the interaction of the Gabba Station with the Brisbane Cricket Ground ('the Gabba'), which is managed by Stadiums Queensland
- weekly public markets at the BRUV
- major events, including the Brisbane International tennis tournament at the Queensland Tennis Centre, Tennyson, which is managed by Stadiums Queensland
- regular large events at the City Botanic Gardens and the Roma Street Parklands, Victoria Park at Spring Hill and various parts of the Brisbane CBD, which have a range of management arrangements and are mostly organised through the BCC.

This evaluation report has also considered the potential need to coordinate the CRR project with future events not currently identified.

The RNA has additional unique requirements that warrant further discussion in this evaluation report. The RNA has signed a redevelopment agreement with property developer, Lend Lease. In November 2010, the ULDA approved the \$2.9 billion, 15-year RNA Showgrounds Master Plan over this 22-hectare site.¹² The master plan includes redeveloping 340 000 square metres of new residential, commercial and retail buildings, including demolishing and replacing several pavilions, including some that are heritage-listed. The master plan approval does not include approval of individual buildings. While construction of stage 1 of the RNA redevelopment is well advanced, the precise timing of delivery of subsequent stages remains flexible.

5.4.2. EIS findings, submissions and analysis

The approach of using interface agreements with neighbouring developers was suggested early in the EIS consultation process. TMR's proposals in EIS documents and draft outline environmental management plan (EMP—EIS Chapter 24) call for such agreements.

Each of the project railway station construction sites between Moolabin Creek Yeerongpilly and O'Connell Terrace Bowen Hills are important development locations for which a functional working relationship with property owners and existing or potential development proponents would be critical to ensure the:

- efficient delivery of the project
- capture of property value uplift around these sites (which may significantly defray CRR capital costs)

The Yeerongpilly construction site is 13.4 hectares and offers premium redevelopment potential with significant scope for value capture. Around the proposed Albert Street station site, several lots are small (less than 700 square metres), so owners of all contiguous lots could be considered as appropriate candidates for interface

¹² Further information available at: <http://www.rna.org.au/redevelopment.aspx>

agreements. However, around the other station sites, it would be more effective to secure interface agreements with owners of larger allotments with significant redevelopment potential. Therefore, other than for Albert Street, I consider that such agreements should not be pursued for development sites smaller than 2000 square metres.

The Chief Executive under the TRS Act can require two rail transport operators, or a rail transport operator and road manager to reasonably enter into an interface agreement. The chief executive under TIA can declare a 'transport interface management area' requiring a busway or light rail owner or operator to enter into interface agreements with another person who owns, manages, controls or is otherwise responsible for a relevant thing or place in relation to the transport interface (for example, a landowner or occupier, a local government, chief executive, or public utility plant provider).

I consider that the developer interface agreements could:

- describe a genuine consultation process with relevant developers and property owners
- have regard to the design, access, heritage management and construction schedules of both the CRR project and the projects proposed by developers above or adjacent to the CRR station site
- aim to avoid, minimise, mitigate or offset (in that priority order) any unacceptable impacts (including cumulative impacts)
- describe the nature and frequency of required consultation at each stage of delivery of the CRR project
- ensure the safety of the public around these sites and the continuation of major events near to these locations to the greatest extent practicable
- not provide any 'approval rights' over any aspect of the CRR project to the non-proponent parties, but provide access to an efficient dispute resolution procedure at certain identified points in the delivery of the CRR project where critical issues are raised (for example, community safety for proposed pedestrian access).

I consider that interface agreements may be a suitable option, at each of the following CRR project delivery stages:

- finalisation of procurement documentation by TMR
- consultation on final design prior to commencement of construction
- periodically as required during construction, with respect to event coordination matters
- during the railway and train commissioning processes
- at a timely review point within 18 months of the project commencing operation (unless otherwise directed by the Chief Executive of the TRS Act).

Interface agreements should not apply during any competitive CRR project procurement tender process, as commercial confidentiality with the bidding parties will be paramount. The interface agreement need not apply to the review of the successful tenderer's design for the CRR project when the successful tenderer is announced, as

all stakeholders will have the opportunity to review this design and make submissions to the Coordinator-General during the 'request for project change' process that is likely to be conducted under Part 4, Division 3A of the SDPWO Act following appointment of the project construction entity.

Wherever TMR proposes to adopt an interface agreement, I consider that it would be helpful if a framework was included as part of the CRR project procurement documentation so that bidding parties can take into account this proposed mechanism.

Special considerations with respect to management of major events

Where conducting major events around CRR sites is likely to disrupt construction, the tendering entities for construction components will need to be properly informed of the likely windows of disruption. Therefore, when the competitive tendering process commences, these broad windows need to be communicated, even if details of each event disruption cannot be documented precisely.

RNA Showgrounds

TMR's proposals in its EIS documents and RNA's EIS and SEIS submissions all call for interface agreements between the CRR proponent and the RNA to guide all phases of project delivery. The Office of Coordinator-General was directly involved in extensive discussions between TMR and RNA on these matters.

Section 24.8 of the draft Outline EMP (Table 24.9) in the EIS allows for the project design to be developed and implemented in consultation with the RNA, which may be advised in those consultations by parties working for the RNA (for example, Lend Lease).

Continued operation of the Exhibition Station during construction

RNA's submissions have sought to preserve the current level of rail services to events at the showgrounds and look for opportunities to improve safety, ticketing, rail services logistics and commercial opportunities around any redevelopment of the existing Exhibition Station area.

I note TMR's commitments to:

- not close the Exhibition Station for more than one Ekka
- for other events nominated by RNA and agreed by TMR, either:
 - keep the Exhibition Station open for train services during CRR construction works, or
 - provide approximately equivalent alternative public transport services.

Availability of Sideshow Alley during construction

The RNA has strongly expressed its preference to optimise the availability of exhibition space for major events during the construction of the CRR project, especially on Sideshow Alley where the majority of the CRR project construction activity will occur.

During the eleven days of the 'Ekka' events (plus reasonable 'bump-in' and 'bump-out time'), TMR has committed to:

- halt CRR project construction activities on the showgrounds
- retract construction boundary fences to the minimum area practicable
- work with the RNA to ensure all aspects of public safety.

I consider it sensible that each event requiring use of the Sideshow Alley part of the site operate in accordance with a simple and specific event plan that:

- coordinates Lend Lease and CRR construction activities during major scheduled showgrounds events
- manages the impacts of events on the CRR construction program and vice versa
- includes emergency evacuation procedures.

For events nominated by RNA in the interface agreement, it would be expected that the CRR construction entity would maintain safe and practicable access for moving people, traffic, exhibits and livestock across the railway line.

O'Connell Terrace alignment

The reference design for the CRR project identified a requirement to raise the road-over-rail bridge on O'Connell Terrace, Bowen Hills. Raising the bridge will require O'Connell Terrace to be regraded for 70 metres to the east and 150 metres to the west. Current private access to the road will need to be amended and regraded. The reference design has allowed for a worst-case scenario of raising the bridge for a 6.1-metre clearance.

The reference design described in the EIS has been unable to accurately resolve uncertainty about the potential impact of this bridge raising on the future vertical and horizontal alignment and the extent of road resumptions along O'Connell Terrace between Tufton and Wren Streets. This uncertainty may impact upon Lend Lease and the RNA being able to advance its development plans for the showgrounds. It would be preferable for this uncertainty to be resolved before the procurement process commences for the showgrounds component of the CRR project.

As it appears unlikely that TMR will be able to fully resolve the O'Connell Terrace alignment matter until the final detailed design for this component of CRR is available, it may be helpful for TMR to provide an 'indicative alignment' to RNA, Lend Lease and other property owners in the near future.

Demolition and relocation of animal pavilions

The approved master plan for the RNA Showgrounds requires that the dairy and beef cattle pavilions and the dairy goat pavilion at the northern end of Sideshow Alley, adjacent to O'Connell Terrace, be demolished and replaced with a new larger single structure to be built immediately to the south of the existing pavilions.¹³

The timing of that redevelopment is not fixed. Lend Lease's current conceptual drawing of the replacement pavilion encroaches into the required CRR corridor, so that apparent anomaly will need to be corrected. All alternative designs developed so far for the replacement pavilion are predicted to have some impact on cultural heritage values

¹³ Further information available at: <http://www.rna.org.au/redevelopment/master-plan.aspx>

of other structures or Show Ring No. 2 (refer to Section 6.8 of this report for further detail).

The CRR project reference design requires the demolition of the existing pavilions if these structures are still standing. TMR has acknowledged some potential to contribute to the 'bring-forward' costs of a replacement pavilion.

While I accept that the Exhibition Station component of the CRR project may not proceed before the Lend Lease redevelopment of those pavilions, all potential outcomes needs to be considered.

I consider that cost sharing arrangements for the relevant replacement pavilions are a matter of a commercial negotiation between TMR, RNA and Lend Lease:

- The Queensland Heritage Council should be consulted before designs of replacement pavilions are finalised.
- While it would be reasonable for the RNA to be closely involved in the design of the replacement pavilions, it would be preferable if:
 - the designs do not significantly compromise the safe and efficient construction and operation of the CRR project and pedestrian and animal movements through the showgrounds
 - TMR and the CRR construction entity are consulted at each step of the replacement pavilion design and construction process
 - RNA did not withhold access to the CRR construction site at the showgrounds if commercial arrangements or design detail have not been agreed.

Construction parking for the CRR project and access from O'Connell Terrace

Construction worker parking is a common significant issue for major urban infrastructure projects.

I recognise that commercial parking in the Sideshow Alley area is a source of income for RNA outside of larger event times. Nonetheless, it appears likely that the best overall worker parking outcome for all stakeholders, including the community, would not dismiss use of the showgrounds site at this stage. I consider that the terms of any use of the showgrounds for CRR project construction worker parking are a matter for commercial negotiation between RNA and the proponent party.

The RNA has requested TMR ensure that a heavy vehicle access pathway between O'Connell Terrace and Sideshow Alley, for use by RNA and Lend Lease authorised personnel, be maintained at all times during the CRR construction program. TMR has indicated that such continued access should be possible to maintain, but it is not prepared to make a commitment on that matter at this stage.

I consider that where the CRR construction contractor must close this access for reasons of practicability, it would be preferable if:

- the duration of any closure is minimised to the extent possible
- the CRR project contractor give RNA reasonable notice of intended closures.

5.4.3. Coordinator-General's conclusion

During the design, procurement, construction, commissioning and early operation phases of CRR, it would be preferable for the proponent to secure appropriate interface agreements with:

- other rail transport operators, road managers and other infrastructure service providers overlapping the proposed CRR project corridor and construction sites
- significant property owners and developer stakeholders contiguous to the station worksites between Yeerongpilly and Bowen Hills.

These agreements could establish the principles for consultation and joint working on the project, especially where joint commercial opportunities exist or points of potential conflict might arise over multiple development proposals.

The standard provisions of sections 71–80 of the TRS Act and Chapter 15A of the TIA should be applied to the governance of interface matters where applicable. I have provided some general recommendations about the suggested use of the interface agreement framework in Appendix 4.

I note both the concerns raised by the RNA and Lend Lease in their submissions on the EIS and TMR's commitments in response to those concerns. Given the commercial nature of matters raised, I consider it inappropriate to impose conditions or issue precise recommendations on each of these issues. However, I consider it reasonable to recommend that, during the project construction procurement process for this component of the CRR project, TMR ask potential bidding construction entities to consider the matters raised by the RNA. Therefore I have made general Recommendation 7 (Appendix 4) urging the proponent to seek 'innovation in design' on:

- the availability of Exhibition Station platform during the Ekka and other Showgrounds events
- the availability of and access to the Sideshow Alley area during events
- the proposed realignment of O'Connell Terrace
- the demolition and replacement of several animal pavilions
- access to and from O'Connell Terrace and across the railway line during construction
- any other special proposals to reduce disturbance of the project on the Ekka.

6. Environmental impacts

6.1. Noise and vibration—construction

6.1.1. Context

Exposure to excessive or prolonged noise and vibration is generally one of the top concerns raised by neighbouring communities during the construction of large scale urban infrastructure projects. These matters can become exacerbated when local communities are exposed to the cumulative impacts of noise from different sources or are exposed to noise over a long period of time from the construction of a successive number of infrastructure projects.

There are a number of communities near the proposed project in parts of Bowen Hills, Woolloongabba and Dutton Park that have endured construction impacts of several large projects over recent years. It is well understood that concerns over noise and vibration can escalate unnecessarily if these concerns are not addressed directly and sensitively early in the development of these projects and throughout each stage of project delivery.

Lessons learned from previous tunnel projects

The Office of the Coordinator-General has built up experience in dealing with these issues, especially in relation to the construction of the three Brisbane road tunnel projects (now named Clem7, Airport Link and Legacy Way). The EISs for each of these projects were also assessed under the SDPWO Act. Consequently, the lessons learned from those projects have been applied to this project evaluation.

Residents are generally more sensitive to night-time works than daytime works. Therefore, the simplest mitigation measure is to restrict or prevent noisier construction activities at night, especially during the more common sleeping hours. However, there can be very large cost penalties associated with limiting the window of time available for construction of large projects. Some construction industry estimators assert that a total ban on all night-time works can double the cost of building a large infrastructure project. Consequently, there is a need to balance the impacts of night-time noise on the community against the benefits of reducing the time and cost of completing a noisy phase of work.

There is often a ‘trade-off’ between noise volume and length of exposure to noise. Experience has shown that some people prefer to accept higher levels of noise for shorter periods of time, rather than tolerate moderate levels of noise for long periods of time:

- if the job gets done quicker (or if they can accept short-term tertiary mitigation measures such as alternative accommodation)
- if reasonable respite periods are provided between higher noise works (for example, an hour after every four hours of noisy works, or two days after 10 continuous business days of noisy works)

- if the higher noise is occasional rather than continuous (unless the noise exceeds sleep disturbance limits)
- if the noise occurs early in the evening rather than during common sleeping hours (say, 6:00 pm to 10:00 pm rather than 10:00 pm to 6:00 am).

When considering mitigation options beyond those commonly applied and effective direct physical measures at the worksite, it is important to allow flexibility for consultation between the project proponent and the local community. Overly prescriptive controls can sometimes prevent 'common sense' or innovative solutions being derived if all stakeholders are acting in good faith. I have attempted to adopt that approach in this evaluation report.

6.1.2. EIS findings, submissions and analysis

The EIS stated that the noise and vibration levels for construction and operation are predicted for the worst-case impacts for sensitive receivers within the project study corridor and near significant project components. Measured existing background levels have been used as the baseline to model the predicted impacts of noise- and vibration-generating activities such as building demolition; surface construction; pile driving; rock drilling and breaking; tunnelling; spoil handling and haulage; and management of construction traffic.

The main locations of impact during construction are worksites, surface track upgrade areas, tunnel portals, surface properties above the tunnel alignment, and mechanical ventilation plant at stations, and emergency tunnel ventilation.

Based on the advice of relevant agencies, I am satisfied that the noise and vibration modelling has generally been conducted properly and is appropriate for this development phase of the project. Although there are periods in a number of locations across the study corridor where noise and vibration impacts vary considerably and exceedance events are predicted to occur before mitigation measures are applied, there is sufficient evidence presented in the EIS to conclude that the mitigation measures proposed would meet the established noise and vibration limits.

The EIS describes a practical range of management and mitigation measures to achieve the environmental objectives for nearby sensitive receptors while permitting construction activities to proceed at a reasonable rate of progress (for example, use of high-performance acoustic enclosures over excavations to permit work to continue underground).

In Queensland, there is no quantitative limit against which to assess the impacts of long-term construction noise sources, especially at night. I consider that the goals suggested in the EIS suitably reflect the noise environment for normal functioning of adjoining developments such as residential, healthcare, educational and commercial office uses.

Noise

The extent of noise impacts varies substantially with construction phases, equipment selection, distances to sensitive receptors and the duration of noise generation

activities. The range of construction noise control and impact mitigation measures for surface construction are summarised in section 16.4.14 of the EIS.

Definition of ‘construction sites’ for the application of long-term noise limits

The EIS proposed that the Queensland Rail *Code of Practice – Railway Noise Management*¹⁴ (the Queensland Rail Noise Code) noise criteria apply to all project construction works that occur within the rail corridor. This code is intended to be applied to railway operations, although there are several previous examples of it being applied to rail corridor construction works. It does not appear that this code was ever meant to apply to all construction works in all Queensland rail corridors. The code and its scope of application are currently under joint review by TMR, DEHP, Aurizon (formerly QR National) and Queensland Rail.

At most construction sites in Queensland, the Environmental Protection (Noise) Policy 2008 (EPP Noise)¹⁵ and the State Planning Policy 5/10: Air, Noise and Hazardous Materials¹⁶ are the basis for setting noise goals for development approvals. However, as most of the long-term construction sites occur partly within and partly outside of existing rail corridors, there is potential confusion of standards.

I consider that it is not appropriate to apply two different noise standards for long-term construction sites for this project, as it has the potential to create inequities and inconsistency. Also, it is often impractical to distinguish between two or more construction noise sources. Consequently, the noise management requirements to apply to ‘construction sites’ and all sites ‘contiguous’ with construction sites for the project should be similar to those that apply to the most recent Brisbane Road Tunnel project (Legacy Way), except where variation has been subsequently recommended by DEHP. The definitions of ‘construction sites’ and ‘contiguous’ are identical to those described in Section 5.4.1 of this evaluation report. Construction activities within rail corridor sites that fall entirely outside of this definition may alternatively comply with Appendix 1, Schedule 2, Condition 7.

Both the Queensland Rail Noise Code and all SPPs are currently under review. Therefore, the versions of the relevant documents that are current on the day that the procurement documentation is provided to tendering parties for the design and construction of the relevant part of the project, will apply to the conditions set by this evaluation report.

Daytime high-impact noise for short duration construction activities

Louder construction noise activities will be restricted to daytime hours, except for special circumstances defined in Appendix 1, Schedule 2, Condition 5(b).

The EIS predicted that proposed mitigation measures will enable daytime construction limits to be achieved for surface track worksites at Mayne Rail Yard, Clapham Rail Yard and Moorooka Station. At these locations there are significant buffer distances between construction worksites and sensitive receivers.

¹⁴ Queensland Rail 2007, *Code of Practice – Railway Noise Management*, revised November 2012, Queensland Rail, Brisbane, viewed 21 November 2012,

<<http://www.queenslandrail.com.au/AboutUs/ReleaseOfInformation/Documents/EMS-STD-46-004.pdf>>.

¹⁵ <http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/E/EnvProtNoPo08.pdf>

¹⁶ <http://www.ehp.qld.gov.au/noise/documents/air-noise-hazard-policy.pdf>

For worksites throughout the construction of the project, the noise limits specified in Table A4 (Appendix 1, Schedule 2, Condition 7) must be achieved. However, for some short phases of construction at certain locations, adequate noise mitigation will be difficult to achieve due to the inability to apply primary noise reductions measures (like screens) at the source of the noise and the impracticality of installing secondary noise mitigation measures (such as double glazing of windows) for short-duration events. The most notable examples of these activities are works that must be conducted before acoustic screens or enclosures can be erected, such as large building demolition, pile driving and rock breaking.

Table 6.1 describes the seven major worksites at which modelling undertaken in the EIS predicts the daytime noise goal will be exceeded at some phases of construction if additional mitigation measures are not implemented.

Table 6.1 Noise predictions in EIS at worksites with noisy construction activities at the closest receptors

Location	Construction activity phase	Noise Goal in EIS (dB(A))	Exceedence with 3 metre hoarding (dB(A))	Duration (weeks)
Woolloongabba	1 demolition	57	20	6
	2 perimeter piles	57	16	7
	3 shaft excavation	57	19	7
	4 TBM support operations	47	18	61
Northern portal	1 site establishment	72	11	4
	2 trough excavation	57	7	5
	3 TBM disassembly	57	4	15
Southern portal (Yeerongpilly)	1 demolition	57	29	6
	2 pile installation	57	15	6
	3 TBM support operations	47	15	68
Roma Street Station	1 site & demolition	65	14	Nth-Cen-Sth 6 - 10 - 6
	2 piling of access shafts	65	12	8 - 6 - 4
	3 shaft excavation	65	11	12 - 20 - 10
Albert Street Station	1 demolition	62	27	Nth – Sth 10 - 20
	2 piling	62	21	10 - 4
	3 shaft excavation	62	20	20 - 10
Boggo Road	1 piling - *platform box	57	19	Nth – Sth 12 - 12 - 9*
	2 excavation	57	16	3 - 12
	3 shaft excavation	57	10	25
Fairfield Ventilation and emergency access building	1 site establishment	57	9	6
	2 piling of access shaft	57	16	5
	3 shaft excavation	57	13	12

Phases 1 & 2 – 3 m hoarding (6 m hoarding option also available)

Phases 3 & 4 – works inside acoustic enclosure (provides additional mitigation)

Source: EIS Tables 16-22, 16-25, 16-27, 16-29, 16-32, and 16-35.

* Platform box (i.e. middle section)

Clearly, both the potential duration and magnitude of exceedence of noise goals depicted in Table 6.1 would not be acceptable to impacted communities closest to these construction sites. In particular, the length of time that the tunnel boring machine (TBM) support operations might produce excessive noise at Yeerongpilly and Woolloongabba could not be tolerated.

TMR has recognised this to some extent and has nominated the use of six-metre noise barriers or acoustic enclosures at these sites where possible. The predictive models have indicated that, at most sites where these more substantial noise-reduction structures are deployed, noise goals are not exceeded. At one or two sites (for

example, Albert Street), measures additional to the acoustic enclosures will be required.

Despite all of these considerations, there are likely to be very limited circumstances where particular construction activities (especially building demolition and pile driving) that could not be undertaken without either short day-time exceedence of the limits or moving affected parties from that area for the duration of that activity. Some affected parties may reject being relocated.

To deal with these circumstances, I propose the following regime that may be preferable for most stakeholders to permit construction noise arising from a particular nominated activity to moderately exceed the limits during the daytime (6:30 am to 6:30 pm, Monday to Saturday), provided that:

- the particular construction activity and proposed management measures are nominated at least 20 business days in advance to the agency responsible for the *Environmental Protection Act 1994* (EP Act—currently DEHP)
- the agency responsible for the EP Act approves the proposed activity after first ensuring that all reasonable mitigation measures have been implemented
- if measured noise exceeds the relevant limit in Table A4 (Appendix 1, Schedule 2, Condition 7) by more than 20 A-weighted decibels (dB(A)) averaged over a one-hour period (LAeq adj(1hr)), then the nominated construction activity ceases as soon as it is safe to do so and does not continue until approved by the agency responsible for the EP Act
- a minimum respite period is implemented, during which the nominated construction activity ceases, of:
 - one hour after every continuous four hours that the nominated construction activity is undertaken
 - two calendar days after every continuous 10 business days that the nominated construction activity is undertaken
- the affected community is properly informed about the noise management process.

This regime (specified in Appendix 1, Schedule 2, Condition 5(b) and Appendix 1, Schedule 2, Condition 7) is both similar to that currently being deployed successfully to construction of the Legacy Way road tunnel project, and is consistent with recommendations that arose from the June 2011 Queensland Ombudsman's Report *The Airport Link Project: An investigation into complaints about night-time surface work*.¹⁷

Excessive noise at the southern portal prior to launching the tunnel boring machines

The TBM launch worksites at Woolloongabba and Yeerongpilly warrant additional consideration with respect to their potential to exceed noise limits over a long period of time.

¹⁷ Queensland Ombudsman, *The Airport Link Project: An investigation into complaints about night-time surface work*, Queensland Ombudsman, Brisbane, 2011, viewed 21 November 2012, <http://www.ombudsman.qld.gov.au/PublicationsandReports/InvestigativeReports/AirportLinkProjectReport/tabid/420/Default.aspx>

These works would generally be constructed using 'cut and cover' methodology to build the surface to underground 'transition structures' prior to launching the TBMs. Spoil from the TBMs would be transported to these worksites by conveyer. Pre-cast, reinforced concrete segments would be delivered to these worksites to support the TBM northbound drives to the Woolloongabba and Victoria Park worksites respectively. The noise outcomes described in Table 6.1 above are those predicted prior to the installation of all expected mitigation measures, as listed in the draft outline EMP (EIS Chapter 24), that include:

- relocation of acoustically significant plant inside the cut and cover tunnel or enclosure
- selection of quietest available plant
- installation of a high performance acoustic enclosure or individual property mitigations as soon as practicable after commencement of site establishment.

Several members of the community have raised additional concerns that removing existing structures and vegetation for the realignment of Wilkie Street, Yeerongpilly will remove the existing noise mitigation benefits of these features, increasing both construction and operational noise impacts at the residences to the east. These concerns extend to both construction and operational noise from freight trains after construction is complete. The operational noise aspects are discussed below in Section 6.2 of this evaluation report.

The EIS demonstrated that ground-borne regenerated noise from the operation of the TBMs themselves is unlikely to exceed the environmental limits, which are nonetheless described in Table A6 (Appendix 1, Schedule 2, Condition 7).

Ventilation and emergency access building

The EIS predicts that the relevant daytime limits at the ventilation and emergency access building and shaft worksite at Fairfield (refer to Table 6.1 of this report) will be exceeded due to the close proximity of sensitive receivers to the north of the worksite. Piling works would be followed by shaft excavation. Therefore, like the southern portal site, the construction entity will need to deploy additional noise mitigation measures at the Fairfield shaft.

I note that the reference design described in the EIS proposes not to use an acoustic shed during construction at the Fairfield site. I observe that:

- erecting an acoustic shed after completing pile driving would provide significant additional noise mitigation
- experience at the Woolloowin shaft on the Airport Link project was that it was viable to partially erect the acoustic shed during the shaft excavation works providing significant noise mitigation, and that the roof could be installed on the shed once a gantry crane was erected over the shaft.

I therefore make general Recommendation 5 (Appendix 4) that during the procurement process for the construction of this component of the project, TMR should seek 'innovation in design' to the shaft excavation activity to either incorporate an acoustic enclosure as early as possible during this activity, or in some other way ensure that noise limits in Appendix 1, Schedule 2, Condition 7 are met during this activity.

Measurement of noise: Internal versus external measurement

QH raised a concern that, while the EP Act exempts noise from rail infrastructure, the noise criteria specified within the World Health Organization's (WHO's) *Guidelines for Community Noise* for health effects of environmental noise—other than hearing loss—should be adopted.¹⁸

Operational railway noise is managed in Queensland in accordance with the Queensland Rail Noise Code. For this evaluation report, sleep disturbance criteria have been applied for night-time construction works, in accordance with BCC's guidelines.

The WHO guidelines apply to noise measured inside buildings, whereas Queensland Rail uses noise measured outside buildings. It is easier and less intrusive to measure noise externally. Due to the vast differences in construction methods and materials, and the preferential behaviour of individuals (for example, leaving windows open in non-air-conditioned buildings), the building 'façade reduction' effect can vary considerably.

This issue has arisen during the construction of each of the Brisbane road tunnel projects and was one of the recommendations in the June 2011 Queensland Ombudsman's Report *The Airport Link Project: An investigation into complaints about night-time surface work*.¹⁹ Recommendation 11 in that report was that where it is not possible for noise to be measured inside buildings, external measurements should be undertaken and a standard façade reduction factor applied.

The Coordinator-General's July 2011 response²⁰ to the Ombudsman's recommendation was that, while it provides a sensible approach for the construction entity to use façade for the management of its works, such a standard façade reduction 'approach is likely to be insufficient for all enforcement purposes'. In other words, it appears unlikely that a court would accept façade reduction calculations as acceptable for non-compliance prosecutions.

I conclude that the project construction entity should adopt, as a management tool, the measurement of noise levels externally and apply the typical noise reductions presented in *Guideline: Planning for Noise Control*²¹ to obtain an approximate internal value when dealing with noise investigations where access to internal premises is not practicable. These measurements should be conducted in accordance with the *Noise Measurement Manual*.²²

However, where non-compliance with a condition is alleged, internal noise measurement by a non-proponent entity will be required.

¹⁸ World Health Organization, *Guidelines for Community Noise*, World Health Organization, Geneva, 1999, viewed 21 November 2012, <http://www.who.int/docstore/peh/noise/guidelines2.html>

¹⁹ Queensland Ombudsman, *The Airport Link Project: An investigation into complaints about night-time surface work*, Queensland Ombudsman, Brisbane, 2011, viewed 21 November 2012, <http://www.ombudsman.qld.gov.au/PublicationsandReports/InvestigativeReports/AirportLinkProjectReport/tabid/420/Default.aspx>

²⁰ See <http://www.dsdirp.qld.gov.au/resources/project/airport-link-tunnel/cg-response-to-recommendations-of-ombudsman-on-apl-project-22-jul-11.pdf>

²¹ Department of Environment and Resource Management, *Guideline: Planning for Noise Control*, Environmental Protection Agency, Brisbane, 2004, viewed 6 September 2012, <<http://www.ehp.qld.gov.au/register/p01369aa.pdf>>.

²² Environmental Protection Agency, *Noise Measurement Manual*, 3rd edn, Department of Environment and Resource Management, Brisbane, 2000, viewed 17 July 2012, <<http://www.derm.qld.gov.au/register/p00367aa.pdf>>.

Night-time limits for special circumstances construction

I acknowledge that all large urban infrastructure projects must conduct certain short duration activities at night that may exceed noise goals such as:

- moving oversize plant and equipment (for example, mobilising or demobilising a tower crane)
- works on busy roads that cannot be undertaken during daytime hours where disruption to peak hour traffic flows could not be tolerated
- rail possessions that cannot occur for safety or train scheduling reasons during the day.

Experience with the Brisbane road tunnel projects has been that:

- it is very difficult to compile a full list of circumstances for special night-time activities for each site well ahead of construction
- local residents regularly dispute the interpretation of construction circumstances requiring special night-time works.

Therefore, I require that the proposed nominated use of special night works be agreed in advance by the relevant district office of the entity then responsible for the EP Act (currently DEHP). To be clear, it is anticipated that most special circumstances night works, other than railway possessions, will be single- or two-night events.

I have imposed Appendix 1, Schedule 2, Condition 5(b) to define the limited exceptional circumstances when noisier night-time works could occur.

Specific locations for noise and vibration monitoring

Queensland Rail questioned that the EIS did not specifically identify all of the construction monitoring locations for noise and vibration. Instead, the EIS stated indicative locations for monitoring and proposes that exact locations be chosen at the detailed design phase in consultation with stakeholders. I agree with TMR that refinement during the detailed design consultation should provide the basis for selecting monitoring sites. Therefore, I have imposed conditions 3 and 7 (Appendix 1) to ensure that appropriate monitoring locations are selected and publicly notified.

Vibration

Construction activities likely to cause vibration and regenerated noise for this project include rock breaking, rock hammering, blasting, operating vibratory rollers and the passage of the TBMs under each property.

The EIS predicts that vibration during surface track construction activities would not exceed environmental limits at any sensitive receivers outside of the project's rail corridor.

The EIS commits the proponent to mitigation measures for low frequency construction noise generation that could create vibration impacts including:

- a comprehensive notification and education program
- infrasound and low frequency noise measurements at the commencement of tunnelling operations and in the event of a noise complaint (where required)

- temporary relocation of people pending the outcome of an assessment of the impact against the EIS limits and DERM EcoAccess Assessment of Low Frequency Noise (ALFN) guideline²³, using actual monitoring data as each TBM advances.

The community raised concerns about the potential damaging impacts of construction vibration on the St Fabians Church buildings (the church itself, the Columbarium and Magellan House) at the corner of Wilkie and Cardross streets, Yeerongpilly. While I acknowledge these concerns, I note that:

- the EIS predicts that construction vibration at this location should be well below the levels that would cause damage to these buildings
- the vibration monitoring and building condition requirements, required by conditions 3 and 9 (Appendix 1), should be adequate to manage these concerns.

Sensitive instruments

Ground-borne noise and vibration from underground tunnel and station construction is predicted to fall well below the environmental limits (generally, less than 5 millimetres per second (mm/s)) at all nearest sensitive receptors, so cosmetic damage to building is generally not anticipated from the construction of this project. However, for buildings with equipment that is highly sensitive to vibration, some special mitigation measures may be required. Such equipment currently exists at the Ecosciences Precinct at the BRUV and may exist in future anywhere along the tunnel corridor, especially in the CBD.

The transmission electron microscope (TEM) located in the basement of the Ecosciences Precinct has instrument-specific vibration criteria. This instrument is potentially located less than 10 metres away from proposed Boggo Road Station excavation works. Table 16.36 of the EIS reported that the TEM manufacturer's specifications for maximum ground vibration at this instrument is a very low 0.02 mm/s, but the predicted impact of station construction works is 0.11 mm/s. Therefore, more specialised mitigation measures would need to be implemented to ensure that operation of this instrument could continue undisturbed during the construction of the project.

A number of options to both moderate construction vibration itself and manage the timing of higher vibration construction events and/or the timing of TEM operation and maintenance, will be available to the construction contractor and Ecosciences Precinct management. It is therefore inappropriate to prescribe construction vibration mitigation requirements at this stage of the project delivery.

Nonetheless, to ensure that the Ecosciences Precinct's ongoing access to TEM services are not unduly interrupted, I impose Condition 9(j) (Appendix 1, Schedule 2), which requires station cavern works to be managed in accordance with a vibration management sub-plan, in the event of an exceedence.

I suggest that a similar approach be adopted should other vibration-sensitive equipment be identified in the vicinity of the CRR project tunnel works in the future.

²³ ALFN is an internal DERM guideline, which is now maintained by DEHP.

6.1.3. Coordinator-General's conclusion

I am satisfied that appropriate methodologies have been applied in the EIS and SEIS to investigate construction-related noise and vibration impacts.

Given the project is proposed to be constructed near residences and businesses, including high-profile buildings and sensitive communities, and due to the nature of the construction activities, it is inevitable there could be potential noise and vibration impacts.

To ensure the appropriate management of these potential impacts, I impose conditions 3 and 7–9 (Appendix 1) specifying:

- that noise and vibration management plans be implemented as part of the project construction environmental management plan (CEMP)
- requirements for monitoring, dynamic predictive modelling and reporting
- construction working hours limits under the range of project circumstances that may arise for:
 - noise, generally:
 - 35 decibels ((dB(A) measured inside residential and commercial premises)
 - background + 3dB(A) where continuous night-time works are permitted below ground
 - vibration, generally:
 - 5 mm/s for residential and commercial buildings
 - 2 mm/s for sensitive heritage listed structures
 - blasting (transient overpressure of 130 dB linear peak)
- that the Queensland Rail Noise Code only applies to this project where construction occurs within an existing rail corridor, more than 100 metres from the construction sites identified in the EIS
- triggers for the implementation of both additional primary (at the source) and secondary (at the receptor) mitigation measures
- arrangements for exceptional circumstances where:
 - daytime noise limits cannot be met (for example, building demolition and pile driving)
 - night works must be conducted (for example, road closures ordered by BCC)
- building condition surveys and repair works
- special arrangements for vibration-sensitive equipment.

6.2. Noise and vibration—operation

6.2.1. EIS findings, submissions and analysis

Regenerated noise from trains passing through rail tunnels

Operating trains within tunnels will generate vibration at the wheel-rail interface, which will be transferred via the rail mounts into the track support system through to

structures and potentially sensed as regenerated noise by occupants of the buildings. Mitigation includes three 'trackform' options to reduce the dynamic forces that occur at the wheel-rail interface.

Modelling undertaken in the EIS for the reference design indicated that ground-borne noise impacts transferred through the ground as vibration from train operations throughout the tunnels can be reduced to below the required limits by the deployment of 6.9 kilometres of 'resilient' and 1.2 kilometres of 'highly resilient' rail fasteners. The sections of track requiring these resilient fasteners are generally at track crossover points and bends, especially for shallower sections of tunnel that are close to building foundations.

Several community submissions raised concerns about the impacts of ground-borne noise and vibration during rail tunnel operations, particularly on older Queensland-style housing. The predictive modelling described in the EIS indicates that regenerated noise would be under the required limits if all proposed reference design features are incorporated. The modelling indicated the environmental limits would be achieved and the operational ground-borne noise and vibration levels with the resilient rail fasteners would be adequate to achieve the 35 dB(A) noise limits in a 'worse case' scenario.

Vibration from trains passing through tunnels

The predicted vibration levels associated with train operations in the tunnels are less than 0.06 mm/s at any building near the tunnels and therefore the risk to any buildings is negligible. This is also well below the level of human detection (approximately 0.15 mm/s). The industry standard maximum vibration level to prevent damage to sensitive heritage structure is 2.0 mm/s. The potential for damage to other key utilities or infrastructure from train pass-by events in the tunnels is also negligible, as tunnel wall vibration levels are conservatively estimated to be approximately 0.1 mm/s at a 'worst case' 100 dB train pass-by sound level.

While the predicted vibration levels from the passage of the trains through the tunnels are not generally expected to be perceptible within nearby buildings, there is one location in the CBD, currently occupied by a 7-day medical centre, where predicted vibration levels may exceed the generic vibration limit for highly vibration sensitive equipment. Therefore:

- during the detailed design stage of the construction of the project, there is a need to identify mitigation measures that might be required (such as the use of highly resilient track fasteners) in the section of tunnels near this building
- this location will require special attention with respect to vibration testing during the tunnel commissioning phase.

Special case of Ecosciences Precinct TEM

As electrified trains pass by a point, they carry in the space around them a moving pulse of electrical charge that can also induce a magnetic field. This is sometimes called an electromagnetic (EM) pulse. With respect to the Ecosciences Precinct, the operation of the TEM may be impacted by passing trains due to these EM pulses and/or vibration.

Experience with EM pulse effects between electrified trains and metal pipelines is that this can be adequately controlled by installing appropriate shielding. While the risk of train operation vibration effects on the TEM appears to be low, this should be further considered.

Therefore:

- during the detailed design stage of the construction of the project, there is a need to identify mitigation measures that might be required (such as using metal tunnel shielding and highly resilient track fasteners) to reduce EM pulses and vibration in the section of the Boggo Road station cavern near to TEM
- this location will require special attention with respect to vibration and EM testing during the tunnel commissioning phase.

Potential increase in noise arising from increased number of freight trains

A significant number of community submissions on the EIS, including from residents along the Tennyson line, raised concerns about more noise from the increase in the number of freight trains using this part of the rail corridor.

While the focus of the project is to improve the Brisbane passenger rail system, and the project does not specifically provide any new infrastructure on the Tennyson Line, it will boost the capacity of the rail freight system to the Port of Brisbane by:

- upgrading some track sections that would be used by freight trains
- removing passenger train services from the existing surface track increasing the capacity available for freight services.

Modelling undertaken for the EIS indicated that the average increase in operational train noise, when averaged over a 24-hour period, would be barely detectable to the human ear (2–3 dBA). However, I am conscious that:

- residents along urban rail corridors are generally more sensitive to freight train noise than they are to passenger train noise
- the number of noisier freight train pass-by events that could be assessed by LA₁₀ analysis (that is, the average level of the noisiest 10 per cent of events) will increase
- operational train noise monitoring is not currently standard practice along these parts of the rail system
- coal train lengths are likely to increase.

Existing freight trains between Salisbury and Park Road are currently 620 metres long and are proposed to be increased to 1500 metres by 2031. The change in train length has been incorporated in the EIS noise modelling as a 'worst case' for rail freight operations.

Mitigating the perception of an increased noise environment, I also note that:

- future train locomotive and wagon rolling stock is likely to be quieter than old rolling stock
- the CRR project would probably result in a decrease in late evening and night freight train noise over the short to medium term (several years) as increased track

capacity will enable Aurizon and other freight service operators to schedule more freight and coal trains during the day

- while longer coal trains will increase the duration of the train noise over a single track point, the peak noise of coal trains would be unaffected by deploying longer trains because the loudest noise is caused by the train locomotive (unless the use of additional locomotives is triggered) and, in any case, the gradual use of longer coal trains in the Moreton coal system is independent of the CRR project.

I conclude that an increase in freight train services along the Tennyson and Salisbury to Dutton Park lines is a likely indirect impact of CRR that does sit within the scope of this EIS evaluation. Nonetheless, as long as adequate measures are implemented to monitor and mitigate any resultant future increase in noise on these sections of rail line, there appears to be no need to depart from existing measures to mitigate any consequential change to the operational noise environment, outside of the Queensland Rail Noise Code. These measures might include new or extended noise barriers along the rail corridor.

However, ongoing operational noise monitoring will be required on the Tennyson line and between Yeerongpilly and Dutton Park commencing prior to the completion of construction of the first component of the project to monitor any noise changes.

Based on this information, I have imposed an operational condition for additional monitoring to address the community concerns (refer to Appendix 1, Schedule 3, Condition 38).

Removal of buildings at Wilkie Street, Yeerongpilly

Concerns of some residents about the removal of buildings and vegetation for the construction of the project along parts of Wilkie Street, Yeerongpilly are discussed above in Section 6.2.1. These same submitters have also raised concerns that removal of these buildings and vegetation might also result in increased operational train noise. However, noise modelling described in the EIS at this location has determined that rail noise will comply with the Queensland Rail Noise Code and has taken into account the removal of the Wilkie Street townhouses, and associated trees, in order to assess a 'worst case' scenario for rail noise. The operations EMP (OEMP) includes the Code of Practice and has provisions for monitoring specific sites and agreeing on appropriate mitigation, if required.

The CEMP includes monitoring during the commissioning phase of the project against achievement of all Queensland Rail's Code of Practice for Noise Management operational requirements over the entire surface corridor. Therefore, testing during commissioning will require that the Code of Practice standards are met for the Cardross Street Bridge, Tees Street and new Wilkie Street at Yeerongpilly (Appendix 1, Schedule 2, Condition 7).

Noise at the Fairfield ventilation building

The Fairfield ventilation and emergency access building's noise emissions have not been specifically assessed in the EIS due to the very sporadic use of this facility in exceptional circumstances only (that is, fire events). However, based on the in-tunnel maximum predicted noise level at 50 dBA LA_{max} and concrete-lined air ducts, the train

noise break-out though the tunnel ventilation shaft from train operations is not expected to exceed the noise limits and is expected to be comparable (or quieter) than motor vehicle noise levels.

Mechanical plant and ventilation at underground stations

For underground stations mechanical plant and ventilation, the maximum sound levels that would be emitted have been predicted in the EIS for each location. The proposed mitigation measures required to comply with the noise limits have been determined. Mitigation measures to be considered at some locations would include equipment selection, in-duct attenuators, noise barriers, acoustic enclosures and the strategic positioning of critical plant away from sensitive receivers.

Clapham Rail Yard

Moving rolling stock within the stabling yards contributes to the overall rail noise emissions emitted from through-traffic and the modelling for the Mayne and Clapham Rail Yards meets Queensland Rail's operations noise emissions guidelines.

At Clapham Rail Yards there is some risk of sleep disturbance impacts from stationary trains due to the steady-state character of the noise sources and duration (two hours) for trains with auxiliary systems and air-conditioning units operating after parking and before pick-up. The noise emissions from the air-conditioning units after parking and before pick-up would be mitigated by careful management of the stabling yards.

It is proposed that trains would be stabled on the outer tracks in the yards (closest to the homes) first during daytime hours and then successively fill the inner tracks and conversely for pick-up. This would result in the trains on the outer tracks acting as noise barriers for the trains stabled on the inner tracks and ensure maximum distance between the noise source and receivers during the night (refer to Appendix 1, Schedule 3, Condition 38).

6.2.2. Coordinator-General's conclusion

I am satisfied that appropriate methodologies were applied in the EIS and SEIS to investigate operational noise and vibration impacts. Operational noise and vibration components of principal interest are underground and surface passenger and freight trains and the tunnel ventilation facility at Fairfield.

Noise and vibration is predicted to be lower than the limits during operation at all nearest sensitive receiver locations, except for potential exceedence of the vibration limit at buildings with special vibration sensitive equipment (for example, the TEM at the Ecosciences Precinct in the Boggo Road Urban Village).

Potential exceedences of the operational airborne noise criteria have been identified at the southern end of the study corridor and will require mitigation. The predicted changes in train traffic, including freight train traffic, on the surface tracks between the portals should not lead to exceedence events when the proposed mitigation measures, such as installing extended or new acoustic barriers, are implemented. In addition, there are no projected exceedence events of operational noise limits for road traffic arising from the realignment or upgrade of roads.

To manage the potential impacts of the operation of the project, I impose condition at Appendix 1, Schedule 3, Condition 38. In addition to the specific requirements discussed in more detail in Section 6.2.1 above, the imposed conditions require a noise and vibration OEMP sub-plan to be prepared. Specifications included in this condition are triggers for the implementation of both at-source and at-receptor mitigation measures.

Requirements for operational verification of noise and vibration levels of trains and other key mechanical plant during the commissioning phase of the project are specified in Appendix 1, Schedule 1, Condition 3.

6.3. Traffic and transport

6.3.1. Public transport network

Context

By 2006, public transport had overtaken the car and become the major mode of transport for accessing employment in the Brisbane CBD. By 2009, over 540 000 trips were made by public transport on an average weekday. Rail users comprised approximately 45 per cent of this total. Almost half of the demand for public transport and rail travel occurs during the morning and evening peak periods. It is during these peak periods that congestion is experienced on the rail and bus services for commuting trips to and from the Brisbane CBD.

EIS findings, submissions and analysis

Previous rail capacity studies conducted by TMR have identified that the inner city rail network will be at capacity by 2016, constraining future growth in rail services across the region. At present, approximately 243 200 passengers use the rail system on an average weekday. Just over 50 per cent of use occurs during the morning and evening peak periods, which cover four hours of the typical weekday. Queensland Rail, in partnership with TMR, provides 57 train services each weekday morning peak between 7:30 am and 8:30 am through the CBD.

The capacity of the SEQ rail network is highly constrained by the inner city rail network. This is mainly due to inbound routes to the CBD being limited to one line from Milton, servicing trains from the western line, and one line from Park Road across the Brisbane River, servicing passenger trains from Beenleigh, Gold Coast and Cleveland, in addition to freight trains. This results in trains from multiple lines needing to merge into two inbound lines in order to access the CBD. This limits the potential capacity of the western and southern lines.

Operation of rail freight during the passenger off-peak services is facilitated by the provision of 30-minute off-peak passenger frequencies on most lines, which constrains the provision of increased off-peak passenger service frequencies.

The project area is well serviced by the bus network. Buses currently carry approximately half of total public transport trips across the Brisbane metropolitan area. The Brisbane CBD is the hub of the Brisbane bus network, with approximately 530

buses per hour entering the CBD during the morning peak period. However, the bus network is reaching capacity. Bus operations are affected by both road and busway capacity limitations, particularly from the south and south-east, and the limited availability of on-street stopping space and layover. There are significant CBD bus access constraints, minimal opportunity for additional bus stops and layover spaces within and close to the CBD and limited capability to significantly improve bus infrastructure and services to the CBD.

Ferry services operating in the central section of the study corridor include: CityCat (high capacity catamaran ferries accommodating up to 162 passengers) and the City Ferry (single hull ferries accommodating between 54 passengers and 80 passengers). It is estimated there is minimal modal interchanging between ferry and rail. CityCats operate between Apollo Road (Bulimba North) and the University of Queensland at St Lucia, generally every 15 minutes in each direction throughout the day (Monday to Sunday). City Ferries operate cross river and inner city distributor type ferry services within the study corridor generally every 10 minutes in each direction.

Validity of the modelling approach

A number of submissions raised concerns regarding the modelling for CRR. These were in relation to figures relating to ferry patronage, detailed catchment assessment, bus/rail interchange points and the assumptions which were used to undertake modelling.

I consider the modelling approach to be appropriate as a range of 'transfer penalties' were built into the mode choice decisions in the model including a 'boarding penalty', a time to walk from service to service, and additional wait time. With these penalties as well as a 'crowding penalty' on the trains themselves (with CRR), modal shift from bus to rail is still forecast in 2021 due to the substantial overall journey time savings afforded by the CRR project. Population, employment and car ownership are the most influential factors that drive the demand for travel. As a result, I believe that the modelling matters do not significantly alter the perceived project benefits or impacts of the project and the core modelling results including rail patronage estimates reported in the EIS are considered robust.

Impacts of the project on future public transport

The SEQ rail network

The EIS clearly demonstrated the benefits of the CRR project with respect to future expansion of the rail network in SEQ. The analysis of various studies presented in the EIS shows that future rail expansion to meet growing public transport demand, especially on the outer fringes of the existing network, is severely constrained by both the rail 'bottleneck' through the inner city and the shortage of train stabling capacity and related services, particularly on the south side of the Brisbane River.

It seems that unless these constraints are relieved, the future allocation of train sets and services to new branch lines, especially off the main Gold Coast and North Coast lines, will not be possible without reducing some services on existing lines.

Bus transport

The EIS has not generally considered the consequential impacts of the operation of the CRR project on non-rail modes of future public transport. TMR has considered future impacts of the CRR project on other transport modes as outside of the scope of this EIS and I have not specifically directed TMR to conduct a thorough analysis of these potential impacts.

Nonetheless, several submitters have raised the likely need to either:

- adjust future bus services to counter potential negative impacts of the CRR project, especially increased demands for car parking around some new or upgraded project train stations, or
- boost existing, or provide new bus services to take advantage of new public transport opportunities provided by the CRR project.

I do not intend to provide a thorough analysis of these matters in this evaluation report. However, I will mention two matters that I consider will require obvious attention by TMR and Translink, in consultation with BCC.

Firstly, a number of members of the community around the Yeerongpilly Station have raised concerns that the vastly improved train services to and from that station will significantly increase demand for street car parking around the station. Many residents and businesses have complained that the existing levels of commuter parking are unacceptable and some have requested that a large park 'n' ride facility be constructed on the site of the existing light industrial site when the CRR construction site is withdrawn at the end of the project. BCC's submission on the EIS supported development of a park 'n' ride facility at Yeerongpilly.

While a park 'n' ride facility at Yeerongpilly Station is not favoured for the reasons below, it remains an option for further investigation to implement a commuter vehicle solution:

- it is counter to TransLink's current policy of locating park 'n' ride facilities within 10 kilometres of the Brisbane CBD, because, amongst other reasons, it draws suburban vehicle traffic closer into the city
- the local streets around the Yeerongpilly Station and the arterial roads near to it do not have capacity to carry much additional commuter traffic during peak hours
- it is likely that the capacity of a park 'n' ride would be filled and commuter cars would spill over into surrounding local streets without a supporting street parking control plan.

However, I also dismiss the position of the TMR CRR project team that Yeerongpilly is unlikely to attract significantly greater commuter vehicle traffic.

Therefore, I impose Condition 15(i)–(iv) (Appendix 1, Schedule 2) on TMR that, prior to the commencement of the operation of CRR project, it implement a commuter vehicle solution for the Yeerongpilly Station that addresses the issue of parking capacity and the likely additional demand for parking services at that location. I observe that such a solution may require TMR:

- in consultation with BCC, residents and businesses in the potential ‘feeder’ suburbs surrounding Yeerongpilly, investigate the demand for commuter bus services to and from the new Yeerongpilly Station
- assist BCC to implement and upgrade bus services aimed at reducing the demand for car parking at the station from sources or destinations in the few kilometres around the new Yeerongpilly Station
- investigate the adequacy of existing and proposed park ‘n’ ride facilities elsewhere around the SEQ rail system, especially on the Gold Coast line, in light of the CRR project
- where that review of park ‘n’ ride facilities identifies any obvious deficiencies in that capacity, plan an appropriately scaled upgrade of that system in conjunction with other road and public transport planning.

Secondly, without analysing the detailed possibilities, it is clear that the CRR project will substantially alter the value of properties in the CBD and shift the movement of people around the city. The EIS predicts that the number of people using the proposed Albert Street Station in 20 years time would be greater than the number of people who currently use Central Station. The EIS also forecasts that the number of people transiting through Roma Street Station will grow several fold over that same period.

Some of the potential implications of these changes in terms of land use planning have been addressed in Chapter 5 of this report and there are many exciting possibilities for the people of Brisbane arising from the opportunities that would be created.

It is clear that the connectivity of the bus system and patterns of bus, cycle and pedestrian circulation around the CBD will need to be redesigned if the CRR project proceeds. Some of the changes in the CBD will also have immediate implications for transport planning at Woolloongabba. For example, the EIS mentions that there may be potential public transport benefits of being able to turn some northbound bus services at Woolloongabba rather than them continuing into the CBD, adding to bus capacity pressure there. Therefore, I impose Condition 15(b)–(ii) (Appendix 1, Schedule 2) on TMR that it:

- in consultation with BCC, and the residential and business communities of the CBD and inner Brisbane, investigate the likely changes to passive transport patterns, CBD bus circulation patterns and bus–train linkage demands in the CBD (including Roma Street) and Woolloongabba
- prior to the commencement of the operation of CRR project, must assist BCC to implement a revised bus services arrangement aimed at maximising the benefits and minimising the negative impacts of the predicted changes arising from the project.

Coordinator-General’s conclusion

While some stakeholders have raised concerns about some aspects of the transport modelling undertaken for the CRR project EIS, I consider the modelling to be adequate. None of the questions raised about the transport modelling significantly alter the perceived benefits or impacts of the project.

The capacity of future expansion of the SEQ rail network would be significantly enhanced if the CRR project, or some other project to relieve the inner Brisbane rail capacity constraints, is implemented.

As the EIS has not generally addressed the implications of the CRR project for future non-rail public transport matters, I have imposed three conditions on TMR that relate to bus planning around the future Yeerongpilly Station; the adequacy of the park 'n' ride system, especially on the Gold Coast line; and the bus service planning in the CBD and Woolloongabba (Appendix 1, Schedule 2, Condition 15).

6.3.2. Rail

Context

The constrained capacity of the inner city rail system limits the potential to expand future rail services to meet demand. The CRR project will transform the configuration and performance of the Brisbane rail network by providing substantially improved rail track capacity across the Brisbane River, relieving congestion on the Merivale Bridge in South Brisbane.

EIS findings, submissions and analysis

Project rail components

Key components of the project include:

- two single-track tunnels from Yeerongpilly in the south to the Exhibition loop in the north
- new nine-car-capacity platforms to serve the CRR tracks at Yeerongpilly, Boggo Road, Gabba, Albert Street, Roma Street and Ekka stations
- northern surface works from the northern portal at Victoria Park to Enoggera/Breakfast Creek
- southern surface works from the southern portal to Musgrave Road at Salisbury.

Each tunnel will be approximately six metres in diameter when completed (constructed within a 7-metre borehole). Cross-passages will be provided at 240-metre intervals.

The project includes a train stabling facility at Clapham Rail Yards, which has capacity for 27 six-car trains or 15 nine-car trains. The availability of a new train stabling facility would remove a major operating constraint, where trains en-route to the Mayne Rail Yards from the north to cross over the tracks for services from the south, west and east. Clapham will also be developed to contain two freight train passing tracks.

The project proposes to construct platforms for nine-car trains which are 220 metres long at depths of between 20–31 metres. These are proposed at: Yeerongpilly, Boggo Road, Woolloongabba and Roma Street. New facilities proposed in underground stations include:

- platform screen doors
- air conditioning
- ventilation and smoke control devices

- flood control devices.

Above-ground stations will be similar to existing Queensland Rail stations.

Interface arrangements with other rail infrastructure are discussed in Section 5.4 of this report. Cumulative impacts for rail interactions are also covered in sections 6.3 and 6.16 of this report.

The project would relieve future congestion at Central Station, which is the busiest station in the network. New underground stations at Roma Street, Woolloongabba and Dutton Park will provide modal interchanges with busway and rail connections.

Potential freight impacts

Currently, rail operations in SEQ involve interdependencies and crossing movement between the passenger and freight sectors, which constrains the rail network capacity, as well as service reliability. Freight rail services use the Brisbane suburban network to access key freight destinations including the Port of Brisbane, Acacia Ridge freight terminal and the North Coast line. There is no dedicated freight rail network. Passenger services are prioritised over freight during peak periods, while the efficiency and performance of non-peak passenger rail operations are often affected by the need to schedule freight trains.

There are currently around 344 freight services per week travelling through the Brisbane rail network along narrow gauge lines and 177 services per week operating on the dual gauge lines between Acacia Ridge and the Port of Brisbane. Freight services through the inner city to the North Coast line use the Exhibition loop to bypass the CBD, as inner city stations were not designed to accommodate freight services.

The project provides for a dual gauge freight track from Salisbury to Park Road. This provides the missing section of a dedicated freight route from Acacia Ridge to the Port of Brisbane. This freight line provides advantages for freight rail operations, including removing peak-period curfews.

The project itself does not have any impact on wider freight demands as these are a factor of economic growth and demand for goods and services beyond the study area. Freight will continue to be transported between origins and destinations regardless of the project, including by rail or road through the study corridor. While the project itself does not propose changes in freight train services, it does allow for additional freight to be carried through the study corridor by removing conflicts with passenger services in peak commuter times. Given strong and growing demand for freight services in Brisbane, I concur with the EIS transport analysis that has assumed that all of the additional rail freight capacity that would be created by the CRR project would be taken up over the next 20 years and that some of this will be coal freight trains on Aurizon's Moreton system.

Table 5-28 of the EIS presented an analysis of the impact of the CRR project on future freight paths. That analysis predicts an increase in the number of freight trains between Tennyson and the Port of Brisbane in 2031 of approximately 62 per cent (201 to 326 trains per week in two directions) for the no-CRR versus CRR project option. Of this number, 232 trains per week are expected to be coal trains. While freight services on the North Coast line are forecast to be unaffected by CRR in the first ten years, by

2031, competing demands from an over-stretched rail system are predicted to see the number of freight trains on this line reduce from 94 to 3 trains per week without the CRR project.

Separate analysis presented in section 5.4.7 of the EIS indicated that the shortfall in rail freight capacity across the entire Brisbane network in 2031 without CRR would be 616 trains per week, the equivalent of approximately 350 000 tonnes of freight that would need to be transported by other modes such as roads if the economy is not to be constrained by this factor.

Numerous submissions received were concerned about the impacts of increased freight services between Tennyson and Dutton Park, particularly with regard to coal dust, noise and vibration. These issues are discussed further in sections 6.2 (Noise and vibration—operation) and 6.4 (Air quality) of this report.

Coordinator-General's conclusion

I accept that the CRR project will deliver considerable passenger and freight rail benefits. Furthermore, it is clear that Brisbane's rail freight capacity, and thus its economic growth potential, would be constrained if these rail freight path problems are not relieved. While these freight benefits are one of the strong factors supporting the business case for CRR, the impacts that increased freight trains will have on communities along the corridor will need to be managed. These impacts are discussed in more detail elsewhere in this report.

6.3.3. Spoil haulage and materials delivery

Context

The EIS identified potential haulage routes to the proposed spoil sites at Swanbank. Since some of the major roads on the haulage routes already experience peak-period congestion, adding haulage traffic could create inefficiencies for truck movements and may have unacceptable impacts on general traffic.

EIS findings, submissions and analysis

Spoil placement location

The decision by the delegate of the Commonwealth Environment Minister that the CRR project is 'not a controlled action under the EPBC Act if undertaken in a particular manner' relied on Swanbank being used as the spoil placement location. Sites at Swanbank are currently being used for placement of tunnel spoil from the Legacy Way project.

While the EIS did not investigate alternative spoil placement locations, I am satisfied with this location as a destination for the tunnel spoil on the basis that:

- the information presented in the EIS is satisfactory for:
 - proposed transport arrangements and arterial routes to Swanbank
 - the availability of spoil placement sites at Swanbank
 - proposals for management of spoil placement locations

- the Australian Government has directed that this is acceptable on the basis of the information provided with the EPBC Act referral (as discussed in Section 3.3).

Spoil transport alternatives

A number of submissions suggested alternatives to road haulage of spoil be considered, including transportation by the Brisbane River, conveyor and by rail.

Removing spoil by rail presents a number of difficulties, including overall cost, double handling, flexibility and scheduling. Only three of the construction worksites have practical access to the rail network. Consequently, only approximately one-quarter of the TBM spoil (from Woolloongabba and Yeerongpilly) could be feasibly transported by rail.

Transporting spoil via barge on the Brisbane River may pose a number of environmental risks to water quality and wetland estuarine and marine environments in the Brisbane River, its lower tributaries and Moreton Bay. Barge transport would be more expensive per kilometre, involve additional spoil transfers (to and from trucks), and introduce additional air quality, noise, visual and traffic impacts around the additional transfer points.

The construction and operational impacts and costs of a spoil conveyor to Swanbank are likely to be prohibitive.

While I do not entirely dismiss that spoil haulage by modes other than road could ever be viable, I am satisfied that road haulage is the most suitable mode for spoil transport for the CRR project.

Spoil haulage routes

The CRR project would generate traffic impacts over a long duration of time (up to five-and-a-half years in some locations). It is proposed in the reference design and EIS that spoil haulage by road on the arterial road network would be permitted to be undertaken continuously 24 hours a day, 7 days per week.

The EIS and *Technical Report 1 – Transport*, provide information on proposed spoil routes and access points at Roma Street that conflicts with the information presented in the main body of the EIS and the SEIS. To provide clarification regarding spoil routes, the reference design is that spoil haulage from the three construction worksites at Roma Street Station will use Roma Street and Parklands Boulevard for truck access. Only construction worker access to the Roma Street sites would be permitted via Parklands Crescent. It is anticipated that there will be minor movement of equipment between the construction worksites and the site office and workshop via Parkland Crescent.

The EIS stated that suitable management could be covered by standard or existing freight approvals and travel bans on specific state-controlled routes. Nonetheless, the proponent has made some commitments to voluntarily constrain spoil haulage hours from some locations in deference to potential peak period traffic congestion (at the Woolloongabba, Roma Street and Albert Street construction sites). I consider that this commitment should be reinforced and tightly defined because the construction spoil traffic impacts coinciding with peak traffic flows through some locations in the CBD and

inner Brisbane may create significant impacts over the long construction duration of the project. Therefore, I have imposed Appendix 1, Schedule 2, Condition 5(a) to manage this matter.

Spoil haulage on local roads is generally proposed from 6.30 am Monday to 6.30 pm Saturday, except where particular arrangements are suggested (e.g. Station Road and Lucy Street Yeerongpilly).

Specific comments raised in relation to Moorooka include concerns about pedestrian safety at the Keats Street and Hamilton Road intersections, which include pedestrian crossings providing access to Moorooka Station and bus stops. There is no proposed spoil haulage or materials delivery activities proposed via Keats Street or Hamilton Road with trucks to remain on Ipswich Road through these intersections. As such there would be no impact on the performance of these intersections or changes in safety envisaged.

Submissions raised by local residents in relation to Boggo Road and the Ecosciences Precinct included the safety of local school children, moving to and from school, in light of spoil haulage routes.

A number of submissions on the EIS raised spoil haulage issues around Annerley Rd, Ipswich Rd and Cornwall Street. In particular, a submission from the Princess Alexandra Hospital pointed out that during peak hours, commuter traffic frequently queues back from the Ipswich Road intersection eastbound on Cornwall Street. This submission expressed concern that heavy vehicles travelling from the Boggo Road construction site would increase this traffic, potentially blocking the main access to and from the Hospital's Emergency facility off Cornwall Street that is approximately 200m from the intersection.

TMR responded to this concern in the SEIS by altering some proposed travel routes for heavy vehicles around Boggo Road. However, I consider that these adjustments did not address the key potential problem of outbound spoil haulage trucks adding to traffic volumes eastbound on Cornwall Street during peak periods, so I have included a requirement in Table A4, Appendix 1, Schedule 2, Condition 5(a) to avert this problem.

Construction traffic management sub-plans (TMPs) must be prepared for each worksite to avoid, mitigate or manage the impacts on transport networks and local communities and this is addressed in Condition 13(b) (Appendix 1, Schedule 2).

Delivery routes for materials would vary with the sources of materials and equipment, which cannot be defined for most deliveries at this stage of the planning process. In general, truck numbers required for deliveries are expected to be lower than those required for spoil haulage. Deliveries during peak periods may have to be reduced when feasible if delivery routes are close to capacity. I am satisfied that this issue can be investigated in detail during the preparation of the TMPs.

Some deliveries to construction sites and decommissioning of constructions sites would need to be made using oversize vehicles. These activities must follow guidelines set out by TMR and follow directions provided by BCC and the Queensland Police Service (QPS) on matters such as loading, safety measures, road closures, signage, vehicle escorts and time of transport. The precise number of such deliveries and the

routes required are not yet known. Therefore, planning for these deliveries would need to be examined in detail during the preparation of the TMPs.

The noise and vibration impacts of the construction of the project, including the handling of spoil at worksites and arrangements for managing exceptional circumstances works such as night deliveries of oversize loads, are addressed in detail in Section 6.1.2 of this evaluation report. Changes to some local roads, required partly as a consequence of project heavy vehicle traffic, are discussed in Section 6.3.5 of this report.

Management of construction traffic around special events near specific construction sites will also be required. Proposals for event management are discussed in Section 5.4 of this report.

Coordinator-General's conclusion

I am satisfied with the proposal that spoil be placed at Swanbank and that spoil be transported by road along the route defined in the reference design.

Given the scale and potential impacts of the CRR project, a comprehensive approach to heavy vehicle management is required. I therefore impose:

- Appendix 1, Schedule 2, Condition 10 to govern:
 - spoil handling
 - spoil placement
 - rehabilitation of spoil handling and placement sites
- Appendix 1, Schedule 2, Condition 13 requiring the preparation of TMPs for each construction site
 - Appendix 1, Schedule 2, Condition 5(a) placing restrictions on spoil haulage during peak hours from the Boggo Road, Woolloongabba, and Albert and Roma Street construction sites.

6.3.4. Pedestrian movement and cycling

Context

A range of issues were raised in submissions in relation to construction impacts on cyclists and pedestrian movements. Most of these issues have been adequately addressed in the reference design and EIS.

EIS findings, submissions and analysis

Upon completion, the CRR project would deliver additional passenger rail capacity into and through inner Brisbane. This capacity has been designed to accommodate the forecast demands of Monday to Friday trips, special cultural and sporting events and increased patronage requirements over the weekends. Upgrades and changes to the pedestrian and cycle network near the stations are proposed to improve connectivity and access.

Albert Street Station precinct

The new station in Albert Street would improve rail and walking access, with no part of the CBD more than a 15-minute walk from a railway station, and the vast majority of the CBD within a 10-minute walk.

The proposed surface works adjoining the Albert Street station include:

- reconfiguring Albert Street between Charlotte and Alice streets to enable footpath widening
- reconfiguring Albert Street between Charlotte and Elizabeth streets to enable more efficient use of space for pedestrians
- partially reconfiguring traffic lanes on Mary Street to enable footpath widening on the western side
- providing a large covered forecourt and public space at Mary Street with associated retail
- footpath widening on Albert Street crossings to increase pedestrian waiting capacity at signals during peak periods
- reallocating kerb space to provide for new taxi ranks, drop-off areas, bus stop relocation and reconfiguration of loading bays.

It is acknowledged in the EIS that with no change to existing footway width on Mary Street, this footway would be operating at 'level of service'²⁴ (LOS) D in 2016 (peak 15 minutes) and LOS F in 2031 (peak 15 minutes) with CRR. Interpolating between the two years, then in 2020 (assumed CRR opening year), the LOS would be around LOS E (peak 15 minutes). However, the reference design already includes provision for the refurbishment of this footway (including street furniture rationalisation). To address this impact, the proponent must continue to work with BCC to develop a footway improvement solution for the northern side of Mary Street which could include additional footway widening into the current parking lane, with provision for parking or loading off-peak. An additional mid-block crossing may also be further considered to manage and disperse pedestrians in the vicinity of the station.

Roma Street Station precinct

Surface works adjoining Roma Street Station identified to support the project include:

- improving and widening footpaths on the northern side of Roma Street
- improving street crossing opportunities from the CBD across Roma Street to address pedestrian safety risks
- reconfiguring the intersection of Roma and George streets to provide enhanced pedestrian capacity and to improve pedestrian safety
- reconfiguring Parkland Boulevard to enable the delivery of the southern CRR entry and public plaza.

The long construction timeframe at this site will result in many footpath changes for the duration of the construction. Pedestrian access through Roma Street Station to the

²⁴ 'level of service' (LOS) is an index of the operational performance of vehicle or pedestrian traffic on a given road or footpath respectively when accommodating various traffic volumes under different combinations of operating conditions. Further explanation of LOS is provided in the Glossary (page 195).

Roma Street Parkland will be maintained and pedestrian detours will be required along Parkland Boulevard/Roma Street to divert pedestrians through the station to access the parkland. Staged construction activities within Parkland Boulevard will require traffic control adjacent to the worksites and would need to consider cyclists.

Permanent changes at Roma Street Station also include removing the existing Parkland Boulevard roundabout, located approximately 50 metres north of the Roma Street intersection. Removing this roundabout will prevent u-turns for vehicles over 4.5 metres in height from entering Parklands Boulevard from Roma Street and for all traffic travelling south along Parklands Boulevard to turn left into Parkland Crescent as the geometry on the intersection does not permit that direct turn.

A pedestrian bridge over Roma Street linking Emma Miller Place to the Magistrates Court and George Street is planned, but not committed and is not considered part of the reference design for this project. However, if the pedestrian bridge is delivered concurrently with the CRR project, the bridge would enhance connectivity in the north quarter of the CBD.

RNA Showgrounds

Numerous points were raised in submissions by the RNA and Lend Lease regarding pedestrian and animal movements. The EIS, through the draft outline EMP, proposed a consultative process involving the RNA. The heads of consideration for the interface agreement would include informing design development for the project about RNA requirements for internal access and movement systems for people, traffic, exhibits and livestock; events schedules, development and construction programs. These matters have been addressed in more detail in Section 5.4 of this evaluation report.

Yeerongpilly and Boggo Road stations precincts

At Yeerongpilly Station, the realignment of Wilkie Street to the east, including the introduction of a reverse curve north of Crichton Street to tie the realigned route back into the existing Wilkie Street, south of Cardross Street, will result in pedestrian and cycling changes. The project proposes removing two existing off-street park 'n' ride areas, which have capacity for 24 vehicles, provision of new bus bays, recessed taxi bays and four kiss 'n' ride bays. Numerous submissions raised concerns regarding the lack of pedestrian access to the station and across the railway corridor during the realignment of Wilkie Street. This will be addressed by construction sequencing to prioritise the extension of the current pedestrian overpass to align with the new Wilkie Street early in the construction program.

Numerous submissions were also received regarding:

- the location of the Yeerongpilly pedestrian footbridge in relation to the Queensland Tennis Centre
- the pedestrian/cycleway linkages from the Boggo Road Station to the Princess Alexandra Hospital and the V1 bikeway.

While these matters are not insignificant, I do not accept that their resolution is entirely the responsibility of the CRR project or within the scope of this evaluation report. However, to maximise the benefits of CRR infrastructure and integrate these aspects

with the surrounding area, I have made a recommendation (Appendix 4, Recommendation 5) that the proponent review best practice and innovation in design when undertaking detailed design at these locations.

Coordinator-General's conclusion

While I am generally satisfied that the impacts on cyclists and pedestrian movements during construction of the project should be minor, I impose conditions 11 and 12 (Appendix 1, Schedule 2) to ensure that these matters are appropriately managed.

6.3.5. Changes to the road and rail network

Context

Traffic and transport in the CRR project area is likely to be affected by additional construction traffic, physical changes to transport networks and the disturbance to normal traffic flows resulting from construction traffic management measures. Such measures may include diversions, lane closures, temporary realignment of traffic lanes and temporary access arrangements to local streets and properties.

Construction of the project would include both major surface and underground works. Much of the surface rail works would interface with the existing rail network, which would result in extensive sections of rail construction being carried out in or close to areas where passenger and freight rail services operate. Underground works would have minimal impact on current operations. The extent of surface works south of the portal at Yeerongpilly and north of the portal at Victoria Park is significant.

EIS findings, submissions and analysis

The EIS described proposed amendments to the road network in numerous locations along the project route. Modelling described in the EIS predicts a relatively minor increase in peak period delays and queuing at key intersections along the project corridor as a result of road modifications and/or construction traffic.

The project will also result in permanent road changes, including the removal of the roundabout on Parkland Boulevard, reconfiguration and road and footpaths adjacent to the Roma Street and Albert Street stations, the closure of the Beaudesert Road level crossing, realignment of Heaton Street, Dollis Street, Fairlie Terrace, Railway Road, and the provision of an emergency access gate onto Beaudesert Road. The project also involves the construction of new road and rail bridges, including at Mayne Rail Yard, Moolabin Creek, Clapham Rail Yard and Muriel Avenue.

These surface works would result in minor impacts over a short period of time across an 18-kilometre corridor, which will need to be addressed through separate construction TMPs. Such impacts would include lane closures, temporary traffic and pedestrian diversions and minor, temporary changes to on street parking and loading.

Yeerongpilly

Several road changes are required to accommodate the project construction at Yeerongpilly. This includes realigning Wilkie Street, amending on-street parking

arrangements and removing the off-street parking near the Wilkie Street entrance to the Yeerongpilly Station.

Several submissions were received in relation to Yeerongpilly Station regarding commuter parking, public transport, cycling, 'rat running' in surrounding streets, Wilkie Street realignment and access to the station during construction. There is likely to be an increase in 'wild parking' in the area. This could be resolved by introducing two-hour parking 'traffic areas' with consultation with BCC. The issue of commuter parking during the operation of the CRR project is discussed in Section 6.3.1 of this report.

The intersection of Lucy Street and Ipswich Road will require mitigation works additional to that proposed in the EIS to reduce delays to Ipswich Road traffic, safety concerns and vehicle queuing across entrances to businesses in Lucy Street. While there is debate about the extent to which the EIS analysis accounts for the differences in commercial and through-traffic on Station Road before and after construction commences, my preliminary assessment is that a more targeted investigation will point to redesigning the intersection geometry to include:

- a dedicated right-turn lane from Lucy Street into Ipswich Road
- a lengthened left-turn lane from Ipswich Road into Lucy Street.

However, rather than pre-empt more thorough investigation, I require Condition 13 (Appendix 1, Schedule 2) that allows BCC to determine the intersection requirements following an investigation funded by TMR.

I further note several submissions raised concerns about the capacity and safety of this intersection during the subsequent operation of the CRR project. Clearly, the proposed capital works also deliver benefits during the operation of the CRR project.

Moorooka/Rocklea

Numerous submissions were received objecting to the closure of the Beaudesert Road level crossing. Amongst these concerns is that the crossing provides the only reasonable evacuation route during flood events for part of the Rocklea community south of the railway line, in the streets immediately to the west of Beaudesert Road. The rail corridor is being widened to accommodate an additional two rail tracks and an almost doubling of the number of trains on this section of track with the project. This would result in long wait times at the crossing with increased congestion and safety concerns. I accept that the proposed closure of the level crossing is required if the CRR project proceeds.

In addition to the proposed signalisation of the intersection of Beaudesert Road and Lillian Avenue, the reference design includes a new emergency access point through a gate from the Beaudesert Road service road. This would allow direct access to the Beaudesert Road overpass (to be controlled by police or other emergency services personnel) during a major flood event and offers similar flood immunity as the existing level crossing.

I consider that this proposed emergency access point does provide a potentially workable solution to evacuation access during flood events that would meet minimum requirements. However, I am not convinced from the material presented in the EIS, SEIS and subsequent information provided by TMR, that the proposed gated access

point onto Beaudesert Road provides the most efficient evacuation solution, considering an appropriate weighting of risk, cost, and practicality. Therefore I have made a recommendation (Appendix 4, Recommendation 5) that the proponent review best practice and innovation in design for the alternative flood evacuation elements of the project when undertaking the procurement process for this component.

Station closures

The project will also result in the temporary closure of several stations.

TMR has committed to closing the Exhibition Station for not more than one Ekka event during the 30-month construction period. This matter is discussed in more detail in Section 5.4 of this report, along with:

- the relative timing of design and construction of new buildings for the CRR project and Lend Lease along O'Connell Terrace
- changes to the future vertical and horizontal alignment of O'Connell Terrace for the project to accommodate the reference design proposal to raise the O'Connell Terrace Bridge over the widened rail corridor at that point.

BCC has also requested that the O'Connell Terrace/Bowen Bridge Road intersection needs further refinement.

The reference design also proposes the closure of Moorooka Station for one year to support project surface works for road and rail infrastructure. Additionally, the short closures of other stations will occur as part of project construction such as during rail network shutdown periods or temporary closures. Bus replacement services are to be provided where passenger rail operations are interrupted.

Construction works near other stations

CRR project construction works are proposed to occur within close proximity to a number of existing railway stabling and maintenance facilities and staff access points to such facilities. While access would generally be maintained for staff and trains throughout the construction period, any temporary closure or diversion would need to be identified in detail in each TMP and require prior approval of Queensland Rail (and the rail manager if that is not also Queensland Rail at that time). To manage these impacts, I propose that the proponent, the rail manager, BCC (where appropriate) and Queensland Rail enter into formal interface agreement(s) in relation to rail safety, workplace health and safety, fire and life safety, public transport and passenger and freight rail services under the TIA where these matters fall within the scope of that Act.

Coordinator-General's conclusion

CRR surface construction works could result in minor impacts across the corridor. These works will range in duration from a few hours to several years over the five to six-year construction period of the project. These impacts will need to be adequately addressed and managed in TMPs, which I impose in Condition 13 (Appendix 1, Schedule 2).

I am concerned about the safety and capacity of the Lucy Street/Ipswich Road intersection during the construction of the CRR project, so I have imposed Condition 13 (Appendix 1, Schedule 2) to address this matter.

I accept that the proposed closure of the level crossing is required. While I accept that the proposed access gate onto Beaudesert Road should provide an acceptable flood evacuation alternative to the level crossing, I recommend that TMR identify a better solution during the project detailed design and procurement process.

I accept that replacement bus services will be required during numerous interruptions to rail services (including the 12-month closure of the Moorooka Station) caused by the construction of the project.

I recommend that the proponent, the rail manager, BCC (where appropriate) and Queensland Rail enter into formal interface agreement(s) in relation to rail safety, workplace health and safety, and fire and life safety, public transport and passenger and freight rail services under the TIA where these matters fall within the scope of that Act. Refer to Appendix 4, Recommendation 6.

6.3.6. Changes to car parking

Context

Construction workforce car parking on local streets has the potential to inconvenience local residents and cause traffic concerns over the long construction period of the project. Worker and visitor parking is proposed at most construction worksites to meet the parking demands of the respective worksite.

EIS findings, submissions and analysis

The identified construction workforce is expected to generate a peak parking demand of approximately 1050 vehicles across all construction worksites based on a conservative assumption that each worker would drive. A total of 858 parking spaces is to be provided across the construction worksites catering for the majority of the peak workforce.

I am cautious about this analysis because all of the Brisbane road tunnel EIS documents significantly underestimated both the eventual number of construction workers required and the intensity of concern in the communities around each construction site about worker parking matters. The fact that the CRR project EIS identified a likely construction worker parking deficit is concerning.

Workforce parking and associated management for surrounding residential or commercial areas, addressing issues such as safety, access and amenity, must be addressed in the CEMPs prepared by the construction entity.

Mayne Rail Yards

The proposed workforce car parking at the Mayne Rail Yards would accommodate around two-thirds of the projected peak workforce number. Estimates of peak workforce numbers at this construction location totals 156 people, which is expected to last for between 50 and 75 per cent of the construction time of the project.

RNA Showgrounds

Workforce parking would be provided within the Ekka Station construction worksite with a capacity of 15 vehicles, and a second car parking area would be provided on land located on the north-east corner of Tufton Street and O'Connell Terrace, comprising some 30 spaces. The existing layout of parking within the RNA Showgrounds may require modification to ensure construction vehicle access to and from the construction worksite can be achieved without construction vehicles having to travel down rows of parked vehicles, which may present a safety hazard.

Overall parking numbers across these and the northern portal construction worksites appear to accommodate most of the projected demand with limited on-street parking impacts, due to on-street parking being restricted to two hours through the Brisbane Central Traffic Area. There is limited on-street parking currently provided in O'Connell Terrace east of Tufton Street. Depending on the scope of reconstruction work, this parking may need to be suspended during construction activity.

Roma Street

On-site workforce parking totalling 45 spaces is proposed at the Roma Street construction worksites. Five of these would be provided at construction worksite A, with the majority provided at the proposed workforce car parking area at College Close. At the peak of construction, an estimated 137 workers would be on site at any one time. On-site parking provision would accommodate around one-third of this number, with workers required to use public transport. The reliance on public transport for the vast majority of the construction workforce at Roma Street is a concern.

A number of submissions were received regarding parking at Roma Street. The submissions considered the number of car spaces taken excessive, particularly for weekend visitation to the parkland, and this reduced parking would place increased pressure on already limited parking spaces along Parkland Boulevard and at Platform 10. Visitation to the parkland by private vehicles is at its peak over weekends.

Submissions also raised the impact on the residential apartments along Parkland Boulevard. Increased use of Parkland Crescent during construction may have an impact on residents and their ability to readily access their car parks, which is likely to lead to increased traffic on Parkland Boulevard.

Albert Street

At the construction worksites in Albert Street, workforce parking for 12 cars will be provided. On-site parking would generally be limited to visitor parking, with workers required to use commercial off-street parking or public transport.

Woolloongabba

Workforce parking for 72 cars will be provided within the Woolloongabba construction worksite. Parking within the existing GoPrint site would be removed as a result of construction works on the site. Workforce access to the car parks would be from the Vulture Street off-ramp and from northbound Main Street site access points.

There is no on-street car parking available on Leopard, Vulture, Stanley or Main streets adjacent to the site. In addition, there are no park and ride car spaces provided at

Woolloongabba Busway Station. Peak workforce estimates at the Woolloongabba construction worksite total 137 workers. The construction worksite parking would be able to accommodate over half of the peak workforce.

Boggo Road

Workforce parking for 30 cars would be provided within the boundaries of the proposed Boggo Road construction worksite in Peter Doherty Street. At the peak of construction, a workforce of up to 137 workers would be expected on site at any one time. The proposed on-site car parking provision would not be able to cater for the total parking demand. Given the site's location adjacent to the Boggo Road Busway Station and Park Road Station, a proportion of the workforce would be expected to use bus and rail services to access the construction worksite.

Furthermore, given the presence of surrounding on-street parking controls and limited off-street commercial parking options, overspill workforce parking would need to occur at the Yeerongpilly construction worksite (approximately four kilometres to the south) where sufficient additional off-street workforce parking is proposed.

Yeerongpilly

The Yeerongpilly construction worksite provides workforce car parking for over 420 cars. This exceeds the requirements during peak of construction for up to 118 workers. The site is proposed to function as a central parking area for several construction worksites, including Fairfield and Boggo Road. Dedicated shuttle bus services will link the Yeerongpilly parking area with these other construction worksites.

Multiple submissions raised the issue of a park 'n' ride facility being constructed for the operational phase of the project at Yeerongpilly station. A park 'n' ride facility is not proposed at Yeerongpilly as part of the reference design in keeping with TransLink's park 'n' ride policy for areas within 10 kilometres of the CBD. To mitigate potential impacts on local streets of increased demand for commuter parking, the EIS proposes implementation of an on-street parking management scheme for streets surrounding the station to restrict on-street commuter parking. Further discussion of this issue is provided in Section 6.3.1 of this report

A worker car parking strategy is required for other construction worksite car parking and would rely upon a combination of dedicated car parking at Yeerongpilly and shuttle transport to worksites such as Fairfield, Boggo Road and Woolloongabba. The strategy would be developed in accordance with Table 24-11 in the draft outline EMP. A car parking scheme would also be required to prevent construction workers parking in local streets.

Overall the level of car parking provided is expected to be sufficient to cater for overall workforce parking demands across the construction program. However, certainty in managing the impacts created by workforce car parking will need to be planned and managed in close consultation with BCC and the local communities around each site.

Coordinator-General's conclusion

Based on experience with other infrastructure projects in Brisbane, I consider that there is potential for both:

- the actual construction workforce to be greater than predicted in the reference design
- conflict with the local communities surrounding each construction site if parking is not properly planned and managed.

To manage these matters, I require that workforce parking be implemented in accordance with a plan specified in imposed Condition 13 (Appendix 1, Schedule 2).

6.4. Air quality

6.4.1. Context

As for noise and vibration, air quality, or more particularly, dust and air particulate management around construction sites, rates as one of the most prominent community concerns during the delivery of large urban infrastructure projects. The presence of some particularly sensitive health facility receptors near some of the construction sites for CRR will heighten these concerns.

Air quality objectives are generally based on human health criteria, which are more stringent than the levels at which measurable impacts on the natural environment would be expected.

In the study corridor, the existing air quality environment is reasonably good. Concentrations of most pollutants around inner Brisbane are well below the air quality goals with the main influence being regional air emissions.

The CRR project may generate minor localised air quality impacts for major construction activities such as worksite establishment and building, demolition at rail stations, surface road and rail works, bridge works, cut and cover excavation of tunnel entrances and handling of the tunnel spoil.

During operation of the CRR project the potential for air quality impacts would arise mostly indirectly from increased rail freight movements which may generate increased coal dust and increased exhaust emissions from diesel powered locomotives.

6.4.2. EIS findings, submissions and analysis

I consider that the analysis and modelling of potential air quality impacts of the project have been properly conducted and meet EIS needs for this development phase of the project. Although potential exceedence events are predicted for some stages of the major construction activities at some locations, sufficient mitigation measures are proposed to satisfactorily meet the environmental objectives recommended by DEHP.

Construction impacts

Potential air quality impacts would be longest in duration at the three worksites located at the northern portal, Woolloongabba and Yeerongpilly where construction of dive structures, cut and cover sections and launching and/or retrieval of the TBMs require excavation activities and spoil handling operations that would be less protected than underground works.

The EIS prediction for the worst case scenario are that the air quality limits (described in more detail below) may be marginally exceeded at three construction worksites during some phases of construction at:

- Woolloongabba (at a few neighbouring properties on Vulture and Stanley Streets – refer to Figure 15-15 of the EIS)
- Boggo Road (at the south-east corner of the Dutton Park State Primary School property (but not at the school buildings) and parts of BRUV precinct (including the Ecosciences building—refer to Figure 15-18 of the EIS)
- Yeerongpilly (at a few neighbouring properties to the north and east—refer to Figure 15-21 of the EIS).

Each of these worksites are likely to require additional dust mitigation measures to those considered in the predictive models.

The Mayne Rail Yard, RNA Showgrounds, Moorooka, Rocklea and Salisbury worksites would support various surface rail track and station construction activities that are considered to have lower, although not insignificant potential air quality impacts.

While the Roma Street station and ventilation shaft excavation activities have the potential to generate dust, these are not expected to exceed the air quality limits with the implementation of standard construction industry management measures outlined in the draft outline EMP (EIS Chapter 24).

TMR will be required to monitor dust for the project construction sites, along with taking corrective actions to address any exceedence events. Individual consultation is proposed to be undertaken with community members where predictive modelling indicates that additional receptor mitigation measures are required at residences and businesses. Dust monitoring at all locations, especially in the CBD, would need to take into account the potential impacts of any nearby construction sites in close proximity with monitoring equipment.

Concerns raised in submissions about construction impacts

The main concerns about air quality raised in community submissions on the EIS related to dust from excavation and materials handling around worksites. The predicted concentrations for ‘total suspended particles’ (TSP) and suspended fine particles with a diameter of 10 microns or less (PM₁₀) generated by construction activities are mostly below the ambient air quality limits of 80 micrograms per cubic metre (µg/m³) and 50 µg/m³, averaged over a 24-hour period, for both TSP and PM₁₀ respectively. However, around a few worksites, there are a small number of nearby sensitive receptors where PM₁₀ limits could be exceeded when worksite-generated dust is added to ambient concentrations.

The Yeerongpilly community raised concerns about the station worksite during the 10-week construction period for open-trough excavation and dust exceedences of the nuisance guideline in residential areas. While mitigation measures proposed in the CEMP aim to reduce dust generation during the first stages of construction works, a rigorous dust monitoring would be required at four locations at the Yeerongpilly worksite (refer to Table 15-19 of the EIS).

Some submissions from the community on the EIS also raised concerns that proposed individual property mitigation measures, such as house cleaning, may be inadequate to ensure the health of residents and animals. I note that the draft outline EMP (EIS Chapter 24) requires thorough consultation with property owners and residents prior to the implementation of any individual property mitigations. Furthermore, human health should be protected because the air quality conditions would not allow construction works to consistently exceed the air quality limits. Therefore, I am satisfied that close consultation should allow individual property mitigation measures to be tailored to the needs of property owners and residents in light of actual dust measurements and the particular circumstances of construction at that location.

The former Department of Public Works (DPW) raised concern with air emissions on office workers in the Landcentre at Woolloongabba and at 53 Albert Street. I acknowledge that TMR proposes that where exceedences are identified, additional levels of dust control would be immediately taken to reduce emissions from surface worksites.

Health facilities

QH raised concerns with the potential exceedence events for air quality limits at sensitive receptors in proximity to health facilities during the construction period. The EIS predicts that the air quality limits at all health facilities would not be exceeded under normal meteorological conditions. Dust will be minimised through dust management measures for health facilities as detailed in EIS Section 15.4.5. I agree that air quality monitoring should be undertaken at key health localities such as the Royal Brisbane, Princess Alexandra and Mater hospital precincts during potential dust-generation construction activities. As the air quality limits are based on human health standards, I do not consider it necessary to adopt stricter air quality limits at these locations. However, I do consider it necessary for the construction entity to act immediately if these limits are exceeded near health facilities, including the new Leukaemia Foundation accommodation at the BRUV. Therefore, I have imposed conditions 3 and 16 (Appendix 1, Schedule 2), that the CEMP require the construction entity to:

- establish air quality monitoring near the Boggo Road, Woolloongabba and Victoria Park construction sites at locations approved by DEHP as being satisfactory to provide reasonable estimates of conditions at the nearby health facilities
- install an alert system on the monitors that notify construction site management immediately of an exceedence of PM₁₀ limits
- list the measures that would be implemented immediately if such an exceedence event occurs.

Ecosciences Precinct (ESP)

The former DPW raised concerns about construction dust impacting:

- the intakes of air conditioning plant at the Ecosciences Precinct (ESP) servicing laboratories with very high air quality requirements²⁵ and the likely consequential need to more frequently replace high efficiency particulate air (HEPA) filters
- the 'dive store' fresh air intake (used to fill scuba tanks), located on Level 4 of the western side of the building closest to the CRR station excavation, becoming contaminated with dust particulates.

I observe that the laboratories could keep a record of HEPA filter usage during a reasonable period prior to construction commencing at the BRUV site and the proponent could then meet the cost of any additional filter usage during the construction period. I also observe that adherence to the PM₁₀ limit of 50 µg/m³ should secure suitable air quality for the dive tank intakes. Nonetheless, it may be feasible to locate a monitor at the air intake location and fit a cut-off switch at the tank filling station which activates if air quality falls below a required standard.

However, it is not appropriate in this evaluation report to prescribe a precise solution to these matters. Chapter 24 of the EIS describes that a dust management sub-plan would be implemented as part of the CEMP and this will include a range of measures to manage specific potential dust impacts on nearby sensitive receptors during construction. Therefore, I have imposed Condition 16(g) (Appendix 1, Schedule 2) to require the dust management sub-plan at the BRUV to be approved by the ESP Executive prior to the commencement of construction at that location.

Operational phase

During the operational phase of CRR, the air quality emissions are unlikely to affect regional air quality and there may be a positive air quality benefit over the medium-term because of reductions in motor vehicle commuter traffic. There would be no general air emissions of any significance produced by the operation of the project. At the individual site level, each tunnel and station ventilation system would be required to be designed and located to provide as much separation as possible from surrounding sensitive receptors.

Fairfield ventilation and emergency access shaft

Some submissions on the EIS from local residents expressed concerns about heat being released from the ventilation and emergency access shaft. As all trains running through the tunnels (other than the very occasional maintenance vehicle) would be electric powered, there would be no locomotive exhaust and the level of hot air likely to be generated would be similar to a shopping mall. Furthermore, the height of the shafts and the exhaust fan speeds are designed to expel tunnel air well away from neighbouring buildings. There would be no visible plume from any of the rail tunnel ventilation outlets.

²⁵ Aust Quarantine Inspection Service (AQIS) and Office of the Gene Technology Register (OGTR)

During the commissioning stage of the project, testing and training of fire and life safety systems would be conducted and this would include testing to verify that the design performance of all elements of the ventilation systems are within specification.

Dust from coal trains

The projected increase in general freight and coal trains as consequence of the CRR project is discussed in Section 6.2 of this report.

Several submissions on the EIS from residents along the rail corridor raised concerns about the increased movement of coal freight creating an increase in dust pollution, especially between Tennyson and Dutton Park. I am also aware that this issue receives regular attention in the Brisbane media, including in recent months.

Aurizon, which operates the coal trains on its Moreton Network through this area, has published a *2010 Coal Dust Management Plan*²⁶ which outlines a range of actions and strategies to address coal dust. I note that Aurizon and some coal companies will soon implement a trial of spray-on veneers for coal wagons on the Moreton system in the near future. I also note that this technology appears to be having a strong positive effect where trials have been progressing on the Blackwater Rail System in central Queensland.

In mid-September 2012, the Department of Science, Information Technology, Innovation and the Arts (DSITIA) undertook (on behalf of DEHP) a month-long coal dust monitoring program on the rail corridor at Tennyson. A report on the results of that monitoring program is expected to be completed shortly.

The management of freight services is the responsibility of the rail manager and it is generally outside the direct scope of CRR. However, I acknowledge that an increase in freight services is an indirect consequence of CRR and this could result in a minor increase in coal dust adjacent to the railway within the study corridor. Therefore, this matter is within the scope of this report.

I note that there is currently no regular ongoing operational program of air (and noise) monitoring along the rail corridor between Tennyson and Dutton Park although there are currently discussion between TMR, Queensland Rail and Aurizon.

Based on this information, I have imposed a condition at Appendix 1, Schedule 3, Condition 39, to require monitoring at no less than two locations along the freight tracks, prior to commencement of construction. This monitoring would provide the basis for implementing any future mitigation measures should it be demonstrated that environmental air quality limits are being exceeded.

6.4.3. Coordinator-General's conclusion

Due to the size, central city location and surrounding residential areas within the corridor for this project and the nature of the construction activity, there is potential for impacts on air quality in the vicinity of the project worksites.

The key findings of the EIS are that predicted dust levels would generally be below the air quality limits, except for potential short term events at a small number of locations.

²⁶ http://www.qrnational.com.au/InfrastructureProjects/RailNetwork/Coal_Dust_Management_Plan.pdf

The proposed CEMP includes the establishment of an air quality monitoring sub-plan specifying 'real time' air quality monitoring, including at locations representative of potential 'worst case' air quality impacts. It also commits the proponent to implement measures to avoid, mitigate and manage the generation of dust from construction sites.

The proposed mitigation measures require community consultation in the lead up to construction and a complaints management system throughout the construction period. The proponent must implement its community consultation commitments stated in chapter 24 of the EIS.

I am satisfied that the air quality impacts of the construction of the project can be appropriately mitigated through an imposed condition at Appendix 1, Schedule 2, Condition 16. This condition sets limits for dust and particulate matter for emissions from project activities and is based on relevant standards and guidelines. I have also imposed a condition regarding operational air quality impacts at Appendix 1, Schedule 3, Condition 39.

6.5. Land

6.5.1. Topography, geomorphology, geology and soils

Context

The project investigated topography, geomorphology, geology and soils in the study corridor.

EIS findings, submissions and analysis

Topography

Topography within the project corridor has influenced tunnel design and also the design and placement of surface structures including stations, station access locations, the ventilation shaft at Fairfield and the electricity feeder station locations.

There would be only very localised changes to topography as a result of this project, as the major part of construction is underground. The transition from tunnel to surface infrastructure has been designed with consideration of the existing topography. During construction, there will be temporary changes to topography at major construction worksites.

Geology and geomorphology

As with all major tunnel projects, geology will have a large bearing on the final detailed design. Geology is one of the fundamental determinants of horizontal tunnel alignment, depth, construction methodology and cost.

The geotechnical information presented in the EIS did not identify any major obstacles to the general feasibility of the CRR project or any 'fatal flaws' in the proposed vertical and horizontal alignment of the tunnel or station locations. On that basis, I have no hesitation in concluding that the continued development of the project should proceed.

Nonetheless, I note that the coverage and intensity of geotechnical survey information presented in the EIS is insufficient to complete a detailed design of a project of this magnitude, given its sensitive location. Some remaining areas of uncertainty with respect to geology and geomorphology for the CRR project include:

- a relatively low level of solid rock cover above the tunnel through Fairfield that may require the tunnel to be set deeper in that section
- relatively difficult construction conditions for the Boggo Road station cavern
- incomplete information on rock conditions (potential unconformities) for the reference alignment under the Brisbane River
- the need for confidence in all groundwater conditions through the CBD, especially in light of:
 - the reference design objective of supporting 80-storey buildings above the stations and tunnels in the CBD
 - the sensitivity to minor subsidence or settlement, particularly near the Brisbane City Hall
 - susceptibility to surface flooding, and
 - the imperative of public safety given the huge number of people who will use the train services.

During the first quarter of 2012, after the SEIS had been drafted, TMR commissioned additional geotechnical investigations. The *Cross River Rail Geotechnical Interpretive Report 29 June 2012* was received by the Office of Coordinator-General at the end of August 2012. This additional work forms part of the information I have considered in evaluating the EIS. This document presented a geotechnical update to incorporate the findings of the Phase 3 geotechnical investigations. It recommended that the following actions be carried out in future project phases:

- undertake an alignment study to look for alternative solutions that generate more rock cover at Fairfield and the river crossing, which is likely to involve minor amendments to horizontal and vertical alignments
- re-assess the tunnel and underground station strategies in response to the new ground models.

It appears that this additional geotechnical investigation, although useful, has not significantly reduced the level of uncertainty regarding tunnel alignment. Should further investigations necessitate adjustments to the horizontal alignment of the tunnels, then this may also dictate the need to broaden the existing studies on other EIS topics, especially if the tunnels run under properties outside the scope of existing observations or models.

Soils

Although the EIS did not provide detailed soil surveys for the construction sites, Chapter 7 of the EIS adequately describes the variety of soil types through which the project passes.

Erosion and sedimentation

Erosion risk is greatest in areas where surface and sub-surface soils will be disturbed on the relatively small areas with slopes steeper than 10 per cent gradient. This will affect some surface works between the Mayne Rail Yards and the northern portal, and at Woolloongabba.

The greatest focus with respect to soil management during construction of the project will be on soil erosion and sediment control. The severity of the impacts will depend on the type of affected soil and the period and frequency of the disturbance events. However, management methodologies for control of soil movement from construction sites are well established and these appear to be adequately documented in 'Element 3' of the draft outline CEMP (EIS Chapter 24). I have imposed requirements in Appendix 1, Schedule 2, Condition 18, including the implementation of an erosion and sediment control plan (ESCP) to ensure that this risk is adequately managed.

Acid sulfate soils

There is the possibility of encountering acid sulfate soils (ASS) where surface works are proposed in a number of low-lying alluvial valleys along the study corridor, particularly in the Mayne Rail Yards, just south of Breakfast Creek where there is also a high probability of encountering contaminated materials. Disturbing these soils has the potential to impact on the quality of surface water and groundwater close to a estuarine environment. I have imposed requirements in Appendix 1, Schedule 2, Condition 19, to ensure that this risk is adequately managed and Appendix 1, Schedule 1, Condition 3 to ensure that the location and management strategies are reported to the public.

Some further potential impacts from soil disturbance are discussed in sections 6.12 (Water) and 6.13 (Nature conservation) of this evaluation report.

Ground settlement

There is potential for settlement to occur following completion of tunnelling works. While I accept the EIS assertion that the risk of significant settlement above the tunnel is generally low because of the proposed tunnel design, construction and management methods, I appreciate that the project passes through areas (e.g. the CBD) that may be very sensitive to even minor settlement. It is not impossible that some building with sensitive laboratory or manufacturing equipment may encounter problems with even 1 mm of settlement. By contrast, for areas such as parkland on which no structures exist or are planned, 50 mm settlement may be tolerable. Even subsidence under a structure is usually more tolerable than uneven subsidence.

The risk of subsidence is a complex matter that must be assessed in conjunction with evaluation of surface and groundwater movements.

Consequently, it is not practical to set a single ground subsidence limit below which there could be no negative impacts. Therefore, I have imposed requirements in Appendix 1, Schedule 2, Condition 18 to ensure that this risk is appropriately managed and in Appendix 1, Schedule 1, Condition 3 to ensure that the location of settlement monitoring and the results of that monitoring are reported to the public.

Coordinator-General's conclusion

The geotechnical information presented in the EIS did not identify any major obstacles to the general feasibility of the CRR project or any major deficiencies in the proposed tunnel alignment or station locations. Nonetheless, I note that the geotechnical survey information presented in the EIS is insufficient to complete a detailed design of a project of this magnitude, given its sensitive location.

Consequently, I impose a condition at Appendix 1, Schedule 2, Condition 17, that an additional, more detailed geological survey program be undertaken before procurement documentation for the construction of the tunnel component of the CRR project is released. I also require that this information be reviewed by a suitably qualified, independent, geotechnical and/or tunnel construction expert and that procurement of the tunnel component of the project not proceed until that expert recommends that the geological and geotechnical information for the tunnel alignment and station locations is adequate to proceed to the detailed design phase of the project.

I also require the additional controls imposed in Appendix 1, Schedule 2, Condition 18 to adequately manage the risks during construction arising from:

- soil erosion
- ASS
- ground settlement.

6.5.2. Land contamination

Context

The potential for contaminated land within the study area was investigated as part of the EIS. The purpose was to identify properties which, due to either direct interference and/or acquisition, or as a result of potential contaminated groundwater drawdown, may require further investigation or management as part of the project works.

EIS findings, submissions and analysis

A total of 74 land parcels within the project construction footprint and on adjacent land parcels were identified as containing potential soil and/or groundwater contamination. These would require further investigation as part of the project works.

The significance of contamination at the contaminated sites directly affected by the project and the level of impact these sites may have on the project due to the disturbance of contaminated soil and/or groundwater is not completely known. To accurately assess the impacts of each potentially contaminated site, detailed investigations would be required, including consultation with the landowners, BCC and/or DEHP, to determine the availability of contaminated site information.

For the purposes of the EIS, potentially contaminated properties were assessed individually, and mitigation measures developed to enable further characterisation of the risk these properties pose to the project, and management measures required to mitigate these potential risks.

The RNA submission raised the issue of storing dangerous goods. The draft outline EMP captures approvals, licensing conditions and permits required for hazardous substances and dangerous goods. The construction entity for the CRR project at that location would need to develop and implement an emergency response plan, provide training for staff in the appropriate use, handling, storage and transportation of dangerous goods and hazardous substances and would also monitor compliance of personnel with safety procedures.

Submissions also raised the potential to disturb contaminated land at the GoPrint and Landcentre sites at Woolloongabba. Construction activities relating to the disturbance, excavation, removal and/or disposal of contaminated soil and/or groundwater would need to ensure that environmental harm is prevented. To achieve this, specific mitigation measures are to be developed and implemented prior to the commencement of site activities. Additionally, the EIS did not undertake asbestos investigations for buildings which are proposed to be demolished. This is discussed in section 6.10.

The draft outline EMP provides performance criteria, mitigation measures, monitoring and reporting requirements for contaminated land. Additionally, a stated condition has been provided by DEHP to manage contaminated land.

Coordinator-General's conclusion

The draft outline EMP covers the approvals, licensing conditions and permits required for hazardous substances and dangerous goods. This matter is further addressed by stated Condition 2 (Appendix 3).

6.6. Lighting and visual amenity

6.6.1. Context

The study corridor traverses an urban area in inner city Brisbane. Landscape and visual amenity was discussed in the EIS, which found that the study corridor is mostly well-illuminated particularly within commercial areas and beside road corridors.

6.6.2. EIS findings, submissions and analysis

Visual amenity

While transport infrastructure is a recurring visual element within the project corridor, the corridor includes a variety of views including the CBD, high density inner city areas, commercial, industrial, residential and greenspace.

Locations particularly sensitive to changes to the visual environment include residential dwellings or residential areas, especially those within one kilometre of the project; and places of community importance, such as parks, recreational areas and heritage sites.

RNA Showgrounds

The regrading of O'Connell Terrace for the rail bridge will change the visual appearance of the street. Additional changes to the visual environment will also occur at the RNA Showgrounds due to the removal of key elements from Show Ring No. 2

and changes to the shape of the oval. In the event that redevelopment works for the RNA Showgrounds have not been undertaken prior to CRR, the project would also impact on the Dairy Cattle Pavilion and other parts of the showgrounds, which would change the visual nature of the O'Connell Terrace streetscape. However it is proposed that the station would be designed to be visually appealing and would be consistent with the proposed redevelopment of the showgrounds.

Victoria Park

The main visual impact within Victoria Park would be due to the major worksite and access road. Existing vegetation in the park would be impacted and the existing buildings associated with the BCC facility would be removed. The main permanent impact on visual environment of this area would be the height and bulk of the electricity feeder station proposed to be situated in the lower section of Victoria Park. A small section of Victoria Park along the boundary with the rail corridor would be permanently lost. In the longer term, the project infrastructure is not expected to impact on the amenity of local residents due to the relatively discrete nature of the portal and dive structure within or adjacent to the existing rail corridor.

Brisbane CBD

Amenity in the Brisbane CBD and at Woolloongabba is typical of the city centre and inner city environments, while the amenity in Dutton Park and Fairfield varies, with high noise barriers, some of which do not have vegetative screening, visible to some residents near the rail corridor.

The project proposes some long-term changes to visual amenity. This includes the demolition of the Royal on the Park Hotel as part of the Albert Street Station construction worksite. This building has a distinct presence in Brisbane's architectural history and removing it would change the existing visual environment in this location. The underground station at this location will be designed to enable the future construction of an 80-storey tower overhead.

Due to the nature of high rise buildings within the Brisbane CBD, views of the construction worksites would occur from nearby high-rise residential and commercial buildings. After the first 6–9 months of construction, these views would primarily be of acoustic sheds. The project is expected to result in a positive change to the streetscape environment of Albert and Alice streets by providing high quality architectural stations, plazas, widened footpaths, street trees and street furniture.

The new Roma Street Station would integrate with the existing urban setting. Potential changes to the visual environment may occur from the permanent loss of a portion of open space and a large fig tree in Emma Miller Place. The project also proposes to permanently remove the Parkland Boulevard roundabout. Implementing urban design principles in the detailed design will further improve visual amenity.

Woolloongabba

Additionally, both the GoPrint building and Landcentre buildings will be demolished as part of the Woolloongabba construction site. The station has been situated to take advantage of the opportunities arising from the existing busway station and to support

major urban regeneration in the area. The station entrance is proposed to provide a landmark shade structure design, which would be visible from Stanley Street and would aid legibility and way-finding to the station.

Fairfield

Visual amenity adjacent to the emergency access building at Fairfield will change dramatically with the introduction of a construction site and the built structure in what is a quiet greenspace area between Fairfield Road and the Energex substation. Construction works would require the realignment of Railway Road between Bledisloe Street and Sunbeam Street. Due to the short distance of the realignment, the existing functionality of Railway Road would not be impacted.

Yeerongpilly

Yeerongpilly post-construction will also change dramatically. The project includes the realignment of Wilkie Street, and the removal of dwellings and the off-street parking area at the station. Post-construction land use of the Yeerongpilly worksite will also be significantly different as the site creates a large redevelopment opportunity (approximately 13.4 hectares) adjacent to high-frequency transit facilities.

Moorooka

Existing views to Clapham Rail Yard are currently possible from many local viewpoints. Consequently, the project would not significantly change the intensive rail and transport corridor visual environment. The most visually prominent feature would be the rail viaduct adjacent to Moorooka Station. As this structure would be elevated, it would increase the visual prominence of rail infrastructure for travellers along Ipswich Road and occupants within commercial and residential properties on the eastern side of Ipswich Road.

Mitigation measures

Views of construction activities would be minimised by erecting noise barriers, hoardings and acoustic sheds. While these features would, themselves, be visually prominent, they would reduce the overall visibility of the proposed activities. The project proposes landscaping and positive improvements to streetscape using a range of key design principles relevant to the visual and landscape environment including:

- providing new connections and reinforcing existing connections for pedestrians, cyclists and other modes of public transport
- providing sufficient capacity to ensure distribution of pedestrians into the community at peak times within desirable levels of service
- facilitating safety in design, particularly to bus stops and waiting areas
- providing shade and shelter at entries and key pedestrian collection points
- providing opportunity for retail or other activities at ground level in the vicinity of the station entry to improve passenger service and comfort and passive surveillance
- protecting and enhancing view lines to reinforce the character of existing streets and buildings

- minimising the impact of station services and project infrastructure on the visual environment
- delivering enhanced landscape, lighting, seating and other public amenity around station entry points
- using durable and distinctive materials to increase sense of place and differentiate station locations.

The draft outline EMP proposes mitigation measures which specifically minimise impacts of the project infrastructure by delivering positive outcomes for the community by minimising and mitigating impacts.

To ensure the project is designed and constructed in accordance with appropriate urban design policies, I impose a condition at Appendix 1, Schedule 2, Condition 21.

Lighting

I note that some submitters raised concerns about light spill on existing and future development. Where feasible, construction lighting would be focused at its intended target and would be shielded to minimise light trespass onto nearby sensitive receptors. Mitigation measures will be addressed through the lighting sub-plan of the EMP.

BCC specifically raised in its submission that any connections to the Roma Street Parklands should have enhanced lighting and security systems which align with the parklands existing lighting and security. To ensure that lighting does not impact on amenity and addresses concerns relating to light spill and security, I impose a condition at Appendix 1, Schedule 2, Condition 22, requiring that lighting, including security lighting, must be designed, installed and positioned to minimise light spill onto residential premises and comply with the relevant Australian Standard.

Once operational, the project's lighting requirements would be similar to existing lighting requirements on Brisbane's rail network. Lighting impacts would not be experienced in those areas where the project is in tunnel, apart from those areas around stations or the ventilation and emergency access building. Lighting along surface tracks would be minimal and would be in line with current Queensland Rail lighting requirements for above-ground tracks. In coordination with other security measures, lighting would also be used as a deterrent to crime. Generally, light would be provided to improve amenity and safety and would be consistent within the urban environment.

6.6.3. Coordinator-General's conclusion

Lighting and visual amenity have the potential to impact on residential amenity. During construction this impact is potentially negative, but the measures proposed for this project should ensure appropriate mitigation of this risk.

I impose conditions 21 and 22 requiring that the project be designed in accordance with urban design principles and that lighting is designed and installed to minimise light spill.

6.7. Indigenous cultural heritage

6.7.1. Context

There are a number of cultural heritage sites located within the study corridor. Aboriginal cultural heritage is administered under the *Aboriginal Cultural Heritage Act 2003* (Qld) (ACH Act) by DEHP. A Cultural Heritage Register and Cultural Heritage Database exist under this legislation. The register holds information about cultural heritage studies, cultural heritage management plans, cultural heritage bodies, and Aboriginal and Torres Strait Islander parties.

6.7.2. EIS findings, submissions and analysis

The Indigenous cultural heritage study undertaken for the project found that a rich Indigenous cultural heritage exists at sites across the study corridor. The study identified seven places on the database that are located within the study area:

- (1) a campsite in the vicinity of Petrie Barracks
- (2) a campsite in the vicinity of Roma Street Station
- (3) an extensive camp, contact and cultural site at Victoria Park
- (4) a resource extraction site in the vicinity of Roma Street Station
- (5) the windmill on Wickham Terrace, the site of the execution by hanging of two Aboriginal men in 1841
- (6) the site of a bora ground in the vicinity of Merton Road (and the present day Holy Trinity Church), Woolloongabba (bora grounds were used for initiations and other ceremonies, and in dispute resolution)
- (7) the Bowen Hills/Spring Hill/ New Farm area was a large scale food resource area.

In addition to the above sites, the EIS also identified the following prominent Indigenous cultural features in the study area:

- York's Hollow (Barrambin)—includes the area now covered by Victoria Park, the Royal Brisbane and Women's Hospital, and the Brisbane Exhibition Grounds
- the area around Woolloongabba—important to Aboriginal groups south of the Brisbane River for residential purposes and resource exploitation, and an important cultural and ceremonial centre.
- Dutton Park/Boggo Road Precinct—Annerley Road follows an Aboriginal pathway, and the precinct was ideally placed for subsistence, settlement and cultural activities. Aboriginal finds were also made in the vicinity, prior to constructing the Eleanor Schonell Bridge (opened in 2006).

Surveys of the study area were undertaken by the two relevant Aboriginal Parties, Jagera, through Jagera Daran Pty Ltd and Turrbal, through Turrbal Association Inc. Each party recommended matters for inclusion in the project's cultural heritage management plan (CHMP—refer to sections 18.3.2 and 18.3.3 of the EIS).

The EIS concluded that, with an agreed cultural heritage management plan in place and adhered to throughout the construction phase, the extent of the residual impact on

Indigenous cultural heritage is expected to be low. The study also found there are likely to be some Aboriginal cultural heritage finds at some locations, given the Indigenous history that exists throughout the study corridor and that, in the southern part of the corridor, there have been limited opportunities to investigate the potential for Aboriginal finds.

6.7.3. Coordinator-General's conclusion

I am satisfied that the level of impact on Indigenous cultural heritage is expected to be low, provided the proponent complies with its legislative obligations under both the *Queensland Heritage Act 1992* and the ACH Act and implements a CHMP. Additionally, the EIS states that all work should conform to the Burra Charter and ongoing contact must be maintained with Aboriginal parties throughout the duration of the project.

I have made a recommendation requiring a CHMP to be developed and approved under the ACH Act (Appendix 4, Recommendation 14). The CHMP must be negotiated between the proponent and the relevant Aboriginal parties, and include the matters raised by each Aboriginal party in the cultural heritage report prepared for the EIS (and summarised in section 18.3.4 of the EIS).

In addition, the relevant Aboriginal parties must be included as stakeholders in the communication and consultation plan for each phase of the project, and appropriate communication strategies developed and implemented.

6.8. Non-Indigenous cultural heritage

6.8.1. Context

As the study corridor traverses some of Brisbane's oldest developed areas, it contains a large proportion of Brisbane's registered non-Indigenous cultural heritage places. The majority of these places are located within the Brisbane CBD and Spring Hill areas.

6.8.2. EIS findings, submissions and analysis

Chapter 19 of the EIS and *Cross River Rail Technical Report No. 9 – Cultural Heritage* described the numerous non-Indigenous cultural heritage sites that exist across the study corridor. Three hundred and thirty-five registered heritage places were identified within the study corridor, seven of which had the potential to be directly affected by the project, namely:

- RNA Showgrounds
- Victoria Park
- Roma Street Station
- Boggo Road Gaol
- Yeerongpilly Station
- Rocklea Station
- Salisbury Station.

The EIS found the majority of the above sites could potentially be physically affected by noise, vibration and subsidence, and that particular construction methodologies (such as blasting and drilling) could cause exceedences of the cultural heritage vibration limit at some locations, and should be avoided if possible. Noise and vibration impacts are discussed in sections 6.1 and 6.2 of this report, while subsidence impacts are covered in Section 6.5.1 (Topography, geomorphology, geology and soils).

I have received advice on cultural heritage matters from relevant staff at DEHP and I have considered the submission from the Queensland Heritage Council on these matters.

RNA Showgrounds

The EIS found that the RNA Showgrounds contain an extensive number of buildings and structures which, along with the layout of the grounds and plantings (including numerous mature weeping fig trees), contribute to its cultural heritage significance. The project involves surface works that would substantially alter parts of the showgrounds, including outside the existing rail corridor. Changes are proposed to the rail alignment to allow for the inclusion of a longer straight platform.²⁷ Changes would be required to the height and alignment of O'Connell Terrace to accommodate an increase in the clearance of the rail bridge.

Based on the reference design, the project's potential impacts on heritage-listed structures or features within the showgrounds are as follows:

- demolition of the brick rail viaduct
- demolition of Dairy Cattle, Goat, Pig and Deer, and Beef Cattle pavilions
- removal of part of Show Ring No. 2
- removal of up to four mature trees around Show Ring No. 2
- removal of part of Sideshow Alley
- loss of existing subways
- loss of the toilet block adjacent to the rail embankment
- loss of the existing pedestrian bridge near O'Connell Terrace
- potential impact on sight lines from Bowen Park across the RNA towards John MacDonald Stand.

The EIS identified the RNA Showgrounds also has the following non-physical cultural heritage values, namely:

- the site's almost continuous use as a showground in a capital city since 1876
- the dynamic to the place, including the constantly evolving form and composition
- social significance for the generations of Queenslanders who have attended the annual Ekka.

I agree with the EIS conclusions that:

- the project is not expected to have a long-term impact on the non-physical cultural heritage values

²⁷ The current short platform bends and would be inadequate for the project. The reference design is for a single centre platform, but there are some merits in a dual-platform option.

- the site would retain its history and significance among Queenslanders
- the project would support the evolving form and composition of the site by providing modern buildings that would be situated next to the retained historically significant features.

In its EIS submission, the RNA expressed its desire to be involved in appointing a heritage consultant and to have an opportunity to review and approve the RNA-specific parts of a cultural heritage management plan. This is discussed further in Section 5.4 of this report.

Chapter 16 of the EIS proposed that pre-construction condition surveys and monitoring be undertaken where vibration works are anticipated to occur within 10 metres of heritage structures (pp. 16–98). In its EIS submission, the RNA requested that this 10-metre zone be increased to 50 metres for all RNA buildings on either side of the works corridor.

The RNA Development Scheme Strategy²⁸ was released in April 2008 and included the initial assessment of cultural heritage values on the site. The strategy aims to preserve the character and experience of the Ekka and to identify where redevelopment can occur without detracting from the showgrounds. In addition, the strategy aims to retain those buildings and spaces that are of high heritage value, identify new revenue-generating opportunities and take account of the changes associated with new transport and traffic infrastructure (Cox Rayner 2010).

The RNA Master Plan and development application for material change of use for the redevelopment of the RNA Showgrounds was approved by the ULDA²⁹ in December 2010. The plan identified a number of heritage elements that would be impacted upon for the redevelopment, which is being jointly undertaken by the RNA and Lend Lease. New development will be in line with the approved Bowen Hills Urban Development Area (UDA) Development Scheme. Construction of the \$3 billion redevelopment will be staged over 15 years and began in April 2011.

Victoria Park

A construction worksite outside the existing rail easement will support the tunnelling, portal and surface works would be undertaken within Victoria Park, resulting in impacts on the park south of the Inner City Bypass (ICB). Previous development, including ICB and Inner Northern Busway, has reduced the amount of publicly available land in Victoria Park, and works currently being undertaken for the Legacy Way road tunnel project is also further reducing the publicly available land in the park.

I agree with the EIS conclusion that, as the majority of the open space would be retained and available to the public, the overall long-term impacts to the cultural values of the park would be negligible. However, there are expected to be noise, vibration and visual amenity impacts on the park during construction, which are detailed in sections 6.1 and 6.6 of this report.

²⁸ <http://www.rna.org.au/redevelopment/faq's/overall-rna-showgrounds-regeneration-project.aspx>

²⁹ The powers of the ULDA and the existing Urban Development Area planning schemes will transition to Brisbane City Council by November 2013.

The EIS stated that archaeological investigations undertaken during the construction of the ICB revealed an extensive Indigenous and non-Indigenous historical archaeological record. Therefore, earthmoving in Victoria Park has the potential to unearth archaeological materials.

Several EIS submitters raised concerns about the impact of construction activities on Victoria Park, particularly the originally proposed removal of several semi-mature fig trees. In response to these submissions, the proponent modified the proposed Victoria Park worksite layout to avoid the fig trees. Section 4.7.1 of the SEIS details the revised impacts as a result of the amended worksite layout.

City Hall

The expected vibration levels on the ground surface resulting from tunnel construction using TBM excavation is expected to be less than two millimetres per second. This property is identified as having a low risk of significant effects from settlement, with an estimated maximum ground movement of 10 millimetres (refer to section 6.1 for further discussion of risk management around this issue).

City Botanic Gardens

The project's tunnels would be located beneath the City Botanic Gardens, potentially resulting in settlement and groundwater drawdown within the gardens. The establishment of a passenger entrance on the south-eastern side of Alice Street may also impact on the Botanic Gardens fence and two historic fig trees located nearby.

Boggo Road Gaol

Boggo Road Gaol is located on Annerley Road, Dutton Park (formerly Boggo Road) and is listed on the Queensland Heritage Register. The original gaol was first opened in 1883, and later became known as No. 1 Division, when a women's prison (No. 2 Division) was established in 1903. No. 1 Division was demolished after the prison closed in 1996, and only remnants of it remain, while No. 2 Division is in tact. No. 2 Division was closed in 1989, and was later heritage listed as the only intact nineteenth-century-style prison in Queensland.³⁰

The EIS found that, in addition to the heritage value of the gaol buildings, an important cultural heritage value of the gaol is the sightline to the heritage listed buildings. It concluded that any ancillary structures (for example, station entrances, mechanical or service buildings) must consider the sightlines to the gaol buildings. The construction of the proposed southern station entry, with associated plant attached to this entry, may impact on existing sightlines from the southern and south-western towers of the Division 2 structure. This potential impact would need to be further considered as part of the detailed design process.

The EIS stated that continuous monitoring would need to be undertaken at the gaol to monitor the effects of vibration, drill blast and settlement on Divisions 1 and 2. The cultural heritage vibration limit of 2 millimetres per second is not expected to be exceeded at this location, provided that drill and blast construction methodologies are

³⁰ Dawson 2007 in J Prangnell et al., *Proposed Cross River Rail Project: Cultural Heritage Report Part B*, University of Queensland Culture and Heritage Unit, St Lucia, 2010, p. 6-393.

not used at shallow depths. The remnants of Division 1 are located within two metres of the station cavity, and the brick wall of Division 2 would be located within eight metres of the project.

Further information on construction and operation vibration impacts of the CRR project are in sections 6.1 and 6.2 of this report.

Yeerongpilly Station

The current Yeerongpilly Station is a heritage-listed building. The proponent proposes to construct a new station south of the existing station, with a view to decommissioning it when the new station is operational. While the existing heritage-listed station would not be demolished, a future use for the station has not yet been identified.

Some EIS submitters raised concerns about the future use of the decommissioned Yeerongpilly station, with one suggesting it should continue to function as a railway station. This would not be practical under the reference design except on very rare occasions.

Rocklea and Salisbury stations

Structural changes proposed for these stations include new footbridges, lifts and wheelchair access. This work is not expected to result in major impacts to the existing station fabric.

Indirectly affected properties

The EIS also identified other heritage properties that may be indirectly impacted by the project. The main impacts are expected to be from vibration (refer also to Section 6.1 of this report) and potential vegetation damage (refer to Section 6.1.2). A summary of the properties and expected impacts is in Table 6.2 below. Full details of the properties and impacts can be found in tables 19-1, 19-2 and 19-3 of the EIS (pp. 19, 28–32).

A submission was received regarding the old museum building. While a small section of the site is traversed by the corridor, I accept the project team advice that there would be no impact on the old museum building.

Table 6.2 Residual impacts on heritage places

Heritage place	Potential impact(s)
Brisbane Botanic Gardens	Settlement Nature conservation
Roma Street Station	Vibration Settlement
King George Square	Settlement
William Cairncross Building, 188–196 Albert Street	Vibration Settlement
Perry House—Royal Albert Hotel	Settlement
Charlotte St, Albert St, Alice St	Potential to disturb archaeologically significant items
Camelot Court Carriageway, Beatrice Lane	Settlement
Former St Joseph’s Convent	Settlement
St Joseph’s School, Church and Presbytery	Settlement

Potential for archaeologically significant finds

The EIS reported that there is high potential for significant archaeological finds to be made at sites across the study corridor. The CHMP will address this matter.

Demolition of character housing

City Plan contains a Heritage Register Planning Scheme Policy. This heritage register contains places and precincts of significance at the Brisbane City or local level. All places within the register require the City Plan’s Heritage Code to be applied when development is proposed.

6.8.3. Coordinator-General’s conclusion

In its EIS submission, the former DERM advised that, since the tunnels would generally be located at some depth, the effects of vibration and settlement on heritage places are anticipated to be minimal. This conclusion is supported by experience of generally well-implemented practices at each of the Brisbane tunnel projects. Nevertheless, there is a requirement for close monitoring of the heritage places as noted in the EIS and required by the CEMP.

The results of the additional geotechnical investigation program (refer to Section 6.5.1 of this report) should become an input into the CHMP for each cultural heritage site.

Where work is in close proximity to the heritage place and it is apparent that unacceptable levels of vibration or settlement are likely, or when high levels of vibration are detected, alternative methods of construction must be adopted.

Implementation of stated conditions 3 and 4 (Appendix 3) should adequately mitigate and manage the potential for impacts on non-Indigenous cultural heritage of the CRR project.

I have also made a general recommendation that TMR seek 'innovation in design' to incorporate any significant archaeological discoveries at the Albert Street construction sites into an interpretative display or program at the new Albert Street Station (Appendix 4, Recommendation 5).

6.9. Social impacts

The EIS included the results of a social impact assessment, which was conducted to determine the potential benefits and negative impacts of the project on the social values and characteristics of communities potentially affected by the CRR project.

The EIS concluded that the project would deliver long-term local and regional social benefits by facilitating improved public transport access to key destinations and areas of urban growth within Brisbane's inner city. However, the EIS also revealed that the urban location of project infrastructure, together with the five-and-a-half-year construction period, would bring short- and long-term changes to the physical and social environment of local neighbourhoods and communities in Brisbane's CBD and inner northern and southern suburbs.

6.9.1. Engagement and consultation

EIS findings, submissions and analysis

Comprehensive and timely community and stakeholder consultation, and appropriate mitigation strategies will be essential to manage construction impacts on communities which will be subjected to long periods of disruption.

To date, the proponent has conducted a comprehensive public consultation process, and has committed to continuing to consult with affected parties before and during the construction phase. Appendix C of the EIS outlined the consultation activities undertaken by TMR since the detailed feasibility phase commenced. TMR consulted with a range of stakeholders in and around the study corridor, including:

- residential and commercial property owners
- Commonwealth, state and local government
- sporting clubs
- community associations and organisations
- cultural facilities
- health facilities
- hospitals
- churches.

Project information was distributed using several channels, including newsletters, letters to property owners, a project guide, public advertisements, project website, media events, public displays, face-to-face community information sessions, local advisory group meetings, and targeted stakeholder briefings.

Community feedback was received via a freecall 1800 telephone number, email, letter, online and feedback forms provided at public consultation events.

Several EIS and SEIS submitters commented on the need for continued consultation through the various phases of the project, including detailed design, procurement, construction and operation. Submissions mainly related to:

- establishing a formal complaints management process
- notifying the community in advance of key construction activities, and developing appropriate impact mitigation measures
- facilitating input into construction environmental management plans and associated sub-plans
- establishing targeted management plans to mitigate or minimise impacts
- appointing an independent community liaison representative to ensure effective community communication and enable issues to be quickly resolved.

Section 24 of the EIS (draft outline EMP) described the proposed consultation and complaints management methodologies for the project. In summary, the proponent proposes to:

- establish locality-specific community liaison groups (CLGs), and appoint an independent community consultation specialist(s) to facilitate and convene the CLGs and to ensure efficient but comprehensive communication between the CLG and other parties occurs
- prepare CEMP sub-plans to address matters outlined in the draft EMP for approval by the relevant authorities. CLGs established for the project would be responsible for providing comments in an advisory role to the proponent on matters including the detailed EMPs for construction and operation. The CLGs would also advise the proponent during construction, to assist in identifying and mitigating construction impacts in each locality
- develop a community and stakeholder engagement plan to ensure the community and stakeholders are kept informed about construction. This would be developed during the construction phase, but before construction commences, and would be managed, updated and implemented for the duration of the construction phase
- before construction, establish a 24-hour, 7-day-a-week, toll-free telephone line and email service, for receiving, handling and responding to complaints and community enquiries in a timely and effective manner. Monthly reports on construction compliance would be made available on the project internet site.

6.9.2. Employment

EIS findings, submissions and analysis

The EIS found that the project would support the Brisbane CBD in its ongoing role as a key centre for commerce and employment in Queensland. It would also support improved access to a number of regionally significant employment services and community uses that form the planned network of regional centres identified by the SEQ Regional Plan. These areas include Bowen Hills, the Royal Brisbane and Women's Hospital (RBWH), the Brisbane CBD, Queensland University of Technology (QUT) Gardens Point, Woolloongabba, Princess Alexandra Hospital (PAH), Boggo Road Urban Village and Queensland Tennis Centre.

The project would also generate a significant number of construction jobs during the construction phase. Section 20.3.2 of the EIS described the anticipated workforce requirements for the project, estimating the project would generate jobs for an average of approximately 1600 workers, including construction workers, project managers and design staff. During the peak construction period, it is anticipated approximately 2200 workers would be required, with a peak shift of about 1325 workers. Indirect roles in the construction, financial and business services, government services and road transport sectors would also be generated (EIS p. 20-27).

6.9.3. Property impacts

A total of 411 properties would be acquired, either wholly or in part, for the project. This includes 108 properties acquired for surface works (including 16 owned by either the Queensland Government or BCC) and a further 303 properties requiring a volumetric acquisition, where the project passes beneath the property.

Of the 108 properties to be acquired, either wholly or partly, for surface works:

- 39 properties comprise residential uses, including houses, flats and residential apartments
- 64 properties comprise commercial, industrial or mixed-use developments
- five properties contain community uses such as parks and a church (EIS p. 20-28).

The proponent has informed property owners whose properties may be directly affected by the project. Discussions have also commenced with some property owners who wish to discuss the early purchase of their property in accordance with the Queensland Government's hardship policy.

EIS findings, submissions and analysis

Key land uses directly affected by surface works include:

- part of Victoria Park, east of the rail line, for the northern portal worksite and a small portion required permanently for the northern portal itself
- the Royal on the Park Hotel, at the corner of Albert and Alice streets, for a worksite associated with the Albert Street Station with the corner of the lot at ground and basement levels required to permanently house the southern Albert Street Station concourse and access shaft
- commercial uses at the north-east corner of Mary and Albert streets, for a permanent station entrance as well as worksite associated with the Albert Street Station
- the GoPrint site at Woolloongabba, for the Woolloongabba Station worksite with the western edge of the GoPrint site required permanently to accommodate the station itself
- industrial uses at Station Road, Yeerongpilly, for the southern worksite with a small proportion of these sites required permanently to accommodate the new Yeerongpilly Station and relocated Wilkie and Lucy streets
- portion of land currently occupied by Energex substation and surrounding Council-owned reserve located on land at Railway Road, between Bledisloe and

Sunbeam streets and Fairfield Road for the construction and ongoing operation of the ventilation and emergency access building

- RNA Showgrounds, for the Exhibition Station and associated worksite, with a portion of showgrounds land immediately north-west of the current station required permanently for the widened and relocated station footprint
- Boggo Road Urban Village, for the construction of the Boggo Road Station underground with a portion required permanently to accommodate station entrances and platform access.

Following construction, land occupied by construction worksites that is not required for the project would become available for redevelopment. The planning and tenure implications for these sites are discussed in sections 5.1–5.3 of this report.

A ‘zone of influence’ has been identified for the purposes of volumetric acquisition, around the tunnels and underground stations to protect the project from impacts of future development. The ‘zone of influence’ comprises a buffer of 7 metres extending from the outside of each tunnel and 10 metres from the outside of station caverns.

The zone of influence could potentially result in future constraints to development through limiting future basement development. While the project would influence development along the entire length of the underground works, the impact would be most evident in areas suitable for higher density development such as the CBD, Bowen Hills, Woolloongabba and the Boggo Road Urban Village.

The project will be aligned under Albert Street in the CBD. The zone of influence would extend beyond the road reserve to impact properties adjacent to Albert Street. While the design of the tunnels and Albert Street Station can accommodate an 80-storey building and basement depths of up to 35 metres, any new developments on adjacent sites would need to consider the zone of influence and tunnel locations when designing basements, foundations and rock anchors.

Submissions were received regarding the long time period of construction works and the impacts from ancillary works. During construction, residential properties near construction worksites may experience changes to amenity, particularly due to increased noise and dust. Specific mitigation measures to address noise, dust, night lighting, traffic and other impacts of construction activities are required around construction worksites and these issues are addressed in sections 6.1–6.6 of this report.

Submissions were also received regarding impacts on property values during construction, with some submitters requesting compensation. However, these matters will be addressed through the application of the TIA and the Land Act policies regarding ‘notice of intention to resume’.

Other submitters raised on-street parking as an issue including the Brothers St Brendan’s Football Club and St Fabians Church. The draft outline EMP includes the requirements for a community engagement and communications plan to keep the community and stakeholders informed about the construction of the project. Housing affordability³¹ is a key issue facing the inner city. The study area generally has a good

³¹ Affordable housing generally refers to housing in which households spend no more than 30 per cent of their

supply of affordable rental housing, but some suburbs, such as Fairfield, Yeerongpilly and Yeronga have limited affordable housing properties available for purchase. This may impact on some property owners who may wish to relocate within the study area. The EIS stated the project would directly impact on Queensland Government housing at Yeerongpilly (Wilkie Street and School Road) and Bowen Hills (Tufton Street and O'Connell Terrace).

Ongoing consultation and communication with property owners about the property acquisition and compensation process and support available to potential affected property owners, may assist in reducing potential impacts in sourcing alternative accommodation. To address these impacts, both QH and DHPW (which now has responsibility for housing) recommended the proponent develop a plan to address the impacts on affordable housing residents, which would include providing detailed information on the support services available to residents. QH and DHPW have indicated their willingness to work with the proponent to develop the plan.

Nonetheless, I consider that addressing the general housing affordability issue falls outside the scope of this project.

Once the project becomes operational, it will lead to an improvement to amenity and pedestrian accessibility for the neighbourhoods served by the stations that form part of the project. Other benefits include consequential increased frequency of train services and accessibility. There is also the potential for significant property value uplift for properties located close to the stations.

Discussion of some of the tenure aspects of property matters is provided in Section 5.2 of this report.

6.9.4. Social infrastructure

EIS findings, submissions and analysis

Section 20.3.6 of the EIS presented the positive impacts for social infrastructure access, the negative impacts including temporary access changes, dust, noise, amenity and the reduction in open space. Social infrastructure benefits not discussed elsewhere in this report include:

- significantly improved access after completion of the project to the QUT, City Botanic Gardens, southern CBD, the Woolloongabba Cricket Ground, the Mater Hospital precinct, the University of Queensland, PAH, BRUV, the South Brisbane Cemetery, Sunshine Welfare & Remedial Association and the Queensland Tennis Centre
- widening of the existing pedestrian bridge over the rail corridor near Salisbury Station
- the provision of a new footbridge over the railway creating improved access between the eastern Rocklea community and Nyanda State High School, Salisbury.

Potential negative impacts on social infrastructure not discussed elsewhere in this report include:

gross household income on either rent or mortgage payments (EIS p. 20-9).

- construction impacts on Grosvenor Hall Preschool & Early Learning Centre at School Road Yeerongpilly
- consequences of changes to local road access on the C&K Yeronga Park Kindergarten & Preschool and Yeronga State Primary School at School Road Yeerongpilly.

I am satisfied that the measures proposed in the draft outline EMP (EIS Chapter 24), combined with the additional requirements specified in this report, will be adequate to satisfactorily manage those potential negative impacts.

6.9.5. Coordinator-General's conclusions

The CRR project would deliver long-term local and regional social benefits by facilitating improved public transport access to key destinations and areas of urban growth within Brisbane's inner city. Nonetheless, the CRR project would also generate short and long-term changes to the physical and social environment of local neighbourhoods along the route or the railway. These changes need to be managed, especially during the construction period.

Consultation undertaken on the project so far has been comprehensive and inclusive of potentially affected groups. I conclude that the management measures proposed by the proponent in the EIS (particularly the draft outline EMP) and SEIS would be sufficient to effectively manage impacts and I consider it unnecessary to impose a condition to support or guide these measures.

Responsibility for the community engagement strategy in the operational phase of the project will pass to the relevant rail manager and/or train operator(s).

6.10. Economic values and impacts

6.10.1. Context

The CRR project has the ability to significantly increase the capacity of the public transport network, catering for a growing number of commuters in line with population growth. The project aims to deliver a high quality public transport network, while linking people in outer Brisbane suburbs with jobs across the inner city. The project would reduce travel time, improve amenity through reduced passenger crowding, improve service frequency and reliability, and reduce road congestion.

6.10.2. EIS findings, submissions and analysis

The EIS assessed the benefits and impacts of the project in both 2021 and 2031 compared with the base case, which was 2009 for patronage modelling purposes. The EIS predicted a reduction in the number of vehicle trips compared to the 'without CRR' scenario, and a potential reduction in the number of vehicle accidents. It is also forecast to deliver an increase in transfers from bus to rail.

In terms of overall project benefit, the EIS identified that the project would deliver a net present value (NPV) of \$2.3 billion with a benefit cost ratio (BCR) of 1:42. The EIS also predicted that this BCR would increase to 1:63 when the wider economic impacts are

included. In the agglomeration of benefits, the main contributor is largely accounted for by labour supply benefits. Other benefits include reduced travel times, freeing up dedicated rail freight paths and reducing road traffic congestion.

While the project is expected to deliver significant positive economic benefits, there will also be direct financial costs associated with acquiring residential and commercial properties to accommodate the portals and connections with the existing surface rail infrastructure. There would also be an economic impact on businesses along the corridor, and a small number of potential job losses as a result of businesses being displaced.

While distressing to the individuals involved, the total initial loss in the availability of residential accommodation would be insignificant, and the subsequent likely intensification of residential and commercial development around the new station nodes would offset this loss by many orders of magnitude.

Methodology of economic assessment

The methodology used in the EIS to identify the number of employees required for each construction activity was considered by DETE to be inadequate, as it failed to adequately identify the specific skillsets necessary for proper workforce planning purposes.

Nonetheless, the EIS draft workforce plan identified a number of policies or programs relating to the procurement, employment and training for major public construction projects, aimed at stimulating the local economy and job growth opportunities. These policies include:

- a training program for 10 per cent of the overall construction workforce
- a 20 per cent Indigenous employment opportunity program
- local industry policies relating to procurement, employment and training.

TMR has committed to develop a detailed workforce plan in consultation with stakeholders during the detailed design phase of the project prior to construction procurement and to encourage the construction entities to adopt this plan.

I am satisfied that implementing these policies and developing a detailed workforce plan would address the employment and workforce planning matters raised in submissions on the EIS and SEIS.

In relation to the projected economic benefits of the project, BCC raised concerns that the North West Transit Corridor (NWTC) rail tunnel project (then proposed to be operational in 2031) had been included in the benefit cost analysis (BCA) for the project, which increased the BCA reported in the EIS. BCC's concern was that the BCA measured the benefit of two projects, not just CRR.

While including the NWTC project in the demand modelling from 2031 does contribute to the project benefits, the BCA modelling assumptions also include the considerable NWTC costs. TMR was able to subsequently demonstrate in the SEIS that if the NWTC project was removed from the modelling, the BCR would improve from 1:42 to 1:51. Under that scenario, the NPV would increase from \$2.3 billion to \$2.6 billion.

Local business impacts

Impacts on individual businesses throughout the corridor were raised by the community in submissions on the EIS. Matters raised included:

- loss of passing trade by businesses due to loss or restrictions to road and footpath access or visibility
- partial resumption of car parking spaces
- noise and dust on outdoor dining
- end users of the freight companies losing rail freight capacity during construction
- potential loss of community events due to site closures and workforce parking.

In particular, the project would require the resumption of numerous residential and commercial premises across several locations. In addition to direct financial costs associated with property resumptions, there would also be significant economic costs as a result of business and job losses during the course of displacement (and a loss in the availability of residential accommodation impacting real estate market).

Key property resumptions for the project would occur in the Albert Street area, where 19 businesses currently supporting approximately 70 to 100 employees would be displaced. The southern section from Yeerongpilly to Salisbury would also result in resumptions of over 100 businesses supporting 480 to 600 employees. In addition, there will be a significant impact on the availability of industrial land in the south of the corridor. I have discussed this matter further in Section 5.1.2 of this report.

An individual business on Beaudesert Road raised concerns about the loss of passing trade and visibility to passing traffic, in particular if noise barriers or other screens are installed. However, I note that there are no screens or noise walls proposed on the Beaudesert Road viaduct itself and there may be scope to revise the property resumptions required for that part of the project during the detailed design phase. TMR has committed to consult potentially affected property and business owners in that area early, during that phase.

The Ecosciences Precinct and café at Boggo Road will require early communication on construction timelines and mitigation measures to assist with potentially significant air quality, noise and vibration and visual intrusion. The café's outdoor dining area opens out onto the area that would be part of the station cavern excavation site.

Despite these localised issues, I am satisfied the draft outline EMP (EIS Chapter 24) described the mitigation measures and ongoing consultation with affected property owners and residents required to appropriately manage these matters.

With regard to minimising and managing the potential impacts of project construction on rail freight operations:

- disruptions would be planned well in advance to avoid peak times and demands for service in accordance with Queensland Rail's 'Access Undertaking' approved by the

Queensland Competition Authority in June 2010 and amended in October 2012,³² and

- the proponent should enter into an interface agreement with Queensland Rail under the TIA to establish a framework for rail corridor possessions that would accommodate a process by which potential impacts on rail customers should be addressed and mitigated (Appendix 4, Recommendation 6).

Economic impacts of land use and transport planning decisions

There are economic and employment consequences of any future land-use planning considerations for industrial land resumed for the project, but not required post-construction.

Chapter 9 of the EIS (Land Use and Tenure) explained that one of the fundamental justifications for the CRR project is a key economic development outcome sought by the SEQ Regional Plan of relieving the region's transport capacity constraints.

Brisbane's inner city rail network bottlenecks and improvement of rail freight capacity into the Port of Brisbane are cited as the key examples in the SEQ Regional Plan of economic development matters that need to be addressed.

6.10.3. Coordinator-General's conclusion

I acknowledge that there are likely to be localised, short-term, negative economic impacts of the construction of the CRR project due to its close proximity to businesses and residences. However, notwithstanding the very high capital cost of this project, CRR has a positive BCR and would deliver broad economic benefits including more efficient development densities, better access to employment, improved labour supply, and more efficient public transport and road networks.

I am satisfied that the measures outlined in the draft outline EMP should adequately mitigate the potential negative economic impacts of construction of the CRR project.

6.11. Hazard and risk

6.11.1. Context

The EIS identified the following major construction hazards and risks:

- operating vehicles and equipment in a confined tunnel space
- storing and using dangerous goods
- transporting spoil
- working with electricity
- tunnel collapse or subsidence
- flooding or inundation
- changes of surface road and service.

³²

[www.queenslandrail.com.au/NetworkServices/AccessandRegulation/Documents/QR%20Network%27s%20Access%20Undertaking%20\(2008\)%20June%202010.pdf](http://www.queenslandrail.com.au/NetworkServices/AccessandRegulation/Documents/QR%20Network%27s%20Access%20Undertaking%20(2008)%20June%202010.pdf)

Resolution of all fire and life safety matters for the construction of the CRR project will need to occur during detailed design phase which will require close consultation between the proponent, the construction entity, the rail manager and the proposed emergency services providers for ambulance, fire fighting, chemical hazards emergency and policing.

In the operational phase, hazardous activities include:

- train incidents
- maintenance works on the rail line
- collapse, subsidence or failure of tunnel and other components
- flooding and acts of terrorism leading to major fires, explosions or other hazardous consequences.

The most significant operational risks identified in the EIS are associated with the need to evacuate the tunnel and underground stations in the event of an emergency. All rail safety matters for the operation of the CRR project will be subject to the approval of the rail safety regulator, which is defined under section 11(b) of the TRS Act as the chief executive of TMR.

The draft outline EMP (EIS Chapter 24) proposed a range of hazard and risk measures, including developing and implementing a surface transport security plan to provide a systematic and consistent approach to counter-terrorism.

6.11.2. EIS findings, submissions and analysis

DCS raised a concern with regard to lack of analysis in the EIS of bushfire hazard and risk of landslides in compliance with State Planning Policy (SPP) 1/03 – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide. I am satisfied that the bushfire risks for this project are very low and the requirements of SPP 1/03 have been met. I am also satisfied that these matters are adequately addressed in Element 17 (hazard and risk sub-plan) in the draft outline EMP, which outlines the processes that will be implemented to avoid or minimise the risk of hazardous events during construction and to respond appropriately to hazardous events if they occur.

The Queensland Ambulance Service (QAS) asked to be notified in advance of any road closures, changes to road conditions and other works during construction that may affect its response or operations. QAS has especially noted that O'Connell Terrace in Bowen Hills is a critical ambulance route to the Royal Brisbane and Women's Hospital and that proposed works on the terrace and associated with the RNA Showgrounds must not impede this route. The community and stakeholder engagement sub-plan, proposed in Element 13 of the draft outline EMP, identified the management process to ensure that critical stakeholders such as the QAS are kept informed about all road changes during the construction of the project. This sub-plan would be developed prior to the commencement of construction works, and would be managed, updated and implemented throughout the duration of the construction phase.

Buildings identified as containing hazardous or potentially hazardous materials would require specialised or licensed contractors to undertake demolition works. Element 17 of the draft outline EMP (EIS Chapter 24), described the procedures for handling

hazardous materials, particularly in respect to dust management at worksites during transport. Element 17 also included the fire and life safety codes, standards and guidelines on emergency service access and intervention that would be applied to the project.

The reference design location of the ventilation and emergency access building is midway between Boggo Road and southern portal of the tunnel, which maximises the operational efficiency in relation to the ventilation and rail passenger safety.

Health and safety impacts

The environmental impacts of the CRR project that have the potential to affect human health, public safety, amenity and/or quality of life are discussed elsewhere in this report with respect to events management (Section 5.4), noise and vibration (sections 6.1 and 6.2), roads and traffic (Section 6.3) air quality (Section 6.4), land contamination (Section 6.5.2), lighting (Section 6.6), housing (Section 6.9.3), water quality (Section 6.12) and flood management (Sections 6.12.3).

QH is concerned about the project's alignment with the *Herston Health Precinct Smart Community Plan*. I am relying on the proponent managing this issue through the implementation of its community consultation described in chapter 24 of the EIS.

Concerns were raised in relation to working with contaminated land, including potential health impacts for workers at the Landcentre at Woolloongabba and this will be dealt with in the *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland, 1998* and NEPM (Assessment of Site Contamination) (including variations to the NEPM approved by DEHP). The presence of asbestos in buildings proposed for demolition was not assessed during the EIS and this will need to be done before the construction tender is issued.

The closure of the level crossing as outlined in the draft *Queensland Level Crossing Safety Strategy 2010–2014* stipulates the necessity for ongoing improvements for rail crossings.

Specific comments raised by local residents in relation to Boggo Road and the Ecosciences Precinct included the safety of local school children, moving to and from school, in light of spoil haulage routes.

The proposed interface agreements between the proponent, Queensland Rail and other transport infrastructure providers and operators (Section 5.4 of this report) will provide the planning, consultation and management arrangements for the necessary rail corridor possessions and safety for construction workforce, rail operator workforce, rail customers and passengers.

6.11.3. Coordinator-General's conclusion

The EIS provided a risk assessment matrix of safety and environmental risks associated with construction of the project. The need to evacuate the underground tunnel and stations in the event of an emergency was assessed as having the highest risk level. The potential need to remove asbestos before buildings are demolished is a matter that will require further investigation before the procurement phase.

I acknowledge that draft outline EMP requires the construction entity to develop and implement an emergency response plan, provide training for staff in the appropriate use, handling, storage and transportation of dangerous goods and hazardous substances and would also monitor compliance of personnel with safety procedures. To ensure this occurs, I have imposed conditions 3 and 26 (Appendix 1).

I acknowledge there are risks associated with the operation of the project and the assessment, mitigation management and monitoring of those risks is of utmost importance and these will properly controlled by the rail safety regulator. To ensure these hazards and risk are appropriately addressed, I impose Condition 27 (Appendix 1, Schedule 2) to ensure an operation hazard and risk management plan is developed and implemented in consultation with DCS and emergency services agencies and the approval of the rail safety regulator prior to commencement of operation of the project.

Based on the mitigation measures contained in the EIS, SEIS, the draft outline EMP, legislative requirements that establish minimum health and safety standards, and conditions of this report, I am satisfied that hazards and risks will be appropriately managed during construction and operation of the project.

6.12. Water

6.12.1. Groundwater

Context

Several aspects of the CRR project have the potential to impact on groundwater, including the construction of open trough structures, cut and cover tunnels and the operation of the TBMs.

EIS findings, submissions and analysis

The groundwater resources in the study area are variable and influenced by the Brisbane River and the local drainage system, as much as they are by the geological conditions. In some locations, there is likely to be a hydraulic connection between the river and the local streams and shallow aquifers. The hydrogeological regime of the study area comprises two broad aquifer types:

- (a) fractured rock (secondary porosity) aquifer systems
- (b) alluvial (primary porosity) aquifer systems overlying bedrock aquifers.

Groundwater facilities encompass water bores, wells, groundwater interception trenches and other infrastructure constructed to allow extraction of groundwater. There are 402 registered groundwater facilities identified within a five-kilometre radius of the study corridor. Of these, 331 are existing and 71 are abandoned or destroyed facilities.

Groundwater levels in the study area are variable and are a subdued reflection of topography, except in areas where the water table has been impacted by existing infrastructure—for example, basement dewatering.

Groundwater extraction during construction for dust suppression and other construction activities is not proposed for the CRR project.

The following potential impacts were predicted in the EIS:

- While there may be dissolved contaminants in the groundwater drawdown from contaminated lands neighbouring the tunnel that may seep into the tunnel water management system, the total expected inflow to the tunnel is less than one litre per second, so the influx of contaminants is likely to be small.
- As there is potential for groundwater acidification to occur in areas next to the Brisbane River, Breakfast/Enoggera Creek, Norman Creek and Oxley Creek where limited areas of ASS exist, further quantification is required in drawdown zones within these areas.
- The level of groundwater dependency of vegetation in the study area is considered to be relatively low, with vegetation utilising groundwater in the saturated zone only during drought conditions. Potential groundwater-dependent ecosystems identified within the City Botanic Gardens and Brisbane are discussed in section 6.13.
- Possible surface settlements and damage to some buildings, such as in Albert Street.

For much of its route, the project would pass through dense rock with limited potential to transmit groundwater to the project voids (less than one litre per second inflows, which is a long-term steady state inflow rate over the life of the project). As the main tunnels approach the surface, fractured or jointed rock and alluvial beds would be intercepted, the permeability of the ground increases and the probability of encountering poorer quality or contaminated groundwater also increases.

The risk of groundwater drawdown due to the main tunnels is mitigated by the use of pre-cast concrete-segmented lining with gaskets during construction. The very low level of inflow allowed by this method is sufficiently small for the tunnel to be considered effectively dry. While the main tunnels would be sealed, small potential for groundwater drawdown is created at the cross-passages and the underground stations. A range of secondary impacts could be created by the movement of groundwater.

The EIS found that the potential for groundwater drawdown is greatest at the underground stations at Albert Street, Roma Street and Woolloongabba, and at the ventilation and emergency access building at Fairfield.

With the cross-passages, construction would entail the application of cast-in-situ concrete lining over a waterproof membrane, again effectively mitigating groundwater inflow. While this method is effective, the inflow rate in the cross-passages would be higher than for the main tunnels, particularly in those locations where they occur in permeable material, such as alluvium and jointed or fractured rock formations. Generally however, cross-passages are expected to be in impermeable rock. Groundwater inflow to the tunnel and station voids would be captured by a drainage system.

A network of monitoring bores has been established as part of the geotechnical investigations for the project. Before construction commences, groundwater monitoring would be undertaken in the groundwater monitoring network to establish baseline groundwater conditions. The baseline groundwater data would serve as guideline

levels to identify potential impacts during the construction and operation phases of the project.

To minimise potential groundwater impacts during construction, a variety of control measures are proposed to be developed and implemented within the overall CEMP (as described in the draft outline EMP (EIS Chapter 24).

All tunnel groundwater captured during the construction and ongoing operation of the project will need to be tested and released at the surface into surrounding waterways only where water quality parameters meet the criteria specified by DEHP. I have received advice from DEHP on discharge criteria and I have incorporated these into imposed Condition 28 (Appendix 1, Schedule 2).

Coordinator-General's conclusion

I am satisfied the potential impacts associated with groundwater can be adequately addressed through the implementation of the CEMP groundwater and surface water sub-plans described in the draft outline EMP. I impose conditions 27–28 (Appendix 1, Schedule 2) to clarify my requirements for groundwater management.

6.12.2. Surface water

Context

A number of waterways located within the study corridor may be potentially affected by construction and operation of the project through changes to surface water quality.

Construction has the potential to impact on surface water through activities including:

- vegetation clearance
- excavation and earthworks associated with utility diversions
- construction of cut and cover tunnels, embankments, bridges and haul roads within each worksite
- stockpiling and transferring spoil from tunnel excavation.

EIS findings, submissions and analysis

Waterways potentially affected by the project

The major waterways within the area of the project include the Brisbane River, Breakfast Creek, Moolabin Creek and Stable Swamp Creek. A number of minor surface water features such as ponds and lakes are also located within the study corridor at the City Botanic Gardens, Roma Street Parklands and York's Hollow at Victoria Park. All waterways in the study corridor eventually flow into Moreton Bay.

The assessment of existing water quality for waterways potentially affected by the project has concluded that they are in poor condition.

Surface waters of most concern are those in close proximity to construction works. Potential impacts on surface water quality could result from:

- changes to surface water flow
- sedimentation and surface water run-off

- disturbance of ASS
- disturbance of contaminated land
- introduction of litter or toxicants from spills or the accidental release of pollutants.

Concerns raised in submissions

Several submitters raised concerns about impacts on surface water quality, including the former Department of Public Works (now DHPW), which noted that all drains in the area near the Colleges Close car park, drain into the lake at the Roma Street Parklands. The draft outline EMP (EIS Chapter 24) included a requirement for managers of receiving waterways such as DHPW to be consulted at detailed design and construction stages of project delivery.

The RNA raised the issue of stormwater runoff onto the RNA Showgrounds and requested that review and approval is required from the RNA during the detailed design stage for elements that have a direct impact on the RNA site and its operations. The proponent noted that the RNA will be consulted in the design of stormwater controls.

BCC raised concerns about the need for bridge design at Moolabin Creek and Rocky Waterholes to minimise waterway health impacts. Works associated with the construction of these bridges have the potential to impact on the flow of surface waters, flooding and consequently water quality. This matter is addressed further in the draft outline EMP.

Proposed mitigation measures

Construction

A range of measures would be implemented during the construction phase to avoid or minimise the transfer of sediment or other pollutants to waterways and drainage lines. These include:

- minimising vegetation clearing and progressive rehabilitation and restoration of cleared areas, particularly at new waterway crossings
- installing effective erosion, sediment, dust and stormwater controls
- avoiding flood-affected areas, drainage lines and waterways in the stockpiling and placement of spoil and other materials
- implementing water-sensitive urban design measures at worksites
- implementing appropriate practices and procedures for handling, storing and managing chemicals and hydrocarbons.

The EIS indicated that stormwater/drainage control and sediment control measures would be installed at each site. A soil, erosion and sediment control management sub-plan would be prepared and implemented as part of the draft outline EMP to avoid or minimise the transfer of sediment or other pollutants from construction activities to waterways or stormwater systems. The draft outline EMP described a range of environmental objectives, performance criteria and provided a range of mitigation measures to guard against environmental damage.

Opportunities to improve localised hydrologic conditions would need to be explored during the detailed design stage, as this would involve designing mitigation measures

(for example, stormwater drainage). As described in section 13.3.9 of the EIS, a number of measures would be used to effectively manage and treat run-off from surface tracks, maintenance facilities and stations. These measures would seek to reduce the volume of run-off and pollutant load.

To ensure that critical mitigation measures are implemented during the detailed design and construction phases of this project, I impose conditions 3 and 30 (Appendix 1).

Operation

During operation, a number of measures would be used to manage and treat run-off from surface tracks, maintenance facilities and stations. These measures would seek to reduce the volume of run-off and pollutant load. A number of different components and controls would be investigated and developed during the detailed design phase for inclusion in the final design. These include:

- grassed/vegetated swales
- permanent settlement ponds and detention basins
- stormwater quality improvement devices (for example, gross pollutant traps, gully pit baskets and nets) to filter stormwater and prevent pollution of surface waters
- oil/grit separators to remove hydrocarbons and coarse sediments.

Permanent water quality treatment control devices would be designed for the adequate control of pollution and sediment and other coarse materials during flood events.

Following construction, an operations EMP would be developed to avoid potential water quality impacts. As the existing water quality of waterways potentially affected by the project is generally poor, the proposed mitigation measures may improve existing run-off quality.

Coordinator-General's conclusion

I am satisfied that the potential impacts associated with surface water can be adequately addressed through imposed Condition 30 (Appendix 1, Schedule 2) and the requirement to implement the CEMP and surface water sub-plans.

6.12.3. Flood management

Context

The project includes surface works that have the potential to change the existing flood regime of waterways, drainage lines and overland flow paths through the study corridor. This includes permanent infrastructure such as surface stations, access to underground stations, ventilation buildings, surface tracks and stabling facilities, bridges and elevated structures and temporary infrastructure associated with construction works.

I am conscious of the strong interest that the broader community has in flood management matters for the CRR project as the project traverses several parts of Brisbane that have a prominent history of flooding. Most notable amongst these are Rocklea, Yeerongpilly, Fairfield and the lower CBD.

EIS findings, submissions and analysis

Given that the project has a design life of 100 years, it was appropriate that the EIS considered the impacts of climate change on flooding regimes. Climate change is also addressed in Section 6.14 of this report.

Flood studies and models used in the EIS

Numerous flood studies have been undertaken in recent years for the Brisbane River. These are listed in *Technical Report No.6 – Flood Study*.³³ These studies were used as the basis for the flood models developed for the EIS.

I consider that the flood modelling conducted in this EIS was adequate. In particular, I note that CRR is the first 'significant project' in SEQ for which flood models were recalibrated to incorporate the outcomes of the January 2011 Brisbane floods.

While the project takes into consideration the 2011 defined flood event levels, the *Queensland Floods Commission of Inquiry: Final Report*³⁴ was released after the EIS was prepared. The final report has many recommendations of relevance to the project including the Brisbane River Catchment Study, state planning policies, the Queensland Building Code, utilities, community infrastructure and evacuation plans, which are being prepared by various lead agencies, mostly prior to 2015.

The proponent has made a commitment to adopt all relevant findings and recommendations of the Flood Commission report³⁴ and I consider it necessary to reinforce this commitment by imposing Condition 33 (Appendix 1, Schedule 2).

Project exposure to flood events

Details of the proposed flood protection measures are available in chapter 4 of the EIS.

Proposed flood protection measures include:

- raised underground station entry points to protect against local flash flooding events and potential problems with the local stormwater network. Floodboards can be quickly and easily installed in case of intermediate flood events and provide up to one metre of additional protection above the raised entrances
- dedicated automated flood gates at each of the entry points to the Albert Street Station and at the southern portal to protect against extreme flood events. Each floodgate would comprise a hinged tilting gate operated by hydraulic rams
- protection of potential flood entry points from local and extreme flooding by local topography and elevation of flood entry points, such as vents.

The project design provides flood immunity to the tunnel infrastructure in an extreme flood event (that is, a 1-in-10 000 Annual Exceedence Probability (AEP) event). While most project worksites and project surface structures are located outside of the 1-in-100 AEP flood extents, the following eight worksites or project structures (excluding culvert extensions) are in locations that experience a higher probability of flooding:

³³ SKM Aurecon CRR Joint Venture, *Technical Report No. 6 – Flood Study*, Department of Transport and Main Roads, Brisbane, 2011.

³⁴ Queensland Floods Commission of Inquiry, *Queensland Floods Commission of Inquiry: Final Report*, Brisbane, 2011, viewed 20 November 2012, <http://www.floodcommission.qld.gov.au/publications/final-report>.

- Beaudesert Road Service Road, Salisbury
- Rocky Water Holes Creek bridge
- Clapham Rail Yard
- Moolabin Creek bridge
- Yeerongpilly worksite
- the ventilation and emergency access building, Fairfield
- Albert Street Station
- Ekka Station.

Brisbane River flooding can result in inundation of the lower Albert Street area. The mechanism for inundation of these parts of the CBD is through:

- Brisbane River floodwaters back-flowing through the pipe drainage system and surcharging up onto the City Botanic Gardens and nearby streets and properties, or
- during a Brisbane River flood event, rainfall in the CBD falls while the river is at or near peak levels, which results in ponding of water in the lower parts of the CBD (as the tailwater level in the river would be elevated and delay gravity drainage).

Automated flood gates at each entry point to the Albert Street Station and at the southern portal are proposed to protect against extreme flood events.

Measures proposed in the reference design to protect the project from flood events

Design of the Albert Street Station, the Fairfield ventilation and emergency access building and the southern portal each provides flood protection measures for both local and extreme flood events. Design of the underground stations at the Woolloongabba, Roma Street and Boggo Road provide protection for local flood events only, as they are not impacted by extreme flood events.

The reference design standards adopted to ensure the protection of the Albert Street Station, Fairfield ventilation shaft and the southern portal from flooding appear to be satisfactory:

- 1:20 AEP event for flood protection mechanisms (for example, Moolabin Creek bund around the Yeerongpilly site during construction)
- 1:100 AEP for fixed engineering floodwater protections at all sites during operation
- 1:10 000 AEP for Albert Street floodgate operation and engineering integrity of all other project structures).

However, I consider that clear identification of responsibilities and correct operating systems for the proposed floodgates at Albert Street Station and the southern portal will be critical. Therefore, I have imposed Condition 35 (Appendix 1, Schedule 2) requiring every future stage of delivery of the CRR project to clearly document floodgate design and management requirements. During flood events there should be:

- a designated entity for provision of advice on floodwater forecasts (for example, the Bureau of Meteorology)
- documented and tested procedures for events leading up to a likely floodgate closure

- a precise trigger for when the gates are to be operated and by whom (for example, Brisbane River level at a designated point on the river as reported by a designated entity such as BCC to the rail manager such as Queensland Rail)
- documented procedures for:
 - evacuating personnel and decommissioning facilities and train operations prior to closing the gates, and
 - reopening the station and tunnels after a flood event requiring the gates to be closed.

Impacts of the project on local flood patterns

Potential impacts of the project on flood behaviour from the construction and operation of the project may result in:

- small loss of flood conveyance and floodplain storage for Moolabin Creek, due to the worksite adjacent to the north bank of Moolabin Creek and the construction of a new rail bridge across Moolabin Creek
- minor loss of flood conveyance for Rocky Waterholes Creek due to the construction of a new bridge across the creek
- some loss of flood storage for Stable Swamp Creek due to raising of the Beaudesert Service Road
- minor reductions in the flood storage volume of large Brisbane River flood events at Rocklea, Clapham Rail Yard, Fairfield and Albert Street.

The project requires the extension of minor culvert cross-drainage infrastructure in some locations at the north and south of the study corridor to accommodate widened rail embankments. These crossings were not detailed as part of the reference design but would be designed in accordance with the appropriate standards such as the *Queensland Urban Drainage Manual*, during detailed design.³⁵

BCC raised concerns about bridge design at Moolabin Creek and Rocky Waterholes in its submission. Both bridges require the construction of piers in the waterway and floodplain. Works associated with the construction of these bridges have the potential to impact on the flow of surface waters and impact on flooding.

Bridges on Rocky Waterholes and Moolabin Creeks

The project involves constructing eight additional piers across Rocky Waterholes Creek for a new rail bridge. The 1-in-100 AEP mapping in *Technical Report No. 6 – Flood Study* shows that peak flood levels would be increased by up to 0.04 metres on Muriel Avenue. No impacts to flood levels are predicted on private property during the 1-in-100 AEP. However, there is an increase during the 1-in-5 AEP and 1-in-20 AEP as a result of the piers during lower velocities. Although private property is affected by the 1-in-5 AEP and 1-in-20 AEP flood events, there are no structures on the site. Only the bridge piers will be affected by flooding.

³⁵ Institute of Public Works Engineering Australia (Queensland Division) and Brisbane City Council, *Urban Drainage Manual*, Department of Natural Resources and Mines, 2005, viewed 26 November 2012, <http://www.derm.qld.gov.au/water/regulation/drainagemanual.html>

Submissions were received regarding concerns on additional flooding impacts at Rocklea and Yeerongpilly with additional impacts of up to 0.04 metres due to filling and construction works from the project. The project has been designed to minimise impacts from potential changes to flooding. Mitigation measures are identified in the outline EMP.

Construction of the project includes a bund at the Yeerongpilly worksite adjacent to Moolabin Creek to prevent floodwater in a 1-in-20 AEP flood event from entering the worksite. The bund would be located outside the waterway and on industrial land. For the purposes of the EIS, it is assumed that the bund at the Yeerongpilly worksite would be in place for the five-and-a-half-year duration of construction works. The bund would be removed following the completion of construction activities and the creek would be rehabilitated.

Yeerongpilly worksite bund

Changes to flood levels in a 1-in-5 AEP flood event at Moolabin Creek due to the Yeerongpilly worksite bund are expected to be negligible (less than 0.01 metres). A 1-in-5 AEP flood event is likely to occur during the construction period given the duration of construction. In a 1-in-20 AEP flood event, changes in flood levels are expected to be in the order of 0.04 metres, while potential changes to flood levels would be in the order of 0.09 metres in a 1-in-100 AEP flood event. The probability of experiencing a 1-in-100 AEP flood event during the construction period is approximately 5.5 per cent.

Two commercial/industrial buildings are potentially affected by changes to flooding from the proposed construction bund. It is predicted that these properties would experience an increase in water level during a 1-in-100 AEP flood event of about 0.09 metres. Consultation would be undertaken to discuss mitigation options, such as compensation or a temporary relocation of the premises during construction. Chapter 11 in the EIS described mitigation measures for the rehabilitation of Moolabin Creek following construction.

Clapham Rail Yards

Ground levels vary at Clapham Rail Yards between 7–9 metres AHD (Australian Height Datum). The site will be filled to 9.5 metres AHD, which will result in a small decrease in flood plain storage for areas less than 7 metres AHD during a 1-in-100 AEP event. This will change surface water flows around surrounding sites, which is discussed in section 6.12.2.

Fairfield ventilation outlet

The ventilation and emergency access building would be constructed to avoid inundation of the tunnel through vent openings in a 1-in-10 000 AEP flood event. It would remove a small area from the available flood storage in a Brisbane River flood event. Submissions received during the EIS process raised concerns that the site partly flooded during the 2011 floods and properties surrounding the building are prone to flooding when the stormwater drains that pass through the site are obstructed. The draft outline EMP addresses temporary drainage matters during construction works.

Beaudesert Road structures

Numerous submissions were received during the EIS process regarding the closure of the Beaudesert Road level crossing, flood access and the operation of the emergency flood gate during flood events. During the 2011 floods, residents south of the rail corridor utilised the level crossing to evacuate from the area.

The issue has been addressed through the EIS process. The proponent proposes to raise the Beaudesert Road Service Road north of Dollis Street to the level of Beaudesert Road. This is to allow emergency egress from the area during flood events via a gate to Beaudesert Road. My evaluation of this proposal is provided in Section 6.3.5 of this report.

At Stable Swamp Creek, filling is required to raise the Beaudesert Road Service Road north of Dollis Street to the level of Beaudesert Road. Existing ground levels along the proposed service road alignment vary between 6.1 metres AHD and 10.6 metres AHD. The Stable Swamp Creek 1-in-100 AEP flood level is approximately 6.2 metres AHD. Therefore, the project will cause a very minor reduction in floodplain storage in Stable Swamp Creek. However, during detailed design it is possible that other solutions may be identified to resolve the closure of the Beaudesert Road level crossing and flood access.

RNA Showgrounds

The Campbell Street drain is a piped drainage system that flows under the RNA Showgrounds. The channel drains into an underground network which discharges into Breakfast Creek upstream of Horace Street. For larger, rarer flood events, the excess of flow from the RNA catchment only would discharge through the RNA Showgrounds, flowing to the Brisbane River through Newstead. The project does not include any works in the area that may experience local flooding in the Campbell Street Drain catchment and proposed surface works are unlikely to affect the Campbell Street drain overland flowpath.

The residual effects on flood management during the operation phase of the project are predicted to be low over the long-term.

Coordinator-General's conclusion

Given the scale of the CRR project and its potential impacts, a comprehensive approach to flood management is required, including consideration of recommendations that would emerge during the detailed design and procurement phases of the project.

I impose conditions 3 and 33–34 (Appendix 1) to guide flood project design and procurement matters and Condition 35 (Appendix 1, Schedule 2) to manage potential flood management and operation impacts of the CRR project.

6.13. Nature conservation

6.13.1. Context

The study corridor is located within a highly urbanised corridor with limited conservation value. The overall impact on flora and fauna by the project will be minimal.

6.13.2. EIS findings, submissions and analysis

The EIS discussed this topic in Chapter 11. It describes the natural features in the study corridor as generally limited to waterways and major open space areas.

Waterways located within the study corridor include:

- the Brisbane River
- Breakfast/Enoggera Creek, which is located at the boundary of the project
- the Oxley Creek tributaries of Moolabin Creek, Rocky Waterholes Creek and Stable Swamp Creek, which are located in the southern part of the study corridor.

A number of surface water features such as ponds and lakes are also located in the study corridor at the City Botanic Gardens, Roma Street Parkland and York's Hollow at Victoria Park. The study corridor also traverses the catchment boundaries of Kedron Brook in the north and Norman Creek in the south.

There is little direct connectivity between most of the habitats both within the study corridor and with the surrounding areas because the study corridor traverses high density development.

The majority of the central section of the project is located within a driven tunnel. Areas which hold nature conservation values have been either avoided by the project through design or are situated aboveground above the tunnels and would not be disturbed. No national parks, conservation parks, nature refuges or marine parks listed under applicable legislation are located within or directly adjacent to the study corridor.

The construction worksites will cause minor, localised displacement of species. Additionally, construction worksites may impact surrounding areas through sedimentation in waterways. Clearing and construction activities may increase weed infestation through topsoil disturbance and vehicle movement.

Waterways

Moolabin Creek, Rocky Waterholes Creek and Stable Swamp Creek all pass through a number of highly urbanised residential, commercial and industrial areas. They all receive large amounts of urban stormwater run-off and have been extensively modified from their original state. All three are freshwater creeks and support small patches of vegetation along their banks. However the habitat values are low due to the poor condition of much of the vegetation and the lack of structural diversity. There is the potential for the project to negatively impact on all three creeks. However impacts would be minimised through mitigation measures stated in the draft outline EMP.

Potential opportunities presented by the project to improve habitat value and function include removing and controlling weed species, revegetating around new infrastructure

within and/or adjacent to the creeks with applicable endemic and or native plant species and incorporating retention basins and other 'water sensitive urban design' (WSUD) devices to provide potential habitat for frogs, aquatic fauna and birds.

Approvals for works in Moolabin Creek are likely to arise for the new rail bridge, rehabilitation works along the southern edge of the construction site and any potential works on the Station Rd/Lucy Street bridge.

The project also offers a good opportunity to substantially enhance the natural environmental values of that part of Moolabin Creek adjacent the Yeerongpilly worksite as part of the required post-construction rehabilitation program for that location. I suggest that DEHP district office and the Oxley Creek Catchment Association³⁶ be consulted during the planning and implementation of this rehabilitation program. Refer to Recommendation 11 (Appendix 4).

Due to the predominantly underground nature of the project, most of the waterways located within the study corridor would not be disturbed. Therefore, investigations into the aquatic substrate, stream type, tidal influence, fish spawning periods, offsets for fish habitats and alternatives to waterway crossing were not required as part of the EIS.

The EIS indicated the main species that may be influenced by groundwater are the large remnant forest red gums.

The Brisbane River is saline and tidal in nature. It is anticipated that shallow aquifers within the vicinity of the Brisbane River are also to some extent, brackish to saline. Groundwater levels in these areas are likely to be tidally influenced and the water table is likely to fluctuate accordingly. It is difficult to determine what, if any, influence groundwater plays in the survival of the remaining remnant trees. It is considered however that the level of groundwater dependency in these areas is likely to be relatively low (opportunistic at best) with only salt tolerant species potentially utilising groundwater in these saturated zones.

Fig trees

Figs located along Alice Street in the CBD may be impacted due to the underground concourse from Albert Street Station to the City Botanic Gardens. During detailed design, it is proposed to obtain a report from a suitably qualified arborist to determine the potential impacts the underground concourse may cause to the roots of the large figs located along Alice Street adjacent to the Albert Street Station. This information will be used to develop a management plan for these trees.

Numerous submissions raised concerns regarding the impacts of construction on vegetation and also the removal of fig trees at Victoria Park. This has been addressed by refinements to the construction worksite in the SEIS to avoid removing large fig trees and minimising vegetation clearing. These changes are illustrated in the two drawings 'Northern portal underground works construction site (July 2011–CRR-NPL-W-5000 Rev C and Revised December 2011-CRR-NPL-W (Rev D)) in Appendix C of the SEIS. While there is still a possibility that construction soil disturbance in the root-zone of two fig trees may result in damage, TMR has committed to monitoring and implementation of arborist advice as necessary.

³⁶ www.oxleycreekcatchment.org.au

The draft outline EMP includes environmental objectives of nature conservation, performance criteria, mitigation and monitoring. One of the performance criteria includes no net loss of mature vegetation outside of the clearing footprint. Additionally, the draft outline EMP also states that where reasonable and practicable, construction site infrastructure (such as site offices, vehicle access and parking, material storage and cleaning areas for plant and equipment) must be located away from large trees and their drip zones, particularly in Victoria Park along Alice Street within the City Botanic Gardens.

6.13.3. Coordinator-General's conclusion

I conclude that the overall impact on flora and fauna as a result of the project should be minimal, with impacts largely limited to the fig trees in Victoria Park and along Alice Street, in the vicinity of the Botanic Gardens. I am satisfied that the proponent has reduced these impacts in Victoria Park by reconfiguring the construction worksite to avoid the need to remove the mature fig trees.

I impose a condition at Appendix 1, Schedule 2, Condition 23 to manage the impacts on flora and fauna.

I also recommend that all rehabilitation works requiring separate approvals be subject to Recommendation 11 (Appendix 4) and rehabilitation works specific to Moolabin Creek be subject to stated Condition 5 (Appendix 3).

6.14. Climate change, sustainability and greenhouse gas emissions

6.14.1. Background and context

Chapter 6 of the EIS presented an assessment of climate change and sustainability issues, and proposed associated mitigation strategies. The EIS discussed the legislative and policy context, and described issues such as energy efficiency, greenhouse gas emissions; the impacts of climate change on public transport infrastructure; and the importance of incorporating sustainability considerations into the detailed design, construction and operational phases of the project.

6.14.2. EIS findings, submissions and analysis

Climate change

Climate change has been recognised as a critical area of sustainable development within Queensland planning frameworks, and it is also a key input to planning transport infrastructure, with urban transport systems and inefficient settlement patterns a major contributor to greenhouse gas (GHG) emissions. The project has the capacity to manage the carbon footprint of urban transportation systems by moving people more efficiently over longer distances.

- As part of the EIS, a preliminary risk assessment was undertaken to identify key climate change risks and mitigation and adaptation options. The assessment

examined the potential hazards associated with the detailed design, construction and operation of the project and assessed the likelihood and consequences of risks associated with each potential climate change hazard.

Based on the potential changes in climate, the EIS identified the key potential risks to the project were from:

- inundation of critical infrastructure due to higher intensity, frequency and duration of rainfall events
- the speed and direction of winds, affecting surface infrastructure
- impacts on power supply due to a range of possible high-temperature-related events
- heat impacts on mechanical and electrical systems, such as accelerated deterioration of facilities and infrastructure due to changed operating conditions
- impacts of sea level rise and storm surges on critical infrastructure, particularly at Mayne Rail Yard adjacent to the tidal Breakfast Creek, which has the potential to be subject to sea level rise and intensification of storm tide events.

Design elements considered

The climate change risk assessment was undertaken based on the reference design, and included the following components, which would be further developed during the detailed design phase to ensure the project can readily adapt to future climate change scenarios:

- raised station entry points at the surface to protect underground stations against local flooding
- a protection system for intermediate flood events for low lying stations
- dedicated automatic flood gates to protect Albert Street Station and the southern portal at Yeerongpilly against extreme flood events
- station entries designed to respond to the existing warm climate with a combination of adjustable panels, louvres and shading
- entrance coverings for stations that can be progressively closed and secured in severe weather conditions
- the use of platform screen doors to maintain temperatures of 26°C at the platform level
- three new 25 kV feeder stations to provide the required power for the project, including an independent supply for traction power in the event of a localised power failure (EIS Ch. 6, pp. 10–11).

Greenhouse gas emissions

Chapters 6 and 15 of the EIS included an analysis of the likely sources of GHG emissions, and recommended strategies to mitigate or minimise emissions where possible. The EIS concluded that, during the construction phase, the majority of GHG emissions would be generated from diesel-operated construction equipment and from electricity consumption. The total estimated GHG emissions during the construction phase would be 0.65 million tonnes, which would be equivalent to 0.10 per cent of total Queensland emissions.

During the operational phase, the majority of GHG emissions would be generated from the electricity consumption of trains and stations. The estimated annual GHG emissions during the operational phase is 0.09 million tonnes per year (in 2021) and 0.14 million tonnes per year in 2031, which would be equivalent to 0.06 per cent of total Queensland emissions in 2021 and to 0.14 per cent in 2031.

The EIS recommended the following strategies to minimise GHG emissions:

- pressure differentials, platform screen doors and targeted cooling to improve air conditioning efficiency during operation
- tunnelling between Boggo Road Station and Yeerongpilly instead of surface track widening, which would reduce energy use from straighter track alignment between Boggo Road and Yeerongpilly
- energy efficient design of ventilation systems to minimise power requirements
- an improved specification for new rolling stock to reduce energy demands
- a review of annual energy use to identify potential energy efficiency opportunities to reduce GHG emissions (EIS, p. 15-61).

The EIS found that the GHG emissions generated during the construction and operational phases would be significantly offset by an expected reduction in the number of private vehicle trips made each day. Table 15-28 of the EIS summarised vehicle travel in Brisbane each weekday, and Table 15-29 estimated the expected reduction in vehicle fuel used each day. The project is expected to reduce road-generated GHG emissions by 22.5 kilotonnes in 2021 and by 91.1 kilotonnes in 2031.

Sustainability

The proponent presented a sustainability framework for the project (Appendix E-2 to the EIS), to enable the development of feasible, project-specific design measures that result in enhanced sustainability outcomes for the project. The sustainability elements in the reference design were developed to help ensure the sustainable performance of the project is carried forward into the detailed design stage. The framework identifies implementation actions, project phase, implementation ownership and further actions required. The following sustainability measures were incorporated into the reference design:

- maximise energy efficiency and reduce water consumption
- integrate the project with existing transport nodes
- increase the health and social wellbeing of users of the project
- ensure infrastructure compatibility with existing land uses and further enhance their viability
- improve safety and security for project users
- minimise the project's contribution to climate change
- contribute to economic growth in Brisbane.

In addition, the EIS provided a comprehensive list of actions for consideration at the detailed design, construction and operational phase of the project, and acknowledged

that the sustainability assessment framework should be reviewed and updated throughout the phases of the project.

6.14.3. Coordinator-General's conclusion

I am satisfied that the climate change and sustainability impacts have been sufficiently analysed, and that the sustainability measures developed are appropriate to ensure sustainable outcomes for the project. I note there will be further opportunities to modify mitigation strategies during each project phase, and as research into climate change evolves.

I note that a list of sustainability measures, incorporated into the reference design, was provided in Appendix E2 of the EIS and in the draft Outline EMP. The sustainability framework encourages the detailed designer, construction contractor and eventual operator to implement sustainable design principles, select energy efficient technologies, and address climate change matters through each phase of the project.

I recommend that the list of sustainability measures be incorporated into the tender documentation for each phase of the project, to encourage tenderers to develop innovative and cost-effective solutions to address the sustainability issues identified in the EIS (Appendix 4, Recommendation 12).

Furthermore, I have imposed a condition at Appendix 1, Schedule 2, Condition 24 to ensure the stations are designed and constructed in accordance with the requirements for environmentally responsible design, as specified in the latest version of the *Queensland Rail Station Design Guide*³⁷.

I acknowledge the important role that public transport systems play in reducing CO₂ emissions and I am satisfied that the GHG emissions to be generated during the construction and operation phases would be offset by the expected reduction in daily private vehicle trips. Nonetheless, I have imposed a condition to ensure that both carbon emissions and potable water usage are minimised during the construction and operational phases (refer to Appendix 1, Schedule 2, Condition 24). For my conclusions regarding groundwater, surface water and water quality, refer to Section 6.12.

6.15. Waste

6.15.1. EIS findings, submissions and analysis

Waste management in Queensland is governed by the EP Act, Environmental Protection Regulation 2008, Environmental Protection (Waste Management) Policy 2000 (EPP (Waste)), and the Environmental Protection (Waste Management) Regulation 2000.

The Environment Protection (Waste Management) Regulation 2000 and the EPP (Waste) seek to achieve the objectives of the EP Act and set the legislative framework governing Queensland's waste management strategy and plan.

³⁷ <http://www.dsdip.qld.gov.au/resources/guideline/tod/appendix.pdf>

During the construction phase, the project would generate waste from activities such as blasting, clearing, excavation, building works, materials delivery, equipment maintenance and water treatment. During the operational phase, waste would be generated from activities including equipment and infrastructure maintenance, general public waste, kitchen wastes (from commercial food outlets), office waste and train incidents and accidents. Chapter 17 of the EIS provided full details of each activity and the associated wastes expected to be generated.

The EIS concluded the waste and resource recovery activities of the project are not expected to pose a significant risk to the environment or public health, provided effective waste management and resource recovery control measures are implemented.

In accordance with the Environment Protection (Waste Management) Regulation 2000 and the EPP (Waste), TMR intends to implement a waste management hierarchy for the project, which would follow the principles of:

- avoidance
- reuse
- recycle
- recovery
- disposal.

TMR proposes to implement a waste and resource recovery management plan (WRRMP) for the demolition, construction and operations phases of the project. The WRRMP would form part of the EMP, and include strategies consistent with the principles of the relevant waste management legislation and policies. Operational waste management strategies would be detailed in a waste sub-plan to the Operational EMP—refer to the draft outline EMP (EIS Chapter 24); and waste management provisions also would be included in the construction EMP.

The then Department of Environment and Resource Management (DERM) raised concerns about the proposed movement of spoil from construction sites to Swanbank. In its submission, DERM required a detailed breakdown of the quantity of spoil/quarry material generated during construction works. This level of detail will be understood following detailed design and once determined will be used to obtain sales permit or authorisation under the *Forestry Act 1959* where required.

Spoil haulage is addressed in section 6.3.3.

6.15.2. Coordinator-General's conclusion

The project could generate a substantial amount of waste, both during construction and operation. Waste should be managed in accordance with existing legislation, policies and regulations as guided by imposed Condition 25 (Appendix 1, Schedule 2).

6.16. Cumulative impacts

6.16.1. Context

The CRR EIS has considered cumulative impacts on the environment. Cumulative impacts can be experienced when there are either:

- interactions of several developments occurring concurrently and in the same area, or
- the same community experiences ongoing construction activities on a number of different projects over a period of time (sometimes called 'construction fatigue').

EIS findings, submissions and analysis

During construction, the principal cumulative impacts would be from the construction of adjacent projects that overlap or have similar construction timeframes (refer to EIS Table 5-12). The key negative impacts are predicted to be from combinations of noise, dust, visual intrusion, traffic, competition for parking and/or reduced access. In order to avoid, minimise or mitigate these cumulative impacts, TMR has indicated its intention to implement a variety of control measures (draft outline EMP, EIS Chapter 24) in consultation with affected groups.

As the timing of delivering the CRR project is currently uncertain, the details of any cumulative impacts cannot be assessed at this time. However the cumulative impacts for the reference design predicted in the EIS were:

- overlap of the Legacy Way road tunnel project construction timeframes (of minor potential consequence to traffic around Spring Hill)
- development construction at RNA Showgrounds, Roma and Albert Streets, Woolloongabba, Boggo Road and Yeerongpilly³⁸ (traffic, parking, access, noise and dust)
- minor cumulative loss of flood conveyance and floodplain storage capacities along Moolabin Creek and Rocky Waterholes Creek at the southern portion of the corridor.

Community submissions raised concerns about the cumulative noise impacts of multiple potential projects at one location. I am conscious, for example, that over the last decade communities have seen protracted construction at:

- Dutton Park (Eastern Busway station, Boggo Road redevelopment and the Ecosciences Precinct)
- Bowen Hills (ICB, Inner Northern Busway, RBH redevelopment, Clem7, Airport Link and Legacy Way road tunnels and now the RNA Showgrounds redevelopment).

Closer to the time of the CRR project proceeding, the construction schedules of each existing and proposed project in the study corridor would be better known and the CEMP would be refined to more accurately identify and manage cumulative impacts.

³⁸ The EIS identified the proposed development of a transit oriented development (TOD) at Yeerongpilly. That particular proposal has been abandoned, but some level of other future commercial and residential development appears likely at Yeerongpilly in the future.

New monitoring for the predictive models described in the draft outline EMP and required by the conditions of this report would be done to recalibrate for the 'real world' cumulative impacts just before the commencement of the project. For example, new monitoring would be undertaken of background noise at nominated sensitive locations around each construction site before and during construction. Refer to conditions 3 and 7 (Appendix 1).

6.16.2. Coordinator-General's conclusion

I am satisfied the EIS and SEIS adequately investigated the cumulative impacts of CRR to the extent possible at this stage of the project's development.

The project is likely to be located in close proximity to other construction projects and in communities suffering from construction fatigue, so it is inevitable that this project would partially contribute to negative noise, dust, traffic, visual and access problems in the study corridor. Nonetheless, I consider that, upon completion of construction, the net benefits of the CRR project (including numerous indirect positive cumulative impacts) would outweigh any cumulative negative impacts of this project, provided that the proposed mitigation measures described in the draft outline EMP and required by the imposed conditions of this report are fully implemented.

7. Environmental management plan

7.1. Context

Chapter 24 of the EIS provided a draft outline EMP for the construction and operational phases of the CRR project. A detailed CEMP, OEMP and relevant sub-plans must be prepared by the proponent or its agent or contracted entities, and approved by a relevant state agencies (nominated in Appendix 2 of this report) prior to the commencement of the project phase to which they relate.

The EMP becomes the key reference document that converts the undertakings and recommendations of the environmental studies into actions and commitments. All personnel engaged on the project will be bound to comply with the requirements of the CEMP and OEMP and their sub plans. An EMP specifies:

- proposed environmental management strategies, actions and procedures to be implemented to mitigate adverse and enhance beneficial environmental and social impacts
- monitoring, reporting and auditing or verification requirements
- the entity responsible for implementing proposed actions
- proposed timing
- corrective actions if monitoring indicates that performance requirements have not been met.

7.2. EIS findings, submissions and analysis

As proposed by the proponent in the EIS, the EMPs would be dynamic documents and would be updated to incorporate further information and public concerns, approval conditions, changes in environmental management procedures in the light of ongoing monitoring results, new techniques and legislative requirements.

The proponent has committed that each EMP would be supported by sub-plans. The CEMP sub-plans are likely to deal with matters such as:

- soil erosion and sedimentation
- construction air quality, including dust
- noise and vibration
- flooding
- surface water quality and groundwater quality
- spoil removal, haulage and placement
- hours of work and work practices at each worksite
- safety hazard and risk
- community liaison and communications.

The OEMP sub-plans are likely to deal with matters such as:

- wastewater management and disposal

- landscape management and maintenance
- emergency and risk procedures
- flooding and groundwater management
- community liaison and communications.

Effective implementation of the EMP should satisfy the commitments made by the proponent in the EIS, SEIS, project information, in subsequent correspondence from TMR to the Office of the Coordinator-General and in correspondence with members of the public and advisory agencies, and should ensure environmental impacts of the project are managed.

In a number of areas, including air quality, noise, vibration and traffic, I have imposed conditions setting limits for the project. In these cases, the requirements of the conditions I impose, override any objectives provided in the draft outline EMP.

The final EMPs would need to include, but not be limited to, the mitigation measures outlined in the draft EMPs and must reflect the requirements that I have mandated through imposed conditions and the requirements of other approvals under other legislation, to the extent they are relevant. For example, the final EMP and sub-plan in respect to surface water will need to provide the performance criteria and mitigation measures to achieve the water quality release limits I have set, among other requirements.

In some cases, I have also imposed conditions requiring specific mitigation measures be undertaken to minimise or manage impacts and these measures will need to be adopted in the final EMPs.

7.3. Coordinator-General's conclusion

To ensure the EMPs and sub-plans meet the requirements of my imposed conditions and the commitments made in the EIS and SEIS, I impose conditions 36 and 37, (Appendix 1, Schedule 2), which require that:

- the proponent provide the plans to the relevant nominated entities and consultative bodies for review
- any comments from those bodies are taken into account in finalising the plans
- EMPs and sub-plans are made publicly available.

I have also imposed Condition 3 (Appendix 1, Schedule 1) to:

- ensure that the proponent implements appropriate reporting of monitoring results and other important project commitments to the community
- provide an effective mechanism to ensure that compliance with all conditions in Appendix 1, schedules 1 and 2 will be independently verified, especially in the cases where non-compliance is alleged or apparent exceedence events of environmental limits have occurred.

The monitoring and verification processes I have imposed for the CRR project are:

- less prescriptive and more outcome focussed than recent projects

- rely more on proponent demonstration of self-regulation and compliance through broader, more transparent and higher frequency public reporting, unless evidence or validated allegations of non-compliance with conditions emerges

In this later case, the verification process specified in Condition 3 still allows for subsequent enforcement actions and imposition of penalties on the proponent if required.

8. Conclusion

I am satisfied that the EIS process adequately meets the requirements for impact assessment, in accordance with the SDPWO Act. The EIS process provided sufficient information to allow an informed evaluation of the project's potential environmental impacts.

Based on the information provided by the proponent and outlined in Subsection 2.3, I conclude that the project could deliver economic and city-building benefits to the city of Brisbane, by improving rail capacity, service frequency and reliability. I consider that all potential negative environmental impacts of the project can be avoided, or acceptably minimised or mitigated.

I am satisfied that the CRR project could proceed, subject to the approvals listed in Section 4 and the conditions and recommendations listed in appendices 1–4 of this report. In addition, it is expected that the proponent's commitments will be fully implemented as described in the EIS documentation.

This report includes:

- imposed conditions under section 54B of the SDPWO Act (refer to Appendix 1)
- nominated entities for jurisdiction over each imposed condition section 54B(3) of the SDPWO Act (refer to Appendix 2)
- stated conditions under sections 39 or 47C of the SDPWO Act (refer to Appendix 3)
- general recommendations (refer to Appendix 4)

The proponent will be required to finalise and implement the CEMP and OEMP for the project.

If there are any inconsistencies between the project (as described in the EIS and SEIS) and the conditions or recommendations in this report, the conditions and recommendations in this report shall prevail. TMR and its agents, lessees, successors and assignees, as the case may be, must implement the conditions of this report and all commitments presented in the EIS, SEIS and other supplementary project information and EMPs.

Copies of this report will be issued to:

- the proponent (TMR)
- the assessment managers (BCC and ICC)
- the entities with jurisdiction for imposed conditions (BCC, DCCSDS, DCS, DEHP, DSDIP, ICC and TMR)
- entities nominated for consultation on imposed conditions or named in general recommendations
- relevant Ministers and local, state and federal elected representatives.

A copy of this report will also be available on the Department of State Development, Infrastructure and Planning's website at www.dsdip.qld.gov.au

I note that any substantial future changes to the reference design for the CRR project upon which this evaluation report is based, could be assessed under the 'change report' process in accordance with Division 3A, Part 4 of the SDPWO Act.

Appendix 1 Imposed conditions

This appendix includes conditions imposed by the Coordinator-General under section 54B of the SDPWO Act.³⁹ The conditions are relevant to applications for development approvals for those parts of the project where there is no relevant approval applicable under other legislation.

All of the conditions imposed in this appendix take effect from the date of this Coordinator-General's report.

These conditions do not relieve the proponent of the obligation to obtain all approvals and licences from all relevant authorities required under any other Act.

In accordance with section 54B(3) of the SDPWO Act, I have nominated several entities to have jurisdiction for the conditions in this schedule. These entities are shown in Appendix 2.

Pursuant to section 54D of the SDPWO Act, these conditions apply to anyone who undertakes the project, such as the proponent and an agent, contractor, subcontractor or licensee of the proponent, and any public utility providers undertaking public utility works as a result of the project.

SCHEDULE 1 GENERAL CONDITIONS

Condition 1 General conditions

- (a) The project must be carried out generally in accordance with the EIS (July 2011) (EIS) for the project, and the SEIS for the project (March 2012).
- (b) The proponent must notify the Coordinator-General and all nominated entities in Appendix 2 in writing of the commencement of construction works and the commencement of the commissioning and operational phases of each 'construction site'⁴⁰ at least 20 business days prior to the relevant commencement date.

Condition 2 Construction timetable

- (a) At least 20 business days prior to the commencement of any construction works at each 'construction site' the proponent must submit a construction timetable to the Coordinator-General.
- (b) The timetable must identify the key construction activities and the dates of commencement and completion of each key construction activity.
- (c) The Coordinator-General must be provided with any construction timetable updates.

³⁹ For a definition of 'imposed conditions', refer to the Glossary on page 195 of this report.

⁴⁰ Defined in the Glossary.

Condition 3 Environmental monitoring reporting and verification

Required outcome

- (a) The proponent must monitor and report on all aspects of the environmental performance and management of the project, including independent verification.

Monitoring and reporting requirements

- (b) Prior to the commencement of construction works, the proponent must establish and maintain an information system available to the general public (for example a dedicated internet site) that includes at least the following:
 - (i) all environmental monitoring data undertaken for the project, as required by of conditions set out in schedules 1 and 2 of Appendix 1
 - (ii) a description of all incidents where recorded data indicates non-compliance with limits prescribed by conditions set out in Appendix 1
 - (iii) a description of all other incidents of non-compliance with a condition set out in Appendix 1
 - (iv) a report on the proponent's response to each non-compliance incident including any corrective actions and/or amended practices taken or proposed to be taken
 - (v) a register of all complaints received, including the subject of complaint, responses and any corrective actions taken
- (c) The information in Condition 3(b) is to be made available as soon as practicable. Electronically recorded environmental data is to be published within 24 hours.
- (d) In the case of an incident that may cause 'environmental harm' as defined by section 14 of the EP Act, the reporting and management requirements of the EP Act take precedence over the provisions of this Condition 3(a)–(c).
- (e) The matters covered by the conditions in Appendix 1 of this report that should be specifically excluded or specifically included in the information system in (b) are listed in Table A1: Matters to be included in reporting required under Condition 3(b) .

Table A1: Matters to be included in reporting required under Condition 3(b)

Condition	Description of matter
1(b)	Notification of commencement of construction, commissioning and operation of the project at each construction site
5(a)	Work outside of standard construction hours if not subject to 5(b)
5(b)	Circumstances causing works outside of 'standard construction hours and forward notification of such events
6	Any non-compliance with conduct of construction work requirements
7(a)-(f)	Non-compliance with construction noise limits
7(g)(ii)	Background noise monitoring undertaken that informs predictive modelling
7(g)(iii)-(iv)	Identification of construction noise & vibration monitoring points during construction and commissioning
7(g)(viii)-(ix)	List of construction noise mitigation measures
7(g)(x)	Timeframes for consultation with stakeholders on noise & vibration matters
7(g)(xi)	Details of verification & monitoring requirements. Impact-based triggers for offering mitigation measures at the location of the sensitive receiver
7(h)	Intention to seek permission to conduct noisy day-time works that do not comply with Conditions 7(a)-(f). Any non-compliance with 7(h)
8(a)-(b)	Non-compliance with blasting limits
8(c)	Intention to conduct blasting
9(a)-(b)	Non-compliance with construction vibration limits
9(e)	Results of construction vibration monitoring
10	Any non-compliance with construction spoil handling & placement requirements
11	Only significant changes to public access & transport matters must be reported

Condition	Description of matter
12	Only significant changes to pedestrian & cycle connectivity matters must be reported
13	Only matters related to changes to public roads must be reported
14	Only matters related to proposed use of public streets for worker parking or changes to existing public parking arrangements, must be reported
15	Consultation proposals & study outcomes for future public transport & parking arrangement around the Yeerongpilly Station & for CBD & Woolloongabba bus services after commencement of operation of the project
16(a)-(c)	Any non-compliance with construction air quality limits
16(d)-(e)	Location and results of all construction air quality monitoring
16(f)-(g)	All background monitoring locations and results & all mitigation measures adopted must be reported
18	All ground settlement monitoring locations & monitoring results
19(e)-(f)	List of erosion & sediment control mitigation measures being implemented at each construction site
19(g)	Report failures of erosion and sediment control structures and corrective actions taken to avoid such future failures
20	Report any identified acid sulfate soils, mitigation measures adopted to manage them and any unscheduled release of untreated water from these locations
21 & 22	Provide diagrams of views of all construction sites at mid construction point and all prominent operational project finished structures
24	Report measures being adopted to manage carbon emissions & water use
25	Report measures being adopted to manage wastes any accidental release of waste products from construction sites
26	Report any non-compliance with hazard and risk requirements
27, 29 & 30	Report any non-compliance with groundwater quality requirements or limits
28	All groundwater monitoring locations and results
31 & 32	Report any non-compliance with surface water quality requirements or limits and monitoring locations

Condition	Description of matter
33	Report any measures implemented for the project that are specifically derived from the Flood Commission of Enquiry recommendations
34	For each construction site and significant operational structure, report the flood immunity design levels and any flood afflux impact profile of any construction site greater than 0.04 metres for a range of potential rainfall and flood events from 1:20 to 1:100 AEP
36(a)-(e)	Publish the CEMP and any CEMP updates
36(f)	Provide all necessary information required for a member of the public to use the complaints management system

Table A2: Matters to be excluded in reporting required under Condition 3(b)

Condition	Description of matter
1(a)	Project carried out generally in accordance with EIS
2	Construction timetable
4	Interface agreements
7(vi)-(vii)	Noise model recalibration
7(j)-(k)	Matters to do with operational noise limits during Commissioning phase.
9(c), (d) & (f)	Vibration model recalibration
9(g)-(i)	Use of secondary mitigation measures for vibration and results of building condition surveys pre & post construction
9(j)	Matters to do with the Ecosciences Precinct transmission electron microscope
9(k)-(l)	Matters to do with operational vibration limits during Commissioning phase
13(h)	Matters to do with dust management at the Ecosciences Precinct
17	Pre-procurement geology & geotechnical survey program
19(a)-(d)	Erosion & sediment control plan
19(g)-(h)	Design & maintenance of erosion & sediment control structures
23	Flora & fauna
35	Emergency access management sub-plan
37-41	Project operations matters

Verification and certification of monitoring and reporting

- (f) Upon the request of the Coordinator-General, the proponent must provide a verification report to the Coordinator-General or an entity nominated by the Coordinator-General that certifies the accuracy and completeness of any published information. The report is to be:
 - (i) prepared by independent and suitably qualified specialist(s), engaged by and at the expense of the proponent.
 - (ii) submitted within 10 business days of a request

Note:

1. A maximum of ten verification reports may be requested in a fixed calendar year.
2. Provision of incorrect information under this condition may be interpreted under s. 157O of the SDPWO Act as giving the Coordinator-General a document containing information a person knows is false or misleading in a material particular and therefore an offence.

Condition 4 Interface agreements for transport matters

Proponent must manage all interfaces between the project and all other activities and infrastructure to ensure minimum impact to those interfaces and consistent with any agreements put in place with the interface owners before any related construction occurs.

- (a) All provisions for 'interface agreements' under Queensland transport legislation should apply to the construction and operation of the project, in particular:
 - (i) sections 71–80 of the *Transport (Rail Safety) Act 2010*
 - (ii) Chapter 15A of the *Transport Infrastructure Act 1994*.
- (b) The proponent should consider general Recommendation 6 (Appendix 4) of this report during the development of any interface agreements for this project.

SCHEDULE 2 CONSTRUCTION

Condition 5 Construction hours of work

- (a) Construction activities are to be undertaken in accordance with the hours of work set out in Table A3: Construction hours of work, except in circumstances described in Condition 5(b).

Table A3: Construction hours of work⁴¹

Construction site	Surface works No work on Sunday or public holidays	Works conducted underground or within an acoustic enclosure, providing the limits in Table A4, Table A5 and Table A6 are achieved, otherwise as for surface works	Spoil haulage and materials/ equipment delivery, providing the limits in Table A4, Table A5 and Table A6 are achieved, otherwise as for surface works No haulage Sunday or public holidays
Northern Portal (Victoria Park),	daily from 6.30 am – 6.30 pm, Monday to Saturday	24 hours, 7 days	at all times from 6.30 am Monday to 6.30 pm Saturday
Boggo Road	daily from 6.30 am – 6.30 pm, Monday to Saturday	24 hours, 7 days	at all times from 6.30 am Monday to 6.30 pm Saturday(except 7.00 am to 9.00 am and 4.00 pm to 6.00 pm eastbound on Cornwall Street)
Woolloongabba	daily from 6.30 am – 6.30 pm, Monday to Saturday	24 hours, 7 days	24 hours, 7 days (except 7.00 am to 9.00 am on Stanley Street and 4.00 pm to 6.00 pm on Vulture Street)
Yeerongpilly Clapham Rail Yard Mayne Rail Yard	daily from 6.30 am – 6.30 pm, Monday to Saturday	24 hours, 7 days	24 hours, 7 days
Roma Street, Albert Street	daily from 6.30 am – 6.30 pm, Monday to Saturday 6.30 pm-10.00 pm Monday to Friday providing the limits in Table A4 are achieved	24 hours, 7 days	daily from 9.00 am – 10.00 pm, Monday to Friday (except 4.00 pm to 6.00 pm 6.30 am-6.30 pm Saturday)

⁴¹ Subject to Condition (c)

Construction site	Surface works No work on Sunday or public holidays	Works conducted underground or within an acoustic enclosure, providing the limits in Table A4, Table A5 and Table A6 are achieved, otherwise as for surface works	Spoil haulage and materials/ equipment delivery, providing the limits in Table A4, Table A5 and Table A6 are achieved, otherwise as for surface works No haulage Sunday or public holidays
Surface roadworks at: O'Connell Terrace Rocklea (Ipswich Motorway) and any other 'construction sites' not described in this Table.	daily from 6.30 am – 10.00 pm, Monday to Friday 6.30 am-6.30 pm Saturday	n/a	at all times from 6.30 am Monday to 6.30 pm Saturday

(b) Notwithstanding Condition 5(a) above, the following construction works are permitted to be undertaken outside of the standard construction hours, subject to conditions:

- (i) construction works undertaken within a rail corridor more than 100 metres from a construction site that cannot be undertaken reasonably nor practicably during standard hours due to potential for disruption to normal rail network operations;
- (ii) the delivery of oversized plant or structures that police or other authorities determine require transport along public roads to be outside the standard construction hours and for which there is no feasible alternative;
- (iii) emergency works to avoid the loss of lives, damage to property or to prevent environmental harm;
- (iv) construction works for which relevant authorities (for example Queensland Rail, BCC or road management authorities) require that particular works at particular locations can only be undertaken outside of the daytime construction hours;
- (v) any other construction works approved by the Coordinator-General.

Condition 6 Conduct of construction work

All construction works must be designed and implemented to minimise community disruption and shall include the following measures:

- (a) Construction night lighting, including security lighting, must be designed, installed and positioned to minimise light spill onto residential premises or other sensitive places and comply with AS4282-1997: Control of the obtrusive effects of outdoor lighting.

- (b) The location of construction access points for pedestrian and vehicular traffic must have regard to the Transport, Access, Parking and Servicing Planning Scheme Policy in the BCC Planning Scheme.
- (c) Achieve compliance with the requirements of the Hazard and Risk Assessment Planning Scheme Policy in the BCC Planning Scheme.
- (d) Any water supply or other infrastructure services required to support construction works must be designed and constructed to achieve the environmental objectives and performance criteria set out in the Draft Outline EMP of the EIS, including, but not limited to flood management.
- (e) Where it is identified that property damage has occurred to premises as a consequence of the construction works, such damage must be repaired as soon as practicable at no cost to the property owners. Such repairs must be undertaken in consultation with the property owners and occupants and must return the premises at least to the condition existing prior to commencement of construction works.
- (f) Construction areas must be rehabilitated as quickly as reasonable and practicable to manage and mitigate potential impacts such as dust, diminished water quality, soil erosion and sedimentation.
- (g) Adequate construction workforce off-street parking areas must be provided or accessible as described in the EIS or as otherwise approved by the Coordinator-General. All practical measures should be undertaken to avoid construction workforce car parking in streets within 500 metres of each construction site for the duration of the period the worksite is in use, such as the provision of shuttle transport between construction workforce car parks distant from a worksite where appropriate as proposed in the EIS.
- (h) Dedicated construction workforce car parks must be rehabilitated as quickly as is reasonable and practicable to a standard suitable for future use of a purpose preferred in this location under the area designation in the BCC Planning Scheme.
- (i) The visual amenity of the worksites must be maintained in a manner that is consistent with its immediate neighbourhood.
- (j) The proponent must ensure that an access to all properties is maintained during construction and following opening of the project to traffic and rail services, unless a solution acceptable to the property owner/occupant is reached and documented in the form of a signed agreement. The proponent must ensure that lawful access to a property affected by the project is reinstated to an equivalent standard or that adequate compensation is negotiated with the relevant landowner(s).
- (k) Following completion of construction works, the worksites must be rehabilitated as quickly as reasonable and practicable. The plan for rehabilitation must be developed in consultation with the relevant CLG. Planting and landscaping must give priority to the use of native species endemic to the Brisbane area and the BCC Planning Scheme: Planting Species Planning Scheme Policy. There must be provision for ongoing maintenance (including any necessary remedial action)

to ensure the survival of vegetation planted at the site for a period of at least twelve months from the completion of construction of each area.

Condition 7 Noise

Required outcomes and noise limits

- (a) The proponent must not exceed the noise limits specified in this condition (except where approved under (h)) and approach all noise management with the key objective of minimising noise 'nuisance'⁴².
- (b) All construction works undertaken during the daytime and evening construction hours must not exceed the limits specified in Table A4: Limits for internal noise daytime and evening—construction.

Table A4: Limits for internal noise daytime and evening—construction

Noise measure	Type of building	Daytime Mon–Sat 6.30 am – 6.30 pm	Evening Mon–Sat 6.30 pm – 10 pm
Continuous (LAeq adj) (1hr)	Dwelling	35	35
	Library and educational institution, including a school, college and university	35	35
	Hospital, surgery or other medical institution. Visiting hours	35	35
	Hospital, surgery or other medical institution. Anytime, other than visiting hours	30	30
Intermittent (LA10 adj) (1hr) (LA Max)	Dwelling	40	40

Implementation notes:

- ¹ Where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in *Guideline Planning for Noise Control*, Ecoaccess, DERM, July 2004 apply.
- ² Construction noise between 6.30 pm and 10.00 pm Monday to Saturday would be permitted only in those locations identified for surface works during those hours.

- (c) Night-time noise sources for surface construction works must not exceed the limits specified in Table A5. Limits for long-term, night-time noise—surface construction.

⁴² Environmental nuisance is defined in section 15 of the EP Act.

Table A5. Limits for long-term, night-time noise—surface construction

Noise type	Time of day	LA _{10,(adj) (10mins)} (measured at a sensitive place) ¹	LA _{1(adj) (10mins)} (measured at a sensitive place) ¹
Steady construction noise	Monday – Saturday 10 pm – 6.30 am Sundays, Public Holidays	Background + 3 dB(A)	Background + 5 dB(A)

Implementation notes

¹ Measured in accordance with the most recent edition of the Queensland Government’s Noise Measurement Manual.²²

- (d) Works conducted in a rail corridor more than 100 metres from a CRR ‘construction site’⁴³ may alternatively comply with the requirements of the edition of the Queensland Rail *Code of Practice – Railway Noise Management* (EMS/STD/46/004) that is current at the time that the competitive tendering process for the procurement of the construction of the CRR project commences.
- (e) Regenerated noise created by underground works must not exceed the limits specified in Table A6: Limits for night-time regenerated noise —underground works in the most affected habitable rooms of a sensitive place.

Table A6: Limits for night-time regenerated noise —underground works

Time	Objectives – LA _{eq (adj) (15 min)} ¹
6.30 pm to 10.00 pm	40 dB(A)
10.00 pm to 6.30 am	35 dB(A)

Implementation notes

¹ Measured in accordance with the most recent edition of the Queensland Government’s *Noise Measurement Manual*.²²

Night works conducted in accordance with Condition 5(a)

- (f) Night works that conform with Schedule 2, Condition 5(b) that exceed the limits in Table A4: Limits for internal noise daytime and evening—construction are permitted only where the limits in Table A7: Noise limit for night works permitted under Condition 5(a) (Schedule 2).

⁴³ ‘Construction worksites’ are those defined in EIS Volume 2 Reference Design Drawings ‘Construction Worksite Plans’.

Table A7: Noise limit for night works permitted under Condition 5(a) (Schedule 2)

Noise type	Time of day	LAeq(adj) (24hour) (measured at a sensitive place) ¹
Night-time steady construction noise Condition 5(a)(ii)–(v)	10 pm - 6.30 am (construction sites and within rail corridors up to 100 metres from a construction site)	65dB(A)
Night-time steady construction noise Condition 5(a)(i)	10 pm - 6.30 am for rail possessions more than 100 metres from a 'construction site' ²	In accordance with the Queensland Rail Code of Practice – Railway Noise Management
<p>¹ Measured in accordance with the most recent edition of the Queensland Government's <i>Noise Measurement Manual</i>.²²</p> <p>² 'Construction sites' are 'Construction areas' defined in the EIS, Volume 2, Reference Design Drawings 'Construction Worksite Plans', except where modified by 'Boggo Road Station underground works construction site (Revised December 2011)', CRR-BGO-W-5000 (Rev D) of the SEIS</p>		

Monitoring and predictive modelling

- (g) The proponent must implement a noise and vibration program to predict, measure and take early remedial action if exceedences are detected, as part of its CEMP for each construction site that:⁴⁴
- (i) contains clear criteria for the assessment of compliance with the conditions of this approval
 - (ii) includes background noise monitoring undertaken in the vicinity of construction sites adjacent to sensitive receivers that informs predictive modelling
 - (iii) identifies proposed specific noise and vibration construction monitoring points, which have taken into account any noise monitoring points proposed by
 - (A) the existing railway manager(s) for the Brisbane rail passenger and freight transport networks
 - (B) the proposed railway manager for the project (if known at that time)
 - (iv) identifies noise and vibration monitoring points required during the commissioning phase of the tunnel component of the project
 - (v) is based on the required noise modelling for decision-making in respect of achieving compliance with these conditions
 - (vi) as construction proceeds, uses the results from monitoring to re-calibrate the predictive models to ensure the accuracy of the impacts predicted by those models
 - (vii) identifies works which may exceed noise limits at sensitive places

⁴⁴ Construction sites are defined in the EIS Volume 2, Reference Design Drawings 'Construction Worksite Plans', except where modified by 'Boggo Road Station underground works construction site (Revised December 2011)', CRR-BGO-W-5000 (Rev D) of the SEIS.

- (viii) identifies all measures which must be implemented to achieve the noise limits listed in Table A4: Limits for internal noise daytime and evening—construction
- (ix) implements a hierarchy of mitigation focusing on:
 - (A) planning (e.g. construction site layout/location of noisy equipment, staging of construction works, delivery times)
 - (B) source control (e.g. implementation of quieter construction techniques)
 - (C) construction site mitigation measures (e.g. temporary screening) clearly indicates the timing of implementation of mitigation measures
- (x) sets timeframes within which stakeholder consultations must be completed and any agreed actions undertaken

Exceptional circumstances for noisy day-time activities

- (h) Any surface work generating high noise impact that is predicted to exceed the limits in Table A4: Limits for internal noise daytime and evening—construction, must be:
 - (i) detailed in a noise and vibration EMP sub-plan
 - (ii) proposed at least 20 business days in advance to the agency responsible for the (EP Act—currently DEHP) only where it can be clearly demonstrated that all reasonable mitigation measures have been incorporated
 - (iii) approved by the agency responsible for the EP Act
 - (iv) may only be undertaken in continuous blocks within the same noise catchment for periods not exceeding four hours, with a minimum respite from that construction activity of not less than:
 - (A) one hour between each continuous block
 - (B) two calendar days after every ten continuous business days that the nominated construction activity is undertaken
 - (v) if measured noise exceeds the relevant limit in Table A4: Limits for internal noise daytime and evening—construction, by more than 20 dB(A)_{LAeq adj(1hr)}, then the nominated construction activity must cease as soon as it is safe to do so and not resume until approved by the agency responsible for the EP Act.
- (i) Any surface work generating high noise impact, as detailed in the noise and vibration EMP sub-plan, may only be undertaken in continuous blocks within the same noise catchment for periods not exceeding four hours with a minimum respite from those works of not less than one hour between each block.
 Note: for the purposes of Appendix 1, Schedule 2, Condition 7(h), ‘continuous’ includes a period during which there is less than a one hour respite between ceasing and recommencing any of the work the subject of this condition.

Project commissioning phase

- (j) If it is demonstrated during the commissioning phase of the CRR project that operational noise goals under the version of the Queensland Rail Code of

Practice – Railway Noise Management at the time the CRR project is awarded are not being met, then additional mitigation measures must be implemented prior to commencement of operations.

- (k) Responsibility for meeting the operations noise limits (Schedule 3, Condition 38) during the commissioning phase will be the responsibility of the construction entity for CRR passenger trains.

Condition 8 Blasting

- (a) Transient airblast overpressure must not exceed 130 dB (lin) at a sensitive place. Notwithstanding this requirement, all reasonable and practicable measures to prevent or minimise the impacts of blasting must be taken.
- (b) Blasting must only occur during the hours of 7:30 am to 4.30 pm Monday to Saturday, and not on Sundays or public holidays.
- (c) Prior to blasting events, at least 48 hours notice must be provided to persons that may be adversely affected.

Condition 9 Vibration

Required outcomes and noise limits

- (a) The proponent must not exceed the vibration limits specified in this condition and approach all vibration management matters with the key objective of avoiding all damage to structures and, where relevant, vibration-sensitive building contents.
- (b) All construction works undertaken during the daytime and evening construction hours must not exceed the limits specified in Table A8: Limits for construction vibration.

Table A8: Limits for construction vibration

Receiver	Cosmetic damage		Human comfort		Sensitive building contents
	Continuous (mm/sec PPV)	Transient (mm/sec PPV)	Day (mm/sec PPV)	Night (mm/sec PPV)	Guide values
Residential	5	25 (>35Hz) 10 (<35Hz)	AS 2670 applies	0.5	-
Heritage place	2	2	-	-	-
Sensitive equipment A	-	-	-	-	0.5 – 2.0
Sensitive equipment B	-	-	-	-	1.0 – 5.0
Sensitive equipment A	Includes precision balances, some optical microscopes – check specifications.				
Sensitive equipment B	Includes large computer disk drives, sensitive electronic equipment – check specifications.				

Implementation notes

mm/sec means millimetres per second

PPV means Peak Particle Velocity

Monitoring and predictive modelling

- (c) Predictive modelling for vibration from construction works must be undertaken progressively and prior to the commencement of construction works along the corridor of construction influence.
- (d) Sufficient ongoing vibration and regenerated noise monitoring must be conducted during construction in the corridor of construction influence to provide an understanding of the predicted levels of vibration and regenerated noise within buildings in response to different types of construction activities.
- (e) As construction proceeds, results from such predictive modelling must be compared with vibration monitoring results.
- (f) Where there is a significant difference between the actual measured vibration levels and the predicted vibration levels, the model must be re-calibrated to ensure the model accurately predicts the impacts.

Mitigation measures and building condition surveys

- (g) Mitigation and management measures may include temporary relocation of occupants or sensitive contents of buildings and/or measures carried out at the premises to minimise the risk of damage.
- (h) Building condition surveys must be progressively conducted of properties identified in the predictive modelling as potentially being affected by cosmetic damage as a result of construction works.
- (i) Where a building condition survey indicates that cosmetic damage or more severe damage has occurred to premises as a consequence of the construction

works, such damage must be repaired as soon as practicable at no cost to the property owners. Such repairs must be undertaken in consultation with the property owners and occupants and must return the premises at least to the condition existing prior to commencement of the construction works.

Special case of the Ecosciences Precinct TEM

- (j) With specific respect to the transmission electron microscope (TEM) at the Ecosciences Precinct, where the modelling predicts that the vibration limit in the TEM room is likely to be exceeded 0.02 mm/s, then the construction works for the Boggo Road station must be managed in accordance with a 'Vibration Management Sub-plan' to be agreed with the executive officer for the Ecosciences Precinct. The cost of any variation to the usual operation of TEM must be met by the proponent.

Commissioning phase of the project

- (k) Responsibility for meeting the operations vibration limits (Schedule 3, Condition 38) during the commissioning phase will be the responsibility of the construction entity for CRR passenger trains.
- (l) If it is demonstrated during the commissioning phase of the CRR project that construction vibration limits for the CRR project are not being met, then additional mitigation measures must be implemented prior to commencement of operations.

Condition 10 Spoil handling and placement

- (a) Notwithstanding the overriding provisions of the noise and air quality conditions (conditions 7 and 16 respectively) where any potential inconsistency may arise, construction spoil within worksites and at access points to worksites must:
 - (i) for surface works and cut-and-cover works, be handled and removed in a manner to minimise noise and dust impacts on nearby properties, consistent with the environmental objectives and performance criteria established in the Draft Outline EMP in Chapter 24 of the EIS and these conditions; and
 - (ii) for tunnel construction works, be handled and removed from within an acoustically-lined and ventilated workshed to minimise noise, air quality, night lighting and over-shadowing impacts on nearby properties, consistent with the environmental objectives and performance criteria established in the draft outline EMP in Chapter 24 of the EIS and these conditions.
- (b) Spoil handling facilities, including the stockpiling and storage facilities, must be designed, constructed and operated to ensure the safe operation, maintenance of visual amenity and minimisation of the spread of pest or weed species. Spoil handling facilities should:
 - (i) be safe and secure, such that unauthorised access to any part is not available, directional night lighting is provided to all access points and hazard areas, and facility operations are capable of remote surveillance by worksite staff;
 - (ii) be situated, designed and constructed to present the minimum visual and landscape impact as far as practicable, having regard to topography,

vegetation, scale, character of construction and construction materials, location relative to sensitive land uses, and the likely duration of its use; and

- (iii) be constructed to avoid where practicable, or minimise and mitigate the potential colonisation of areas disturbed through construction activities, by introduced plant and animal pests such as, but not limited to, fire ants, birds and weeds.
- (c) Upon completion of the spoil handling and transport operations, the spoil handling facilities must be decommissioned as soon as practicable and rehabilitated to a condition suitable for use for the preferred purposes under the area's designation in the BCC planning scheme. Such rehabilitation must include:
- (i) remediation of any land contaminated by either the construction or use of the facilities;
 - (ii) rehabilitating the worksites to an approximation of the pre-existing ground form, providing such rehabilitation works would not cause negative changes in surface drainage patterns or flood levels;
 - (iii) landscaping works generally consistent with a landscape master plan to be prepared and provided to BCC (with a copy to the Coordinator-General) at least 20 business days prior to decommissioning works commencing at each site; and
 - (iv) reinstatement of impacted pedestrian and cycle paths.
- (d) All placement of spoil must comply with the performance criteria of the relevant filling and excavation code under the applicable Planning Scheme for that spoil placement site and any necessary development approval.

Condition 11 Transport and access

- (a) Emergency access and evacuation for each station and the rail tunnels must be designed to the highest possible safety standards and achieve the lowest possible risk in consultation with the Department of Community Safety, Emergency Services Queensland (DCS), the railway manager and the Queensland Police Service (QPS).
- (b) New and upgraded footpaths and pedestrian walkways in the vicinity of stations must be designed in consultation with Queensland Rail, BCC and DCS, and have regard to Queensland Rail's 'Station Design Guide, July 2010' and relevant BCC policies and guidelines.
- (c) At least three months prior to the commencement of construction, the proponent must submit an Equitable Access Statement (EAS) to the Department of Communities, Child Safety and Disability Services (Disability Services Queensland) (DCCSDS) for comment. The EAS must document how the needs of people with a disability or who may experience access problems are to be addressed in the design of the CRR project.

Condition 12 Pedestrian and cycle connectivity

- (a) Pedestrian and cycle connectivity must be maintained during the construction period. Where closures are required for construction works or other safety issues,

alternative routes must be provided. A communication strategy must be implemented to advise pedestrians and cyclists of the alternative routes.

- (b) At worksites, construction traffic vehicle access and egress must be managed to prevent conflicts where pedestrian and cycle routes cross site access points.
- (c) The CRR proponent must work with BCC to develop a footway improvement solution for the northern side of Mary Street which could include:
 - (i) additional footway widening into the current parking lane, with provision for parking or loading off-peak; and
 - (ii) an additional mid-block crossing to manage and disperse pedestrian movement in the vicinity of the station.

Condition 13 Construction traffic and construction vehicles management

Required outcomes

- (a) Project construction traffic must be managed to avoid, minimise or mitigate any negative impacts of the project:
 - (i) arising from noise, dust, traffic congestion or other traffic problems
 - (ii) on road safety and traffic flow, public transport, pedestrian and cyclist safety, property access and parking.

Traffic Management Plans (TMPs)

- (b) The construction environmental management plan (CEMP) must include a construction traffic management sub-plan (TMP) for each project construction site approved by BCC prior to the commencement of construction at that site.
- (c) The TMP must include the measures specified in Table 24-11 of the draft outline EMP in the EIS, or other measures in accordance with these conditions.
- (d) The TMP should consider inclusion of those matters described in Appendix 4, Recommendation 15.
- (e) The proponent is to consult with the relevant road section of TMR, BCC, Ipswich City Council (ICC) and any other relevant local government authority where its roads may be affected by construction traffic in order to confirm and effectively manage the impacts of construction traffic.
- (f) The TMP is to identify principal routes to be used by construction traffic vehicles for haulage of construction materials and any construction spoil produced as part of the project.
- (g) Each TMP must be subject to periodic review by the proponent to address changes to construction program and methods, or identified opportunities for improvement.
- (h) Where changes to the methodologies or mechanisms described in the TMP are proposed by the proponent, any revision must be approved by BCC prior to these changes being implemented.

Construction vehicle management

- (i) On request, all construction traffic vehicle registration numbers must be supplied to TMR, BCC or ICC (where the relevant jurisdiction applies).

- (j) All construction traffic vehicles must comply with, and be tested and maintained in accordance with *Vehicle Standard (Australian Design Rule 28/01 - External Noise of Motor Vehicles) 2006*.

Intersection of Ipswich Road and Lucy Street, Moorooka

- (k) The safety and traffic capacity of the intersection of Ipswich Road and Lucy and Durack Streets must be maintained before the commencement of and during construction at the Yeerongpilly construction site.
- (l) Prior to the finalisation of procurement documentation for the Yeerongpilly construction component of the CRR project, TMR must obtain the approval of BCC for a Lucy Street/Ipswich Road intersection augmentation and/or management requirements following an investigation funded by TMR involving:
 - (i) a road safety audit conducted by an accredited road safety auditor in accordance with the Austroads *Guide to Road Safety Part 6: Road Safety Audit*⁴⁵
 - (ii) calculation of impacts and any bring forward costs for pavement rehabilitation for the intersection itself, Lucy Street and Station Road as a result of construction traffic in accordance with the *Pavement Rehabilitation Manual*⁴⁶
 - (iii) assessment of the intersection capacity in accordance with the *Guidelines for Assessment of Road Impacts of Development* (2006 or updated edition).⁴⁷

Condition 14 Construction parking

Required outcomes

- (a) Workforce parking must be managed to avoid, minimise or adequately mitigate unnecessary impacts on the local community.

Parking plans

- (b) Thirty business days prior to the commencement of construction at any project site, the proponent must prepare a workforce parking management sub-plan ('the parking plan') for that construction site and the surrounding streets and submit it to BCC.
- (c) As a minimum, the parking plan must:
 - (i) address safety, access and amenity for both workers and the local community
 - (ii) describe any proposals to shuttle workers to or from other sites
 - (iii) identify any restricted areas or times where different worker procedures must apply

⁴⁵ Austroads, *Guide to Road Safety Part 6: Road Safety Audit*, Austroads, Sydney, 2006, viewed 22 November 2012, <https://www.onlinepublications.austroads.com.au/items/AGRS06-09>.

⁴⁶ Department of Transport and Main Roads, *Pavement Rehabilitation Manual*, Department of Transport and Main Roads, Brisbane, 2012, viewed 22 November 2012, <http://www.tmr.qld.gov.au/Business-industry/Technical-standards-publications/Pavement-Rehabilitation-Manual.aspx>.

⁴⁷ Department of Main Roads, *Guidelines for Assessment of Road Impacts of Development*, Department of Main Roads, Brisbane, 2006, viewed 22 November 2012, <http://www.tmr.qld.gov.au/Business-industry/Technical-standards-publications/Guidelines-for-assessment-of-road-impacts-of-development.aspx>.

- (iv) identify any parking control arrangements suggested for implementation by BCC
- (v) include the capacity for updating as worksite demands change during the construction program
- (vi) be approved by BCC prior to commencement of construction at that site
- (vii) adopt all practical measures to avoid workers parking cars in streets within 500m of construction sites
- (viii) become part of the CEMP for the project.

Condition 15 Future transport planning

- (a) Prior to the commencement of the operation of the CRR project, TMR must implement a commuter vehicle plan for the Yeerongpilly Station that addresses the issue of parking capacity and the likely additional demand for parking services at that location. Such a plan should:
 - (i) in consultation with BCC, residents and businesses in the potential suburbs surrounding Yeerongpilly, investigate the demand for commuter bus services to and from the new Yeerongpilly Station
 - (ii) assist BCC to implement and upgrade bus services aimed at reducing the demand for car parking at the station from sources or destinations in the few kilometres around the new Yeerongpilly Station
 - (iii) investigate the adequacy of existing and proposed park 'n' ride facilities elsewhere around the SEQ rail system, especially on the Gold Coast line, in light of the CRR project
 - (iv) where that review of park 'n' ride facilities identifies any obvious deficiencies in that capacity, plan an appropriately scaled upgrade of park 'n' ride facilities in conjunction with other road and public transport planning
- (b) Prior to the commencement of the operation of CRR project, TMR must assist BCC to implement a revised bus services plan for the CBD and Woolloongabba. Such a plan may require TMR to:
 - (i) in consultation with BCC, and the residential and businesses communities of the CBD and inner Brisbane, investigate the likely changes to travel patterns, CBD bus circulation patterns and bus-train linkage demands in the CBD (including Roma Street) and Woolloongabba
 - (ii) the revised bus services arrangements should aim to maximise the benefits and minimise the negative impacts of the predicted changes arising from CRR project.

Condition 16 Construction air quality

Required outcomes

- (a) All construction activities must be carried out in a manner that minimises the emission of dust and particulate matter.
- (b) Emissions of dust and particulate matter from construction and associated works must not cause ambient air quality to exceed the limits in Table A9: Air quality limits for construction.

Table A9: Air quality limits for construction

Objective	Air Quality Indicator	Objective	Averaging Period	Allowable exceedence events
Human Health	Total Suspended Particulates (TSP)	90 µg/m ³	1 year	none
	Particulate matter (PM ₁₀) ¹	50 µg/m ³	24 hours	none except for natural background events ⁴
Nuisance	TSP ²	80 µg/m ³	24 hours	none
	Deposited dust ³	120 mg/m ² /day	30 days	none

Implementation Notes:

1. When monitored in accordance with the most recent version of AS3580.9.6 Determination of suspended particulate matter – PM₁₀ high volume sampler with size-selective inlet – Gravimetric method.
2. When monitored in accordance with the most recent version of AS/NZS 3580.9.3:2003 Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method.
3. When monitored in accordance with the most recent version of AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method.
4. Background events as measured by the DEHP Rocklea permanent station.

- (c) The release of noxious or offensive airborne contaminants resulting from construction activities must not cause a nuisance⁴⁸ at any sensitive place.

Monitoring and modelling

- (d) Monitoring undertaken for the purposes of meeting the requirements of these conditions must be undertaken in accordance with the methods prescribed in the latest edition of the *Air Quality Sampling Manual* (Queensland Government).
- (e) The air quality monitoring program should consider inclusion of those matters described in Appendix 4, Recommendation 16.

Air quality management sub-plan

- (f) Prior to commencement of construction works, an air quality management sub-plan of the CEMP, acceptable to the administering authority for this condition must be developed and include the following:
 - (i) a background dust and particulate matter air quality monitoring program to determine air quality levels at sensitive places likely to be impacted by the project

⁴⁸ Environmental nuisance is defined in section 15 of the EP Act.

- (ii) identification of potential sources of dust and particulate matter emissions from works associated with the project
 - (iii) an assessment of the potential impact that dust emissions will have on sensitive places, including predicted dust deposition rates, TSP and PM₁₀ concentrations
 - (iv) measures that will be implemented to avoid, mitigate and manage the generation of dust, TSP and PM₁₀ at worksites to ensure compliance with these conditions.
- (g) For the Boggo Road, Woolloongabba and Victoria Park construction sites:
- (i) air quality monitoring at locations approved by the nominated entity administering this condition as being satisfactory to provide reasonable estimates of air conditions external to the nearby health facilities
 - (ii) an alert system on the monitors in (h)(i) that notifies construction site management immediately of an exceedence of PM₁₀ limit in Table A9: Air quality limits for construction
 - (iii) a list of measures that would be implemented immediately if such an exceedence event occurs.
- (h) The dust management sub-plan at Boggo Road construction site must be approved by the Ecosciences Precinct senior executive prior to the commencement of construction at that location.

Condition 17 Pre-procurement geology and geotechnical survey program

- (a) Construction geotechnical risk must be reduced to an acceptable level.
- (b) An additional detailed geological survey program must be undertaken before procurement documentation for the construction of the tunnel component of the CRR project is released.
- (c) The information in (a), along with all existing geological, geomorphology, soils and engineering information available, must be reviewed by a suitably qualified, independent, geotechnical expert and/or tunnel construction engineer.
- (d) Procurement of the tunnel component of the project must not proceed until the person in (c) recommends that the geological and geotechnical information for the tunnel alignment and station locations is adequate to proceed to the detailed design phase of the project.

Condition 18 Potential ground settlement

- (a) Detailed geotechnical and groundwater investigations and predictive modelling of sub-surface conditions must be conducted along the tunnel alignments and at underground stations to identify the potential for settlement impacts.
- (b) Where potential settlement impacts are predicted (including cosmetic damage):
 - (i) appropriate measures must be implemented to monitor, manage and mitigate against any predicted adverse impacts
 - (ii) pre-construction condition reports must be done for all potentially affected buildings or, for building within 50 metres of the tunnel, where requested in

- writing to by the building owner, and a copy of that condition report provided to the building owner(s)
- (iii) if any subsequent ground settlement is alleged to be caused by the project then the proponent must engage an independent consultant to prepare a new building condition report
 - (iv) where the independent assessment identifies that building damage arising from settlement has been caused by the project, then the proponent must pay for the repair of the building to at least the standard of its pre-construction condition.
- (c) A program of monitoring and review of settlement must be conducted from the commencement of underground construction works or dewatering.

Condition 19 Erosion and sediment control

Required outcome

- (a) All construction must be managed to minimise soil erosion and prevent movement of sediment off the construction sites.

Erosion and sediment control plan (ESCP)

- (b) Soil and sub-surface soil sampling must be conducted to inform ESCPs to identify areas at risk of erosion and sediment movement.
- (c) An ESCP certified by a professional in sediment and erosion control (or similar qualification) as complying with these conditions must be implemented for each construction site and become part of the overall CEMP.
- (d) The proponent must include the relevant matters in the draft outline EMP in chapter 24 of the EIS and consider inclusion of the elements suggested in Recommendation 18 (Appendix 4).

Mitigation measures for soil erosion and sediment movement

- (e) Prior to the commencement of any construction works, mitigation measures must be developed and implemented for each worksite and location of surface works to limit the risk of soil erosion.
- (f) Mitigation measures must minimise:
 - (i) water and wind erosion
 - (ii) turbidity in the freshwater, estuarine and marine environments
 - (iii) landslip and slumping
 - (iv) soil mixing, inversion and compaction
 - (v) streambank erosion and channel stability.
- (g) Erosion control and sediment control structures must be maintained at all times, including during site clearing, construction and rehabilitation works, and be repaired or replaced as required after each rainfall event.
- (h) All sedimentation ponds must be designed by a suitably qualified and experienced engineer to achieve the objectives of the ESCP.

- (i) The ESCP must include the relevant matters in the draft outline EMP in chapter 24 of the EIS and consider inclusion of the elements suggested in Recommendation 18 (Appendix 4).

Condition 20 Acid sulfate soils (ASS)

- (a) All building or operational works within each construction site must be managed to avoid any release of untreated acid sulfate material, and particularly to avoid contamination of groundwater or surface waters.
- (b) Acid sulfate soils must be managed in accordance with:
 - (i) State Planning Policy 2/02: Planning and Managing Development Involving Acid Sulfate Soil
 - (ii) the *State Planning Policy 2/02 Guideline: Acid Sulfate Soils, and with reference to the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland*
 - (iii) the *Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines*
 - (iv) *Instructions for the Treatment and Management of Acid Sulfate Soils* or any updates of them as they become available.
- (c) At least 30 business days prior to the commencement of construction activities involving significant excavation of soil below five metres Australian Height Datum (AHD), or by a date specified in writing by the entity responsible for the EP Act, areas at risk must be identified using the sampling protocol detailed in Section 4 of *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland*, Ahern et al., 1998, Queensland Department of Natural Resources' Queensland Acid Sulfate Soils Investigation Team (QASSIT).
- (d) Where ASS is identified, a site-specific acid sulfate soil management plan must be developed in consultation with DNRM to demonstrate best practice measures as outlined in the abovementioned documents. The plan must be developed by consultants experienced in large scale development projects containing acid sulfate soils and finalised prior to commencement of any construction.

Condition 21 Urban design and landscaping

- (a) The urban design and landscape components of the CEMP must ensure the project is constructed in a manner that minimises the visual impact of infrastructure and hard landscaping elements, including portals, stations, overhead structures, fencing, signage, etc.
- (b) The project detailed design must incorporate measures established in *CPTED (Crime Prevention Through Environmental Design) Guidelines for Queensland Part A: Essential features for safer places*, 2007.
- (c) Project lighting must be designed, constructed and operated to comply with AS 4282-1997: Control of the Obtrusive Effects of Outdoor Lighting.

Condition 22 Visual amenity and lighting

Required outcome

- (a) The design of project stations and their environs must contribute to and integrate effectively with the surrounding urban and landscape environment.

More detailed requirements

- (b) Project stations must be designed in accordance with Queensland Rail's Station Design Guide, July 2010.
- (c) The design of other project infrastructure, such as rail viaducts and pedestrian bridges, ventilation buildings and noise barriers, must consider the existing landscape and streetscape.
- (d) The design of pedestrian and cycle pathways and public spaces must incorporate crime prevention through environmental design (CPTED) principles.
- (e) Project lighting must be designed in accordance with Australian Standard AS4282-1997 Control of the obtrusive effects of outdoor lighting and Queensland Rail's Lighting Standard for Railway Stations (refer to Queensland Rail's Station Design Guide, July 2010).
- (f) Park 'n' ride and kiss 'n' ride facilities and vehicle access to stations must be designed and sited to avoid headlight glare intruding into nearby sensitive places.
- (g) Any connections to the Roma Street Parklands should have enhanced lighting and security systems that align with the parklands existing lighting and security, and BCC should be consulted in the finalisation of designs for this project element.

Condition 23 Flora and fauna

- (a) Clearing must only occur to the extent that is absolutely necessary for construction of the project.
- (b) The project must be constructed generally in accordance with the Flora and Fauna component of the draft outline EMP (EIS Chapter 24).
- (c) Procedures to minimise the potential for impacting flora and fauna must be included in the Flora and Fauna component of the CEMP and be implemented on the site. Procedures are to include:
 - (i) engagement of an experienced fauna catcher/spotter to undertake checks for fauna prior to removal of any significant native vegetation
 - (ii) checking site works such as trenches and culverts each morning and after periods of inactivity for any fauna trapped or likely to be harmed by construction works
 - (iii) identifying and marking vegetation to be retained to minimise loss of habitat
 - (iv) undertaking a health assessment of significant trees that may be impacted by the project using a qualified arborist prior to commencement of construction and adopt a program to ensure minimum impacts of the project and rapid recovery

- (v) tree root protection of trees to be retained, including the fig trees at Victoria Park and on the Alice Street boundary of the City Botanic Gardens, is to be undertaken in accordance with AS 4970-2009 Protection of trees on development sites. All trees to be retained must have protective fencing installed at the outer edge of the root zone. Construction materials, equipment and vehicles must not be stored or temporarily placed within the protected fencing area
- (vi) revegetating disturbed areas along drainage lines on Moolabin Creek and Rocky Water Holes Creek to promote stability of the riparian zones
- (vii) identifying fauna, including habitat areas and avoidance, management and mitigation requirements.

Condition 24 Climate change and sustainability

- (a) During detailed design, ways of minimising direct and indirect carbon emissions during construction and operation must be considered in conjunction with other project objectives.
- (b) During detailed design, ways of minimising reliance on potable water supplies during construction and operation must be considered together with other project objectives.
- (c) Project stations must be designed and constructed in accordance with Queensland Rail's Station Design Guide (July 2010) requirements for environmentally responsible design.

Condition 25 Waste management

- (a) All construction activities must be designed and conducted to minimise the generation of waste materials.
- (b) Management of waste generated by the project must avoid environmental harm.
- (c) At least 30 business days prior to the commencement of 'construction works'⁴⁹ for the project, the proponent must submit to the entity responsible for the EP Act for review and approval a waste and resource recovery sub-plan for the construction works prepared in accordance with the *Environmental Protection (Waste Management) Policy (2000)* and the *Waste Reduction and Recycling Act 2011*.
- (d) Within 24 hours of becoming aware of circumstances where waste material is released to the environment which may cause environmental harm, the incident must be reported to the relevant authorities. Corrective or remedial action as required to render the area safe and to avoid environmental harm must be taken as soon as reasonably practicable.

Condition 26 Construction hazard and risk

Required outcome

- (a) The project must minimise the potential risks associated with tunnel construction, including risk minimisation and incident management, inundation, construction failures or incidents, tunnel collapse, fire and life safety, chemical hazard, and traffic hazards associated with construction traffic.

⁴⁹ 'construction works' defined in the Glossary.

- (b) The project must:
 - (i) comply with the Australian Standards listed in the draft outline EMP (EIS Chapter 24)
 - (ii) the *Work Health and Safety Act 2011 – Tunnelling Code of Practice 2007*⁵⁰

Hazard and risk management sub-plan

- (c) At least two months prior to the commencement of construction work at any construction site, a hazard and risk sub-plan of the CEMP must be submitted to the DCS for consultation on elements related to emergency services access to project worksites and associated procedures, especially with regard to:
 - (i) worksite accessibility for emergency services vehicles to the road network and construction sites
 - (ii) maintenance of essential urban services (water, power)
 - (iii) transport and the use and storage of dangerous goods at worksites
 - (iv) communications during incidents.
- (d) The hazard and risk sub-plan must be implemented fully.

Monitoring and testing

- (e) Each month during construction, the proponent must conduct routine worksite safety inspections.
- (f) The proponent and lead construction contractor must conduct a simulated emergency response exercise on at least one occasion within 12 months of the commencement of construction works in conjunction with the DCS.

Condition 27 Groundwater quality

- (a) Any diversion of existing groundwater aquifers that might be intercepted during construction earthworks must minimise the risk of aquifers becoming polluted.
- (b) Groundwater quality must be maintained at pre-disturbance levels during and after construction and not be adversely affected by the project.
- (c) Groundwater impacted by the activity must not be released to receiving waters outside of the prescribed limits for the quality characteristics identified in Table A10: Groundwater release limits as measured at the release point.
- (d) Where project construction works are likely to intercept groundwater or cause the movement of groundwater:
 - (i) background groundwater monitoring must be undertaken, to provide sufficient information (including consideration of seasonal and other variations (e.g. tidal movements)) for the subsequent assessment of any adverse groundwater impacts that may be caused by the project
 - (ii) predictive modelling, based on background monitoring, must be carried out
 - (iii) specific mitigation and management measures must be designed and implemented to achieve the environmental objectives and performance criteria in the CEMP

⁵⁰ www.deir.qld.gov.au/workplace/resources/pdfs/tunnelling-cop-2007-2010.pdf

- (iv) all reasonable and practicable measures must be taken to avoid, or mitigate and manage potential groundwater impacts on any property.

Table A10: Groundwater release limits

Quality Characteristics	Values		Details
	Minimum	Maximum	
pH	6.5	8.5	
Dissolved Oxygen	80-100% saturation	-	
Total phosphorus	-	0.06 mg/L	
Total nitrogen	-	0.45 mg/L	
Chlorophyll-a	-	0.01 mg/L	
Turbidity	-	20 NTU	
Suspended Solids (combined wet and dry flows)	-	50 mg/L	
Suspended Solids (wet weather flow)	-	100 mg/L	90 th percentile
Total dissolved iron	-	0.3 mg/L if Secchi >1m NR <1m	
Total arsenic	-	0.05 mg/L	
Total cadmium	-	0.002 mg/L	
Total chromium	-	0.05 mg/L	
Total copper	-	0.005 mg/L	
Total nickel	-	0.015 mg/L	
Total lead	-	0.005 mg/L	
Total zinc	-	0.05mg/L	
Oils and Grease	-	-	No visual films or odour
Polycyclic aromatic hydrocarbon (PAH)	-	0.003 mg/L	
Total chlorine	-	0.02 mg/L	

Condition 28 Groundwater monitoring

- (a) A groundwater monitoring sub-plan must be prepared as part of the CEMP to detect any potential impact on groundwater as a result of the activity.
- (b) The sub-plan in (a) must be approved by the entity responsible for the EP Act prior to the commencement of construction and may be subsequently amended with the approval of that entity.
- (c) A monitoring program must be adopted to monitor groundwater flows before and during construction works, and for a period of five years after commencing operations, including, in locations where predictive modelling suggests there is a potential for inflow to occur from the Brisbane River.

- (d) The sub-plan in (a) might include the details suggested in Recommendation 17 (Appendix 4).
- (e) All groundwater monitoring must be overseen by a qualified and experienced hydrogeologist or groundwater engineer.

Condition 29 Quality of water release during construction

- (a) Where water quality monitoring indicates an exceedence of the water quality values:
 - (i) corrective actions and mitigation measures, including ceasing the release, must be implemented immediately
 - (ii) reporting of an event that results in an uncontrolled release of contaminants to the environment must be reported to the nominated entity for this condition within 24 hours of the proponent becoming aware of the release
- (b) Water quality monitoring must include any releases from worksites immediately following a rainfall event exceeding a two-year Average Recurrence Interval (ARI).

Condition 30 Water quality objectives

- (a) The proponent must ensure that water quality objectives for waters that may be impacted upon as a result of the activity are maintained to protect the environmental values in accordance with the Environmental Protection Regulation 2008 and the Environmental Protection (Water) Policy 2009.
- (b) Any water quality monitoring must be established utilising the following guidelines and documents:
 - (i) Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000
 - (ii) Queensland Water Quality Guidelines 2009
 - (iii) Monitoring and Sampling Manual 2009 Environmental Protection (Water) Policy 2009.

Condition 31 Surface water management

- (a) The proponent must ensure that all practicable measures are taken to avoid the production and transportation of contaminants that might be released to waters. Such measures must be implemented in the following order of preference:
 - (i) prevention
 - (ii) avoidance
 - (iii) containment
 - (iv) reuse
 - (v) recycling
 - (vi) treatment
 - (vii) disposal to surface waters (where approved by these conditions).
- (b) The environmental values of receiving surface waters must not be adversely affected by the project.

- (c) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillage must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or material to any external storm water drainage system, roadside gutter or waters.
- (d) All unwashed empty chemical, oil and fuel drums must be stored on a concrete hardstand area and so as to not contaminate stormwater.
- (e) Washing, degreasing, servicing, cleaning or other maintenance of vehicles, plant, or other equipment must not occur in any area where resulting contaminants will or may be released to any storm water drain, land or waters.
- (f) Regulated wastes, chemicals (including paints and solvents), fuels (and other hydrocarbons), cement and concrete must be stored and handled so as to prevent the release or likelihood of release of contaminants, particularly to stormwater drains and pits.

Condition 32 Surface water release

Required outcome

- (a) Surface water must not be released from the approved place to receiving waters outside of the prescribed limits for the quality characteristics identified in Table A11: Surface Water Release Limits as measured at the point of release.

Table A11: Surface Water Release Limits

Quality Characteristics	Values		Details
	Minimum	Maximum	
pH	6.5	8.5	
Turbidity	-	20 NTU	
Suspended Solids (combined wet and dry flows)	-	50 mg/L	
Suspended Solids (wet weather flow)	-	100 mg/L	90 th percentile
Oils and Grease	-	-	No visual films or odour
Debris	-	-	None

Monitoring

- (b) The surface water monitoring program must be designed to detect any potential impact on surface waters as a result of the activity.
- (c) The surface water monitoring program must include monitoring:
 - (i) of upstream and downstream surface waters at each approved place
 - (ii) of all surface waters contained within the boundaries of the approved place
 - (iii) prior to discharge of any surface waters from each approved worksite.

Condition 33 Flood Commission of Inquiry recommendations

- (a) Prior to the finalisation of the procurement documentation for the construction of the project, TMR must:

- (i) review all recommendations of the *Queensland Floods Commission of Inquiry: Final Report*⁵¹ to ensure that there are no inconsistencies in the reference design put out to tender
- (ii) highlight all relevant actions arising from the inquiry recommendations that are required to be taken into consideration by the construction entity in preparing final project designs and in the construction of the project.

Condition 34 Flood management

The project detailed design must provide immunity from flood inundation for the underground rail infrastructure in a 1-in-10 000 AEP event and be based on detailed flood modelling to avoid or minimise adverse flooding impacts on properties caused by the project, including under a climate change scenario approved by DEHP.

Condition 35 Emergency access management sub-plan

- (a) An emergency access management sub-plan must be developed and implemented by the proponent as part of the OEMP during the commissioning phase of the project in consultation with BCC, Emergency Services Queensland, Queensland Police Service, Queensland Rail and Queensland Fire and Rescue Service.
- (b) The emergency access management sub-plan must be approved by the rail safety regulator prior to commencement of the project.

Condition 36 Construction environmental management plan (CEMP)

Required outcome

- (a) The CEMP must be submitted to the relevant nominated entities identified in these conditions and the Coordinator-General, for review and at least 30 business days before the commencement of construction at each construction site. The CEMP must be certified by the proponent as being in accordance with these conditions, prior to seeking comments from the relevant nominated entities and Coordinator-General.
- (b) The CEMP may be submitted separately for each construction site.

Content and nature of the CEMP

- (c) The CEMP must:
 - (i) be developed generally in accordance with the draft outline EMP (EIS Chapter 24)
 - (ii) incorporate all of the imposed conditions for design and construction
 - (iii) provide for progressive assessment of predicted impacts and design of mitigation measures prior to the relevant stages or areas of construction.
- (d) The CEMP must contain a program and procedures for ongoing monitoring to identify the effectiveness of the mitigation measures, having regard for the environmental requirements established in the CEMP. Monitoring must include a range of activities such as scientifically-conducted measurements of specified

⁵¹ Queensland Floods Commission of Inquiry, *Queensland Floods Commission of Inquiry: Final Report*, Brisbane, 2011, viewed 20 November 2012, <http://www.floodcommission.qld.gov.au/publications/final-report>.

parameters, visual inspections, recordings of events, and communications with affected property owners and occupants.

- (e) There must be a regular review of the CEMP. A process for review of mitigation measures must be outlined in the CEMP. The review process must provide for mitigation measures to be implemented as soon as practical in response to monitoring results where the environmental limits are not achieved and the outcomes of community consultation.

Complaints management system

- (f) The CEMP must include a formal process for receiving and dealing quickly and effectively with complaints about construction issues. This process must be established before the commencement of any construction works.
- (g) The proponent must ensure that the complaints process includes the matters suggested in Recommendation 19 (Appendix 4).
- (h) A process for dealing with circumstances where limits are exceeded during construction activities must be established prior to the commencement of construction works. This process must establish mechanisms for consultation, resolution of disputes, taking corrective action where required, reporting and indicating responsibilities and timing for such actions.

Condition 37 Operations environmental management plan (OEMP)

Required outcome

- (a) Prior to the commencement of operation, an OEMP must be prepared and submitted to the rail safety regulator for approval. The OEMP must be certified by the proponent as being in accordance with these conditions, prior to seeking comments from the relevant nominated entities.
- (b) At least 60 business days prior to the commencement of operation, the certified OEMP must be provided to the relevant nominated entities.
- (c) The OEMP must be submitted to the rail safety regulator, for approval at least 20 business days prior to the commencement of operation.

Content and nature of the OEMP

- (d) The OEMP must:
 - (i) be developed generally in accordance with the draft outline EMP (Operations) in Chapter 24 of the EIS
 - (ii) incorporate all of the imposed conditions for operation and any other approvals that are relevant to the environmental management of the operation of the project
 - (iii) incorporate the elements of the CEMP that have ongoing requirements for the operation phase of the project
 - (iv) be implemented for a period of five years from commencement of operation
 - (v) provide for progressive assessment of predicted impacts and design of mitigation measures prior to the relevant stages or areas of operation.

- (vi) document mitigation measures to in respond to the predicted impacts, including a process for dealing with circumstances where thresholds are exceeded during operation such as reporting, taking corrective action where required and responsibilities and timing for such action.

Reporting, monitoring and review of the OEMP

- (e) The OEMP must be made publicly available on the project internet site and be updated when it is progressively developed or revised.
- (f) The OEMP must contain a program and procedures for monitoring to identify the effectiveness of the mitigation measures, having regard for the environmental requirements established in the OEMP. Monitoring must include a range of activities such as scientifically-conducted measurements of specified parameters, visual inspections, recordings of events, and communications with affected property owners and occupants.
- (g) There must be a regular review of the OEMP. A process for review of mitigation measures must be outlined in the OEMP and must occur at a minimum of annually for the first five years of operation, starting within three months of opening.
- (h) The review process must provide for mitigation measures to be implemented as soon as practical in response to monitoring results where the environmental limits are not achieved. The review process must also address recurring concerns raised during community consultation or through the complaints mechanism.
- (i) There must be a formal process for receiving and dealing quickly and effectively with complaints about operation issues.

SCHEDULE 3 OPERATION

Condition 38 Operations noise and vibration

Required outcome

- (a) At the commencement of the operational phase of the CRR project, the railway manager will be responsible for compliance with the noise limits.
- (b) The proponent must meet all operational noise and vibration goals in the *Queensland Rail Code of Practice for Noise Management* (edition current at the time).
- (c) The proponent must use the results of noise and vibration monitoring conducted during the project commissioning phase to refine all noise and vibration mitigation measures prior to the commencement of operations.
- (d) All measures and processes specified in the draft outline EMP (chapter 24 of the EIS) must be incorporated into the Noise and Vibration Sub-Plan of the OEMP.

Monitoring

- (e) Unless a rail noise monitoring program already exists for the section of freight track that is both approved by the agency responsible for the EP Act and for which results are publicly reported, then approximately twelve months prior to the commencement of the CRR tunnel operations, the proponent must establish three permanent train noise monitoring stations between Tennyson to Dutton Park that are both approved and for which results are publicly reported according to a program approved by the agency responsible for the EP Act.
- (f) Unless the Ecosciences Precinct transmission electron microscope (TEM) has been relocated from its current position, the proponent must establish vibration monitoring equipment as close as feasible to the TEM to monitor vibration from train pass-bys according to a program approved by the senior executive of the Ecosciences Precinct.
- (g) If requested by the Ecosciences Precinct senior executive, the proponent must also monitor near the TEM for potential interference to the operation of the TEM arising from electromagnetic pulses caused by the passage of trains through the Boggo Road station and tunnels.

Ecosciences Precinct (TEM)

- (h) If monitoring establishes that vibration or other interference from the operation of the project is compromising the operation of the Ecosciences Precinct TEM, the proponent must implement the necessary measures to ensure that the Ecosciences Precinct continues to have access to TEM services for as long as specified by the Ecosciences Precinct that are similar to the year prior to the commencement of construction of the CRR project Boggo Road Station.

Condition 39 Operations air quality

- (a) The rail manager must maintain:
 - (vi) a safe and comfortable air environment in all relevant underground stations
 - (vii) ensure that air quality in the tunnel meets all relevant standards.
- (b) Prior to commencement of operations an air quality management sub-plan, acceptable to the rail safety regulator (in consultation with the entity responsible for the EP Act), must be developed and implemented and include, but not be limited to the following:
 - (i) a background dust and particulate matter air quality monitoring program to determine air quality levels at no less than two locations within the rail corridor for freight between Tennyson and Dutton Park stations
 - (ii) The monitoring under (i) may be merged with or replaced by an existing coal rail dust monitoring program, if agreed by the nominated entity.
- (c) Monitoring undertaken for the purposes of meeting the requirements of this condition must be undertaken in accordance with the methods prescribed in the latest edition of the *Air Quality Sampling Manual* (Queensland Government).
- (d) The rail manager for the tunnel component of the project must conduct ongoing monitoring of gas levels, including oxygen, methane, carbon dioxide and carbon monoxide, in underground structures using gas monitoring systems and alarms fitted in surface and subsurface infrastructure.
- (e) Reporting must be undertaken in accordance with Queensland Rail Standard ENV/STD/2015/SYS.

Condition 40 Quality of water released during operation

Required outcome

- (a) Where water quality monitoring indicates an exceedence of the water quality values:
 - (i) corrective actions and mitigation measures, including ceasing the release, must be implemented immediately
 - (ii) reporting of an event that results in an uncontrolled release of contaminants to the environment must be reported to the nominated entity for this condition within 24 hours of the proponent becoming aware of the release
 - (iii) an incident report must be prepared within ten business days of the receipt of determinations that indicate the exceedence, together with a statement describing the corrective actions and mitigation measures implemented to ensure no further exceedence occurs.

Condition 41 Operation of the flood gates

Each future stage of delivery of the project must clearly document floodgate management and operation requirements, including clear documented procedures for:

- (a) who provides advice on flood level forecasts and who processes this advice in terms of railway train and station operating procedures
- (b) testing and implementing procedures leading up to a likely floodgate closure event
- (c) when the gates are to be operated and by whom
- (d) evacuation of personnel and decommissioning of facilities and train operations prior to closing of the gates, and
- (e) reopening the station and tunnels after a flood event requiring the gates to be closed.

Appendix 2 Jurisdiction for imposed conditions

Table A12 lists the organisations/agencies responsible (the nominated entity under section 54B(3) of the SDPWO Act) for each of the Coordinator-General's imposed conditions (listed in Appendix 1).

Table A12: Entities with jurisdiction for Coordinator-General imposed conditions

Topic	Condition no.	Entity with jurisdiction	Consultation entity
Schedule 1—General conditions			
General conditions	Condition 1	Coordinator-General (CG)	DEHP, BCC, ICC, QPS, DCS, DSDIP, DAFF. If BRUV involved then also DSITIA and DHPW.
Construction timetable	Condition 2	CG	DEHP, BCC, Queensland Rail
Environmental monitoring reporting and verification	Condition 3	CG	DEHP, BCC, TMR
Interface agreements for transport matters	Condition 4	TMR	BCC for bus matters
Schedule 2—Construction			
Construction hours of work	Condition 5	CG	DEHP, BCC, Queensland Rail
Conduct of construction work	Condition 6	CG	DEHP, BCC, Queensland Rail
Noise	Condition 7	DEHP	CG, TMR, BCC, Queensland Rail
Blasting	Condition 8	DEHP	BCC. If BRUV involved then also BRUV and DHPW.
Vibration	Condition 9(a)–(h)	DEHP	DEHP, DSITIA with respect to matters relating to the Ecosciences Precinct (j), DHPW for matters related to the BRUV.
	Condition 9(k)–(l)—project commissioning	TMR	DEHP, Queensland Rail. DSITIA with respect to matters relating to the Ecosciences Precinct
Spoil handling and placement	Condition 10	DEHP	ICC with respect to use of local government roads or approvals required within the Ipswich Local

Topic	Condition no.	Entity with jurisdiction	Consultation entity
			Government Area
Transport and access	Condition 11(a)	DCS	Railway manager, BCC, QPS
	Condition 11(b)	BCC	DCS, Queensland Rail
	Condition 11(c)	Department of Communities, Child Safety and Disability Services	
Pedestrian and cycle connectivity	Condition 12	BCC	TMR
Construction traffic and construction vehicles management	Condition 13	BCC/ICC for relevant local roads TMR for state roads	
Construction parking	Condition 14	BCC	
Future transport planning	Condition 15	TMR	BCC, Queensland Rail
Construction air quality	Condition 16	DEHP	QH, DSITIA with respect to matters relating to the Ecosciences Precinct
Pre-procurement geology and geotechnical survey program	Condition 17	CG	
Potential ground settlement	Condition 18	BCC	DEHP
Erosion and sediment control	Condition 19	DEHP	DAFF, BCC
Acid sulfate soils (ASS)	Condition 20	DEHP	Queensland Rail for Mayne Rail Yards
Urban design and landscaping	Condition 21	BCC	DSDIP
Visual amenity and lighting	Condition 22	BCC	DTMR
Flora and fauna	Condition 23	DEHP	BCC, DAFF, DSITIA
Climate change and sustainability	Condition 24	CG	TMR, DEHP
Waste management	Condition 25	DEHP	BCC, ICC
Construction hazard and risk	Condition 26	DCS	BCC, QPS, QAS, QFRS Department of Justice and Attorney-General (Major Hazards Facilities Dangerous Goods unit)
Groundwater quality	Condition 27	DEHP	BCC
Groundwater monitoring	Condition 28	DEHP	

**Appendix 2. Jurisdiction for imposed conditions
Cross River Rail project:**

Topic	Condition no.	Entity with jurisdiction	Consultation entity
Quality of water release during construction	Condition 29	DEHP	BCC, DAFF
Water quality objectives	Condition 30	DEHP	
Surface water management	Condition 31	DEHP	DAFF, BCC
Surface water release	Condition 32	DEHP	DAFF, BCC
Flood Commission of Inquiry recommendations	Condition 33	SDIP	BCC
Flood management	Condition 34	DEHP	BCC
Emergency access management sub-plan	Condition 35	DCS	BCC, QPS, QR
Construction environmental management plan (CEMP)	Condition 36	DEHP	CG, BCC, TMR, QH, DCS
Construction environmental management plan (CEMP)	Condition 36	TMR	CG, BCC, DEHP, QH, DCS
Schedule 3—Operation			
Operations noise and vibration	Condition 38	TMR Rail Safety Regulator	DEHP, BCC, QH, DCS, Ecosciences Precinct regarding the TEM, DHPW for BRUV
Operations noise and vibration	Condition 38	DEHP	TMR Rail Safety Regulator, BCC
Quality of water released during operation	Condition 40	DEHP	DAFF, BCC
Operation of the flood gates	Condition 41	TMR Rail Safety Regulator	Railway manager, BCC, DEHP, QPS, QAS, QFRS, Queensland Rail

Appendix 3 **Stated conditions for *Sustainable Planning Act 2009 (SPA) approvals***

This part includes the Coordinator-General's stated conditions, stated under section 39 or 47C of the SDPWO Act.⁵²

Condition 1 Constructing or Raising a Waterway Barrier

- (a) The design and construction methodology of all waterway crossings must consider the self assessable codes for constructing or raising a waterway barrier:
 - (i) WWBW01 Code for Self Assessable Development: Minor Waterway Barrier Works
 - (ii) WWBW02 Code for Self Assessable Development: Temporary Waterway Barrier Works.
- (b) If the project works do not satisfy the self assessable codes, consultation must be undertaken with an appropriately qualified person within the entity responsible for the *Fisheries Act 1994* (currently the Department of Agriculture Fisheries and Forestry) to determine the best practice approach to establishing structures within a waterway.
- (c) The agency responsible for the *Fisheries Act 1994* (currently DAFF) is the responsible entity for this condition.

Condition 2 Material change of use of premises if all or part of the land is on the Environmental Management Register (EMR) or Contaminated Land Register (CLR)

- (a) An appropriately qualified person must undertake investigations in locations where earthworks may potentially encounter contaminated soils (i.e. land that is listed on the EMR as defined under the *Environmental Protection Act 1994* (EP Act) or identified areas from a site history and observations analysis). The *Draft Guidelines for the Assessment and Management of Contaminated Land in Queensland* (1998) must be adhered to in these investigations. Any land identified as having contaminated soil must be notified to DEHP.
- (b) A site management plan for contaminated land must be prepared where that land is not being removed from the EMR or CLR under the EP Act prior to any disturbance of the soil on that land, in accordance with:
 - (i) National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPM)/National Environment Protection Council (NEPC)
 - (ii) the EP Act.
- (c) If spills occur during the transportation of contaminated soil, the area affected must be remediated and the relevant authorities advised.
- (d) The agency responsible for the EP Act (currently DEHP) is the responsible entity for this condition.

⁵² For a definition of 'stated conditions', refer to the Glossary on page 195 of this report.

Condition 3 Development on a state heritage place

- (a) Condition surveys must be conducted of each place on the Queensland Heritage Register ('place of State significance'), to the extent the place is the subject of development, prior to any construction works commencing which may impact on the cultural heritage values of that place. The condition surveys must include detailed structural inspections prior to construction, including all timber framing, stonework, brickwork, and the integrity of sealing of all timber in the stone/brickwork.
- (b) Prior to any construction works commencing which may impact on the cultural heritage values of a place of state significance, prepare specific cultural heritage management plans for each place, to the extent impacted, including:
 - (i) RNA Showgrounds
 - (ii) Boggo Road Gaol
 - (iii) Roma Street Station
 - (iv) City Botanic Gardens
 - (v) Albert Street
 - (vi) Dutton Park Cemetery
 - (vii) Victoria Park.
- (c) The cultural heritage management plans (CHMP) required in Condition 3(b) must include the following elements:
 - (i) vibration limits and their monitoring and recommended actions should those limits be exceeded
 - (ii) the effects of potential settlement and associated monitoring and management
 - (iii) archival recording of all elements of cultural heritage significance that will be removed, demolished, or exposed to a significant risk of damage
 - (iv) archival recording of cultural heritage values to be undertaken with the advice of an appropriately qualified heritage consultant
 - (v) monitoring of compliance with the measures outlined in the CHMP
 - (vi) immediate reporting of any damage caused as a result of the project to the chief executive administering the *Queensland Heritage Act 1992*, including details of the damage, how it occurred and proposed measures to reinstate, rectify or remediate the damage
 - (vii) consultation with DEHP in an effective and timely manner, particularly where the potential exists for the construction works to impact on a place of state significance
 - (viii) For the RNA Showgrounds, consultation with the RNA and/or its nominated cultural heritage representative during the preparation of the CRR project CHMP for the Showgrounds:
 - (A) for the parts of the Victoria Park, Albert Street and Boggo Road construction sites directly impacted by the project:
targeted preliminary archaeological excavations should be

undertaken at least 90 days prior to the commencement of construction at that site

- (B) if the initial excavations in Condition 3(c)(viii)(A) produce significant finds, follow-up archaeological excavations should be completed, as directed by DEHP, prior to construction works.
- (d) The draft CHMPs must be provided to DEHP for review and approval, prior to any construction works on, under or over the place of state significance.
- (e) The agency responsible for the *Queensland Heritage Act 1992* (currently DEHP) is the responsible entity for this condition.

Condition 4 Development on a local heritage place

- (a) Condition surveys must be conducted of each place on the BCC Planning Scheme Heritage Register ('Local Heritage place'), to the extent the place is the subject of development, prior to any construction works commencing which may impact on the cultural heritage values of that place. The condition surveys must include detailed structural inspections prior to construction, including all timber framing, stonework, brickwork, and the integrity of sealing of all timber in the stone/brickwork.
- (b) Prior to any works commencing which may impact on the cultural heritage values of a local heritage place, prepare a specific CHMP for each place, to the extent impacted.
- (c) The CHMPs required in Condition 4(a) must include the following elements:
 - (i) vibration limits and their monitoring and recommended actions, should those limits be exceeded
 - (ii) the effects of potential settlement and associated monitoring and management
 - (iii) archival recording of all elements of cultural heritage significance that would be removed, demolished, or exposed to a significant risk of damage
 - (iv) archival recording of cultural heritage values to be undertaken with the advice of an appropriately qualified heritage consultant
 - (v) monitoring of compliance with the measures outlined in the CHMP
 - (vi) consultation with Brisbane City Council (BCC) in an effective and timely manner, particularly where the potential exists for the construction works to impact on a place of local significance.
- (d) BCC is the responsible entity for this condition.

Condition 5 Rehabilitation at Moolabin Creek

- (a) The following conditions are recommended in relation to the proposed works for road or rail crossing works of Moolabin Creek:
 - (i) the crossing is designed to ensure that it does not adversely impact on flooding or drainage (peak discharge and duration for all events up to the 100 year Average Recurrence Interval (ARI)) of properties that are upstream, downstream or adjacent to the site

- (ii) Submit a hydraulic report and engineering plans, prepared by a Registered Professional Engineer of Queensland (RPEQ) that is in accordance with BCC's *Subdivision and Development Guidelines*⁵³ demonstrating how the development will comply with the above requirement.
- (iii) The nominated entity for this condition is BCC.
- (b) Prior to site/operational/building work commencing, obtain the approval of BCC for a rehabilitation plan. The plan is to be in the form of scaled plans and supporting documentation that includes at least the following information for the area impacted by the road crossing of Moolabin Creek:
 - (i) description of proposed rehabilitation, including earthworks, methods, objectives
 - (ii) details of the proposed rehabilitation schedule, including staging, plant species names, stock size, quantities, locations; a maintenance program for all rehabilitation works
 - (iii) stabilisation methods for all areas of exposed soil surface;
 - (iv) details of special habitat features to be provided for the enhancement/restoration of habitat values
 - (v) specification notes on weed management, planting methods, mulching and soil preparation.
- (c) Carry out in accordance with the approved rehabilitation plan.
- (d) Rehabilitation works are to be undertaken while site/operational/building work is occurring and then maintained in accordance with the approved rehabilitation plan.
- (e) BCC is the responsible entity for this condition.

⁵³ Copies of the *Subdivision and Development Guidelines*, Standard Drawings and *Water Sensitive Urban Design Guidelines* can be downloaded from Brisbane City Council's website at www.brisbane.qld.gov.au

Appendix 4 Coordinator-General's general recommendations

Recommendation 1. Industrial land supply

Brisbane City Council (BCC) and the Planning Group of the entity responsible for the *Sustainable Planning Act 2009* (SPA – currently DSDIP) should undertake a study of the impact of the potential loss of industrial lots and work with displaced business to assist with the relocation process and help mitigate overall impact on industry.

Recommendation 2. Greenspace planning

The proponent, together with BCC and DSDIP, should undertake a detailed greenspace planning exercise at Mayne Rail Yards in close consultation with Queensland Rail.

Recommendation 3. Bus and rail station integration at Woolloongabba

TMR and BCC should undertake further, more detailed design work to investigate the potential to integrate the existing Woolloongabba Busway Station with the proposed Gabba Station, prior to finalisation of the procurement documentation for the construction of that part of the CRR project.

Recommendation 4. Future land use—Yeerongpilly and Albert Street

BCC, together with DSDIP should commence a separate planning process, in close consultation with the surrounding communities, to determine future recommended land use on and surrounding the project construction sites at Yeerongpilly and Albert Street. This planning process could commence any time after the start of CRR project construction at those sites and should be concluded at least one year prior to the completion of construction on those sites.

Recommendation 5. Best practice and innovation in design

The proponent should review best practice and innovation in design for the project with particular focus on the pedestrian overpass, bikeway and footpaths when undertaking detailed design at Yeerongpilly and Boggo Road.

Recommendation 6. Interface agreement

With respect to Appendix 1, Schedule 1, Condition 4:

- (a) 'construction sites' are defined in the EIS, Volume 2, Reference Design Drawings 'Construction Worksite Plans', except where modified by 'Boggo Road Station underground works construction site (Revised December 2011)', CRR-BGO-W-5000 (Rev D) of the SEIS
- (b) 'contiguous' is defined as within 100 metres of the construction site (same as that used for state-controlled roads in section 283ZT(4) of the TIA).
- (c) The principal purpose of each interface agreement is to establish the heads of consideration for consultation between the CRR project proponent and overlapping, connecting or neighbouring transport and other infrastructure service providers. The interface agreements should:

- (i) aim to:
 - (A) minimise impacts to the safe and efficient construction and operation of the CRR project
 - (B) minimise points of potential conflict between neighbouring development proposals
- (ii) describe a genuine consultation process between the parties, including nature and frequency of required consultation at each stage of delivery of the CRR project
- (iii) avoid, minimise, mitigate or offset any unacceptable environmental impacts
- (iv) have regard to the design, access, environment and heritage management and construction schedules of both the CRR project and projects on neighbouring lands
- (v) not provide any approval or veto rights over any aspect of the CRR project to the non-CRR proponent parties
- (vi) describe the:
 - (A) roles and responsibilities of each party
 - (B) mechanisms by which the agreement can be tested, evaluated and revised where appropriate
- (vii) provide an efficient dispute resolution procedure at certain identified points in the delivery of the CRR project where critical issues are raised such as community safety or potential environmental harm as defined in section 14 of the EP Act.

Recommendation 7. RNA Showgrounds

During the project construction procurement process for the RNA Showgrounds component of the CRR project, TMR should ask potential bidding construction entities to consider the matters raised by the RNA in its EIS submissions and TMR's responses to those matters (as both described in this report) and seek 'innovation in design' on:

- (a) the availability of Exhibition Station platform during the Ekka and other Showgrounds events
- (b) the availability of and access to the Sideshow Alley area during events
- (c) the proposed realignment of O'Connell Terrace
- (d) the demolition and replacement of several animal pavilions
- (e) access to and from O'Connell Terrace and across the railway line during construction
- (f) any other special proposals to reduce disturbance of the project on Ekka events.

Recommendation 8. Amendment to City Plan

To reduce uncertainty regarding Integrated Development Approval System under SPA (IDAS) project approvals, I recommend to BCC that City Plan be amended in the short term to add rail to the list of exempt ancillary developments.

Recommendation 9. Amendment to Sustainable Planning Regulation 2009

To reduce uncertainty regarding IDAS project approvals, I recommend that the CRR project be listed in Table 5, Schedule 4 of the Sustainable Planning Regulation 2009.

Recommendation 10. Construction of the Fairfield ventilation shaft

During the procurement process for the construction of the Fairfield ventilation shaft and emergency access building, TMR should seek to either incorporate an acoustic enclosure as early as possible during this activity, or in some other way ensure that noise limits in Appendix 1, Schedule 2, Condition 7 are met during this activity.

Recommendation 11. Rehabilitation programs

I recommend that:

- (a) all areas of the project rehabilitated after construction be stabilised to provide at least 90 per cent ground cover within seven days of completion of works at each approved place
- (b) DEHP district office and the Oxley Creek Catchment Association be consulted during the planning and implementation of any rehabilitation program for Moolabin or Rocky Waterholes Creek.

Recommendation 12. Sustainability measures

The list of sustainability measures in Appendix E2 and Chapter 24 of the EIS should be incorporated into the tender documentation for each phase of the project, to encourage tender parties to develop innovative and cost-effective solutions to address the sustainability issues identified in the EIS.

Recommendation 13. Connection to a state-controlled road

Approval should be obtained from the Chief Executive of the Department of Transport and Main Roads (TMR) under the *Transport Infrastructure Act 1994* for carrying out works for connections to any state-controlled road.

Recommendation 14. Cultural heritage management plan

The proponent must develop and have approved under the *Aboriginal Cultural Heritage Act 2003*, a cultural heritage management plan (CHMP) prior to any excavation, construction or other activity that may cause harm to Aboriginal cultural heritage. The CHMP should include the following provisions:

- (a) Aboriginal parties to monitor certain surface earthworks, particularly at the location of York's Hollow
- (b) Aboriginal parties to monitor the removal of vegetation which may be associated with the project, particularly within the location of York's Hollow
- (c) Aboriginal parties to monitor ground breaking activities that may impact on their cultural heritage values
- (d) Aboriginal parties to monitor construction works at Moolabin Creek and at other waterways as negotiated
- (e) Aboriginal parties to deliver the Aboriginal component of the cultural awareness training

- (f) arrangements for the storage of any Aboriginal artefacts collected by the Aboriginal parties during the monitoring activities and by project staff during development activities
- (g) any artefacts found during the course of construction be preserved. Artefacts found within an area of overlapping native title claim are to be kept in a neutral Keeping Place pending the outcome of the Native Title determination in relation to that area of overlap. Artefacts found in the non-overlap area should be retained by the relevant Aboriginal Party
- (h) consideration of opportunities to celebrate and commemorate Aboriginal cultural heritage including interpretive signage, public art and traditional plantings.

**Recommendation 15. Suggested inclusions in the traffic management plans
TMPs – as required by Condition 13 (Appendix 1,
Schedule 2)**

- (a) Each TMP should include:
 - (i) changes in levels of service, including safety, security and efficiency, for all traffic
 - (ii) measures to maintain safe and functional access to community facilities, and for pedestrian and cyclist safety and movements on routes adjacent to worksites
 - (iii) staff workplace travel plan to encourage the use of car pooling, public transport and active transport
 - (iv) measures to manage the parking of worker or construction vehicles on streets within a 500-metre walking distance of worksites, including the use of all practical measures to avoid construction workers parking in streets
 - (v) traffic signage, including variable message signs, to be used
 - (vi) communication mechanisms for advising of changes in traffic conditions
 - (vii) measures for avoiding disruption during peak traffic flow periods and public holidays
 - (viii) measures for avoiding disruption of scheduled events, and to coordinate with scheduled construction and maintenance works on other projects
 - (ix) entry and exit locations to worksites, including a road safety audit for each and all worksite entry and exit locations utilising the *Austroads guidelines laid out in Guide to Road Safety, Part 6: Road Safety Audit*
 - (x) the management of incidents (traffic, construction or other) on and around the project works
- (b) The proposed methods of haulage vehicle fleet management described in each TMP should:
 - (i) avoid, or minimise and mitigate, disruption to local traffic movements generally and particularly during peak traffic periods including school drop-off and pick-up times
 - (ii) avoid haulage vehicles queuing in proximity to residential premises, schools or health care facilities

- (iii) avoid generation of dust in the worksites and beyond the worksites from the deposition of material on roads from vehicle wheels or uncovered loads
 - (iv) minimise and mitigate potential impacts from vehicle emissions upon adjoining premises and sensitive places situated nearby worksites
 - (v) ensure that haulage vehicle operations within and at the immediate entries and exits of the worksites comply with the worksite noise limits in Appendix 1, Schedule 2, Condition 7
 - (vi) any other measures necessary to minimise and mitigate the adverse environmental and community impacts of construction traffic vehicle operations.
- (c) Specific measures for the construction traffic vehicle fleet described in each TMP should:
- (i) address only spoil haulage vehicles and equipment, with consistent payloads and bin sizes
 - (ii) minimise the emissions of both noise and exhaust emissions, complying with ADR28/01.
- (d) In addition to any measures included in Table 24-11 of the draft outline EMP in the EIS, specific measures described in each TMP should be fitted to construction traffic vehicles to facilitate:
- (i) real time management of trucks and traffic conditions to avoid traffic congestion, particularly in peak times, and real time scheduling to avoid queuing and the use of local roads
 - (ii) investigation of complaints and to assist with management of spoil haulage fleet performance.
- (e) Construction traffic vehicle fleet systems described in each TMP should address:
- (i) safety, including accident & incident reporting and a Hazard Register, Risk Analysis and Safe Operating Procedures
 - (ii) routine and preventative vehicle maintenance
 - (iii) OH&S Tri Safe Audit (Queensland Government self insurance audit) to assess the suitability of operators.

Recommendation 16. Suggested inclusions in the air quality monitoring—as required by Appendix 1, Schedule 2, Condition 16

- (a) The air quality monitoring should include:
- (i) a real time component using a tapered element oscillating microbalance analyser (TEOM) air quality monitoring device or similar, to manage dust issues and assess compliance with these conditions
 - (ii) the establishment of trigger levels with regard to the limits in Table A9: Air quality limits for construction (Appendix 1, Schedule 2)
 - (iii) procedures to be implemented when trigger levels indicate the limits are likely to be exceeded
 - (iv) monitoring to be carried out in locations representative of the most likely adversely affected sensitive place to provide an understanding of the

- impacts of the project on sensitive places, taking into account the nature and location of construction works and wind directions
- (v) a program to train staff involved in carrying out dust generating activities and in dust management practices.

Recommendation 17. Suggested inclusions in the groundwater quality monitoring program – as required by Appendix 1, Schedule 2, Condition 28

The groundwater quality monitoring program should include:

- (i) water level drawdown as a result of the activity
- (ii) the potential for contaminated groundwater beneath land within the project corridor that may be affected by water level drawdown as a result of construction
- (iii) assessment of actual and potential contaminant migration
- (iv) site specific 'intervention values'—parameters which will trigger further groundwater management
- (v) an outline of contingency actions, including procedures for the further assessment or remediation of source and secondary impacts to be implemented in the event that intervention values are exceeded
- (vi) quality of groundwater being intercepted
- (vii) options to reduce the volume of groundwater to be treated and released
- (viii) volume of groundwater to be treated and released
- (ix) groundwater treatment to achieve compliance with release values specified in these conditions
- (x) a management process which prioritises options for re-use over releases to the environment
- (xi) where it is proposed to discharge to the stormwater system, this assessment must relate to the discharge point of the stormwater system

Recommendation 18. Suggested inclusions in the erosion and sediment control sub-plan (ESCP)—as required by Appendix 1, Schedule 2, Condition 20

- (a) The ESCP should:
 - (i) focus on source control options such as minimising worksite disturbance and optimising worksite layouts to minimise the generation of sediment
 - (ii) set clear performance criteria for sediment basin design, construction, operation and maintenance
 - (iii) detail the timing of installation of all measures to ensure that they are installed and commissioned prior to the commencement of activities which may cause sediment to leave worksites
 - (iv) include a monitoring plan to demonstrate compliance with performance criteria and compliance with relevant conditions in Schedule 2 Appendix 1.
- (b) The ESCP should be based on a management process which prioritises options for re-use over releases to the environment. Where available and of appropriate

chemical and biological quality for its proposed purpose, the proponent must use stormwater, groundwater, recycled water or other water sources in preference to potable water for construction, including concrete mixing and dust control.

- (c) The ESCP should include measures:
 - (i) to minimise runoff from disturbed areas to receiving waters
 - (ii) to ensure separation of clean and contaminated storm waters, including the diversion of clear and uncontaminated stormwater away from any sedimentation ponds
 - (iii) measures used to treat sediment laden stormwater, including performance indicators to achieve compliance with release values specified in these conditions
 - (iv) for corrective action and continuous improvement
 - (v) for implementation of corrective action and continuous improvement measures.
 - (vi) assess the impacts of the volume and the quality of the discharge on the receiving water
 - (vii) to mitigate the impacts of the discharge and protect the environmental values of the receiving environment
- (d) The ESCP should identify proposed receiving environment monitoring points consistent with Condition 32 above.

Recommendation 19. Suggested inclusions in the complaints management system of the CEMP – as required by Appendix 1, Schedule 2, Condition 36

- (a) The CEMP complaints management system should include:
 - (i) a protocol establishing the responsibility for receiving and addressing complaints and the means of notifying the community of this protocol (prior to commencement of construction)
 - (ii) establishment of a 24-hour, 7-day-a-week serviced toll-free telephone line. The aim of the hotline is to enable any member of the general public to reach a person who can arrange appropriate response/corrective action to complaints within two hours during all times construction works occur
 - (iii) identification of the complainant, the identity of the person who received the complaint, the manner in which the complaint was made, the time and date on which the complaint was made, and the matter to which the complaint relates
 - (iv) a process wherein, upon receipt of a complaint, an investigation commences forthwith into the cause of the complaint and any actions reasonably required to address the complaint. At least a verbal response on the action(s) to be taken is provided to the complainant within two hours during all times construction works occur (unless the complainant agrees otherwise) and a detailed written response within seven calendar days of the receipt of the complaint. Information on all complaints received and

response times must be made available on request to the Coordinator-General and relevant nominated entities

- (v) a database for tracking complaints, issues, the subject of complaints, responses and corrective actions taken

Recommendation 20. Suggested inclusion for community consultation in the CEMP—refer to section 7.2 of this report (EIS findings, submissions and analysis)

The sections of the public who are likely to be impacted by the construction phase of the project must be kept informed of progress with the project and the likely impacts of the project through the development and implementation of a community consultation strategy.

Appendix 5 Machinery-of-government changes, March 2012

Following the state government election in March 2012, the names and responsibilities of some Queensland Government agencies changed. The following table summarises the changes. For more information, refer to the *Administrative Arrangements Order (No. 3) 2012*.

Former department	New department(s)
Department of Local Government and Planning	Department of State Development, Infrastructure and Planning Department of Local Government
Department of Employment, Economic Development and Innovation	Department of State Development, Infrastructure and Planning Queensland Treasury and Trade Department of Education, Training and Employment Department of Agriculture, Fisheries and Forestry Department of Natural Resources and Mines Department of Energy and Water Supply Department of Science, Information Technology, Innovation and the Arts Department of National Parks, Recreation, Sport and Racing Department of Tourism, Major Events, Small Business and the Commonwealth Games
Department of Communities	Department of Communities, Child Safety and Disability Services
Department of Public Works	Department of Housing and Public Works
Department of Environment and Resource Management	Department of Environment and Heritage Protection Department of Natural Resources and Mines Department of National Parks, Recreation, Sport and Racing Department of Energy and Water Supply Department of Science, Information Technology, Innovation and the Arts

Acronyms and abbreviations

Acronym	Definition
ACH Act	<i>Aboriginal Cultural Heritage Act 2003</i> (Qld)
AEP	annual exceedence probability
AHD	Australian Height Datum
AS/NZS	Australian standard/New Zealand standard
ARI	Average recurrence interval (e.g. for rainfall or flood events)
BCC	Brisbane City Council
BRUV	Boggo Road Urban Village, Dutton Park
CEMP	construction environmental management plan
CHMP	cultural heritage management plan
CLR	Contaminated Land Register
CPTED	crime prevention through environmental design principles
CRR	Cross River Rail (the project)
DCCSDS	Department of Communities, Child Safety and Disability Services
DAFF	Department of Agriculture Fisheries and Forestry (Qld)
DCS	Department of Community Safety (Qld)
DEEDI	Department of Employment, Economic Development and Innovation (Qld)
DERM	Department of Environment and Resource Management (formerly the Environmental Protection Agency) (Qld)
DLGP	Department of Local Government and Planning (Qld)
DHPW	Department of Housing and Public Works (Qld)
DNRM	Department of Natural Resources and Mines (DNRM)
DSITIA	Department of Science, Information Technology, Innovation and Arts (Qld)
DTMR	Department of Transport and Main Roads (Qld) (the proponent)
EAS	equitable access statement
EIS	environmental impact statement
EMP	environmental management plan
EMR	Environmental Management Representative
EP Act	<i>Environmental Protection Act 1994</i> (Qld)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)
EPP (Air)	Environmental Protection (Air) Policy 2008
EPP (Noise)	Environmental Protection (Noise) Policy 2008
EPP (Water)	Environmental Protection (Water) Policy 2009
ERA	environmentally relevant activity
ESCP	erosion sediment control sub-plan in CEMP
IAS	project initial advice statement in accordance with section 27(a) of the SDPWO Act

Acronym	Definition
ICC	Ipswich City Council
IDAS	Integrated Development Assessment System under SPA
LGA	local government area
mg/L	milligrams per litre
MCU	material change of use
NTU	nephelometric turbidity units
OEMP	operational environmental management plan
QH	Queensland Health
QAS	Queensland Ambulance Service
QFRS	Queensland Fire and Rescue Service
QPS	Queensland Police Service
PM ₁₀	fine air particulates with a diameter up to 10 micrometres
TEM	transmission electron microscope

Glossary

Term	Definition
assessment manager	For an application for a development approval, means the assessment manager under the <i>Sustainable Planning Act 2009</i> (Qld).
construction areas	The construction worksites, construction car parks, and any areas licensed for construction or on which construction works are carried out.
construction site	Construction areas defined in the EIS, Volume 2, Reference Design Drawings 'Construction Worksite Plans', except where modified by 'Boggo Road Station underground works construction site (Revised December 2011)', CRR-BGO-W-5000 (Rev D) of the SEIS
construction works	All works necessary for the construction of the project, including demolition of existing buildings and structures with a ground footprints greater than 70 square metres, public utility works on a construction site, pile driving, shaft excavation, cut and cover excavation, tunnelling works and associated road works, but excluding 'preliminary works'.
contiguous	Any land within 100 metres of a construction site.
controlled action	A proposed action that is likely to have a significant impact on a matter of national environmental significance; the environment of Commonwealth land (even if taken outside Commonwealth land); or the environment anywhere in the world (if the action is undertaken by the Commonwealth). Controlled actions must be approved under the controlling provisions of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwth).
Coordinator-General	The corporation sole constituted under section 8A of the <i>State Development and Public Works Organisation Act 1938</i> and preserved, continued in existence and constituted under section 8 of the SDPWO Act.
environment	As defined in Schedule 2 of the SDPWO Act, includes: <ol style="list-style-type: none"> a) ecosystems and their constituent parts, including people and communities b) all natural and physical resources c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).
environmental effects	Defined in Schedule 2 of the SDPWO Act as the effects of development on the environment, whether beneficial or detrimental.
environmental harm	As defined in section 14 of the EP Act - Any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, including environmental nuisance.

environmental nuisance	As defined in section 15 of the EP Act – Any unreasonable or likely interference with an environmental value caused by: <ul style="list-style-type: none"> a) aerosols, fumes, light, noise, odour, particles or smoke; b) an unhealthy, offensive or unsightly condition because of contamination; or c) another way prescribed by regulation.
environmentally relevant activity (ERA)	An activity that has the potential to release contaminants into the environment. Environmentally relevant activities are defined in Part 3, section 18 of the <i>Environmental Protection Act 1994</i> (Qld).
imposed condition	A condition imposed by the Queensland Coordinator-General under section 54B of the SDPWO Act. The Coordinator-General may nominate an entity that is to have jurisdiction for the condition.
initial advice statement (IAS)	A scoping document, prepared by a proponent, that the Coordinator-General considers in declaring a significant project under Part 4 of the SDPWO Act. An IAS provides information about: <ul style="list-style-type: none"> • the proposed development • the current environment in the vicinity of the proposed project location • the anticipated effects of the proposed development on the existing environment • possible measures to mitigate adverse effects.
LOS	‘Level of service’. LOS is an index of the operational performance of traffic on a given traffic lane, carriageway, footpath or road when accommodating various traffic volumes under different combinations of operating conditions. The meaning provided (for urban and suburban arterials) in Figure 5.12 of the <i>Road Planning and Design Manual</i> (Department of Main Roads, 2004) applies in this report. For road traffic it may be summarised as: <ul style="list-style-type: none"> • LoS A—average travel speed \geq 90 per cent of free flow speed • LoS B—average travel speed approximately 70 per cent of free flow speed • LoS C—average travel speed approximately 50 per cent of free flow speed • LoS D—average travel speed approximately 40 per cent of free flow speed • LoS E—average travel speed approximately 33 per cent of free flow speed • LoS F—average travel speed \leq 25 per cent of free flow speed
matters of national environmental significance	The matters of national environmental significance protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> . The eight matters are: <ul style="list-style-type: none"> d) world heritage properties e) national heritage places f) wetlands of international importance (listed under the Ramsar Convention) g) listed threatened species and ecological communities h) migratory species protected under international agreements i) Commonwealth marine areas j) the Great Barrier Reef Marine Park k) nuclear actions (including uranium mines).

nominated entity (for an imposed condition for undertaking a project)	An entity nominated for the condition, under section 54B(3) of the SDPWO Act.
properly made submission (for an EIS or a proposed change to a project)	Defined under section 24 of the SDPWO Act as a submission that: <ul style="list-style-type: none"> l) is made to the Coordinator-General in writing m) is received on or before the last day of the submission period n) is signed by each person who made the submission o) states the name and address of each person who made the submission p) states the grounds of the submission and the facts and circumstances relied on in support of the grounds.
preliminary works	includes site fencing, minor clearing of vegetation, demolition of structures with a ground footprint of 70 square metres or less, public utility works not on construction sites, erecting signs, constructing road entrances to 'construction sites', and installation of all security, safety and environmental monitoring and protection and infrastructure prior to the commencement of 'construction works'.
proponent	The entity or person who proposes the CRR project. It includes a person who, under an agreement or other arrangement with the person who is the existing proponent of the project, later proposes the project.
rail safety regulator	As defined under section 11(b) of the TRS as the chief executive (currently the Director-General of TMR)
significant project	A project declared as a 'significant project' under section 26 of the SDPWO Act.
stated condition	Conditions can be stated (but not enforced by) the Coordinator-General under sections 39, 45, 47C, 49, 49B and 49E of the SDPWO Act. The Coordinator-General may state conditions that must be attached to a: <ul style="list-style-type: none"> • development approval under the <i>Sustainable Planning Act 2009</i> • proposed mining lease under the <i>Mineral Resources Act 1989</i> • draft environmental authority (mining lease) under Chapter 5 of the <i>Environmental Protection Act 1994</i> (EPA) • proposed petroleum lease, pipeline licence or petroleum facility licence under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> • non-code compliant environmental authority (petroleum activities) under Chapter 4A of the EPA. For the CRR project, sections 45, 49, 49B and 49E of the SDPWO Act are not relevant.

works

Defined under the SDPWO Act as the whole and every part of any work, project, service, utility, undertaking or function that:

- q) the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body is or may be authorised under any Act to undertake, or
- r) is or has been (before or after the date of commencement of this Act) undertaken by the Crown, the Coordinator-General or other person or body who represents the Crown, or any local body under any Act, or
- s) is included or is proposed to be included by the Coordinator-General as works in a program of works, or that is classified by the holder of the office of Coordinator-General as works.



**Department of State Development,
Infrastructure and Planning**
PO Box 15517 City East Qld 4002 Australia
tel 13 QGOV (13 74 68)
fax +61 7 3224 4683
info@dsdip.qld.gov.au
www.dsdip.qld.gov.au