Referral of proposed action

Project title:

Inland Rail – Gowrie to Helidon

1 Summary of proposed action

NOTE: You must also attach a map/plan(s) and associated geographic information system (GIS) vector (shapefile) dataset showing the location and approximate boundaries of the area in which the project is to occur. Maps in A4 size are preferred. You must also attach a map(s)/plan(s) showing the location and boundaries of the project area in respect to any features identified in 3.1 & 3.2, as well as the extent of any freehold, leasehold or other tenure identified in 3.3(i).

1.1 **Short description**

The Australian Government has committed to delivering the Inland Rail Programme which is designed to deliver freight rail services over a distance of 1700km between Melbourne and Brisbane, via central-west New South Wales (NSW) and Toowoomba in Queensland, shown in Attachment 1.

The Inland Rail Programme consists of 13 separate projects that will be assessed, procured and constructed separately. Each of the projects is able to operate independently of other projects within the Inland Rail Programme.

Australian Rail Track Corporation Ltd (ARTC) ('the proponent') is the proponent for the Gowrie to Helidon Project. The Gowrie to Helidon Project is a proposed single track, dual gauge fright line, comprising standard gauge and narrow gauge, approximately 26km in length, utilising sections of the existing rail network and new greenfield corridors. The Gowrie to Helidon Project includes construction of track and track formation, new culverts and bridges, a tunnel and ventilation infrastructure, construction of new crossing loops, rationalisation of level crossings with some grade separations of the local road network.

1.2 **Latitude and longitude**

Latitude and longitude details are used to accurately map the boundary of the proposed action. If these coordinates are inaccurate or insufficient it may delay the processing of your referral.

A Preferred Corridor and wider Study Area have been defined for the Gowrie to Helidon Project as discussed in Section 1.4. Coordinates for both polygons are included in Attachment 2.

Also attach the associated GIS-compliant file that delineates the proposed referral area. If the area is less than 5 hectares, please provide the location as a point layer. If greater than 5 hectares, please provide a polygon layer. If the proposed action is linear (e.g. a road or pipeline) please provide a polyline layer (refer to GIS data supply guidelines at Attachment A).

Do not use AMG coordinates.

1.3 **Locality and property description**

Provide a brief physical description of the property on which the proposed action will take place and the project location (e.g. proximity to major towns, or for off-shore projects, shortest distance to mainland).

The Gowrie to Helidon Project is shown in Attachment 3. It departs from the existing rail line at Gowrie and runs along the south of the existing railway line, parallel to Gowrie Creek for approximately 1.5km and into a proposed tunnel portal for the approximately 6.3km tunnel section under the Toowoomba range. The proposed tunnel passes immediately north of Toowoomba, exiting on the eastern side of the Toowoomba Range. To the east of the ridge, the corridor continues toward Withcott and includes significant crossings over the valleys of Rocky Creek, Six Mile Creek and the Toowoomba Second Range Crossing motorway. From Withcott to Helidon the corridor crosses the Upper Lockyer Creek tributaries and Oakey and Gatton Creeks before tying into the existing rail corridor west of Helidon.

1.4	**Size of the development footprint or work area (hectares)**	The Concept Engineering and Environmental Assessment Phase of the Gowrie to Helidon Project have identified a Preferred Alignment and a broader Study Area for consideration in the IAS and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) Referral, as shown in Attachment 3. This will allow for route and tunnel optimisation and other value engineering opportunities to be investigated during subsequent design development, community engagement, environmental assessment and approvals processes. The final Alignment and Project Corridor will be defined during the Environmental Impact Statement (EIS) and design development phases and will include both brownfield (within existing rail corridor) and greenfield development. The resulting Corridor width will be wide enough to accommodate two dual gauge freight tracks and two narrow gauge passenger tracks. The coordinates of the Preferred Alignment and Study Area are included in Attachment 2.
1.5	**Street address of the site**	The Gowrie to Helidon Project extends from Gowrie in the east to Helidon in the west, and is not associated with a single address point.

1.6 **Lot description**

Describe the lot numbers and title description, if known.

The Gowrie to Helidon Project traverses multiple lots, the majority of which were identified as part of the future public passenger transport corridor protected under the Queensland *Transport Planning and Coordination Act 1994* (TPC Act) by the Queensland Government in 2005 following the Queensland Rail Gowrie to Grandchester study. The properties intersected by the Preferred Gowrie to Helidon preferred alignment are listed in Attachment 2.

1.7 **Local Government Area and Council contact (if known)**

If the project is subject to local government planning approval, provide the name of the relevant council contact officer.

The Gowrie to Helidon Project is within the Toowoomba Regional Council and Lockyer Valley Regional Council local government areas.

1.8 **Time frame**

Specify the time frame in which the action will be taken including the estimated start date of construction/operation.

The indicative timeframes for the Gowrie to Helidon Project are as follows:

- 2017-2019: design, planning and approvals
- 2019-end of 2020: pre-construction and land acquisition
- 2020 – 2025: construction
- 2025 Project opening.

1.9	**Alternatives to proposed action** Were any feasible alternatives to taking the proposed action (including not taking the action) considered but are not proposed?		No
		✓	Yes ARTC have prepared a business case which considers alternatives to the projects that are part of the Melbourne to Brisbane Inland Rail Programme.
1.10	**Alternative time frames etc** Does the proposed action include alternative time frames, locations or activities?		No
		✓	Yes ARTC have conducted numerous studies investigating alternate routes, between Gowrie and Helidon. The wider Study Area currently defined also allows for further route definition and value engineering
1.11	**State assessment**		No

	Is the action subject to a state or territory environmental impact assessment?	✓	Yes An initial advice statement has been submitted to the Queensland Coordinator-General seeking a coordinated project declaration. If this is granted, the Project will be assessed under the Queensland *State Development and Public Works Organisation Act 1971*. If the Project is a controlled action, it is anticipated that assessment will follow the bilateral agreement.
1.12	**Component of larger action** Is the proposed action a component of a larger action?	✓ 	No Yes
1.13	**Related actions/proposals** Is the proposed action related to other actions or proposals in the region (if known)?	 ✓	No Yes The Gowrie to Helidon Project is one of 13 separate projects in the Melbourne to Brisbane Inland Rail Programme. Each of the 13 projects is delivered as a separate, but related action, as each project: • will be subject to separate State assessments; • will be delivered within different timeframes; • will be separately procured, with it being likely that there will be a separate contract for project; • is designed so that it can be constructed and operated independently of each other project; • will be delivered on State-owned land, with tenure different between each jurisdiction; • will be subject to separate referrals under the EPBC Act, if required. Separate projects that are within the Inland Rail Programme that are adjacent to the Gowrie to Helidon Project are the NSW/QLD Border to Gowrie Project and the Helidon to Calvert Project. The Gowrie to Helidon Project connects to the existing Western rail line, with tie-in points designed to enable the Project to proceed and be operated independently of the adjacent Inland Rail Projects, if required. These Projects are shown in Attachment 1.
1.14	**Australian Government funding** Has the person proposing to take the action received any Australian Government grant funding to undertake this project?	 ✓	No Yes The Melbourne to Brisbane Inland Rail Programme has been allocated funding from the Australian Government in mid-2016 to progress planning approvals and commence land acquisition.
1.15	**Great Barrier Reef Marine Park** Is the proposed action inside the Great Barrier Reef Marine Park?	✓ 	No Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

NOTE: It is important that the description is complete and includes all components and activities associated with the action. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in section 2.7.

2.1 Description of proposed action

This should be a detailed description outlining all activities and aspects of the proposed action and should reference figures and/or attachments, as appropriate.

The Gowrie to Helidon Project is proposed as an approximately 26 km long single-track dual-gauge railway, with crossing loops to accommodate double stack freight trains up to 1800 m long, between Gowrie and Helidon in Queensland.

At a point in time defined by demand, business needs, operational modelling and design, a future action may include additional infrastructure within the corridor including freight track duplication and extension of crossing loops to accommodate 3600m freight trains.

The Gowrie to Helidon Project corridor will include space provision for the co-location of the separate Gowrie to Grandchester future public passenger transport corridor, to be developed and operated by the Queensland Department of Transport and Main Roads (TMR).

Key components of the Gowrie to Helidon Project that constitute the project the subject of this referral are:

- a rail corridor approximately 65m wide, containing a single track dual gauge railway line with crossing loops for up to 1,800 m long train consists
- The approximately 6.3km Toowoomba range tunnel, approximately 750,000 cubic metres of earthworks (cut and fill), bridges and viaducts to accommodate topography and project crossings of waterways and other infrastructure
- Tie-ins to the existing West Moreton Railway Line at the project boundary and other potential intermediate locations to be confirmed by operational modelling
- Associated rail infrastructure including maintenance facilities, Advanced Train Management Systems (ATMS) and signalling infrastructure
- Ancillary works including road and public utility crossings and realignments
- External infrastructure requirements to be confirmed during future project stages
- Construction workspace and access roads.
- Provision within the corridor for the possible future co-location of the Gowrie to Grandchester future public passenger transport corridor including two passenger tracks to be developed and operated by the Queensland Department of Transport and Main Roads (TMR). Requirements for passenger transport infrastructure (e.g. stations) are excluded from this Project, and would be progressed by TMR.

Elements not included as part of the proposed action the subject of this referral include the following:

- complementary infrastructure, such as metropolitan and regional freight terminals
- upgraded freight fleet / rolling stock
- complementary land use and freight precinct developments

The Concept Engineering and Environmental Assessment Phase of the Gowrie to Helidon Project have identified a Preferred Alignment and a Study Area for consideration in this EPBC Referral and the IAS submitted to the Queensland Coordinator-General as shown in **Attachment 3**. The coordinates of the Preferred Alignment and Study Area are included in Attachment 2. The Study Area will allow for route optimisation and other value engineering opportunities to be investigated during subsequent design development, community engagement, environmental assessment and approvals processes.

2.2 Alternatives to taking the proposed action

This should be a detailed description outlining any feasible alternatives to taking the proposed action (including not taking the action) that were considered but are not proposed (note, this is distinct from any proposed alternatives relating to location, time frames, or activities – see section 2.3).

Melbourne to Brisbane Inland Rail Programme

The Melbourne to Brisbane Inland Rail Programme has been under development for many years. This has included economic analysis, route studies and preliminary engineering analysis. The original North- South Rail corridor study was undertaken in 2006, followed by the Inland Rail Alignment Study released in 2010. A concept business case was prepared in 2014, followed by the preparation of the Programme Business Case in 2015.

Various alternate scenarios to the overall Melbourne to Brisbane Inland Rail Programme have been considered, including:

- Do nothing: freight remains on the existing road network, regional development opportunities are not realised, and potential opportunities to reduce significant greenhouse gas emissions unlikely to be realised
- Increasing the size and number of trucks to facilitate forecast freight growth, which would increase road safety risk and also require investment in the road network for maintenance and capacity
- Reforms to delay or remove the need for infrastructure investment (demand management, productivity enhancement or deregulation)
- Progressive upgrades of the National Highway
- Upgrades of the existing coastal railway
- Alternate freight transport solutions including air freight (cost prohibitive) and coastal shipping (constrained by port access).

The Business Case concludes that the preferred way to achieve the programme objectives is to proceed with implementation. The Business Case Summary, 'The Case for Inland Rail' is included at Attachment 4.

Gowrie to Helidon Project

Alternate alignments have been investigated within the Study Area. The Preferred Corridor is the result of several iterations of option assessment, and consultation with the Queensland Government. This includes the following:

- The 2003 Gowrie to Grandchester Study. This study was undertaken by Queensland Rail and the Department of Transport and Main Roads (formerly Queensland Transport) to define and protect a future railway corridor suitable for 200 km/h passenger services and freight between Gowrie and Grandchester. The 2003 alignment identified in this study was subsequently declared as a "future public passenger transport corridor" under the *Transport Planning and Coordination Act 1994* and reflected in local government planning schemes.
- The 2006 North South Rail Corridor Study. This study assessed the high level viability of four north south freight corridors between Melbourne and Brisbane. The study was not designed to identify a preferred option but identified the most affordable and economic corridor within which to focus future investigation.
- 2010 Inland Rail Alignment Study (IRAS). This study set the blueprint for the development of an inland railway to meet the future freight demands of eastern Australia. This route included consideration of the Gowrie to Grandchester section of Inland Rail (including the Toowoomba Range and Little Liverpool Range crossings) which ARTC had previously identified as likely to be the critical path component for the completion of Inland Rail. An alternate alignment between Gowrie and Grandchester was selected at the conclusion of this study.
- In 2014 the decision was made to move from the 2010 IRAS alignment to an alignment between Gowrie and Calvert that comprised the previously protected corridor known as the 2003 - Gowrie to Grandchester route. This was based on input and further options analysis undertaken by the Queensland Department of Transport and Main Roads, building upon the existing corridor location and inclusion in planning schemes.
- 2015 Melbourne to Brisbane Inland Rail Business Case confirms the 2014 alignment decision and the 2016 ARTC Concept Assessment process proceeds in consultation with the Queensland Government on this basis.

The Preferred Alignment, shown in Attachment 3, is the result of further options analysis undertaken by ARTC's consultants in 2016 in consultation with the Queensland Government. The concept assessment included a

review of previous options analyses, further preliminary engineering design and environmental assessment and was informed by initial engagement with key stakeholders including the Toowoomba City Council, Lockyer Valley Regional Council, peak industry bodies and Aboriginal parties.

2.3 Alternative locations, time frames or activities that form part of the referred action

If you have identified that the proposed action includes alternative time frames, locations or activities (in section 1.10) you must complete this section. Describe any alternatives related to the physical location of the action, time frames within which the action is to be taken and alternative methods or activities for undertaking the action. For each alternative location, time frame or activity identified, you must also complete (where relevant) the details in sections 1.2-1.9, 2.4-2.7, 3.3 and 4. Please note, if the action that you propose to take is determined to be a controlled action, any alternative locations, time frames or activities that are identified here may be subject to environmental assessment and a decision on whether to approve the alternative.

The Preferred Alignment is shown in Attachment 3. The wider Study Area has been identified to enable community engagement, route optimisation and value engineering opportunities during subsequent project phases (particularly in relation to the crossing of the Toowoomba Range), community consultation outcomes and to accommodate utilities easements, road realignments and ancillary activities and potential construction areas. The nominated construction and operational timeframes set out in section 1.8 are dependent upon funding by the Australian Government, approvals timeframes and detailed design.

2.4 Context, planning framework and state/local government requirements

Explain the context in which the action is proposed, including any relevant planning framework at the state and/or local government level (e.g. within scope of a management plan, planning initiative or policy framework). Describe any Commonwealth or state legislation or policies under which approvals are required or will be considered against.

The Melbourne to Brisbane Inland Rail Programme

ARTC has prepared a business case, examining the complex issue of freight movement and forecast freight demand along the east coast of mainland Australia. ARTC estimates that by 2030, more than 32 million tonnes of freight will be moved on highways between Melbourne and Brisbane.

Australia is heavily reliant on efficient supply chains to provide competitive domestic freight links and gateways for international trade. Freight transport services between major population centres, particularly our capital cities, deliver millions of tonnes of freight each year and provide for the distribution of goods throughout the country. Efficient and effective domestic supply chains that are internationally competitive against import chains, support economic growth and help keep down the cost of the products we buy. It is estimated the transport and logistics sectors of the Australian economy contribute 14.5 per cent of Gross Domestic Product (GDP), with Australia's supply chain worth an estimated $150 billion every year. Efficient transport of Australian exports to world markets maximises the economic returns to the Australian economy. Productive ports, freight networks and other critical infrastructure is the key to efficient supply chains and to Australia's competitiveness. Better infrastructure has a critical role in lifting our nation's wealth and prosperity and the effective operation of national freight is integral to the wellbeing of all Australians. Inefficient infrastructure networks are one of the key reasons why Australia's productivity has declined and a key driver of the cost of living pressures affecting Australians. Australia's east coast comprises 70 per cent of the country's population, 78 per cent of Australia's national employment and generates 75 per cent of the nation's GDP. With the population estimated to grow by 60 per cent over the next 40 years increasing pressure will be placed on freight infrastructure and services.

ARTC surmises the following:

- Relying on road for freight transport will result in increasing safety, environmental and community impacts
- The existing rail line between Melbourne and Brisbane is constrained by passing through Sydney and can't accommodate double stacking
- Our regional suppliers have limited transport options.

The Case for Inland Rail concludes:

The Business Case shows that Inland Rail:

- *Is compatible and interoperable with high productivity train operations in the east-west corridor, to Adelaide and Perth*
- *Uses and enhances existing rail infrastructure where possible, making the most of recent investments*
- *Bypasses the congested Sydney rail network*
- *Improves connections with regional and local rail and road networks*
- *Maximises value for money, while meeting market needs*
- *Delivers the service that rail customers want, at a price they are willing to pay*

- *Provides significant social and environmental benefits*
- *Will cover its ongoing operating and maintenance costs, once operational*
- *Is good for the country's economy – increasing Australia's GDP by an estimated $16 billion by 2050 Meets Australia's strategic, long-term needs.*

The Australian Government approved funding for the Melbourne to Brisbane Inland Rail Programme in the 2016 Federal Budget to progress the design and engineering development, and commence primary planning and environmental approvals and property acquisition.

Queensland Planning Context

ARTC is seeking that the project be declared a 'coordinated project for which an EIS is required' under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971*.

In deciding whether to declare a project to be a coordinated project, the Coordinator-General considers:

- Detailed information about the project given by the proponent in an IAS
- Relevant planning schemes or policy frameworks of a local government, the State or the Commonwealth
- Relevant State policies and Government priorities
- A pre-feasibility assessment of the project, including how it satisfies an identified need or demand
- The capacity of the proponent to undertake and complete the EIS for the project
- Any other matter the Coordinator-General considers relevant.

The Gowrie to Helidon Project will also be referred under the *EPBC Act 1999* (this document) and if deemed a controlled action, it is anticipated that assessment of the Gowrie to Helidon Project will follow the Bilateral Assessment Agreement between the Australian and Queensland Governments.

The key reasons why ARTC are seeking the coordinated project declaration are:

- To provide the public with the opportunity to comment and provide input into the Terms of Reference for the EIS, and following its development, on the draft EIS,
- To have an independent and transparent social, economic and environmental assessment of the project undertaken by the Queensland Coordinator General; and
- For the opportunity of efficient assessment of EPBC Act matters in accordance with the Queensland and Commonwealth government EPBC Act assessment bilateral agreement.

Relevant Planning Schemes and Policy Frameworks

The Preferred Alignment traverses land within two local government areas (LGAs) including:

1. Toowoomba City Council
2. Lockyer Valley Regional Council

As such, the following planning schemes may apply to the Project:

- Toowoomba Regional Planning Scheme 2003
- Gatton Shire Planning Scheme 2007
- Laidley Shire Planning Scheme 2003

The Laidley Shire Planning Scheme identifies a proposed rail corridor consistent with the Preferred Alignment on their Development Constraints Overlay Map I1 and protects it from incompatible development. The existing Gatton Shire Planning Scheme 2007 and Ipswich Planning Scheme 2006 also have provisions for development around existing and proposed transport corridors. The Gatton Shire Planning Scheme 2007 and Laidley Shire Planning Scheme 2003 will be replaced once a single planning scheme for the Lockyer Valley is prepared and adopted.

The Preferred Alignment also forms part of the rail corridor identified under the Gowrie to Grandchester Rail Corridor Study in 2003. This rail corridor was subsequently identified as a 'future public passenger transport corridor' in September 2005 in the Public Passenger Transport Guideline made under the *Transport Planning and Coordination Act 1994*.

The Gowrie to Helidon Project will be generally within the existing Gowrie to Grandchester future public passenger transport corridor.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

If you have identified that the proposed action will be or has been subject to a state or territory environmental impact statement (in section 1.11) you must complete this section. Describe any environmental assessment of the relevant impacts of the project that has been, is being, or will be carried out under state or territory legislation. Specify the type and nature of the assessment, the relevant legislation and the current status of any assessments or approvals. Where possible, provide contact details for the state/territory assessment contact officer.

Describe or summarise any public consultation undertaken, or to be undertaken, during the assessment. Attach copies of relevant assessment documentation and outcomes of public consultations (if available).

The Queensland *State Development and Public Works Organisation Act 1971* allows for the Queensland Coordinator-General to declare a project to be a 'coordinated projects' requiring either an Environmental Impact Statement (EIS) or an Impact Assessment Report (IAR). When seeking the declaration of a coordinated project, proponents must apply to the Coordinator General in writing through the preparation and submission of an Initial Advice Statement (IAS), a statement of the financial and technical capability to complete an EIS, and a separate statement assessing the technical and commercial feasibility of the project. An application has been submitted to the Coordinator-General for the Gowrie to Helidon Project, seeking declaration as a coordinated project.

If the Project is declared a coordinated project and is also determined to be a controlled action under the EPBC Act, it is anticipated that assessment may be progressed under the Bilateral Assessment Agreement between the Australian and Queensland Governments.

After the Coordinator-General's evaluation report, further approvals are likely to be required under separate approvals processes. It is anticipated that this might include approvals for waterway barrier works and vegetation clearing under the *Planning Act 2016* (which is expected to repeal and replace the *Sustainable Planning Act 2009*), and other permits such as Protected Plant clearing permits, Species Management Programs under the *Nature Conservation Act 1992* and water permits under the *Water Act 2000*.

Offsets may be required as part of the Coordinator-General's imposed conditions, or through later State approvals. Other management plans may be required to progress implementation of the Project.

2.6 Public consultation (including with Indigenous stakeholders)

Your referral must include a description of any public consultation that has been, or is being, undertaken. Where Indigenous stakeholders are likely to be affected by your proposed action, your referral should describe any consultations undertaken with Indigenous stakeholders. Identify the relevant stakeholders and the status of consultations at the time of the referral. Where appropriate include copies of documents recording the outcomes of any consultations.

Extensive community consultation was undertaken by the Queensland Government for the studies to inform the protection of the Gowrie to Grandchester future public passenger transport corridor in 2003. ARTC have commenced consultation with key government and industry stakeholders and aboriginal parties and the outcomes of these initial consultations have informed the concept assessment phase. ARTC will implement an extensive public consultation program for the Helidon to Calvert Project.

Local Government Consultation

Specific issues raised during preliminary consultation undertaken by ARTC in 2015 and 2016 are outlined in **Error! Reference source not found.**

Table 1: Summary of issues raised by Local Government

STAKEHOLDER	ISSUES and OPPORTUNITIES	2015	2016	STATUS
Toowoomba Regional Council	**Flooding and mitigation measures** Concerns about impact on townships and properties	✔	✔	Council technical flooding data obtained through data sharing agreement. ARTC flood modelling to be undertaken in future planning.
	Noise	✔	✔	Baseline noise data collected

	Concerns about standards for noise levels and the maximum decibels			during field studies. Noise modelling to be undertaken in future planning. Noise mitigation measures are being considered in built-up residential areas and where required to address noise impacts.
	Road and rail interface Alignment intersects several key roads	✔	✔	Grade separated and at grade crossing locations have been identified and discussions will be held with relevant stakeholder
	Local supplier involvement Seek engagement to ensure local involvement of suppliers and source for material	✔		A key focus of future communication and engagement will be a local supplier program to ensure the project recognises and includes local involvement.
Lockyer Valley Regional Council	**Local road connectivity** Keen for discussions around technical solutions to maintain connections	✔	✔	While some level of severance is expected, grade separated and at grade crossing locations have been identified and discussions will be held with relevant stakeholders
	Flooding Long-standing concerns about contribution of rail infrastructure to flooding impacts	✔	✔	LVRC flooding data and modelling obtained through data sharing agreement. Flooding a key consideration of alignment refinement. Detailed modelling to be undertaken in future planning.
	Cumulative environmental impacts Concerns about the environmental impact that will be caused by both TSRC and IR	✔	✔	To be addressed in more detail during future environmental assessments.
	Operational Impacts of operations with alignment through townships such as Gatton	✔	✔	Alignment selection based on robust MCA and concept assessment process, taking into account various concerns and potential mitigation of risk and operational impacts.

Landowner Consultation

Private landowners were engaged to obtain agreement to access their properties for the purpose of conducting ecological studies. Key themes from landowner feedback included:

- The majority of landowners were aware of the existence of the protected rail corridor within their properties, however a small number of private landowners were unaware of the protected rail corridor.
- Land acquisition arrangements and timing.
- Future operation of existing rail line.
- Landowners asked about plans for a tunnel through the Toowoomba range.
- Negative experiences with adjacent infrastructure projects, such as the Toowoomba Second Range Crossing, including field studies.
- Ongoing consultation with the dedicated community engagement lead was a consistent request.

Specific issues raised during preliminary consultation are outlined in **Error! Reference source not found.**2.

Table 2: Summary of issues raised by Landowners

STAKEHOLDER	ISSUES and OPPORTUNITIES	2015	2016	STATUS
Landowners	**Awareness of the Gowrie to Grandchester 2003 future public passenger transport corridor** The majority of landowners were aware of the existence of the protected rail corridor within their properties, however a small number of private landowners were unaware of the protected rail corridor.		✔	Release of detailed corridor information deferred until completion of concept assessment report and selection of alignment.
	Land acquisition arrangements and timing Concerns about lack of information being provided about the corridor location and project timing		✔	Commitments were provided to provide further information when it became available.
	Future operation of existing rail line Several landowners queried the planned operation of the existing rail line.		✔	All were advised this information could not be provided at this time, given the early stage of planning for the Inland Rail alignment.
	Adjacent infrastructure Many property owners located in the region had recent experiences with adjacent infrastructure projects, such as the Toowoomba Second Range Crossing, including with field studies undertaken as part of design for those projects and during construction activities. A number of negative comments were expressed relating to property impacts caused by access and construction activities.		✔	Comments were noted.

	Operational impacts Townships and communities such as Gatton and associated operational impacts such as noise, visual amenity, disruption to lifestyle, level crossing operations		✔	To be addressed in more detail during future environmental assessments

Community Information Sessions

Advertised community information and feedback sessions were held 20 to 23 June 2016. Direct mail invitations were distributed to landowners in a 500 metre radius to the corridor. The following are general issues raised:

- Lack of awareness about the location of the 2003 Gowrie to Grandchester protected corridor
- Concern from landowners located adjacent to the protected corridor about operational impacts
- Investment in their properties, such as building new infrastructure were now in doubt
- Interest in Inland Rail, when it will be constructed and in operation
- Volume of freight traffic likely to be using the new line and potential impacts
- Flooding issues, particularly from residents in Forest Hill and Laidley
- Opportunities for corridor modifications considering farmland operations, valley, flood plain, and access.
- Access for farmers, movement of stock and machinery across the rail corridor
- Land acquisition and compensation processes
- Opportunities for intermodal and freight interfaces within local communities

Stakeholder Workshops

In early 2016, stakeholder workshops were held in Toowoomba and Gatton to identify key issues:

- to be addressed during the environmental assessment process;
- opportunities to create additional value for the project and project stakeholders; and
- an initial indication of the potential social license and risks.

Attendance at the Gatton workshop included Gehrke Grains and Transport, Lockyer Better Business, Lockyer Valley Growers, Lockyer Valley Regional Council, Lockyer Valley Water Users Forum, Nolans Transport, Regional Development Authority - Ipswich and West Moreton, SEQ Catchments Limited, UQ – Gatton and Withcott Seedlings.

Key issues raised included:

- The alignment options under consideration, including Gatton Bypass (height for bypass, impacts on cropping land), Helidon deviation;
- There were significant concerns raised in relation to the potential flooding impacts associated with the height of embankments through Forest Hill;
- Future operation of existing rail line - e.g. through Laidley;
- Level crossings- impacts on local roads and delays for traffic – community severance. Laidley-Plainlands;
- The likelihood of stations or terminals for freight being constructed in the Lockyer Valley as few benefits.

Specific issues raised by Peak Bodies during the workshops are outlined in Table 3.

Table 3: Summary of issues raised by Peak Bodies

STAKEHOLDER	ISSUES and OPPORTUNITIES	2015	2016	STATUS
Peak bodies	**Flooding impacts** Flood mitigation is a big issue, residents question whether		✔	Flooding a key consideration of alignment refinement. Detailed modelling to be

	there should be a levee around Forest Hill. Previous impacts in Laidley, Grantham and Helidon			undertaken in future planning. Opportunity to use catchment groups flood modelling data.
	Environmental impacts Helidon Hills is an important environmental area for SEQ (rock wallabies)		✔	To be addressed in more detail during future environmental assessments.
	Supply chain benefits Interested in having loading facilities in the Lockyer and how this could work with climate-controlled containers and need to identify the value-add for the area.		✔	Relevant stakeholders, such as trucking companies and growers consulted
	Connectivity to industrial and infrastructure developments Impact of loss of connectivity across Gatton and to the Warrego Highway		✔	More information to be provided on staging and timing when available.
	Operational impacts Townships and communities such as Gatton and associated operational impacts such as noise, visual amenity, disruption to lifestyle, level crossing operations		✔	To be addressed in more detail during future environmental assessments

Further opportunities for formal and informal public consultation will be undertaken to support the delivery of approvals, and to capture relevant information for consideration in project design and assessments.

Aboriginal Party Consultation

The Study Area crosses both the Jagera people's and the Western Wakka Wakka people's Native Title Claim areas. ARTC commenced initial consultations with representatives from the Jagera People and the Western Wakka Wakka people in May 2016 and further engagement will occur during subsequent project stages. ARTC will be responsible for the development of Cultural Heritage Management Plans separately with the Jagera people and the Western Wakka Wakka people (2 groups), in accordance with the Queensland *Aboriginal Cultural Heritage Act 2003*.

2.7 A staged development or component of a larger project

If you have identified that the proposed action is a component of a larger action (in section 1.12) you must complete this section. Provide information about the larger action and details of any interdependency between the stages/components and the larger action. You may also provide justification as to why you believe it is reasonable for the referred action to be considered separately from the larger proposal (eg. the referred action is 'stand-alone' and viable in its own right, there are separate responsibilities for component actions or approvals have been split in a similar way at the state or local government levels).

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest.

Your assessment of likely impacts should refer to the following resources (available from the Department's web site):

- specific values of individual World Heritage properties and National Heritage places and the ecological character of Ramsar wetlands;
- profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*; and
- associated sectoral and species policy statements available on the web site, as relevant.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The Minister has prepared four marine bioregional plans (MBP) in accordance with section 176. It is likely that the MBP's will be more commonly relevant where listed threatened species, listed migratory species or a Commonwealth marine area is considered.

Note that even if your proposal will not be taken in a World Heritage area, Ramsar wetland, Commonwealth marine area, the Great Barrier Reef Marine Park or on Commonwealth land, it could still impact upon these areas (for example, through downstream impacts). Consideration of likely impacts should include both direct and indirect impacts.

3.1 (a) World Heritage Properties

Description

No World Heritage Properties are located within 5km of the Project.

Nature and extent of likely impact

The World Heritage Place identified closest to the Project was the Gondwana Rainforests of Australia located approximately 35km south of the Project. It is unlikely the Project would have any direct or indirect impacts on that area, owing to the separation distance and intervening land uses. The project is not within the catchment for this area, and no downstream effects are likely to occur.

3.1 (b) National Heritage Places

Description

No National Heritage Places were identified within 5km of the Project.

Nature and extent of likely impact

The National Heritage Place identified closest to the Project was the Gondwana Rainforests of Australia located approximately 35km south of the Project. It is unlikely the Project would have any direct or indirect impacts on that area, owing to the separation distance and intervening land uses.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

Four Wetlands of International Importance (Ramsar) wetlands were identified on the PMST as follows:

- Banrock station wetland complex located 1300 to 1400km south of the site in South Australia
- Narran lake nature reserve located 400 to 500km south of the site in New South Wales
- Riverland located 1200 to 1300km south of the site in South Australia
- The Coorong, and Lakes Alexandrina and Albert wetland located 1400 to 1500km south of the site in South Australia.

Nature and extent of likely impact

Address any impacts on the ecological character of any Ramsar wetlands.

The project is located in an area which is within the catchments of the headwaters of the Murray Darling Basin, upstream of these four Ramsar Wetlands which are also located in the Murray Darling Basin. Due to the significant distances between the Project and any of the Ramsar sites, and mix of land uses between the Study Area and the Ramsar sites, direct impacts are not expected and there is limited potential for indirect impacts from the Project.

3.1 (d) Listed threatened species and ecological communities

Description

A report from the EPBC Protected Matters Search Tool (PMST) was generated on 12/01/2017 for a 5km linear buffer along the centreline of the Preferred Alignment. Attachment 5 provides the PMST report results.

Initial targeted field investigations were undertaken along the preferred alignment at 22 locations between Gowrie and Helidon in early April and early June 2016, focusing on MNES species and communities, remnant regional ecosystems, waterways and habitats, predominantly in areas of greenfield sections of corridor where access was available during the field investigation period. Access was constrained by topography, thick vegetation and landowner consent in some areas.

At the majority of sites, habitat assessment was conducted, and opportunistic flora and fauna records collected. Rapid aquatic habitat assessments were conducted at accessible creek and river crossings. Quaternary level flora assessments were conducted at five locations to confirm their regional ecosystem status under the Queensland *Vegetation Management Act 1999*.

Koala presence/absence was determined at eighteen representative locations between Gowrie and Helidon, via the use of the Koala Spot Assessment Technique (KSAT). The KSAT methodology adopted from Phillips and Callaghan (2011) categorises the activity levels into low, medium (normal) or high use, based on the mean activity level.

Extrapolation of the initial KSAT locations across the landscape (regional ecosystems) was undertaken to enable a broad understanding of Koala habitat and potential movement corridors and inform further investigations required.

The findings of the flora and fauna survey were used to inform a likelihood of occurrence assessment documented in Tables 1 and 2, identifying the potential for MNES (threatened flora and fauna, threatened ecological communities) to be present in the Study Area. Results of the targeted flora and fauna investigations are included in Attachment 6. Survey sites discussed in the following sections are shown in Attachment 7.

Threatened Ecological Communities

The PMST identified six Threatened Ecological Communities (TECs) within the defined search area, being:

1. Coolibah - Black Box Woodlands of the Darling Riverine Plains and the Brigalow Belt South Bioregions: Endangered
2. Lowland Rainforest of Subtropical Australia: Critically Endangered
3. Natural grasslands on basalt and fine-textured alluvial plains of northern New South Wales and southern Queensland: Critically Endangered
4. Weeping Myall Woodlands: Endangered.
5. Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions: Endangered
6. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (also known as Box-Gum Grassy Woodland and Derived Grassland): Critically Endangered

The first four TECs listed above, are not considered likely to occur, based on a review of DNRM regional ecosystem mapping. These were also not identified during initial field investigations along the Preferred Alignment.

Threatened Fauna

The PMST report identified 28 EPBC Act listed threatened fauna species, including 12 bird species, 10 mammal species, 5 reptile species and 1 fish species as potentially occurring in the Study Area.
Table 1 provides a preliminary species likelihood assessment based on known habitat preferences, observations during initial field investigations and species records documented for the nearby Toowoomba Second Range Crossing Project.

Table 1- Fauna Species Likelihood Assessment

Name	**EPBC**	**Type of presence**	**Habitat and Distribution**	**Likelihood of Occurrence**
Regent Honeyeater *(Anthochaera phrygia)*	CE	Foraging, feeding or related behaviour may occur within area	Associates with nectar-producing trees, particularly those that flower in winter	Seasonal, pending nectar availability
Australasian Bittern *(Botaurus poiciloptilus)*	E	Species or species habitat known to occur within area	Heavily vegetated permanent freshwater wetlands	Low, no suitable wetlands within the corridor
Curlew Sandpiper (*Calidris ferruginea*)	CE	Species or species habitat known to occur within area	Intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters.	None, no suitable habitat occurs within the study area
Coxen's Fig-Parrot *(Cyclopsitta diophthalma coxeni)*	E	Species or species habitat may occur within area	Rainforest, particularly stands with figs; sometimes isolated trees	Low, lack of figs observed
Red Goshawk *(Erythrotriorchis radiates)*	V	Species or species habitat known to occur within area	Very large home-range of 50-220 km^2; prefers a mosaic of habitat types, on the coastal plain often found near watercourses in forests of; feeds mainly on birds, intolerant of dense regrowth forests which restrict manoeuvrability when hunting; builds a large stick nest	Moderate, largely confined to forests with a high density of medium to large birds but very large home-range suggests occasional use of Study Area possible
Squatter Pigeon (southern subspecies) *(Geophaps scripta scripta)*	V	Species or species habitat known to occur within area	Open-forests to sparse, open-woodlands and scrub that are mostly dominated in the overstorey by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species with patchy, tussock-grassy understories, within 3 km of water.	Low, lantana has invaded most of the suitable habitat (which would preclude it) but some limited areas of forest with a grassy understorey remain
Painted Honeyeater *(Grantiella picta)*	V	Species or species habitat likely to occur within area	Drier Eucalypt forests and woodlands where mistletoes are abundant; diet mostly mistletoe fruit, but also nectar and insects	Moderate, paucity of mistletoes observed, but habitat otherwise suitable
Swift Parrot *(Lathamus discolor)*	CE	Species or species habitat likely to occur within area	Over-winters on mainland, extending to SE Qld; associates with winter flowering trees (e.g. spotted gums, red gums, ironbarks)	Seasonal, but even then rare
Eastern curlew	CE	Species or	Sheltered coasts, mangrove	None, no suitable

Name	EPBC	Type of presence	Habitat and Distribution	Likelihood of Occurrence
(*Numenius madagascariensis*)		species habitat may occur within area	swamps, bays, harbours and lagoons that contain mudflats and sandflats, often with beds of seagrass.	habitat occurs within the study area
Black-throated Finch (southern) (*Poephila cincta cincta)*	E	Species or species habitat may occur within area	Grassy, open woodlands and Eucalyptus forests, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water	Low. Only poor quality habitat available and species has not been recorded in SE Qld since the mid- 1990s
Australian Painted Snipe *(Rostratula australis)*	E	Species or species habitat may occur within area	Well-vegetated shallow margins of freshwater wetlands, lakes and swamps, forages for invertebrates on muddy edges; nests in dense reeds near water	Low, possible in limited habitat
Black-breasted Button-quail *(Turnix melanogaster)*	V	Species or species habitat known to occur within area	Drier rainforests and viny scrubs, often in association with Hoop Pine and a deep, moist leaf litter layer; will use patches of *Lantana camara* when proximate to preferred native habitat types.	Moderate, patches of lantana present, but associated with Eucalypt forest, not preferred habitat types. No potential feeding signs observed
Large-eared Pied Bat *(Chalinolobus dwyeri)*	V	Species or species habitat likely to occur within area	Dry open forest and woodland with extensive cliffs and caves; roosts in caves, crevices, old mines	High, particularly along the Toowoomba Range where roosting habitat can be found
Corben's Long-eared Bat, South-eastern Long-eared Bat *(Nyctophilus corbeni)*	V	Species or species habitat may occur within area	Variety of inland woodland vegetation types such as Eucalyptus woodland and bloodwood species	Low, not generally regarding as occurring east of the Dividing Range, but may be present in the far west of the Study Area
Northern Quoll *(Dasyurus hallucatus)*	E	Species or species habitat may occur within area	Open forests and rocky country; shelters in tree hollows; known range only extends south of to central Queensland	None, outside known range
Spot-tailed Quoll (southern subspecies) (*Dasyurus maculatus maculatus)*	E	Species or species habitat known to occur within area	Forests, woodlands, coastal heath; uses hollow-bearing trees, fallen logs and rock crevices as den sites; territories very large ~7.5 km^2 for females and 35 km^2 for males	High, particularly along escarpment
Greater Glider *(Petauroides Volans)*	V	Species or species habitat known to occur within area	Wide range of habitat including tall open woodland, Eucalypt forests and low woodlands. Wildlife Queensland	Moderate, confined to areas with large tree hollows
Brush-tailed Rock-wallaby *(Petrogale penicillata)*	V	Species or species habitat known to occur within area	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks (Murray et al. 2008; Short 1982). It also utilises tree limbs. Most	Low, possible along the escarpment in rocky areas, but no locality records

Name	EPBC	Type of presence	Habitat and Distribution	Likelihood of Occurrence
			colonies are on north-facing slopes and cliff lines. DoE, 2016	
Koala *(Phascolarctos cinereus)*	V	Species or species habitat known to occur within area	Forests containing primary browse trees, e.g. Forest Red Gum (*Eucalyptus tereticornis*), Tallowwood (*E. microcorys*) and Scribbly Gum (*E. racemosa*)	High, recorded
Long-nosed Potoroo *(Potorous tridactylus tridactylus)*	V	Species or species habitat known to occur within area	Coastal heaths, dry and wet eucalypt forests, rainforest margins; requires a dense understorey with occasional open areas; soil typically a sandy loams; digs for the underground fruit bodies of fungi	Low, potential habitat very limited
New Holland Mouse *(Pseudomys novaehollandiae)*	V	Species or species habitat likely to occur within area	open heathland, open woodland with a heathland understorey and vegetated sand dunes	Low, lack of areas with a heathy understorey
Grey-headed Flying-fox *(Pteropus poliocephalus)*	V	Roosting known to occur within area	Forests with fruiting or flowering trees; roosts in forest near water (including mangroves)	Seasonal, pending nectar availability
Collared Delma *(Delma torquata)*	V	Species or species habitat known to occur within area	Rocky sloped or ridge-top areas, in Eucalypt and Acacia dominated woodland with leaf litter3 to 10cm deep and a sparse understorey of tussock grass and shrubs or semi-evergreen vine thicket; shelters under loose rocks, flattish bedrock outcroppings, logs or mats of leaf litter, or in cracks and crevices among tussock grasses; it is often found in areas with many small rocks (<30cm) and fewer large rocks, and in areas with reasonably sparse vegetation. DoE (2016).	High, recorded
Yakka Skink *(Egernia rugosa)*	V	Species or species habitat may occur within area	The Yakka Skink occurs in dry sclerophyll forest and woodland and is commonly found in cavities under and between partly buried rocks, logs or tree stumps, root cavities and abandoned animal burrows (Brigalow Belt Reptiles Workshop 2010; TSN 2008a). The species often takes refuge in large hollow logs and has been known to excavate deep burrow systems, sometimes under dense ground vegetation (Cogger 2000; Ehmann 1992; Wilson & Knowles 1988).	Moderate, particularly in areas where ironbarks are common and with fallen logs or surface rocks
Dunmall's Snake *(Furina dunmalli)*	V	Species or species habitat may occur within area	Dunmall's Snake has been found in a broad range of habitats, including: Forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow,	Low, no suitable habitat on alluvial cracking clays

Name	EPBC	Type of presence	Habitat and Distribution	Likelihood of Occurrence
			other Wattles, native Cypress or Bull-oak.	
Condamine Earless Dragon *(Tympanocryptis condaminensis)*	E	Species or species habitat likely to occur within area	Occurs in the remnant native grasslands, croplands and roadside verges of the eastern Darling Downs. These grasslands occur on black cracking clays of the Condamine River floodplain	Low, perhaps only far west of Study Area, but lack of black cracking clays
Five-clawed Worm-skink *(Anomalopus mackayi)*	V	Species or species habitat known to occur within area	Remnant and non-remnant woodlands and grasslands.	Low, general lack of deep, moist litter
Murray Cod *Maccullochella peelii)*	V	Species or species habitat may occur within area	Variety of habitats from clear rocky streams to slow flowing turbid lowland rivers and billabongs, Considered a main-channel specialist.	Low
CE= Critically Endangered E= Endangered V= Vulnerable				

In addition to the species identified in the PMST search above, initial field survey also identified potential habitat for Giant Barred Frog (*Mixophyes iteratus*) in one location. This species occurs along shallow rocky streams in rainforest, wet sclerophyll forest and farmland from 100 to 1000 m or deep, slow moving streams with steep banks in the lowlands. The former part of the description is consistent with the habitat downstream from Site 4. Whilst this species was not identified through desktop searches and research, this species should be included in future survey effort. This species is considered to have a moderate likelihood of occurrence, within a limited part of the Study Area.

Threatened Flora

The PMST search identified 18 EPBC Act listed threatened flora species as being potentially present within 5km of the Preferred Corridor.

Table 2 provides a preliminary species likelihood assessment conducted based on known habitat preferences, observations during initial field investigations and species records documented for the nearby Toowoomba Second Range Crossing Project.

Table 2- Threatened Flora Species Likelihood Assessment

Name	EPBC	Type of Presence	Habitat and Distribution	Likelihood of Occurrence
Hairy-joint Grass *(Arthraxon hispidus)*	Vulnerable	Species or species habitat may occur within area	In soaks, seepages and edges of wetlands in forests and pasture. Dies down in winter. Threats include Lantana invasion	Moderate. May occur within wet areas of pasture. Unlikely to occur in most forested areas due to Lantana
Satin-top Grass *(Bothriochloa bunyensis)*	Vulnerable	Species or species habitat	Grassy balds on basalt with other native grasses.	None. No suitable habitat
Miniature Moss-orchid, Hoop Pine	Vulnerable	Species or species habitat likely to	Host-specific species on Hoop Pine. The Hoop	Low. Lack of Hoop Pine within the

Orchid *(Bulbophyllum globuliforme)*		occur	Pine occurs in dry rainforest and upland subtropical rainforest communities.	corridor
Stream Clematis *(Clematis fawcettii)*	Vulnerable	Species or species habitat likely to occur within area	Canopy gaps of drier rainforest, typically semi-evergreen vine thicket, araucarian microphyll vine forest. Basalt and mixed volcanic rocks near streams.	Moderate in the vicinity of site 4 (Attachment 7). Part of Preferred Corridor is adjacent to suitable habitat and affects some regenerating areas of potential habitat
King Blue-grass *(Dichanthium queenslandicum)*	Endangered	Species or species habitat may occur within area	Occurs within brigalow, weeping myall woodlands and natural grasslands TECs.	Low. No suitable habitat
Bluegrass *(Dichanthium setosum)*	Vulnerable	Species or species habitat likely to occur within area	Heavy basaltic black soils associated with white box, silver-leaved ironbark, yellow box, manna gum. Often in moderately disturbed areas.	Low. No suitable habitat
Grevillea quadricauda	Vulnerable	Species or species habitat likely to occur within area	Grows in gravelly loam, in the understorey of dry eucalypt forest, usually along or near creeks.	Moderate. Possible occurrences along creeklines
Tall Velvet Sea-berry *(Haloragis exalata subsp. Velutina)*	Vulnerable	Species or species habitat may occur within area	Rainforest and rainforest margins and adjacent grassland and open grassy woodland above 500 metres altitude	None. No areas above 500m elevation affected, based on current tunnel level information
Leionema obtusifolium	Vulnerable	Species or species habitat likely to occur within area	Eucalypt forest, often with White Mahogany (*Eucalyptus acmenoides*) and Brown Bloodwood (*Corymbia trachyphloia*), on sandstone or granite	Low. Although some *E. acmenoides* was recorded, suitable vegetation associations do not appear to be present
Wandering Pepper-cress (*Lepidium peregrinum)*	Endangered	Species or species habitat known to occur within area	Habitat poorly described. Known from riparian open forest dominated by *Eucalyptus camaldulensis* and *Casuarina cunninghamiana* with a variably dense shrubby understorey of	Moderate. May occur in riparian areas within the corridor

			Hymenanthera dentata, Bursaria spinosa, Acacia fimbriata, A. floribunda, Callistemon viminalis and *Leptospermum brachyandrum*	
Macadamia nut (*Macadamia integrifolia*)	V	Species or species habitat likely to occur within area	The Macadamia Nut grows in remnant rainforest, preferring partially open areas such as rainforest edges. It prefers to grow in mild frost-free areas with a reasonably high rainfall.	Moderate. May occur in limited rainforest areas within the Study area.
a grass *(Paspalidium grandispiculatum)*	Vulnerable	Species or species habitat likely to occur within area	Habitat is poorly understood. Soils are generally shallow with a sandy texture, dark in colour, well drained and derived from sandstone rocks. Generally within remnant vegetation, suggesting an intolerance to disturbance	Low. Suitable substrate available, but most habitat areas highly disturbed
Mt Berryman Phebalium *(Phebalium distans)*	Critically Endangered	Species or species habitat likely to occur within area	Semi-evergreen vine thicket on red volcanic soils. Also microphyll to notophyll vine forest with or without *Araucaria cunninghamii* and low microphyll vine forest and semi-evergreen vine thicket.	Low, but may occur south of the corridor in the vicinity of site 4 (Attachment 7).
Hawkweed *(Picris evae)*	Vulnerable	Species or species habitat likely to occur within area	Usually found on basalt in open Eucalypt forest including a canopy of *E. melliodora*, *E. crebra*, *E. populnea*, *E. albens*, *Angophora subvelutina*, *Allocasuarina torulosa* and/or *Casuarina cunninghamiana* with a Dichanthium grassy understorey. Prefers disturbed areas, often on roadsides.	Moderate. Limited habitat present in the vicinity of site 4 (Attachment 7).
Austral Cornflower, Native Thistle (*Rhaponticum australe)*	Vulnerable	Species or species habitat likely to occur within area	Usually occurs on basalt in woodland and grassland associated with *E. crebra, E. orgadophila, E. populnea, E.*	Moderate. Limited habitat present in the vicinity of site 4 (Attachment 7).

			tereticornis and *E. melanophloia.* Usually in intact habitat.	
Quassia (*Samadera bidwillii*)	V	Species or species habitat likely to occur within area	commonly occurs in lowland rainforest or on rainforest margins , but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude.	Moderate. May occur in limited rainforest areas and adjacent to watercourses within the Study area.
Waxy Sarcochilus, Blue Knob Orchid *(Sarcochilus hartmannii)*	Vulnerable	Species or species habitat likely to occur within area	Volcanic rocks, shallow soils and exposed cliffs in sclerophyll forests, rainforest margins or open areas at 500–1000m altitude.	None. No areas above 500m elevation affected, based on current tunnel level information
Blotched Sarcochilus, Weinthals Sarcanth *(Sarcochilus weinthalii)*	Vulnerable	Species or species habitat likely to occur within area	Rainforest, dry rainforest and drier scrub of sub-coastal ranges and associated foothills inland from the coast at altitudes of 400–700m above sea level.	Low, only marginal habitat present within corridor in the vicinity of site 4 (Attachment 7).
Sophora fraseri	Vulnerable	Species or species habitat likely to occur within area	In moist habitats, often in hilly terrain at altitudes from 60–660m on shallow soils along rainforest margins in eucalypt forests or in large canopy gaps in closed forest communities.	Moderate. Suitable habitat occurs around the foothills of the Toowoomba Range (e.g. Site 4).
Austral Toadflax, Toadflax *(Thesium australe)*	Vulnerable	Species or species habitat known to occur within area	Root parasite on grasses, particularly *Themeda*	Moderate. Known to occur adjacent to the Preferred Alignment in the vicinity of site 14 (Attachment 7). May occur within areas of grassy forest and pasture.

Nature and extent of likely impact

Address any impacts on the members of any listened threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat.

Threatened Ecological Communities

No TECs are anticipated to be directly impacted by the Preferred Corridor. Consequently the Project is not expected to impact any TECs. Further field investigation during the environmental assessment phase however has the potential to identify TECs within the wider Study Area. Should this be the case, design optimisation and other mitigation measures will be employed to avoid and minimise impacts on any TEC identified.

Threatened Fauna

The listed threatened species either identified during this survey or considered to have higher potential to occur due to habitat suitability in the area include:

- Koala (*(Phascolarctos cinereus)* – known
- Regent Honeyeater (*Anthochaera phrygia)* – seasonal, pending nectar availability
- Red Goshawk *(Erythrotriorchis radiates)* – moderate, very large home-range suggests occasional use of Study Area possible
- Painted Honeyeater *(Grantiella picta)* – moderate, paucity of mistletoes observed, but habitat otherwise suitable
- Swift Parrot *(Lathamus discolor)* – seasonal, but even then rare
- Black-breasted Button-quail *(Turnix melanogaster)* – moderate, significance patches of lantana presence, but generally associated with Eucalypt forest. No potential feeding signs observed in initial surveys.
- Large-eared Pied Bat *(Chalinolobus dwyeri)* – high, suitable habitat present
- Greater Glider (*Petauroides Volans*) – moderate, suitable habitat confined to trees with large hollows
- Collared Delma (*Delma torquata*) - known habitat in the vicinity, no sightings in initial investigation
- Yakka Skink - moderate
- Grey Headed Flying Fox *(Pteropus poliocephalus)* – seasonal, pending nectar and fruit availability
- Spotted Quoll *(Dasyurus maculatus maculatus)* – High, particularly along escarpment.

Koala

Evidence of the Koala (*Phascolarctos cinereus*), a vulnerable species listed under the EPBC Act, has been documented in the vicinity of the Preferred Alignment. Koala Spot Assessment Technique (KSAT) surveys were undertaken across 18 sites along the Preferred Alignment. These surveys detected scats, ranging in activity level from 0% to 50%. In accordance with Phillips and Callaghan (2011), this indicates a low – high level of activity across the broader Study Area, in an East Coast (med-high) activity category. It is noted that the high activity levels were generally recorded on flatter slopes (0-5% slope) in areas subject to minimal previous disturbance. While low activity levels may indicate the presence of transitory individuals at some sites, it is also likely that areas of lower population density were sampled (e.g. on steeper slopes) (Phillips and Callaghan 2011).

The key project impacts for koalas that will be examined during the environmental assessment are loss of habitat (which may increase susceptibility to disease), habitat fragmentation and mortality.

The project will require the removal of mapped Koala habitat between Gowrie and Helidon. Environmental offsets will likely be required to compensate for impacts on habitat.

A rail corridor constitutes a linear barrier to Koala movement, particularly if exclusion fencing is installed (see below). Habitat fragmentation may isolate populations and restrict gene flow across the landscape. It is possible to mitigate the impact of movement barriers by the installation of underpasses (culverts and bridges), particularly in areas where higher movement rates may be expected (e.g. along waterways). The Gowrie to Helidon Project includes an approximately 6.3km tunnel section under the Toowoomba Range and significant viaduct structures at Rocky Creek (approximately 600m) and Six Mile Creek approximately (800m), which are mapped within a state-wide environmental corridor. These design elements will enable fauna movement, including Koalas at these locations. Further development of the design during future project stages will identify additional fauna crossing locations and mitigation measures for fauna sensitive design.

While there are few data available to determine the extent of Koala mortality due to train strike, it is known to occur (e.g. Dique *et al*. 2003). The vulnerability of Koalas to train strike will depend on the frequency of rail movement, particularly at night when Koalas are most active, the speed of trains and the extent of exclusion fencing installed. Exclusion fencing has been demonstrated to be a highly effective means of reducing Koala mortality along roads.

Mitigation measures will be implemented during construction to minimise disturbance, injury or fatality of Koalas. Construction stage measures will include the presence of a spotter/catcher and temporary no-go zones around

any Koalas found within the clearing footprint.

The Koala Habitat Assessment Tool, contained within Section 6 of the *EPBC Act referral guidelines for the vulnerable Koala* (DoE, 2014) has been applied to the project to determine if the habitat is critical to the survival of the Koala. The Study Area receives approximately 700mm of rainfall annually and has therefore been assessed using the 'Inland' context of Koala distribution (South East Queensland), as explained in Section 3 of the Guidelines. Table 3 documents this assessment.

Table 3 Koala Habitat Assessment Tool

Attribute	**Score**	**Example habitat appraisal**	
Koala occurrence	+2	Desktop	• EPBC PMST report identified the koala as 'known to occur' in the Study Area. • The Atlas of Living Australia has one koala record approximately 2km north of the impact area from 2002. • EHP Wildlife Online point buffer search records identify 149 sightings within 15km of the Preferred Alignment.
		On-ground	• Scat surveys (KSATs) were carried out along the Preferred Alignment over five days in March, April and June 2016 (SMEC/Arup, 2016). This covered 18 sites along the corridor, with all except one site containing Koala scats. Low to high levels of Koala activity (0%-50%) were detected. No Koalas were directly observed, although no specific observational surveys were conducted.
Vegetation structure and composition	+2	Desktop	• Regional ecosystem mapping (DNRM, 2016) identifies 12 regional ecosystems that occur in the vicinity of the corridor, 10 of which contain koala food trees as follows: - RE 11.3.25 *Eucalyptus tereticornis* or *E. camaldulensis* woodland fringing drainage lines - RE 11.8.5 *Eucalyptus orgadophila* open woodland on Cainozoic igneous rocks - RE 12.3.3 *Eucalyptus tereticornis* woodland on Quaternary alluvium - RE 12.3.7 *Eucalyptus tereticornis*, *Casuarina cunninghamiana* subsp. *cunninghamiana* +/- *Melaleuca* spp. fringing woodland - RE 12.8.14 *Eucalyptus eugenioides*, *E. biturbinata*, *E. melliodora* +/- *E. tereticornis*, *Corymbia intermedia* woodland on Cainozoic igneous rocks - RE 12.8.9 *Lophostemon confertus* open forest on Cainozoic igneous rocks - RE 12.8.17 *Eucalyptus melanophloia* +/- *E. crebra*, *E. tereticornis*, *Corymbia tessellaris*, *C. intermedia* and/or *C. clarksoniana*, *E. melliodora*, *Angophora subvelutina* grassy woodland. Occurs on Cainozoic igneous rocks, especially basalt. - RE 12.8.21 - no koala habitat trees - RE 12.9-10.15 - no koala habitat trees - RE 12.9-10.7 *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks - RE 12.9-10.2 *Corymbia citriodora* subsp. *variegata* +/-

			Eucalyptus crebra open forest on sedimentary rocks - RE 12.9-10.3 *Eucalyptus moluccana* open forest on sedimentary rocks • Essential habitat for Koala is also mapped in the vicinity of the Preferred Alignment and is intersected by the Preferred Alignment at a number of locations.
		On-ground	• On-ground surveys revealed that *E. tereticornis, E. crebra* and *C. citriodora* were among the most dominant species present in the overstorey. Other dominant species suitable for Koala included *E. acmenoides, C. henryii, A. subvelutina, E. carnea, Lophostemon suaveolens* and *L. confertus*. C*. tessellaris.* Some of these species are regarded as primary or secondary food species (e.g. *E. tereticornis*, *E. crebra*, *E. propinqua*).
Habitat connectivity	+2	• The Preferred Alignment traverses a relatively contiguous landscape along the Toowoomba Range. • Large areas of the surrounding land have been cleared for agriculture, residential areas, roads and a quarry and current construction of Toowoomba Second Range Crossing Project. • Project design elements that mitigate potential impacts to habitat connectivity include 6.3km tunnel, numerous viaducts from 200m to 1200m, in addition to bridges and culverts to be further developed during future project stages.	
Key existing threats	+1	Desktop	• Koala Tracker mapping (www.koalatracker.com) indicates the death of a number of Koalas on the existing highway.
		On-ground	• Operation of existing linear infrastructure (e.g. Warrego Highway and Western Rail line) • Potential during construction of infrastructure (land development, Toowoomba Second Range Crossing) • Predation (wild dogs, snakes) • Disease (e.g. Chlamydia)
Recovery value	+1	• Habitat intersected by the Preferred Alignment is one component of an extended area of remnant vegetation. Connectivity will be maintained through the design, by provision of tunnels, viaducts, bridges and culverts to enable fauna passage and other fauna sensitive design approaches and mitigation. • The Project is not considered to significantly impact achievement of the interim recovery objectives for the inland context.	
Total	**8**	**Habitat is critical to the survival of the Koala — an assessment of significance against the Significant Impact Criteria is required.**	

An assessment of the project against the Significant Impact Criteria is provided in Table 4. Reference has been made to Section 7 and 8 of the *EPBC Act referral guidelines for the vulnerable koala* in determining the likely impacts of the project on the recovery of the species and the Significant Impact Guidelines Version 1.1.

Table 4 – Significance impact assessment for Koala

Lead to a long-term decrease in the size of an important population of a species ***(No)***
Habitat removal will be the primary residual impact of the Project. Based on preliminary calculations, approximately 140ha of mapped regional ecosystems consistent with potential koala habitat may be removed,

which has been adopted as a preliminary indicator for koala habitat at this early stage of the Project. Habitat fragmentation is likely to occur as a result of the Project, however connectivity will be maintained by the inherent design features and proposed fauna sensitive design of the project (e.g. tunnels, bridges, culverts). As the surrounding vegetation contains large areas of remnant vegetation comprising Koala habitat and crossing structures will be used to significantly reduce habitat fragmentation, the Project is not expected to cause a long-term decrease in the size of an important Koala population.

Reduce the area of occupancy of an important population ***(Yes)***

Suitable habitat for the Koala will be reduced as a result of linear clearing for the project corridor, therefore reducing the area of occupancy available for the existing population. In comparison to the extensive area of mapped regional ecosystems surrounding the project, the removal of this extent of Koala habitat will not be a significant reduction to the area of occupancy.

Fragment an existing important population into two or more populations ***(Yes)***

The Project is proposed to be constructed across a key north-south movement corridor. This large corridor is mapped as a state corridor of state-wide ecological significance as it connects Main Range National Park in the south to Bunya Mountains National Park and number of National Parks/State Forests in South East Queensland. Lockyer Creek is also mapped as a regional ecological corridor and is intersected by the project just north of Helidon Spa. The Project includes tunnels, viaducts, bridges and culverts within the identified movement corridors which will enable fauna movement through these areas and reduce the potential fragmentation of habitat by the Project.
The population and preferred movement corridors of Koalas in the region are not well known, however the provision of tunnels, viaducts and bridge structures will allow for the movement of Koalas in these areas. These design aspects together with other mitigations to be further developed during future project phases when potential impacts are further defined will reduce potential impacts on habitat connectivity and therefore Koala populations.

Adversely affect habitat critical to the survival of a species ***(Yes)***

The Study Area has been identified as containing habitat critical to the survival of the koala, in accordance with the Koala Habitat Assessment Tool provided in the *EPBC Act referral guidelines for the vulnerable koala*. The project will directly impact areas of critical Koala habitat, with removal of approximately 140ha of mapped regional ecosystems consistent with potential koala habitat, and as noted in table 3, a habitat score of 8. Surveys undertaken within the impact area and within surrounding habitat show low to high Koala activity levels along the proposed rail corridor (Phillips and Callaghan, 2011). It is noted that the high activity levels were generally recorded on flatter slopes (0-5% slope) in areas subject to minimal previous disturbance.

Disrupt the breeding cycle of an important population ***(No)***

The koala breeding season is generally between September and March, with females giving birth to a single joey between October and May. Construction activities will be undertaken in a manner that minimises direct impacts to Koalas. For example, if a Koala is identified during pre-clearance surveys, an exclusion zone will be established to allow that animal to move from the area of its own accord, minimising disturbance and stress to the species. Clearing will be sequential and a fauna spotter catcher will be present for all clearing works.

During the breeding season, males actively seek female koalas and Koala movement is more extensive. The Project could lead to an increase risk of vehicle (train) strike. The impact of train strike on Koalas is poorly understood, but it is known to occur (e.g. Dique *et al*. 2003). The frequency and speed of rail movement will affect that severity of this impact. Exclusion fencing of the rail corridor is proposed for strategic locations and is known to effectively reduce vehicle strike on roads.

Based on the mitigation measures described above, it is not expected that this project will disrupt the breeding cycle of the local population.

Modify, destroy, remove or isolate, or decrease the availability or quality of habitat to the extent that the species is likely to decline ***(No)***

The project requires the removal of approximately 140ha of mapped regional ecosystems consistent with potential koala habitat. Although clearing will cause fragmentation of habitat and reduce the area of available habitat, the project is not likely to decrease the availability or quality of habitat available to the extent that the species will decline. Mitigation measures will be implemented during design, construction and operation to minimise the risk of mortality of the species, and maintain habitat connectivity where possible.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat ***(No)***

Ecological surveys of the corridor identified weeds at the majority of sites investigated. *Camphor laurel, Lantana camara* and *Opuntia* spp. were noted to be dominant species at some sites. Weed management will be undertaken through the construction and operational phases to minimise the impact of pest flora on Koala habitat.

Invasive fauna, including predatory feral animals such as the fox *(Vulpes vulpes)* and dog (*Canis familiaris*) are likely to occur throughout the area. These types of predatory species are drawn to areas of disturbance to prey upon mammals and reptiles that are moving away from the disturbance area, therefore, predation by feral animals is a risk to koalas during and immediately after clearing activities. Predatory species are also attracted to the prey opportunities presented by cleared linear corridors. Mitigation and management measures will be required during the construction phase to minimise the potential for this to impact Koalas. This may include monitoring of relocating individuals, provision of refuge opportunities for relocating fauna (koala poles and furniture during clearing and construction phase works) and/or pest management initiatives.

Given the existing invasive species occurrences across the Study Area, it is considered unlikely that the rail corridor will result in any new invasive species that are harmful to the Koala becoming established in habitat areas.

Introduce disease that may cause the species to decline

The koala is known to be susceptible to a number of diseases, including Chlamydia and Koala retrovirus.

The spread and introduction of diseases and pathogens in koala populations is a potential risk associated with construction of infrastructure. Construction activities have the potential to result in increased stress in koalas through vegetation clearing, habitat fragmentation, increased noise levels, traffic and alteration to existing conditions. Increased levels of stress may cause the expression of disease symptoms in koalas. Stress can be minimised through appropriate construction stage management (e.g. spotter/catchers, temporary no-go zones around observed koalas).

Interfere Substantially with the recovery of the species

Whilst the Project will impact on koala habitat, significant areas of habitat will remain. The provision of tunnels, viaducts and bridge structures will allow for the movement of koalas between these areas. Consequently the potential for the Project to interfere with the recovery of the species will be minimised through design and mitigation measures.

Collared Delma (*Delma torquata*)

Collared Delma are known to occur within the Study Area based on recent investigations undertaken as part of the Toowoomba Second Range Crossing Project. Suitable habitat for the Collared Delma was observed in the Study Area, although no incidental sightings occurred during the initial field investigation. Loss of habitat and habitat fragmentation are potential impacts that may occur as a result of the Project. Further investigations will be required to determine the presence of Collared Delma in the Study Area, and extent of habitat to be impacted as a result of the Project.

Spot-tailed (spotted) Quoll *(Dasyurus maculatus maculatus)*

Suitable habitat for the Spotted Quoll was observed, particularly along the escarpment of the Toowoomba Range. Works in this area will consist of construction of tunnel portals on the east and west sides of the range. Whilst tunnelling through the range will minimise surface impacts including vegetation clearing and habitat fragmentation in this area, further investigations will be required to determine the presence and extent of habitat for spotted quoll to be removed as a result of the Project.

Greater Glider (*Petauroides Volans*)

Suitable habitat for the Greater Glider may be present in the Study Area, though this will be constrained to areas of tall open woodland and eucalypt forests, supporting large tree hollows. No observations of suitable habitat were made during initial field investigations, however further investigations will be required to accurately determine the presence of suitable hollow bearing trees, and presence of this species in the Study Area. Potential impacts include the loss of hollow-bearing trees and habitat fragmentation as a result of vegetation clearing.

Grey-headed Flying-fox *(Pteropus poliocephalus)*
Suitable foraging habitat was observed in the Study Area, with flowering eucalypts and other food trees present. No camps or breeding habitat were identified during initial field investigations. Potential impacts include a localised loss of nectar sources within the Study Area.

Large-eared Pied Bat *(Chalinolobus dwyeri)*
Suitable habitat for this species includes dry open forest and woodland with extensive cliffs and caves; roosts in caves, crevices and old mines. Clearing associated with the Project will result in a small loss of foraging habitat. There is a low probability of the loss of roosting and breeding sites. Due to the mobility of this species, habitat fragmentation is not likely to occur.

Regent Honeyeater (*Anthochaera phrygia)*
The Regent Honeyeater has been identified as a potential seasonal user of the Study Area's resources, and would be dependent upon the availability of nectar and flowering species. Potential impacts include the loss of potential feed trees and ephemeral habitat.

Painted Honeyeater *(Grantiella picta)*
Suitable habitat for this species was observed, though mistletoe was not observed. Potential impacts include the loss of habitat.

Red Goshawk *(Erythrotriorchis radiates)*
Whilst the home-range of the Red Goshawk is very large, the potential for this species to occasionally utilise the Study Area has been identified. Impacts to this species as a result of vegetation clearing are anticipated to be negligible.

Swift Parrot *(Lathamus discolor)*
The Swift Parrot has been identified a potential seasonal visitor to the Study Area, though this is considered to be a rare occurrence, linked to significant winter flowering events. Consequently habitat clearing in the Study Area is not anticipated to significantly impact this species.

Black-breasted Button-quail *(Turnix melanogaster)*
Suitable habitat for the Black-breasted Button-quail was identified, but no evidence of platelets was observed during initial field investigations. Loss of habitat and habitat fragmentation are potential impacts that may occur as a result of the Project. Further investigations will be required to determine the presence of Button-quail in the Study Area, and extent of habitat to be removed as a result of the Project.

Yakka Skink (*Egernia rugosa*)
The potential for suitable habitat for this species was observed, particularly in areas where ironbarks are common and with fallen logs or surface rocks. Potential impacts include the loss of habitat.

Threatened Flora

The flora species either identified during field survey or considered to have higher potential to occur in the Study Area include:

- Hairy-joint Grass (*Arthraxon hispidus*)
- Four-tailed Grevillea (*Grevillea quadricauda*)
- Wandering Pepper-cress (*Lepidium peregrinum*)
- Austral Toadflax (*Thesium australe*)
- Stream Clematis (*Clematis fawcettii*)
- Austral Cornflower, Native Thistle (*Rhaponticum australe*)
- Brush Sophora (*Sophora fraseri*)

Further investigations will be required to determine the presence and/ or extent of presence of these flora species in the Study Area, and to determine the extent of impact as a result of vegetation clearing for the Project.

3.1 (e) Listed migratory species

Description

The PMST identified 14 listed migratory species considered to have the potential to occur in the Study Area.

Table 5 provides a preliminary species likelihood assessment conducted based on known habitat preferences and observations during initial field investigations.

Table 5 – Likelihood assessment for Migratory Species

Name	EPBC	Type of Presence	Habitat and Distribution	Likelihood of Occurrence
Apus pacificus Fork-tailed Swift	Migratory	Species or species habitat likely to occur within the area	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. All breeding occurs in the northern hemisphere.	High. Aerial species that would forage over the Study Area occasionally.
Calidris ferruginea Curlew Sandpiper	Marine, Migratory	Species or species habitat known to occur within area	Intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters.	None, no suitable habitat occurs within the study area
Cuculus optatus Oriental Cuckoo	Migratory	Species or species habitat may occur within area	Inhabits forest including coniferous, deciduous and mixed forest.	Rare in Australia
Hirundapus caudacutus White-throated Needletail	Migratory	Species or species habitat known to occur within area	Aerial space over a variety of habitat types, but prefers to forage over treed habitats as these would provide a greater abundance of insect prey; often forage on the edge of low pressure systems and may follow these systems; breeds in northern Asia	High. Aerial species that would forage over the Study Area occasionally.
Gallinago hardwickii Latham's snipe	Migratory	Species or species habitat may occur within area	Permanent and ephemeral wetlands, open freshwater wetlands with low, dense vegetation	Possible in limited habitat; particularly associated with seepages (e.g. around dams).
Monarcha melanopsis Black-faced Monarch	Migratory	Species or species habitat known to occur within area	Occurs in rainforest to cool/dry rainforest and regrowth rainforest and sometimes in open eucalyptus forest.	High, in limited habitat (e.g. near Site 4 (Attachment 7))

			DotE 2016 (b)	
Motacilla flava Yellow Wagtail	Migratory	Species or species habitat may occur within area	Does not breed in Australia. In habitats near water.	Low. Rare in Project locality.
Myiagra cyanoleuca Satin Flycatcher	Migratory	Species or species habitat known to occur within area	Heavily vegetated gullies in eucalypt-dominated forests and taller woodlands.	High, in limited habitat (e.g. near Site 4)
Numenius madagascariensis Eastern Curlew	Marine, Migratory	Species or species habitat may occur within area	Sheltered coasts, mangrove swamps, bays, harbours and lagoons that contain mudflats and sandflats, often with beds of seagrass.	None, no suitable habitat occurs within the study area
Rhipidura rufifrons Rufous Fantail	Migratory	Species or species habitat known to occur within area	In south-east Australia, mainly inhabits wet sclerophyll forests, often in gullies	High, in limited habitat (e.g. near Site 4)
Symposiachrus trivirgatus Spectacled Monarch	Migratory	Species or species habitat known to occur within area	Thick understorey rainforests, wet gullies and waterside vegetation and mangroves.	High, in limited habitat (e.g. near Site 4)
Pandion haliaetus Osprey	Migratory	Species or species habitat known to occur within area	Estuaries, large rivers and lakes; feeds over open water; builds a stick nest in a large tree	Low to None. Lack of suitable foraging habitat.
Tringa nebularia Common Greenshank	Migratory	Species or species habitat likely to occur within area	Inland wetlands and sheltered coastal habitats, including harbours, river estuaries, deltas and lagoons also permanent and ephemeral terrestrial wetlands including swamps, lakes, dams, rivers, creeks, billabongs and waterholes.	Low. Lack of suitable habitat.

Threatened Marine

The PMST identified 23 marine species, of which 10 are also listed as migratory species in Table 5.

Table 6 provides a preliminary species likelihood assessment based on known habitat preferences and observations during initial field investigations for the marine species identified in the PMST.

Table 6- Marine Species Likelihood Assessment

Name	EPBC	Type of Presence	Habitat and Distribution	Likelihood of Occurrence
Anseranas semipalmata Magpie Goose	Marine	Species or species habitat may occur within area	Typically found in shallow wetlands with fringing rushes or sedges	Low. Lack of suitable wetland habitat.
Apus pacificus Fork-tailed Swift	Marine, Migratory	Species or species habitat likely to occur within area	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher	High. Aerial species that would forage over the Study Area occasionally.
Ardea alba Great Egret	Marine, Migratory	Breeding known to occur within area	Wide range of wetland habitats including inland and coastal, freshwater and saline, permanent and ephemeral, open to vegetated.	Low. Lack of suitable wetland habitat.
Ardea ibis Cattle Egret	Marine, Migratory	Breeding likely to occur within area	Broad habitat including temperate and tropical grasslands, wooded lands and terrestrial wetlands	High. Large areas of pasture within alignment.
Calidris acuminate Sharp-tailed Sandpiper	Marine	Species or species habitat known to occur within area	Prefers muddy edges of shallow fresh or brackish wetlands with grass and sedges.	None. Lack of suitable habitat.
Calidris ferruginea Curlew Sandpiper	Marine, Migratory	Species or species habitat known to occur within area	Intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters.	None, no suitable habitat occurs within the study area
Calidris ruficollis Red-necked Stint	Marine	Species or species habitat known to occur within area	Does not breed in Australia. Mostly found in coastal areas but also found in coastal or inland, permanent or ephemeral shallow wetlands	Low, Mainly found in coastal areas.
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo	Marine, Migratory	Species or species habitat may occur within area	Inhabits forest including coniferous, deciduous and mixed forest.	Rare in Australia
Gallinago hardwickii Latham's snipe	Marine, Migratory	Species or species habitat known to occur within area	Permanent and ephemeral wetlands, open freshwater wetlands with low, dense vegetation	Possible in limited habitat; particularly associated with seepages (e.g. around dams).
Haliaeetus leucogaster White-bellied Sea-Eagle	Marine	Species or species habitat known to occur within area	Coastlines, estuaries, large rivers and lakes; occasionally over adjacent habitats; builds a large	Occasional. Navigates along river systems and occasionally forages over adjacent habitats.

			stick nest in a tall tree, rarely on artificial structures	
Himantopus himantopus Black-winged Stilt	Marine	Species or species habitat known to occur within area	Coastal habitats	None. Lack of suitable wetland habitat.
Hirundapus caudacutus White-throated Needletail	Marine	Species or species habitat known to occur within area	Aerial space over a variety of habitat types, but prefers to forage over treed habitats as these would provide a greater abundance of insect prey; often forage on the edge of low pressure systems and may follow these systems; breeds in Asia	High. Aerial species that would forage over the Study Area occasionally.
Lathamus discolor *Swift Parrot*	Marine	Species or species habitat likely to occur within area	Over-winters on mainland, extending to SE Qld; associates with winter flowering trees (e.g. spotted gums, red gums, ironbarks)	Seasonal. Presence linked to significant winter flowering events.
Merops ornatus Rainbow Bee-eater	Marine	Species or species habitat may occur within area	Open forests and woodlands, shrublands and in cleared or semi cleared habitats normally located near permanent water.	High, recorded
Monarcha melanopsis Black-faced Monarch	Marine, Migratory	Species or species habitat known to occur within area	Occurs in rainforest to cool/dry rainforest and regrowth rainforest and sometimes in open eucalyptus forest. DotE 2016 (b)	High, in limited habitat (e.g. near Site 4).
Monarcha trivirgatus Spectacled Monarch	Marine, Migratory	Species or species habitat may occur within area	Thick understorey rainforests, wet gullies and waterside vegetation and mangroves.	High, in limited habitat (e.g. near Site 4).
Motacilla flava Yellow Wagtail	Marine, Migratory	Species or species habitat may occur within area	Does not breed in Australia. Inhabits near water.	Low. Rare in Project locality.
Myiagra cyanoleuca Satin Flycatcher	Marine	Species or species habitat known to occur within area	Heavily vegetated gullies in eucalypt-dominated forests and taller woodlands.	High, in limited habitat (e.g. near Site 4)
Numenius madagascariensis Eastern Curlew	Marine, Migratory	Species or species habitat may occur within area	Sheltered coasts, mangrove swamps, bays, harbours and lagoons that contain mudflats and sandflats, often with beds	None, no suitable habitat occurs within the study area

			of seagrass.	
Pandion haliaetus Osprey	Marine, Migratory	Species or species habitat known to occur within area	Estuaries, large rivers and lakes; feeds over open water; builds a stick nest in a large tree	Low. Lack of suitable foraging habitat.
Recurvirostra novaehollandiae Red-necked Avocet	Marine	Species or species habitat known to occur within area	Coastal habitats	Low. Lack of suitable wetland habitat.
Rhipidura rufifrons Rufous Fantail	Marine, Migratory	Species or species habitat known to occur within area	In south-east Australia, mainly inhabits wet sclerophyll forests, often in gullies	High, in limited habitat (e.g. near Site 4).
Rostratula benghalensis (sensu lato) Painted Snipe	Marine	Species or species habitat likely to occur within area	Well-vegetated shallow margins of freshwater wetlands, lakes and swamps, forages for invertebrates on muddy edges; nests in dense reeds near water	Moderate, possible in limited habitat; particularly associated with seepages (e.g. around dams).
Tringa nebularia Common Greenshank	Marine, Migratory	Species or species habitat likely to occur within area	Inland wetlands and sheltered coastal habitats, including harbours, river estuaries, deltas and lagoons also permanent and ephemeral terrestrial wetlands including swamps, lakes, dams, rivers, creeks, billabongs and waterholes.	Moderate. Possible in limited habitat; particularly around dams.

Nature and extent of likely impact

Address any impacts on the members of any listed migratory species, or their habitat.

Potential habitat for the following migratory (and marine) species was identified in the vicinity of the Study Area:

- Fork-tailed Swift *(Apus pacificus)* - Migratory, Marine
- White-throated Needletail *(Hirundapus caudacutus)* – Migratory, Marine
- Cattle Egret *(Ardea ibis)* – Migratory, Marine
- Rufous Fantail (*Rhipidura rufifrons*) - Migratory, Marine
- Marsh Sandpiper *(Tringa stagnatilis)* – Migratory, Marine
- Black-faced Monarch (*Monarcha melanopsis*) - Migratory, Marine
- Satin Flycatcher (*Myiagra cyanoleuca)* - Migratory, Marine
- Spectacled Monarch (*Monarcha trivirgatus)* - Migratory, Marine
- Painted Snipe *(Rostratula benghalensis) (sensu lato)* – Marine
- Rainbow Bee-eater (*Merops ornatus*) - Marine
- Swift Parrot *(Lathamus discolor)* – Critically Endangered, Marine, also addressed under section 3.1(d).

Further investigations will be required to determine habitat values and timing of use by migratory species within the Study Area. Potential impacts include habitat clearing, modification of waterways and wetlands, including farm dams.

3.1 (f) Commonwealth marine area
(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

No Commonwealth Marine Areas were identified within the PMST search area. The Commonwealth Marine Area identified closest to the Project was approximately 140km east of the Project.

Nature and extent of likely impact

Due to the significant distances between the study area and the nearest Commonwealth Marine Area, direct impacts are not expected and there is limited potential for indirect impacts from the project.

3.1 (g) Commonwealth land
(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

If the action will affect Commonwealth land also describe the more general environment. The Policy Statement titled *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* provides further details on the type of information needed. If applicable, identify any potential impacts from actions taken outside the Australian jurisdiction on the environment in a Commonwealth Heritage Place overseas.
Refer item 3.2(d)

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth land. Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

Refer item 3.2(d).

3.1 (h) The Great Barrier Reef Marine Park

Description

Not applicable

Nature and extent of likely impact

Not applicable

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

Not applicable

Nature and extent of likely impact

Not applicable

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

You must describe the nature and extent of likely impacts (both direct & indirect) on the whole environment if your project:

- is a nuclear action;
- will be taken by the Commonwealth or a Commonwealth agency;
- will be taken in a Commonwealth marine area;
- will be taken on Commonwealth land; or
- will be taken in the Great Barrier Reef marine Park.

Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

3.2 (a)	**Is the proposed action a nuclear action?**	✓	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	✓	No Please note that ARTC is not a Commonwealth agency for the purposes of the EPBC Act following the amendment of the Environment Protection and Biodiversity Conservation Regulation 2000 on 14 November 2009 to exclude ARTC from the definition of a "Commonwealth agency" under the EPBC Act.
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment	

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	✓	No
			Yes (provide details below)
If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))			

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**		No
		✓	Yes The PMST report identified three areas of Commonwealth land within the 5km search buffer of the preferred alignment. This included: • Defence – Condamine Centre • Defence- Toowoomba Rifle Range • Defence – Training Depot A small area of land is likely to be required from the northern edge of the Toowoomba/Mt Lofty Rifle Range. This land requirement was originally identified in 2003 in the Gowrie to Grandchester Rail Study. The requirement for this land will be determined through the assessment process.
If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))			
The Preferred Corridor traverses the north-western corner of the Toowoomba/Mt Lofty Rifle Range site. The Preferred Corridor directly impacts approximately 14ha of the Rifle Range site and would leave an excised parcel of approximately 5ha on the northern edge of the Preferred Corridor. An estimated 50% of the Preferred Corridor on the Rifle Range Site is mapped as RE 12.9-10.15/12.3.7, with the other half mapped as 12.9-10.2/12.9-10.7. Field Investigation sites 4 and 5 were undertaken in the vicinity of this property. It was observed that the areas were likely impacted by fire 10-20 years ago, with extensive *Lantana camara* cover. The area may provide suitable habitat for the Black-breasted Button-quail. Impacts in this area include habitat loss and fragmentation.			

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	✓	No
			Yes (provide details below)
If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))			

3.3 Other important features of the environment

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed above). If at Section 2.3 you identified any alternative locations, time frames or activities for your proposed action, you must complete each of the details below (where relevant) for each alternative identified.

3.3 (a) Flora and fauna

The escarpment and foothills of the Toowoomba Range are generally heavily vegetated and contain the best quality vegetation and fauna habitat encountered along the Preferred Corridor during the initial field investigations. The area is mapped as a State- wide ecological corridor of State significance and provides north-

south connectivity for a range of terrestrial fauna species. Some significant infestations of *Lantana camara* are present on the escarpment slopes reducing fauna values in some areas.

The Lockyer Creek corridor is also mapped as both state and regionally significant ecological corridors. At the local scale, waterways and remnant vegetation across the Study Area provide for habitat connectivity.

A review of Queensland Government Essential Habitat Mapping available identified four areas of essential habitat which are listed in Table 7. These are also identified in Attachment 7.

Table 7: Mapped Essential Habitat

Area	**Description**
Eastern slopes of the Toowoomba Range	Large area of essential habitat either not attributed to a particular fauna type or attributed as core habitat for koala
Wards Hill area	Another large area of essential habitat attributed as core habitat for koala, north and south of Wards Hill
Lockyer Creek	Essential habitat attributed as core habitat for koala
Lockyer National Park, north of Helidon	Large expanse of essential habitat mapped, attributed as core habitat for koala

The species listed in Table 8 were identified in searches of the Queensland Government Wildlife online database. These are in addition to the species identified under section 3.1(d).

Table 8: Species protected under the Queensland Nature Conservation Act 1992

Scientific Name	**Common Name**	**Q**	**A**	**Habitat and Distribution****	**Likelihood of Occurrence**
Calyptorhynchus lathami lathami	glossy black-cockatoo (eastern)	V	-	Forests and woodlands with she-oaks (*Allocasuarina* spp.); nests in large tree hollow	Moderate, but no feeding evidence was detected during preliminary surveys
Falco hypoleucos	Grey Falcon	V	-	Range covers eastern Australia in arid and semi-arid areas.	Low, lack of suitable habitat
Ornithorhynchus anatinus	Platypus	SL	-	Dependant on rivers, streams and bodies of freshwater, ideal habitat consists of earth banks and coarser bottom substrates.	High, previously recorded
Tachyglossus aculeatus	Short-beaked Echidna	SL		Common in dry open country on eastern Australia, open heathlands and in forests.	High, previously recorded
Acanthophis antarcticus	Common Death Adder	V	-	Habitats associated with deep leaf litter	Low, possible suitable habitat
Hemiaspis damelii	Grey Snake	E	-	Favours woodlands with cracking clay soils in areas with small gullies and water bodies.	Low to None, no suitable habitat
Ninox strenua	Powerful Owl	V		Open forests and woodlands along watercourses	Recorded in studies for Toowoomba Second Range Crossing

Parts of the Study Area are located within the DEHP Protected Plants High Risk Flora Survey Trigger map area, particularly the area along the Toowoomba Range, indicating records of NC Act listed flora in the vicinity.

The Preferred Corridor will intercept areas of regulated vegetation and mapped essential habitat particularly in the vicinity of the Toowoomba Range.

The Preferred Corridor will intercept areas of fauna habitat and has the potential to impact on connectivity for some species. This includes crossings of the Lockyer Creek regional and state significant ecological corridor and the Toowoomba Range state ecological corridor. Fauna passage provisions will be key considerations in future design phases.

Potential exists for animal strike to occur during the operational stage of the Project. Appropriate mitigation (fauna fencing etc.) should limit this potential residual impact.

3.3 (b) Hydrology, including water flows

The Preferred Corridor spans two catchments, with the boundary broadly following the Toowoomba Range between Gowrie and Withcott. The western section is located within the Condamine River Catchment, and the eastern section of the corridor is located within the Lockyer Creek Catchment.

The Preferred Corridor within the Condamine River Catchment crosses Gowrie Creek. Gowrie Creek flows west into Oakey Creek before joining the Condamine River. The Condamine River eventually joins the Balonne River flowing south over the New South Wales border.

The Preferred Corridor within the Lockyer Creek Catchment crosses Lockyer Creek and the tributaries of Six Mile Creek and Rocky Creek. Six Mile Creek joins Rocky Creek which in turn joins Lockyer Creek flowing in a north easterly direction toward the Brisbane River, eventually discharging into Moreton Bay.

3.3 (c) Soil and Vegetation characteristics

Soils

Overlying the Main Range Volcanics and Marburg Formation are solodic soils generally comprising the following pedological sequence:

- Thin organic topsoil: dark shallow porous loamy soils and friable and cracking dark clays
- Sandy-silty layer: red friable earths
- Medium to high plasticity clay: deeper dark cracking clays.

These solodic soils, characterised by their sodic/saline nature, are dispersive and are highly reactive, transitioning from a hard material when dry to non-trafficable when wet due to their plasticity. The cracking clays also experience significant shrinkage and swelling with variations in moisture content.

The Quaternary Alluvium is typically overlain by black earth comprised of black and dark grey clays of high plasticity. The reactive nature of this material allows the mixing of organic content from the surface during the shrink/swell process. This reactive nature of this material results in shrinking and swelling characteristics.

Alluvium material in the Study Area is associated with watercourses and floodplains and is closely aligned with the mapping of important agricultural areas, defined as "land that has all of the requirements for agriculture to be successful and sustainable, is part of a critical mass of land with similar characteristics and, is strategically significant to the region or the state" (Department of Agricultural and Fisheries). Important agricultural areas are mapped within and south of the Study Area, generally associated with Lockyer Creek, Gatton Creek and Rocky Creek.

Contaminated Land and UXO

Sections of the Preferred Corridor are located within the existing railway, on agricultural and rural lands, and in the vicinity of Defence facilities. There is a potential for contaminated land and unexploded ordnance to be present. Further investigations will be undertaken in future stages to quantify this risk.

Department of Defence property (ex-rifle range) is traversed by the Preferred Corridor immediately east of the Toowoomba Tunnel portal. This site has the potential for UXO or other contamination although is not currently identified in the Department of Defence UXO Register. Further investigations will be undertaken in future stages to quantify this risk.

3.3 (d) Outstanding natural features

The Toowoomba Range is traversed by the Preferred Corridor.

3.3 (e) Remnant native vegetation

Twelve Regional Ecosystem (RE) types were identified on mapping in the vicinity of the Study Area being seven least concern, two of concern and three endangered. Mapped regional ecosystems likely to be intercepted by the Preferred Alignment are listed in Table 9.

Table 9: Mapped Regional Ecosystems

Section	RE	VM Act Class	Biodiversity Status	Comment
Gowrie to Tunnel	No REs	NA	NA	Traverses agricultural areas, some protected plants may be

				present and will require survey in future stages of investigation.
Tunnel under Gowrie Creek	11.3.25 11.8.5 12.8.14/12.8.17 12.8.17 12.8.21 12.8.21/12.8.9	LeastC LeastC LeastC LeastC Endangered Endangered/LeastC	OC NC NC/NC NC E E/OC	Unlikely these REs would be impacted as construction of the tunnel would not likely have surface disturbance, except where for ventilation infrastructure if required.
Tunnel exit to Jones Road	12.9-10.15 12.9-10.15**/12.3.7* 12.9-10.15**/12.9-10.7* 12.9-10.2/12.9-10.7* 12.9-10.7*	Endangered Endangered/LeastC Endangered/Of Concern LeastC/Of Concern Of Concern	E E/NC E/OC NC/OC OC	Clearing impacts in this area will be associated with tunnel portal construction and laydown areas for tunnel construction machinery. Validation of the recent field investigations to verify the presence or absence of RE 12.9-10.15 will also be required.
Jones Road to McNamaras Road	12.9-10.2/12.9-10.3* 12.9-10.2/12.9-10.7* 12.9-10.7/12.9-10.2*	LeastC/Of Concern LeastC/Of Concern Of Concern/LeastC	NC/OC NC/OC OC/NC	10.9-10.7/12.9-10.2 will be passed over via a bridge and may have reduced impacts, depending on construction methods adopted.
Helidon Option-North (Preferred Corridor)	12.3.7* 12.3.7/12.3.3 12.9-10.7* 12.9-10.7/12.9-10.2*	LeastC LeastC/Endangered Of Concern Of Concern/LeastC	NC NC/E OC OC/NC	This area was not traversed during surveys and therefore will require further investigation.
Helidon Option-South (Base Case)	12.9-10.7* 12.9-10.7/12.9-10.15* 12.9-10.7/12.9-10.2*	Of Concern Of Concern/Endangered Of Concern/LeastC	OC OC/E OC/NC	This area is associated with the base case and is unlikely to proceed.
Murphys Creek Road to Helidon	12.3.7/12.3.3* 12.9-10.2	LeastC/Endangered LeastC	NC/E NC	12.9-10.2 is associated with a creek. Sections of both REs will have bridges which will reduce the impacts associated with the Project through those sections.
Note- * denotes where an RE is also mapped as essential habitat ** denotes where an RE is suspected of being incorrectly mapped, more likely to be RE 12.8.16 Biodiversity Status: E= Endangered NC= Not of Concern OC= Of Concern				

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

Starting at Gowrie (600m AHD) , the Project departs from the existing rail line and runs along the south of the existing railway line, parallel to Gowrie Creek for approximately 1.5km and into the proposed western tunnel portal for the approximately 6.3km tunnel section passing east under the Toowoomba plateau. The proposed tunnel passes immediately north of Toowoomba under the New England Highway, exiting on the eastern side of the Toowoomba Range. To the east of the ridge, the land falls steeply down the escarpment toward Withcott and Postman's Ridge and includes significant crossings over the valleys of Rocky Creek and Six Mile Creek and the Toowoomba Second Range Crossing Project. The topography in this location requires the construction of a series of large cuts and fills, and some long and high viaducts.

From Withcott to Helidon the terrain of the Lockyer Valley is more gently undulating, crossing Upper Lockyer Creek tributaries and Oakey and Gatton Creeks with typical elevations in the range of 130m to 200m AHD. The route is characterised by a steep 1:60 gradient from the Western portal of the Toowoomba Tunnel to Airforce Road.

3.3 (g) Current state of the environment

Include information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops.

The Preferred Corridor traverses a variety of landscapes between Gowrie and Helidon. The Western tableland portion is largely cleared and disturbed, principally by agricultural and rural residential development activities. Vegetation and wildlife habitat in this section of the corridor is discontinuous.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

The Main Range Railway was identified on the Queensland Heritage Register.

Desktop analysis has also identified the potential for previously unidentified and unlisted historical heritage places and values to be located within the Study Area. Further investigations will be required to determine impacts and mitigation requirements.

3.3 (i) Indigenous heritage values

A search of the DATSIP databases and register for known cultural heritage objects, or places within, or in proximity to, the Study Area was undertaken. Known Aboriginal cultural heritage constraints are shown in Table 10.

Table 10. Aboriginal heritage sites identified on the DATSIP cultural heritage database within 5 km of Study Area

Source	Result	Notes
DATSIP	12 sites	Of the 12 sites, 11 are within Western Wakka Wakka country and 1 is within Jagera country. Sites include are artefact scatters, scarred trees, a landscape feature and an Aboriginal intangible place.
DATSIP	12 sites	Of the 12 sites, 11 are within Western Wakka Wakka country and 1 is within Jagera country. Sites include are artefact scatters, scarred trees, a landscape feature and an Aboriginal intangible place.
DATSIP	230 sites	Sites include artefact scatters, scarred trees, earthen arrangements, landscape features and Aboriginal intangible places.

3.3 (j) Other important or unique values of the environment

Describe any other key features of the environment affected by, or in proximity to the proposed action (for example, any national parks, conservation reserves, wetlands of national significance etc).

Matters of State Environmental Significance mapped within the Study Area include:

- Regulated vegetation intersecting a watercourse (extensively throughout the Study Area)
- Regulated vegetation and Wildlife Habitat along the eastern slopes of the Toowoomba Range
- Large expanse of regulated vegetation, wildlife habitat and protected area designation associated with Lockyer National Park, north of Helidon
- Areas of mapped wildlife habitat associated with the many creeks and tributaries intersected by existing east-west infrastructure corridors.

3.3 (k) Tenure of the action area (eg freehold, leasehold)

The predominant tenure across the Study Area is freehold, with reserves and state owned land in discrete pockets.

3.3 (l) Existing land/marine uses of area

A review of existing land uses was undertaken, with reference to available aerial imagery and Queensland Government land use mapping. These localities are shown in Attachment 3.

Gowrie Junction is located at the western extent of the Project. The locality is centred north of the existing rail line, and is described as a historic rural residential area, with growth potential. The surrounding rural lands are used largely for crop and farming and grazing.

Cranley is a rural residential locality on the outskirts of Toowoomba. It is characterised by large lot rural residential with a waste water treatment plant located between the existing railway line and Gowrie Creek. Queensland Government mapping shows land on the corner of Goombungee Road and Townson Street as a Powerlink/ Energex substation; however this land is currently undeveloped.

Mt Kynoch is a rural and emerging rural residential and residential area. A residential subdivision is located adjacent to the New England Highway. Land associated with the Toowoomba Second Range Crossing Project is located in this area, including an overpass of the New England Highway. Mt Kynoch Park, and the water treatment plant are also located on the New England Highway, with the residential locality of Blue Mountain Heights further north.

The localities of Ballard, Harlaxton and Mt Lofty are located east of Mt Kynoch, on the Toowoomba range. The topography of this area is steep and undulating, and subsequently has not been subjected to the extent of rural and urban development evident on the plains or plateau. An operational quarry is located in Harlaxton, down slope from residential areas. Commonwealth-owned land is located in this area, including the Mt Lofty Rifle Range.

Continuing east, the localities of Withcott and Postman's Ridge includes areas of natural vegetation and grazing on the hillsides, rural and rural residential areas, and a small township at Withcott. The township includes residential, commercial and industrial land uses. Agricultural uses in the area are predominantly grazing and vegetable growing. Ricky Creek, Six Mile Creek and Wards Hill are located within the Withcott and Postman's Ridge area. The Bicentennial National Trail traverses this area, passing from Murphy's Creek in the north to Withcott in the south. Withcott Seedlings, a major commercial supplier of vegetable seedlings, is located east of Withcott at Postmans Ridge. North of Postman's Ridge are the localities of Lockyer and Upper Lockyer, located on Lockyer Creek, with a mix of agricultural and natural vegetation, and extensive area of rural residential development at Upper Lockyer.

Helidon Spa and Helidon are dominated by rural and rural residential uses, and include the small township of Helidon. The Helidon area is historically associated with natural springs and sandstone, which was historically quarried for building materials across Queensland.

3.3 (m) Any proposed land/marine uses of area

The proposed land use is rail and associated infrastructure, including road realignments, grade separations and ancillary infrastructure.

4 Environmental outcomes

Provide descriptions of the proposed environmental outcomes that will be achieved for matters of national environmental significance as a result of the proposed action. Include details of the baseline data upon which the outcomes are based, and the confidence about the likely achievement of the proposed outcomes. Where outcomes cannot be identified or committed to, provide explanatory details including any commitments to identify outcomes through an assessment process.

If a proposed action is determined to be a controlled action, the Department may request further details to enable application of the draft *Outcomes-based Conditions Policy 2015* and *Outcomes-based Conditions Guidance 2015* (http://www.environment.gov.au/epbc/consultation/policy-guidance-outcomes-based-conditions), including about environmental outcomes to be achieved, details of baseline data, milestones, performance criteria, and monitoring and adaptive management to ensure the achievement of outcomes. If this information is available at the time of referral it should be included.

General commitments to achieving environmental outcomes, particularly relating to beneficial impacts of the proposed action, CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, and conditions of approval, if your proposal proceeds to these stages).

To date, endeavours to avoid and reduce impacts to matters of national environmental significance and other environmental values have been a key factor in option assessment and route selection processes for the Project and across the Melbourne to Brisbane Inland Rail Programme. As the Project progresses, impact avoidance and reduction will remain key drivers in design development.

The Project will undergo environmental assessment in line with Commonwealth and Queensland legislative requirements, preferably under the bilateral agreement between the Australian Government and the State of Queensland. This process will provide further detail regarding environmental outcomes, and the data upon which these assessments and proposed outcomes are based. This includes the completion of further studies and design development. Key aspects to be addressed include:

- Further definition of habitat and vegetation impacts, through iterative design and environmental assessment
- Confirmation of the location of MNES and Matters of State Environmental Significance (MSES) habitat and species presence, and significance of populations, through targeted ecological investigations, in accordance with relevant State and Commonwealth survey guidance
- Confirmation of other environmental values in the Study Area
- Design development to avoid, reduce or manage impacts to identified environmental values
- Determination of environmental offset requirements for MNES and MSES impacts. A Programme-wide approach to biodiversity offset management is currently being considered.

The Project's environmental outcomes should also be considered in the context of the overall intent and outcomes of the ultimate Melbourne to Brisbane Inland Rail Programme. The establishment of a freight rail route that provides a comparable level of service to road freight is expected to negate or delay the need for progressive upgrades of the National Highway and associated environmental impacts.

5 Measures to avoid or reduce impacts

Note: If you have identified alternatives in relation to location, time frames or activities for the proposed action at Section 2.3 you will need to complete this section in relation to each of the alternatives identified.

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

For any measures intended to avoid or mitigate significant impacts on matters protected under the EPBC Act, specify:

- what the measure is,
- how the measure is expected to be effective, and
- the time frame or workplan for the measure.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

Provide information about the level of commitment by the person proposing to take the action to achieve the proposed environmental outcomes and implement the proposed mitigation measures. For example, if the measures are preliminary suggestions only that have not been fully researched, or are dependent on a third party's agreement (e.g. council or landowner), you should state that, that is the case.

Note, the Australian Government Environment Minister may decide that a proposed action is not likely to have significant impacts on a protected matter, as long as the action is taken in a particular manner (section 77A of the EPBC Act). The particular manner of taking the action may avoid or reduce certain impacts, in such a way that those impacts will not be 'significant'. More detail is provided on the Department's web site.

For the Minister to make such a decision (under section 77A), the proposed measures to avoid or reduce impacts must:

- clearly form part of the referred action (eg be identified in the referral and fall within the responsibility of the person proposing to take the action),
- be must be clear, unambiguous, and provide certainty in relation to reducing or avoiding impacts on the matters protected, and
- must be realistic and practical in terms of reporting, auditing and enforcement.

If a proposed action is determined to be a controlled action, the Department may request further details to enable application of the *Outcomes-based Conditions Policy 2016* (http://www.environment.gov.au/epbc/publications/outcomes-based-conditions-policy-guidance), including information about the environmental outcomes to be achieved by proposed avoidance, mitigation, management or offset measures, details of baseline data, milestones, performance criteria, and monitoring and adaptive management to ensure the achievement of outcomes. If this information is available at the time of referral it should be included in the description of the proposed measures.

More general commitments (e.g. preparation of management plans or monitoring), commitments to achieving environmental outcomes and measures aimed at providing environmental offsets, compensation or off-site benefits CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, if your proposal proceeds to these stages).

At the time of referral, preliminary information is available regarding measures to avoid or reduce impacts. Further baseline data, design information and confirmation of suitable management approaches will be developed in the next stage of the Project.

Design

All of the Projects that are part of the Inland Rail Programme will be designed and assessed in a consistent way, guided by an overarching Environmental Strategy. Environmental assessment during the design phase will address design, construction and operational phase impacts and management measures. Detailed requirements for environmental assessment and design will also be specified in project tender documentation. This information is still under development, and will also incorporate any assessment requirements provided by the Queensland and Australian governments, if relevant and available at the time of tender release.

Opportunities to minimise earthwork extents, avoid significant impacts to creeks and watercourses through sensitive design, avoid or reduce impacts to areas of sensitive habitat (including habitat loss, habitat fragmentation and mortality) will be key considerations throughout design. Opportunities to minimise amenity impacts (noise, air quality, visual) will also be key drivers of subsequent design processes.

Construction

An Environmental Management Plan will be developed to ensure management and mitigation measures and conditions of approval are clearly documented, and are implemented during the construction phase of the Project. This will include definition of no-go zones, requirements for post-works rehabilitation, and scheduling of works where necessary to minimise impacts during breeding periods or times of heightened environmental sensitivity.

Operation

ARTC have established an environmental process that applies to operations on their network. This includes an environmental policy, an environmental management system and a pollution incident response management plan.

In all their activities, ARTC commits to:

- Taking prompt action in response to non-compliance and other environmental complaints
- Having effective relationships with all environmental agencies and regulators
- Ensuring agreements between contractors and rail operators comply with our Environmental Management System

- Ensuring employees are inducted so they can perform their duties.

Project-specific environmental management or monitoring requirements identified through future stages of design and impact assessment will be incorporated into the relevant operational management documentation. These management and monitoring measures will be determined based on current guidelines and scientific knowledge, with input from relevant government agencies. At this stage of the process the exact nature of this documentation is yet to be determined, however the existing ARTC Environmental Protection Licences for operations in New South Wales and South Australia provide an example of how this is addressed in these jurisdictions. A project specific example is the ARTC operational environmental management plan for the Southern Sydney Freight Line, which was developed in accordance with the conditions of approval from the New South Wales Department of Planning.

6 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. whether you think that significant impacts on the matters protected under Part 3 of the EPBC Act are likely) and the reasons why.

6.1 Do you THINK your proposed action is a controlled action?

	No, complete section 5.2
✓	Yes, complete section 5.3

6.2 Proposed action IS NOT a controlled action.

Specify the key reasons why you think the proposed action is NOT LIKELY to have significant impacts on a matter protected under the EPBC Act.

6.3 Proposed action IS a controlled action

Type 'x' in the box for the matter(s) protected under the EPBC Act that you think are likely to be significantly impacted. (The 'sections' identified below are the relevant sections of the EPBC Act.)

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
✓	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
✓	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

Specify the key reasons why you think the proposed action is likely to have a significant adverse impact on the matters identified above.

The Project will result in direct impacts on Commonwealth land and direct impacts to habitat for listed threatened species, in particular the Koala and potential habitat for other listed threatened species such as the Collared Delma. Management and mitigation measures will be further developed as the Project progresses, to address the impact of habitat loss and enable habitat connectivity. The extent of habitat loss and impact on listed threatened species will require detailed assessment to determine whether the Project is likely to have a significant residual impact on these matters of national environmental significance.

7 Environmental record of the responsible party

NOTE: If a decision is made that a proposal needs approval under the EPBC Act, the Environment Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach.

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** ARTC are a national rail operator. ARTC operate in New South Wales and South Australia under Environmental Protection Licences, and are accountable to the respective Environmental Protection Agencies for their operations. Through implementation of ARTC's Environmental Policy, Environmental Management System, and project specific environmental management plans and licences for construction and operation, ARTC has maintained a satisfactory record of responsible environmental management.	✓	
7.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		✓
7.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework** ARTC's Environmental Policy is included at Attachment 8. ARTC also operates an environmental management system, and has a state based (NSW) code of practice for assessing the impact of Projects.	✓	
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?**	✓	

Provide name of proposal and EPBC reference number (if known)		
2016/7729 – Australian Rail Track Corporation Ltd/Transport - Land/Narribri to North Star/New South Wales/Narribri to North Star Section of Inland Rail, NSW (22 June 2016)		
2016/7731 – Australian Rail Track Corporation Ltd/Transport - Land/Parkes to Narromine/New South Wales/Parkes to Narromine Section Inland Rail, NSW (22 June 2016)		
2009/4897 – Upgrade of approx 32km of Main Northern Railway, including construction of 3rd track, Main Northern Railway between Maitland Junction and Minimbah (NSW) (18 May 2009)		
2009/4783 – Melbourne to Sydney Rail Upgrade Project – Passing Lane 2, Near Hume Highway, between Donnybrook Road and Beveridge Road (VIC) (06 March 2009		
2008/4500 – Northern East Rail Revitalisation, Glenrowan Station (VIC) (08 October 2008) 2007/3795 – Passing Land 2 between Donnybrook Road and Beveridge Road level crossings, Melbourne to Sydney Rail Corridor (VIC) (22 October 2007)		
2005/2393 – South Sydney Freight Rail Line, Sefton Park to Macarthur (NSW) (18 November 2005)		
2005/1948 – Sandgate Rail Grade Separation, Newcastle (NSW) (13 January 2005)		

8 Information sources and attachments

(For the information provided above)

8.1 References

- List the references used in preparing the referral.
- Highlight documents that are available to the public, including web references if relevant.

- 2006 North South Rail Corridor Study
- 2010 Inland Rail Alignment Study (IRAS)
- 2015 Melbourne to Brisbane Inland Rail Business Case
- Australian Heritage Database (NHL, CHL, RNE)
- Borsboom, A. (2009). *Coeranoscincus reticulatus* - Species Information Sheet. Provided to the Department of the Environment, Water, Heritage and the Arts. Department of Environment and Resource Management.
- Buchanan Architects 2002 Brisbane to Toowoomba: A Heritage Management Survey for Queensland Rail. Unpublished report for Queensland Rail.
- DATSIP databases: Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP)
- Department of Agriculture and Fisheries (DAF), 2016, GIS layer: Queensland Waterways for Waterway Barrier Works
- Department of the Environment (DoE) 2016 Species Profile and Threats Database.
- Dique, D., Preece, H. and de Villiers, D. (2003c) Koalas in Pine Rivers Shire: Distribution, Abundance and Management., Unpublished Report to the Queensland Parks and Wildlife Service, Brisbane
- DoE, 2014. EPBC Act Referral Guidelines for the Vulnerable Koala
- EPBC Protected Matters Search Tool (PMST) was generated on 14/06/2016 for a 5km linear buffer along the proposed alignment
- Kerr, J. 1994 Queensland Rail Heritage Report, Final Report, July 1993. Unpublished report to Queensland Rail.
- Koala Tracker mapping (http://www.koalatracker.com.au/view-mapped-koala-sightings)
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- Queensland Government Essential Habitat Mapping
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- Queensland Government Wildlife online
- Queensland Heritage Register
- Queensland Land Use Mapping Program, February 2016. Queensland Land Use Mapping
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- Toowoomba Regional Council Transport Strategy Proposals to 2031 (Brian Lister Planning and TransPosition 2010

8.2 Reliability and date of information

For information in section 3 specify:

- source of the information;
- how recent the information is;
- how the reliability of the information was tested; and
- any uncertainties in the information.

8.3 Attachments

Indicate the documents you have attached. All attachments must be less than three megabytes (3mb) so they can be published on the Department's website. Attachments larger than three megabytes (3mb) may delay the processing of your referral.

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	
	GIS file delineating the boundary of the referral area (section 1)		
	figures, maps or aerial photographs showing the location of the Project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)	✓	
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)		
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)		

9 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action (which can include a person acting on their behalf); or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[1].

Project title:

9.1 Person proposing to take action

This is the individual, government agency or company that will be principally responsible for, or who will carry out, the proposed action.

If the proposed action will be taken under a contract or other arrangement, this is:

- the person for whose benefit the action will be taken; or
- the person who procured the contract or other arrangement and who will have principal control and responsibility for the taking of the proposed action.

If the proposed action requires a permit under the Great Barrier Reef Marine Park Act[2], this is the person requiring the grant of a GBRMP permission.

The Minister may also request relevant additional information from this person.

If further assessment and approval for the action is required, any approval which may be granted will be issued to the person proposing to take the action. This person will be responsible for complying with any conditions attached to the approval.

If the Minister decides that further assessment and approval is required, the Minister must designate a person as a proponent of the action. The proponent is responsible for meeting the requirements of the EPBC Act during the assessment process. The proponent will generally be the person proposing to take the action[3].

1. Name and Title:	Simon Thomas, Project Director
2. Organisation (if applicable):	Australian Rail Track Corporation
3. EPBC Referral Number (if known):	
4: ACN / ABN (if applicable):	081 455 754 / 75081455754
5. Postal address	11 Sir Donald Bradman Drive, Keswick Terminal, South Australia
6. Telephone:	(08) 8217 4366
7. Email:	enquiries@artc.com.au
8. Name of proposed proponent (if not the same person at item 1 above and if applicable):	
9. ACN/ABN of proposed	

[1] *If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Gateway (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

[2] *If your referred action, or a component of it, is to be taken in the Great Barrier Reef Marine Park the Minister is required to provide a copy of your referral to the Great Barrier Reef Marine Park Authority (GBRMPA) (see section 73A,* EPBC Act*). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.*

proponent (if not the same person named at item 1 above):

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

□ an individual; OR

□ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR

□ not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

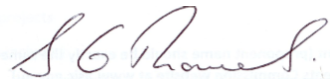
COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:

□ not applicable.

Declaration

I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I agree to be the proponent for this action.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature  Date 10/2/17

9.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name	John Herron
Title	Environment Manager
Organisation	Australian Rail Track Corporation
ACN / ABN (if applicable)	081 455 754 / 75081455754
Postal address	Level 12/40 Creek Street, Brisbane 4000
Telephone	0733648919

Email	jherron@artc.com.au
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	 Date 10 Feb. 2017

REFERRAL CHECKLIST

NOTE: This checklist is to help ensure that all the relevant referral information has been provided. It is not a part of the referral form and does not need to be sent to the Department.

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Attachment A

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)