

APPENDIX E1

EPBC Act

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E1 EPBC ACT

E1.1 INTRODUCTION

The proposed expansion to the Olympic Dam mining and processing operation was referred by BHP Billiton under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 15 August 2005.

The Australian Government (the Department of Environment and Water Resources, now the Department of Environment, Water, Heritage and the Arts) deemed the Olympic Dam expansion a controlled action under the EPBC Act on 2 September 2005. The Act outlines seven matters of National Environmental Significance (NES) against which the significant impact of actions is assessed. Of these, five matters were identified as pertaining to the proposed Olympic Dam expansion and were designated as controlling provisions for the project. The identified controlling provisions were:

- wetlands of international importance
- listed threatened species and ecological communities
- listed migratory species
- protection of the environment from nuclear actions
- the protection of the environment from actions involving Commonwealth land.

These provisions are discussed throughout the Draft EIS. This appendix collates and summarises the assessment findings that are relevant to the controlling provisions of the EPBC Act.

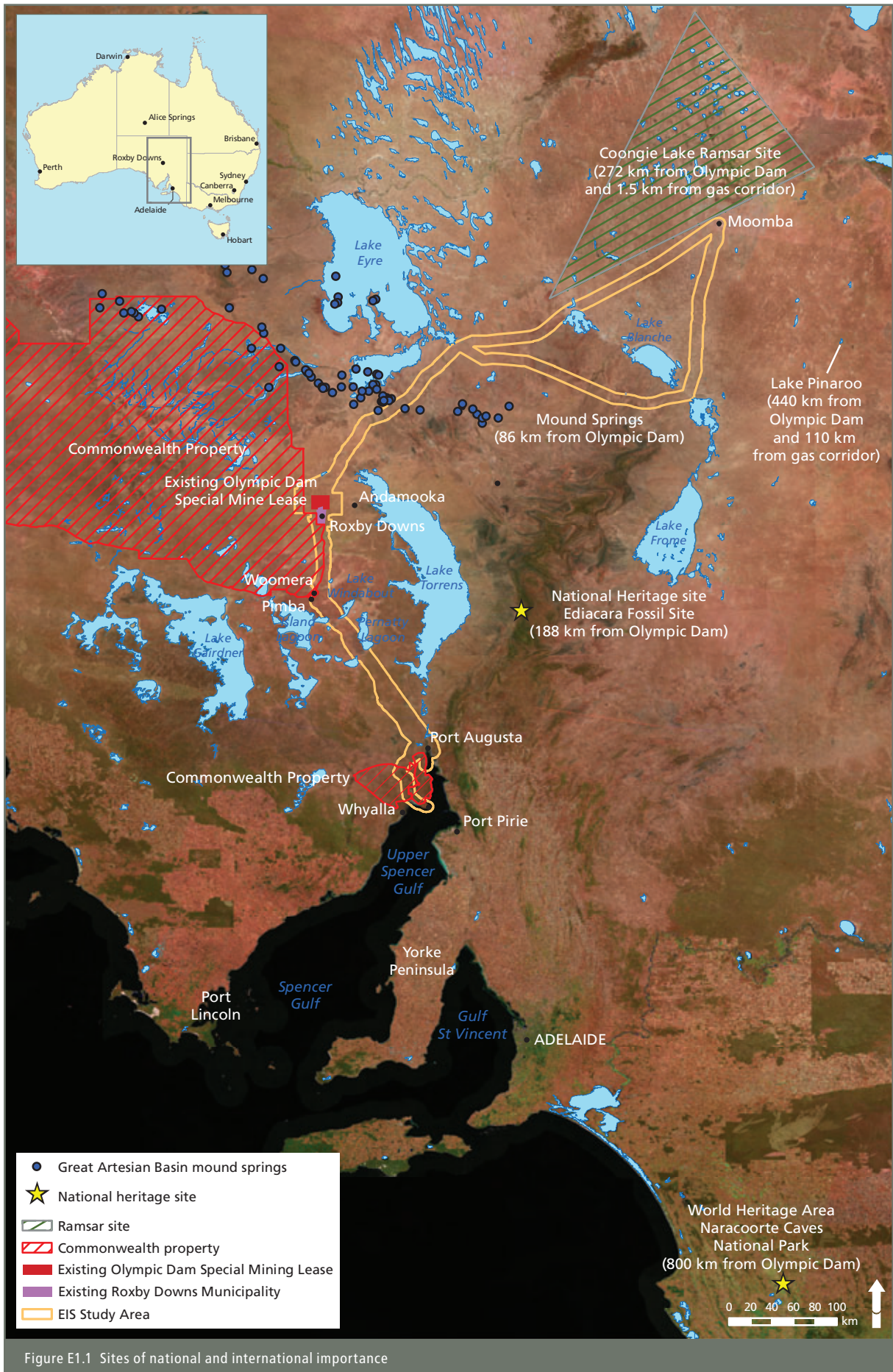
E1.2 OVERVIEW OF CONTROLLING PROVISIONS AND ASSESSMENT METHODS

This section provides an overview of the matters of National Environmental Significance (NES) that are applicable to the project and assessments undertaken to provide a basis for the impact assessment described in Section E1.3.

E1.2.1 Wetlands of international importance

The database searches indicated that there are two wetlands of international importance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* in the search area – Coongie Lakes and Lake Pinaroo (see Figure E1.1). Coongie Lakes lies in the far north-east of South Australia near Innamincka, approximately 470 km from Olympic Dam. Lake Pinaroo is located within Sturt National Park, 24 km south-east of Cameron Corner (the junction of the New South Wales, Queensland and South Australian borders, 430 km from Olympic Dam). Most of the upper Cooper Creek system in South Australia is listed under the Ramsar Convention as the Coongie Lakes Wetland of International Importance.

The nearest infrastructure to the wetlands would be the gas pipeline from Moomba to Olympic Dam (via the three alternative routes). At its closest point the pipeline would be approximately 1.5 km from the boundary of the Coongie Lakes Ramsar area, approximately 102 km south-west of Coongie Lake and approximately 132 km west of Lake Pinaroo.



E1.2.2 Listed threatened species and communities

Terrestrial ecology assessment

The assessment of terrestrial ecology (including threatened species and ecological communities) involved:

- a desktop review and compilation of relevant data from the past 25 years of published reports and databases associated with the wider environs of Olympic Dam and the EIS Study Area (see Figure E1.2)
- field surveys to identify and map vegetation associations, and to identify flora and fauna species and their preferred habitats
- an iterative process of risk and impact assessment, project design refinement and identification of management measures as discussed in Chapter 1, Introduction, of the Draft EIS. This also included the establishment of a significant environmental benefit (SEB) strategy, in accordance with guidelines provided by the South Australian Native Vegetation Council.

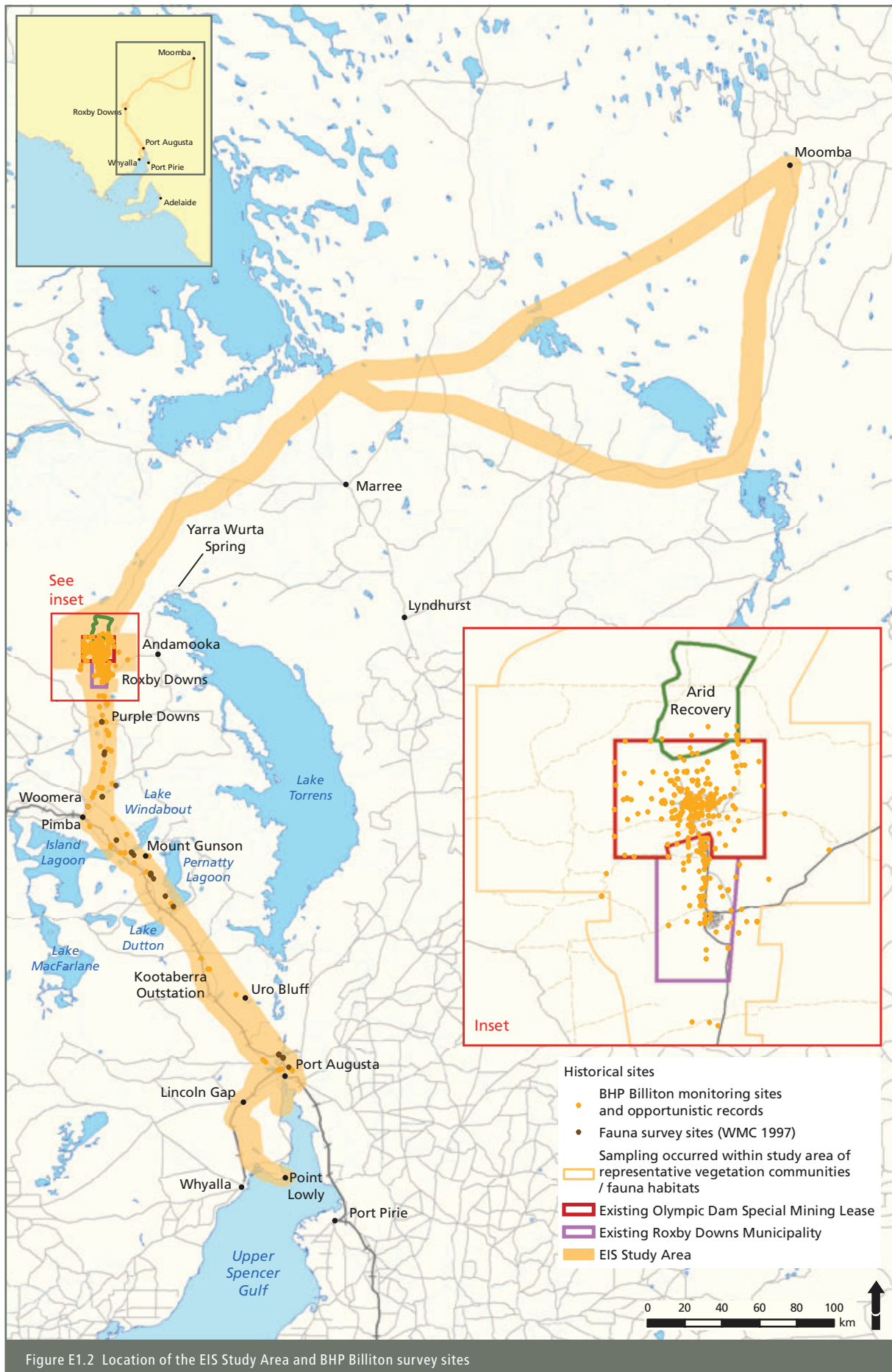
Details of the assessment method are provided in Chapter 15, Terrestrial Ecology, and Appendix N of the Draft EIS.

Marine ecology assessment

The assessment of marine ecology relevant to listed species under the EPBC Act involved:

- a literature review of desalination plants, the effects of salinity on marine species and records pertaining to the marine environment of the study area, including Port Adelaide, the Port of Darwin and Commonwealth waters near the Port of Darwin
- additional marine surveys to assess the distribution and composition of the marine communities
- ecotoxicity studies to assess the tolerance of marine species to various salinity and anti-scalant concentrations
- hydrodynamic modelling to assess dispersion of the desalination plant return water plume and sediment plume from trenching activity on the seafloor
- an iterative process of risk and impact assessment, project design refinement and identification of management measures as discussed in Chapter 1 of the Draft EIS.

Details of the assessment method are provided in Chapter 16, Marine Environment, and Appendix O of the Draft EIS.



E1.2.3 Listed migratory species

The listed migratory species were included as part of the terrestrial and/or marine ecology assessments based on desktop reviews of previous monitoring records. Details of the assessment method are provided in Chapter 15, Terrestrial Ecology, and appendices N1, N6, N10 and N11 of the Draft EIS.

The potential interactions between the tailings storage facility beaches and shorebirds is currently being studied by Donato Environmental Services.

E1.2.4 Protection of the environment from nuclear actions

The proposed expansion involves the mining and milling of uranium ore, transport, handling and export of uranium oxide and concentrate, and the subsequent decommissioning and rehabilitation of the area in which the activity would occur. The potential impacts of these activities are discussed throughout the Draft EIS and Appendix E4 for export of product via the Port of Darwin. Radiological effects are assessed in relation to Terrestrial Ecology (Chapter 15), Health and Safety (Chapter 22), Rehabilitation and Closure (Chapter 23) and Hazard and Risk (Chapter 26). As such, they are not reproduced here: this appendix focuses on those NES matters relevant to ecological effects of the proposed expansion.

E1.2.5 Protection of the environment from actions involving Commonwealth land

The impacts to Commonwealth land, which includes land owned or leased by the Commonwealth or a Commonwealth agency reserve, were assessed by identifying Commonwealth land in the vicinity of the EIS Study Area, the values and current uses of this land, and applying the impact assessment method outlined in Chapter 1, Introduction, of the Draft EIS to determine the level of residual impact. This section of the EPBC Act empowers the Department of Environment, Water, Heritage and the Arts to review potential impacts to the whole environment of Commonwealth land, not just NES matters. As a consequence, this issue is also addressed throughout the Draft EIS. However, this appendix includes some discussion of those Commonwealth lands relevant to the proposed expansion and summarises potential impacts on these lands.

E1.2.6 Matters of national environmental significance not relevant to the project

The NES matters not identified as controlling provisions (i.e. World Heritage properties, National Heritage places and Commonwealth marine areas) are not addressed in this appendix. These NES matters are not relevant to the proposed expansion because:

- the nearest World Heritage sites to the EIS Study Area are the Australian Fossil Mammal Site (Naracoorte Caves) in the south-east of South Australia (approximately 800 km from Olympic Dam) (see Figure E1.1) and the Willandra Lakes Region in south-western New South Wales (approximately 700 km from Olympic Dam)
- the nearest National Heritage place to the EIS Study Area is the Ediacara Fossil Site located on the western side of the Flinders Ranges in South Australia (approximately 185 km from Olympic Dam)(see Figure E1.1)
- Spencer Gulf (the site of the desalination plant and landing facility) and Gulf St Vincent (the site of port facilities) in South Australia are part of State rather than Commonwealth waters; Beagle Gulf (the site of port facilities at Darwin) is outside Commonwealth waters
- Appendix C (Risk Assessment) of the Draft EIS established no unacceptable risk of a shipping incident occurring in Commonwealth waters.

The above sites and areas are too far from the project to be impacted, or at no credible risk of being affected.

E1.3 ASSESSMENT OF POTENTIAL IMPACTS ON MATTERS OF NES

The Department of Environment, Water, Heritage and the Arts (DEWHA) has developed administrative guidelines to assist proponents in identifying whether their project may potentially have a significant impact on matters of National Environmental Significance (NES) listed within the EPBC Act.

The following assessment of potential impacts on matters of NES has been guided by the EPBC Act Policy Statement 1.1 'Significant Impact Guidelines Matters of National Environmental Significance' (DEH 2006).

E1.3.1 Project alternatives

The preferred project configuration was determined after considering 53 alternatives for major project components (see Chapter 4, Project Alternatives). The assessment process was based on BHP Billiton's proprietary risk management standard, which requires consideration of health, safety, environmental, community and economic issues during management of BHP Billiton projects. As such, potential impacts on matters of NES were taken into consideration when assessing project alternatives. The assessment of each option against the EPBC Act Guidelines is given in Table E1.1.

Although most project alternatives were considered to have no credible risk of affecting matters of NES, seven components were considered to have a credible risk, as follows:

- *Continue existing underground method and expand operations by establishing a new open pit mine.* This is the chosen project component and is therefore assessed in greater detail in Sections E1.3.3 – E1.3.5.
- *A paddock system for storage of tailings as used in the existing operation with design modifications (e.g. no requirement for evaporation ponds).* This is the chosen project component and is therefore assessed in greater detail in Sections E1.3.4 and E1.3.5.
- *A paddock system with no design modifications.* This alternative would not have taken the opportunity presented by the expansion project to reduce impacts on birds (including EPBC Act listed migratory species) and was therefore rejected.
- *A third wellfield in the Great Artesian Basin (GAB).* Extraction of 200 ML/day of water for the primary water supply from Great Artesian Basin (GAB) wellfields was considered to have significant implications with respect to matters of NES. Many of the GAB springs in the region are known to support critically endangered wetland communities. Modelling of groundwater drawdown associated with the expansion of the GAB wellfields (i.e. Wellfield C) demonstrated that flows of some GAB springs, known to support endangered communities, would decline if the required primary water demand of 200 ML/d was extracted. The risk to these communities was considered unacceptable, and the GAB Wellfield C alternative was therefore rejected.
- *Extraction from the River Murray.* Extracting 200 ML/day of water from the River Murray was considered to be unacceptable as it would further reduce environmental flows within the river. Additional extraction may exacerbate adverse effects on the Coorong (a Ramsar wetland of international importance). For these and other reasons, the option was rejected.
- *Location of coastal seawater desalination plant.* Listed threatened marine species utilise, on occasion, South Australian coastal waters and Spencer Gulf and therefore all investigated locations of the desalination plant have a potential to impact these species. The assessments reported in Chapter 16, Marine Environment, of the Draft EIS establish that the potential to impact listed marine species from the preferred Point Lowly site is negligible.
- *Thirteen alternative locations for Hiltaba Village and the airport to the north, south and east of Roxby Downs.* The possible presence of a population of the endangered Thick-billed Grasswren in Cottonbush habitat on gibber plains near Roxby Downs was considered when locating camp and airport infrastructure. Impacts on Thick-billed Grasswrens were considered to be unlikely as surveys failed to detect the bird in the area, and most of the Cottonbush habitat would be avoided when locating infrastructure. The residual impact on the Thick-billed Grasswren was considered to be negligible.

Table E1.1 Assessment of project alternatives against matters of NES

Project component	Options investigated ¹	Credible risk to matters of NES	Notes
Mining method	Continue existing underground method and expand operations by establishing a new open pit mine	Yes	Vegetation/habitat clearance may adversely affect a number of threatened species (including plants, small mammals, birds and a gecko) Air emissions may adversely affect the habitat of threatened small mammals introduced to Arid Recovery
Production rate	Expand existing underground mining operations	No	
	Expand to 750,000 tpa of refined copper equivalent plus associated products	No	
	Expand to <750,000 tpa of refined copper equivalent plus associated products	No	
Processing ore	Expand to >750,000 tpa of refined copper equivalent plus associated products	No	
	Upgrade existing processing plant to full capacity and export the additional concentrate	No	
	Construct a new plant at Olympic Dam to process all of the recovered ore	No	
Location of port to export copper concentrate containing uranium	Upgrade existing processing plant to full capacity and construct a new plant in Upper Spencer Gulf to process the additional concentrate	No	
	Port of Darwin	No	
	Port Adelaide	No	
	Port Bonython	No	
	Whyalla	No	

Table E1.1 Assessment of project alternatives against matters of NES (cont'd)

Project component	Options investigated ¹	Credible risk to matters of NES	Notes
Tailings storage method	A paddock system as used in the existing operation with design modifications (e.g. no requirement for evaporation ponds)	Yes	Wet tailings beaches containing acidic liquor may adversely affect listed migratory shorebirds
	A paddock system with no design modifications	Yes	The TSF ponds and evaporation ponds containing acidic liquor may adversely affect listed migratory shorebirds
	Co-disposal of tailings with mine rock	No	
	A central discharge system	Yes	The TSF ponds and evaporation ponds containing acidic liquor may adversely affect listed migratory shorebirds
	Co-locating the tailings and mine rock storage facilities	Yes	The TSF ponds and evaporation ponds containing acidic liquor may adversely affect listed migratory shorebirds
	Thickening tailings above 55% solids – applied to all options	Yes	The TSF ponds and evaporation ponds containing acidic liquor may adversely affect listed migratory shorebirds
	Neutralising the tailings	No	
Primary water supply	Coastal seawater desalination plant	No	
	Expand existing extraction from the Great Artesian Basin (GAB)	Yes	Groundwater drawdown associated with extraction of the primary water supply for the expansion from the Great Artesian Basin may adversely affect endangered GAB spring communities
	New groundwater extraction from the Arckaringa Basin	No	
	Adelaide treated wastewater (i.e. use primary sewage treatment plant water)	No	
	Extraction from the River Murray	Yes	Extraction of water from the River Murray may exacerbate adverse effects on the Coorong (a Ramsar wetland of international importance)
Location of coastal seawater desalination plant	Point Lowly	Yes	Listed marine species utilise Upper Spencer Gulf and the potential impacts on these species are discussed in Chapter 16, Marine Environment
	South of Whyalla	Yes	
	Port Augusta	Yes	
	South of Port Pirie	Yes	
	Whyalla	Yes	
	Ceduna	Yes	Listed marine species utilise waters off Ceduna and therefore would carry a potential for impact or risk
Options for managing desalination plant return water	Return to the sea	No	
	Land-based discharge	No	
	Discharge to an inland salt lake	No	
	Deep well injection	No	
Primary electricity supply	From the national electricity market (i.e. the grid)	No	
	A purpose built onsite gas-fired power plant	No	
	Dedicated low carbon emission energy sources – wind and/or solar	No	
	Dedicated low carbon emission energy source – geothermal	No	
Hiltaba Village (construction workforce accommodation)	On Andamooka Road, 16 km east of Roxby Downs	No	
	Thirteen alternative locations to the north, south and east of Roxby Downs	Yes	Clearance of Cottonbush habitat on gibber plains may adversely affect a population of the threatened Thick-billed Grasswren
Transporting materials	Maximise bulk transport via rail with remaining materials transported by road	No	
	Continue existing all-by-road method	No	

Table E1.1 Assessment of project alternatives against matters of NES (cont'd)

Project component	Options investigated ¹	Credible risk to matters of NES	Notes
Location of landing facility	Site 1 (Snapper Point south of O'Connell Court – about 10 km south of Port Augusta)	No	
	Site 2 – Shack Road, about 16 km south of Port Augusta	No	
	Site 3 – Shack Road, about 18 km south of Port Augusta	No	
	Site 4 – Shack Road, about 21 km south of Port Augusta	No	
	Area 1 – Shack Road, about 2 to 8 km south of Port Augusta	No	
Location of port to import sulphur and diesel	Port Adelaide	No	
	Port Augusta	No	
	Port Pirie	No	
	Whyalla	No	
	Port Bonython	No	
	Interstate ports	No	

¹ Bold indicates the chosen project component.

E1.3.2 Wetlands of international importance

In determining the potential impact of the mine expansion project on the wetlands of international importance, the DEWHA guidelines note that an action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will result in:

- areas of the wetland being destroyed or substantially modified
- a substantial and measurable change in the hydrological regime of the wetland, for example, a substantial change to the volume, timing, duration and frequency of ground and surface water flows to and within the wetland
- the habitat or life cycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected
- a substantial and measurable change in the water quality of the wetland, for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biodiversity, ecological integrity, social amenity or human health
- an invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.

The EPBC Act Protected Matters Search Tool indicated that the proposed gas pipeline from Moomba to Olympic Dam would be located within the same catchment area as the Coongie Lakes and Lake Pinaroo Ramsar wetlands. There is, however, no significant hydrological connection between the pipeline routes and the wetlands.

In view of the significant distance between the proposed pipeline route (irrespective of the route option chosen) and the wetlands, there is no credible risk of any of the above outcomes occurring as a result of the pipeline development.

E1.3.3 Threatened ecological communities

In determining the potential impact of the mine expansion project on listed ecological communities, the guidelines note that an action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

- reduce the extent of an ecological community
- fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
- adversely affect habitat critical to the survival of an ecological community
- modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
- cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting

- cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:
 - assisting invasive species, that are harmful to the listed ecological community, to become established
 - causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community
- interfere with the recovery of an ecological community.

The various ecological communities in the EIS Study Area are described in Chapter 15, Terrestrial Ecology, Section 15.3.2 and Appendix N1. Two endangered ecological communities listed under the EPBC Act require consideration in regard to the proposed expansion:

- A 'community of native species dependent on natural discharge of groundwater from the Great Artesian Basin' is present on the northern edge of the gas pipeline corridors where it traverses the Reedy Springs GAB springs complex on Murnpeowie Station (see Figure E1.1). There would be no impact on this community, as the GAB springs and the vegetation they support would be completely avoided by the pipeline and any ancillary infrastructure (e.g. construction camps, pipe stacking sites, mainline valves) by a distance of several kilometres. Furthermore, no water would be extracted from GAB springs or groundwater wells within 20 km of the springs during construction.
- The Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia is mapped as possibly occurring within a broad general area that overlaps the buffer zone of the infrastructure corridor to the east of Port Augusta (DEWR 2007). Vegetation surveys failed to detect Peppermint Box in the EIS Study Area.

In relation to the EPBC Act, the proposed expansion would not result in any significant impacts on the above communities. In particular, there is no reasonably foreseeable chance or possibility that the project would reduce the extent of, or fragment, these communities.

E1.3.4 Listed threatened species

In determining the potential impact of the proposed expansion on endangered species, the guidelines note that an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of a population
- reduce the area of occupancy of the species
- fragment an existing population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of a population
- modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat
- introduce disease that may cause the species to decline
- interfere with the recovery of the species.

In determining the potential impact of the proposed expansion on vulnerable species, the guidelines note that an action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline
- interfere substantially with the recovery of the species.

Flora

Table E1.2 provides a list of flora from the EPBC database that have been recorded or have the potential to occur in the EIS Study Area. The table also provides a summary of the assessment and potential impacts of the proposed expansion on listed flora species.

The assessment of potential impacts on listed species was undertaken in two stages. All EPBC listed species known or predicted to occur in the EIS Study Area were subject to a screening process, based on their distribution and ecology/resilience, to determine whether they are at credible risk of being affected by the project (see Appendix N6). Those species having a credible risk of being affected were then subject to an additional level of assessment (see Chapter 15, Terrestrial Ecology).

Two flora species listed under the EPBC Act were identified by the desktop assessment as having credible risk of being affected by the proposed expansion (i.e. *Eleocharis papillosa* and *Frankenia plicata*; see Table E1.2). Neither species was detected during surveys conducted for the EIS.

Eleocharis papillosa is found in temporary wetlands and there are database records for two locations in the gas pipeline corridor, more than 2 km from the corridor centreline. All confirmed records of *Frankenia plicata* are from the Breakaways (north-west of the study area), however there is an un-vouchered record from the gas pipeline corridor.

The likelihood of either species occurring in the area that may potentially be disturbed is low. However, further searches will occur when the exact location of the disturbance footprints is known. The surveys will target those vegetation types that are known to support the listed threatened species (refer Chapter 15, Terrestrial Ecology, Section 15.5.4). In the event that any threatened species are identified during these surveys, one of two management measures would be followed:

- Where possible infrastructure alignments would be adjusted to avoid areas that contain listed threatened plants.
- Before disturbance, areas found to contain listed threatened plants and in close proximity to disturbance works would be marked as no-go areas on construction design drawings and in the field with flagging tape and/or hazard fencing.

In relation to the guidelines, the proposed expansion is unlikely to result in any significant impacts on flora that is listed under the EPBC Act. In particular, there is no reasonably foreseeable chance or possibility that the expansion would result in a long-term decrease to population size, reduction in the area of occupancy, fragmentation of an existing population or modification of habitat to the extent that the species are likely to decline.

Table E1.2 Potential impacts on terrestrial flora listed under the EPBC Act and occurring or likely to occur in the project area in South Australia

Species name	Common name	EPBC status ¹	SA status	Credible risk to species ²	Project hazard	Mitigation measures	Residual impact ³
<i>Austrostipa nullanulla</i>	Club Spear-grass	V		No	n.a. ⁴	n.a.	n.a.
<i>Brachyscome muelleri</i>	Corunna Daisy	E	E	No	n.a.	n.a.	n.a.
<i>Caladenia tensa</i>	Greencomb Spider-orchid	E		No	n.a.	n.a.	n.a.
<i>Eleocharis papillosa</i>	Dwarf Desert Spike-rush	V	R	Yes	Corridor clearance	Survey disturbance footprint, attempt to identify, mark and avoid plant(s)	Negligible
<i>Eriocaulon carsonii</i>	Salt Pipewort	E	E	No	n.a.	n.a.	n.a.
<i>Frankenia plicata</i>		E	V	Yes	Corridor clearance	Survey disturbance footprint, attempt to identify, mark and avoid plant(s)	Negligible
<i>Halosarcia flabelliformis</i>	Bead Glasswort	V		No	n.a.	n.a.	n.a.
<i>Maireana melanocarpa</i>	Black-fruit Bluebush	V		No	n.a.	n.a.	n.a.
<i>Prasophyllum pallidum</i>	Pale Leek-orchid	V	R	No	n.a.	n.a.	n.a.
<i>Pterostylis</i> sp. (Eyre Peninsula R. Bates 19474)		V	V	No	n.a.	n.a.	n.a.
<i>Pterostylis xerophila</i>	Desert Greenhood	V	V	No	n.a.	n.a.	n.a.
<i>Senecio megaglossus</i>	Superb or Large-flower Groundsel	V	E	No	n.a.	n.a.	n.a.
<i>Swainsona pyrophila</i>	Yellow Swainson-pea	V	R	No	n.a.	n.a.	n.a.

¹ Status: R = rare; V = vulnerable; E = endangered.

² See Appendix N6 for the description of the screening process to identify species at credible risk of being impacted by the project.

³ See Chapter 1, Table 1.3 of the Draft EIS for the description of residual impact criteria.

⁴ n.a. = not applicable.

Terrestrial fauna

Table E1.3 provides a list of fauna from the EPBC database that have been recorded or have the potential to occur in the EIS Study Area. The table also provides a summary of the assessment and potential impacts of the proposed expansion on threatened fauna.

As for flora, the assessment of potential impacts on threatened terrestrial fauna was undertaken in two stages. All EPBC Act-listed species known or predicted to occur in the EIS Study Area were subject to a screening process, based on their distribution and ecology/behaviour, to determine whether they are at credible risk of being affected by the expansion (see Appendix N6). Those species having a credible risk of being affected were then subject to an additional level of assessment (see Chapter 15, Terrestrial Ecology).

The screening process showed that 16 EPBC Act-listed fauna species would be at credible risk of being affected by the proposed expansion (see Table E1.3).

Of the four threatened bird species recorded in the EIS Study Area (Plains Wanderer, Thick-billed Grasswren Eastern subspecies and Thick-billed Grasswren Gawler Ranges subspecies and Slender-billed Thornbill Western subspecies), the Thick-billed Grasswren Eastern subspecies was considered to be at credible risk of being affected by the proposed expansion.

The residual impact on several small mammals and a lizard was assessed as low or moderate (see Chapter 1, Introduction, Table 1.3 of the Draft EIS). The impact on each of these species in relation to the EPBC Act guidelines is discussed below.

Ampurta *Dasyercus hillieri* and Dusky Hopping-mouse *Notomys fuscus*

The Ampurta is known to occur in Strzelecki Desert dunefields north of the gas pipeline corridor and may occur on the corridor. The Dusky Hopping-mouse is known to occur on the gas pipeline corridor option south of Moomba, in the dunes of the Strzelecki Desert, and may also occur on the gas pipeline option south-west of Moomba. Both of these species are generally distributed sparsely and widely across very extensive habitats.

Construction of the gas supply pipeline would have a localised and short-term impact on these species, if they were present. Individual animals may be affected by vegetation removal, earthworks or entrapment in the pipeline trench. In a regional context, the proposed expansion would affect a negligible percentage of available habitat, which is very extensive. It is unlikely that there would be any significant effects at a population level. Mitigation measures outlined in Section 15.5.10 would ensure that mortality from trench entrapment is very low.

In relation to the EPBC Act Guidelines, the proposed expansion is not predicted to have a significant impact on the Ampurta or Dusky Hopping-mouse. In particular, there is no reasonable or foreseeable chance or possibility that the expansion would result in a long-term decrease to population size, reduction in the area of occupancy, fragmentation of an existing population or modification of habitat to the extent that the species are likely to decline.

Table E1.3 Potential impacts on terrestrial fauna listed under the EPBC Act and occurring or likely to occur in the project area in (a) South Australia and (b) at the Port of Darwin

(a) South Australia

Species name	Common name	EPBC status ¹	SA status	Credible risk to species ²	Project hazard	Mitigation measures	Residual impact ³
Mammals							
<i>Bettongia lesueur lesueur</i>	Boodie, Burrowing Bettong	V	E	Yes	Noise, dust and other emissions from the mine	Recent extension to Arid Recovery SEB Offsets	Moderate
<i>Dasyercus hillieri</i>	Ampurta	E		Yes	Corridor clearance Open gas supply pipeline trench	SEB offsets Trench management plan	Low
<i>Dasyercus cristicauda</i>	Mulgara	V	E	No	n.a. ⁴	n.a.	n.a.
<i>Leporillus conditor</i>	Wopilkara, Greater Stick-nest Rat	V	V	Yes	Noise, dust and other emissions from the mine Open trench	Recent extension to Arid Recovery SEB Offsets Trench management plan	Moderate
<i>Macrotis lagotis</i>	Bilby	V	V	Yes	Noise, dust and other emissions from the mine Open trench	Recent extension to Arid Recovery SEB Offsets Trench management plan	Moderate
<i>Myrmecobius fasciatus</i>	Numbat	V	E	Yes	Noise, dust and other emissions from the mine	Recent extension to Arid Recovery SEB Offsets	Moderate
<i>Notomys fuscus</i>	Dusky Hopping-mouse, Wilkiniti	V	V	Yes	Corridor clearance	SEB offsets	Low
<i>Notoryctes typhlops</i>	Marsupial Mole, Itjari Itjari	E	V	No	n.a.	n.a.	n.a.
<i>Nyctophilus timoriensis</i>	Greater Long-eared Bat	V	V	No	n.a.	n.a.	n.a.
<i>Perameles bougainville</i>	Western Barred Bandicoot	E	E	Yes	Noise, dust and other emissions from the mine	Recent extension to Arid Recovery SEB Offsets	Moderate

Table E1.3 Potential impacts on terrestrial fauna listed under the EPBC Act and occurring or likely to occur in the project area in (a) South Australia (cont'd)

Species name	Common name	EPBC status ¹	SA status	Credible risk to species ²	Project hazard	Mitigation measures	Residual impact ³
<i>Pseudomys australis</i>	Plains Rat	V	V	Yes	Clearance for open pit, RSF, TSF, Hiltaba Village, airport and other infrastructure Open trench Noise, dust and other emissions from the mine Open trench	Recent extension to Arid Recovery SEB Offsets Trench management plan	Moderate
Reptiles							
<i>Nephrurus deleani</i>	Pernatty Knob-tail Gecko	V	R	Yes	Open trench Corridor clearance	Trench management plan SEB Offsets	Low
Terrestrial birds							
<i>Acanthiza iredalei iredalei</i>	Slender-billed Thornbill (Western subspecies)	V	R	No	n.a.	n.a.	n.a.
<i>Amytornis textilis modestus</i>	Thick-billed Grasswren (Eastern subspecies)	V		Yes	Corridor clearance Noise, dust and other emissions from the mine	SEB Offsets	Negligible
<i>Amytornis textilis myall</i>	Thick-billed Grasswren (Gawler Ranges subspecies)	V		No	n.a.	n.a.	n.a.
<i>Leipoa ocellata</i>	Malleefowl	V, Mi	V	No	n.a.	n.a.	n.a.
<i>Pachycephala rufogularis</i>	Red-lored Whistler	V	R	No	n.a.	n.a.	n.a.
<i>Pedionomus torquatus</i>	Plains-wanderer	V	E	No	n.a.	n.a.	n.a.
Migratory / water / marine birds							
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi, Ma	R	Yes	TSF	Cover open water with netting or similar (see Section 15.5.7)	High
<i>Apus pacificus</i>	Fork-tailed Swift	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Ardea alba</i>	Great Egret	Mi, Ma		Yes	TSF	Cover open water with netting or similar (see Section 15.5.7)	Moderate
<i>Ardea ibis</i>	Cattle Egret	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Arenaria interpres</i>	Ruddy Turnstone	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi, Ma		Yes	TSF	Cover open water with netting or similar (see Section 15.5.7)	Moderate

Table E1.3 Potential impacts on terrestrial fauna listed under the EPBC Act and occurring or likely to occur in the project area in (a) South Australia (cont'd)

Species name	Common name	EPBC status ¹	SA status	Credible risk to species ²	Project hazard	Mitigation measures	Residual impact ³
<i>Calidris alba</i>	Sanderling	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Calidris canutus</i>	Red Knot	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Calidris ferruginea</i>	Curlew Sandpiper	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Calidris ruficollis</i>	Red-necked Stint	Mi, Ma		Yes	TSF	Cover open water with netting or similar (see Section 15.5.7)	Moderate
<i>Calidris tenuirostris</i>	Great Knot	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Charadrius leschenaultii</i>	Greater Sand-plover	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Charadrius veredus</i>	Oriental Plover	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Cuculus saturatus</i>	Oriental Cuckoo	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Diomedea exulans gibsoni</i>	Gibson's Albatross	V, Mi, Ma	V	No	n.a.	n.a.	n.a.
<i>Gallinago hardwickii</i>	Latham's Snipe	Mi	V	No	n.a.	n.a.	n.a.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Mi, Ma	E	No	n.a.	n.a.	n.a.
<i>Hirundapus caudacutus</i>	White-throated Needletail	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Hirundo rustica</i>	Barn Swallow	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Limosa lapponica</i>	Bar-tailed Godwit	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Limosa limosa</i>	Black-tailed Godwit	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Macronectes giganteus</i>	Southern Giant-petrel	E, Mi, Ma	V	No	n.a.	n.a.	n.a.
<i>Macronectes halli</i>	Northern Giant-petrel	V, Mi, Ma		No	n.a.	n.a.	n.a.
<i>Merops ornatus</i>	Rainbow Bee-eater	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Numenius madagascariensis</i>	Eastern Curlew	Mi, Ma	V	No	n.a.	n.a.	n.a.
<i>Pandion haliaetus</i>	Osprey	Mi, Ma	E	No	n.a.	n.a.	n.a.
<i>Philomachus pugnax</i>	Ruff	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Plegadis falcinellus</i>	Glossy Ibis	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Pluvialis squatarola</i>	Grey Plover	Mi, Ma		Yes	TSF	Cover open water with netting or similar (see Section 15.5.7)	Moderate
<i>Puffinus carneipes</i>	Flesh-footed Shearwater	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Rostratula benghalensis</i>	Painted Snipe	V, Mi, Ma	V	No	n.a.	n.a.	n.a.

Table E1.3 Potential impacts on terrestrial fauna listed under the EPBC Act and occurring or likely to occur in the project area in (a) South Australia (cont'd)

Species name	Common name	EPBC status ¹	SA status	Credible risk to species ²	Project hazard	Mitigation measures	Residual impact ³
<i>Sterna albifrons</i>	Little Tern	Mi, Ma	E	No	n.a.	n.a.	n.a.
<i>Sterna caspia</i>	Caspian Tern	Mi, Ma		Yes	TSF	Cover open water with netting or similar (see Section 15.5.7)	Moderate
<i>Thalassarche bulleri</i>	Buller's Albatross	V, Mi, Ma	V	No	n.a.	n.a.	n.a.
<i>Thalassarche cauta</i>	Shy Albatross	V, Mi, Ma		No	n.a.	n.a.	n.a.
<i>Thalassarche impavida</i>	Campbell Albatross	V, Mi, Ma		No	n.a.	n.a.	n.a.
<i>Tringa glareola</i>	Wood Sandpiper	Mi, Ma	R	No	n.a.	n.a.	n.a.
<i>Tringa nebularia</i>	Common Greenshank	Mi, Ma		No	n.a.	n.a.	n.a.
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Mi, Ma		No	n.a.	n.a.	n.a.

¹Status: R = rare; V = vulnerable; E = endangered; Mi = migratory; Ma = marine

²See Appendix N6 for the description of the screening process to identify species at credible risk of being impacted by the project

³See Chapter 1, Table 1.3 of the Draft EIS for the description of residual impact criteria

⁴n.a. = not applicable

Table E1.3 Potential impacts on terrestrial fauna listed under the EPBC Act and occurring or likely to occur in the project area in

(b) Port of Darwin

Species name	Common name	EPBC status ¹	NT status	Credible risk to species ²
Mammals				
<i>Dasyurus hallucatus</i>	Northern Quoll	E	CE	No
<i>Megaptera novaeangliae</i>	Humpback Whale	V, Mi, Ma		No
<i>Xeromys myoides</i>	False Water Rat	V		No
Terrestrial Birds				
<i>Erythrotriorchis radiatus</i>	Red Goshawk	V	V	No
<i>Erythrura gouldiae</i>	Gouldian Finch	E, Mi		No
<i>Geophaps smithii smithii</i>	Partridge Pigeon	V	V	No
Migratory species				
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi		No
<i>Anseranas semipalmata</i>	Magpie Goose	Mi, Ma		No
<i>Apus pacificus</i>	Fork-tailed Swift	Mi, Ma		No
<i>Ardea alba</i>	Great Egret	Mi, Ma		No
<i>Ardea ibis</i>	Cattle Egret	Mi, Ma		No
<i>Arenaria interpres</i>	Ruddy Turnstone	Mi		No
<i>Calidris alba</i>	Sanderling	Mi		No
<i>Calidris tenuirostris</i>	Great Knot	Mi		No
<i>Charadrius leschenaultii</i>	Large Sand Plover	Mi		No
<i>Charadrius mongolus</i>	Mongolian Plover	Mi, Ma		No
<i>Charadrius veredus</i>	Oriental Plover	Mi, Ma		No
<i>Coracina tenuirostris melvillensis</i>	Melville Cicadabird	Mi		No
<i>Glareola maldivarum</i>	Oriental Pratincole	Mi		No
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Mi	V	No
<i>Hirundo rustica</i>	Barn Swallow	Mi, Ma		No
<i>Limosa lapponica</i>	Bar-tailed Godwit	Mi		No
<i>Limosa limosa</i>	Black-tailed Godwit	Mi		No
<i>Merops ornatus</i>	Rainbow Bee-eater	Mi, Ma		No
<i>Numenius minutus</i>	Little Whimbrel	Mi		No
<i>Numenius phaeopus</i>	Whimbrel	Mi		No
<i>Pluvialis squatarola</i>	Grey Plover	Mi		No
<i>Poecilodyras superciliosa cerviniventris</i>	Derby White-browed Robin	Mi		No
<i>Rhipidura rufifrons</i>	Rufous Fantail	Mi		No
<i>Sterna albifrons</i>	Little Tern	Mi, Ma	V	No

¹ Status: R = rare; V = vulnerable; E = endangered; CE = critically endangered; Mi = migratory; Ma = marine.

² See Attachment A for the description of species and the assessment of whether the species is at credible risk of being impacted by the project.

Plains Rat *Pseudomys australis*

The Plains Rat occurs in environments with cracking clay soils over a wide area of the arid zone of South Australia, from north-west of Lake Eyre to west of Lake Torrens. It is known to occur on the gibber plains and gibber covered swales of the Special Mining Lease (SML), the Arcoona Plains to the south of Olympic Dam and on the gas pipeline corridors near Screech Owl Creek (south of Lake Eyre South). They form complex systems of burrows, often associated with drainage depressions (gilgais) on gibber plains (Brandle et al. 1999). Populations of the Plains Rat fluctuate dramatically in response to environmental conditions (Brandle and Moseby 1999). No populations of the Plains Rat are permanently associated with particular 'refugia'. Rather, Plains Rat populations consist of a number of dynamic regional populations utilising a network of primary core areas, with rare widespread dispersal occurring between regions (Moseby et al. 1999). The Plains Rat is generally sparsely and widely distributed across very extensive habitats.

The loss of Plains Rat habitat (chenopod shrubland) within the SML would comprise only about 2% of the chenopod shrubland in the EIS Study Area. Some populations of the Plains Rat in the vicinity of the expanded mine would be displaced by construction activities. Some emigration of Plains Rats from areas of intensive construction activities to adjacent suitable habitat would probably occur. The construction of the gas and water supply pipelines would result in localised, short-term disturbance that would affect a small percentage of Plains Rat habitats. Although some communities may be affected, it is unlikely to have significant effect on Plains Rat populations. Mitigation measures outlined in Chapter 15, Terrestrial Ecology, Section 15.5.11 would ensure that mortality from open trench entrapment was very low.

In relation to the EPBC Act Guidelines, the proposed expansion is not likely to result in significant impacts on this species. In particular, there is no reasonable or foreseeable chance or possibility that the expansion would result in a long-term decrease to population size, reduction in the area of occupancy, fragmentation of an existing population or modification of habitat to the extent that the species is likely to decline.

Small mammals introduced to Arid Recovery

Established in 1997, Arid Recovery is an ecosystem restoration initiative within, and immediately north of, the Olympic Dam SML. It is a partnership between BHP Billiton, the community group Friends of Arid Recovery, the South Australian DEH and the University of Adelaide. The program is based around an 86 km² (8,600 ha) fenced reserve from which all foxes, rabbits and cats have been eradicated.

The program has reintroduced locally extinct native fauna within the fenced area, including the threatened Greater Stick-nest Rat *Leporillus conditor*, Burrowing Bettong *Bettongia lesueur*, Greater Bilby *Macrotis lagotis*, Western Barred Bandicoot *Perameles bougainville* and the Numbat *Myrmecobius fasciatus*. The first four species are breeding and have been successfully established in Arid Recovery.

Dust, noise, light and gaseous emissions from the expanded operation may reduce the quality of habitat in the southern part of Arid Recovery. This may result in a long-term decrease in the abundance of fauna in the southern part of Arid Recovery, but their viability in the northern part of the area is unlikely to be affected. Fauna may move into the northern section of Arid Recovery, where the effects of emissions are predicted to be negligible. Arid Recovery was significantly expanded to the north in 2006.

In relation to the EPBC Act Guidelines, the threatened species within Arid Recovery are unusual in that they are not naturally occurring populations. Nevertheless, air and noise emissions may reduce the value of some habitat in the southern sections of Arid Recovery, but these impacts are not predicted to substantially affect the recovery of the species.

Thick-billed Grasswren (eastern subspecies) – *Amytornis textilis modestus*

Thick-billed Grasswrens are sedentary birds that typically occupy territories of approximately four to five hectares. In the Roxby Downs–Andamooka region they usually occupy gibber plains vegetated with emergent chenopod shrubs including Old-man Saltbush *Atriplex nummularia omissa*, Cottonbush *Maireana aphylla*, Black Bluebush *M. pyramidata* and Swamp Canegrass *Eragrostis australasica*, particularly the dense vegetation where run-off collects or along watercourses (NPWS 2002). They shelter at the base of shrubs, in animal burrows or in ground crevices, and nest at the base of chenopod shrubs (Rowley and Russell 1997). A recovery plan for the Thick-billed Grasswren (eastern subspecies) has been prepared (NSW National Parks and Wildlife Service 2002).

Although the species is reasonably common further north in the Lake Eyre catchment, there have been few Thick-billed Grasswren records south of the Dog Fence or the Roxby Downs–Andamooka region (John Read unpublished data, Read et al. 2000). There have been several confirmed records of the Thick-billed Grasswren about 50 km east of Olympic Dam, near Andamooka, and two records about 20 km to the north near Arid Recovery (A Black, Honorary Associate South Australian Museum, pers. comm., 12 December 2007).

Although suitable habitat for the Thick-billed Grasswren occurs in Cottonbush low shrubland on the gibber plain about 2.5 km south-west of the proposed Hiltaba Village and near the proposed airport, surveys of the area could not confirm the presence of Grasswrens in the area (see Appendix N7). Suitable habitat also exists within the pipeline supply corridors, although the species was not recorded in the field assessment of these areas. The loss of about 8 ha of Cottonbush low shrubland at the airport site would represent about 5% of Cottonbush low shrubland, and about 0.002% of chenopod shrubland in the EIS Study Area. An additional 10 ha would fall within the airport perimeter fence and therefore be exposed to noise impacts. Only a small proportion of available habitat would be affected, however, and birds would be likely to move from the affected areas to adjacent areas of suitable habitat.

Suitable habitat would be identified and set aside to offset the loss of Thick-billed Grasswren habitat near the proposed airport. For example, setting aside more of the Red Lake paddock (north of Arid Recovery), where a population of Thick-billed Grasswrens has recently been observed (J Read, pers. comm., 12 February 2008), may be a suitable offset. A significant proportion of the pastoral land included in the package of offsets would contain dense chenopod shrubland along watercourses or drainage depressions that would potentially provide suitable habitat for the Thick-billed Grasswren.

The residual impact of the proposed expansion on the Thick-billed Grasswren (eastern subspecies) would be negligible.

Pernatty Knob-tailed Gecko *Nephurus deleani*

The Pernatty Knob-tailed Gecko occurs in the dunefield and sandplain land system where it builds burrows at the base of low vegetation. Within its known range, important habitat occurs in the dunes along a 50 km section of the infrastructure corridor between Island Lagoon and Dutton Lake (Ehmann 2005).

The Pernatty Knob-tailed Gecko is vulnerable to impact as it is territorial, not highly mobile, difficult to detect during the day and susceptible to heat stress should it become trapped in the open trench during construction of the water supply pipeline. Nevertheless, construction of the water supply pipeline and transmission line would result in only short-term impacts to the gecko. Measures to mitigate potential impacts of the open trench on the gecko are presented in Chapter 15, Terrestrial Ecology, Section 15.5.10. In addition, pre-construction surveys would be undertaken to determine whether final positions or alignments of infrastructure should be moved to minimise potential impacts on habitat. A management plan would be developed prior to construction to ensure that appropriate management and mitigation measures were implemented.

In relation to the EPBC Act Guidelines, the proposed expansion is not predicted to have significant impacts on this species. In particular, there is no reasonable or foreseeable chance or possibility that the expansion would result in a long-term decrease to population size, reduction in the area of occupancy, fragmentation of an existing population or modification of habitat to the extent that the species is likely to decline.

Marine fauna

Eight species of marine fauna listed as threatened under the EPBC Act were identified from relevant databases as potentially occurring in Upper Spencer Gulf and eight at the Port of Darwin (Table E1.4).

The potential impact to each species in Upper Spencer Gulf was considered in terms of the following criteria:

- their occurrence in Upper Spencer Gulf
- their mobility
- the availability of suitable habitat in Upper Spencer Gulf
- the potential for return water from the desalination plant and construction activities to affect the habitat of these species
- the likely sensitivity of these species and their food resources to return water and construction impacts.

Two of the threatened species have never been recorded in or near Point Lowly. These are the Loggerhead Turtle and Leatherback Turtle (see Appendix O3). The risk to these species was therefore considered to be very low.

Six of the threatened species have been recorded in or near the study area but are highly mobile (see Appendix O3). These include the threatened Humpback Whale, Southern Right Whale, Australian Sea-lion, Great White Shark, Green Turtle and Hawksbill Turtle. These species have extensive suitable habitat in areas of Upper Spencer Gulf outside the area potentially affected by return water. Although increased shipping movements in Spencer Gulf increase the risk of whales being hit by ships, the risk is considered negligible (i.e. not a credible risk as per the Draft EIS risk assessment; see Appendix C).

The potential impact to each species in Darwin Harbour was considered in terms of the development activities proposed at the Port of Darwin. These activities would occur on cleared or reclaimed land where industrial development is already occurring.

No disturbance of natural vegetation or habitat would occur. Emissions or discharges to sea from any plant or equipment that is in contact with concentrate would not occur. Concentrate storage, handling and conveying facilities would be enclosed, resulting in no planned escape of fugitive dust to the environment. Stormwater run-off from areas that contact concentrate would be controlled and treated on-site and ultimately returned to Olympic Dam rather than being discharged into the harbour. As in Upper Spencer Gulf, shipping movements would increase in Darwin Harbour, but there would be negligible risk of collision with fauna.

It is concluded therefore that threatened marine species would be at no credible risk from the construction or operation of the desalination plant, landing facility and port facilities.

In relation to the EPBC Act Guidelines, the proposed expansion is not predicted to have significant impacts on these species. In particular, there is no reasonable or foreseeable chance or possibility that construction or operation of the proposed desalination plant, landing facility or port facilities would fragment or decrease the size of populations, affect critical habitat, disrupt breeding cycles or introduce disease or pests that may adversely affect these species.

Table E1.4 Potential impacts on marine fauna listed under the EPBC Act and occurring or likely to occur in the project area in (a) Upper Spencer Gulf and (b) at the Port of Darwin

(a) Upper Spencer Gulf

Scientific name	Common name	AUS status ¹	SA status	Credible risk
Sharks				
<i>Carcharodon carcharias</i>	Great White Shark	V, Mi	P	No
Mammals				
<i>Balaenoptera edeni</i>	Bryde's Whale	Mi, W	P	No
<i>Caperea marginata</i>	Pygmy Right Whale	Mi, W	R, P	No
<i>Eubalaena australis</i>	Southern Right Whale	E, W, Mi	V, P	No
<i>Megaptera novaeangliae</i>	Humpback Whale	V, W, Mi	V, P	No
<i>Neophoca cinerea</i>	Australian Sea-lion	V	V, P	No
<i>Lagenorhynchus obscurus</i>	Dusky Dolphin	Mi, W	R, P	No
Reptiles				
<i>Caretta caretta</i>	Loggerhead Turtle	E, Mi, Ma	E	No
<i>Chelonia mydas</i>	Green Turtle	V, Mi, Ma	V	No
<i>Dermochelys coriacea</i>	Leatherback Turtle	V, Mi, Ma	V	No
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	V, Mi, Ma		No

¹ Status: R = rare; V = vulnerable; E = endangered; Mi = migratory; Ma = marine; W = whale; P = protected.

(b) Port of Darwin

Scientific name	Common name	AUS status ¹	NT status	Credible risk
Mammals				
<i>Balaenoptera edeni</i>	Brydes's Whale	Mi, Ma		No
<i>Dugong dugong</i>	Dugong	Mi, Ma		No
<i>Oracaella brevirostris</i>	Irrawaddy Dolphin	Mi, Ma		No
<i>Orcinus orca</i>	Killer Whale	Mi, Ma		No
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin	Mi, Ma		No
<i>Tursiops aduncus</i> (Arafura Sea/Timor Sea population)	Spotted Bottlenose Dolphin	Mi, Ma		No
Sharks				
<i>Pristis microdon</i>	Freshwater Sawfish	V	V	No
<i>Pristis zijsron</i>	Green Sawfish	V	V	No
<i>Rhincodon typus</i>	Whale Shark	V, Mi		No
Reptiles				
<i>Caretta caretta</i>	Loggerhead Turtle	E, Mi, Ma	E	No
<i>Chelonia mydas</i>	Green Turtle	V, Mi, Ma		No
<i>Crocodylus porosus</i>	Saltwater Crocodile	Mi, Ma		No
<i>Dermochelys coriacea</i>	Leatherback Turtle	V, Mi, Ma	V	No
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	V, Mi, Ma		No
<i>Lepidochelys olivacea</i>	Olive Ridley Turtle	E, Mi, Ma		No
<i>Natator depressus</i>	Flatback Turtle	V, Mi, Ma		No

¹ Status: R = rare; V = vulnerable; E = endangered; Mi = migratory; Ma = marine; W = whale; P = protected.

Further to the assessment against the EPBC Act administrative guidelines, and as per Section 139 of the Act, the proposed expansion would not be inconsistent with Australia's obligations under the Biodiversity Convention, Apai Convention, CITES, a listed species recovery plan or threat abatement plan.

E1.3.5 Listed migratory species

In determining the potential impact of the proposed expansion on listed migratory species the guidelines note that an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles)
- destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species
- seriously disrupt the life cycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

In South Australia, 39 species of listed migratory birds and seven species of marine fauna were identified from database and literature searches as having geographic ranges that overlap the EIS Study Area (see Tables E1.3 and E1.4). Of these, six bird species were considered to be at credible risk of being affected by the expansion of the TSF at Olympic Dam. Of the marine fauna, none were considered to be at credible risk of being affected by the proposed expansion.

In the Northern Territory, 22 species of listed migratory birds and 14 species of marine fauna were identified from database and literature searches as having geographic ranges that overlap the EIS Study Area (see Tables E1.3 and E1.4). None were considered to be at credible risk of being affected by the development of facilities at the Port of Darwin.

BHP Billiton bird monitoring at the existing tailings retention system (TRS) has recorded visits by eight listed migratory species. Of these, occasional mortalities associated with interactions with the TRS acid liquor have been recorded for six species: the Great Egret *Ardea alba*, the Sharp-tailed Sandpiper *Calidris acuminata*, the Red-necked Stint *Calidris ruficollis*, the Caspian Tern *Sterna caspia*, the Common Sandpiper *Actitis hypoleucos* and the Grey Plover *Pluvialis squatarola*.

Impacts on migratory birds that are attracted to the TRS would be affected by two significant changes as a result of the expansion project. The area of wet tailings beaches would increase by about 3,300 ha, and this may attract and result in mortality of those migratory species attracted to beach habitats (e.g. Common Sandpiper *Actitis hypoleucos* and Grey Plover *Pluvialis squatarola*). The second change is that the new tailings storage design avoids areas of free or exposed acidic liquor (i.e. no new evaporation ponds and covered or netted central decant ponds and balance ponds). This reduces the attractiveness of the TRS to those migratory (and other threatened) birds that prefer open water.

The residual impact of the expanded TSF facilities on migratory birds has been categorised as moderate to high for migratory species. This reflects the potential for long-term impacts to these species, and therefore the need for greater management attention to minimise potential impacts and risk. Mortalities of individuals of these species are expected to comprise a relatively small percentage of the populations and would not adversely affect a species viability (see Appendix N11 for details).

In relation to the EPBC Act Guidelines, the proposed expansion is unlikely to result in any of the outcomes being deemed significant. In particular, there is no reasonable or foreseeable chance or possibility that the proposed expansion would seriously disrupt the life cycle for an ecologically significant proportion of the population of any of the listed migratory species.

E1.3.6 Protection of the environment from actions involving Commonwealth land

Lands that fall under the ownership of the Australian Government and within the EIS Study Area are the Department of Defence establishments of the Woomera Prohibited Area (WPA), and the Cultana Training Area (CTA) and also land owned by the Australian Rail Track Corporation (ARTC). In total, Commonwealth land accounts for 2.2% of the land tenure of the EIS Study Area. Approximately 50 ha of the Commonwealth land would be disturbed by the various project components.

Woomera Prohibited Area (WPA)

The WPA is declared under Regulation 35 of the *Defence Force Regulations 1952 (Commonwealth)* as an area for 'the testing of war material'. It is an instrumented air weapons test and evaluation range and is used for a variety of purposes including rocket testing. The area extends from north of the Woomera township to just south of Coober Pedy, with the south-eastern corner approximately 450 km north-north-west of Adelaide (see Figure E1.3). Roxby Downs Municipality borders the eastern sections of the WPA. The existing Olympic Dam Special Mining Lease (SML) is about 6 km from the eastern boundary but the proposed extension to the SML will be directly adjacent to the WPA boundary.

The eastern two-thirds of the WPA is primarily owned by the South Australian Government, except for small Commonwealth-owned areas. The South Australian Government leases most of these areas as pastoral stations.

About 2 ha of the WPA would be directly impacted by the proposed expansion. This would occur about 4 km to the north-east of the Woomera township where the proposed rail would be within Commonwealth land for about 700 m.

Cultana Training Area (CTA)

The CTA extends from Point Lowly, north-east of Whyalla, to approximately 10 km west of Port Augusta (see Figure E1.3). It occupies about 48,000 ha, although the Department of Defence plans to at least double its size by acquiring adjoining pastoral properties to the west. The CTA is used by the Australian Army for training, and wheeled and tracked vehicle manoeuvres. With the additional land, it could also be used for major armoured and mechanised exercises previously undertaken only in the north of Australia.

In the area between Port Augusta and Point Lowly, the water supply pipeline would run along an easement that borders the CTA from kilometre point (kp) 6 to kp 15, then along the western boundary of the CTA through land owned by the Department of Lands (Crown Leasehold) (from kp 19 to 26). Furthermore, the alignment of the proposed pipeline would run through the proposed expansion area of the CTA between kp 15 and 48. As the pipeline would be buried and appropriate rehabilitation measures utilised, the long-term change in land use would be minimal. The access corridor from the proposed landing facility to the pre-assembly yard on the western outskirts of Port Augusta would require the disturbance of an 18 ha strip of land on the boundary of the CTA. This would be a long-term change to land use.

The impacts on the CTA operations as a result of the project are considered negligible.

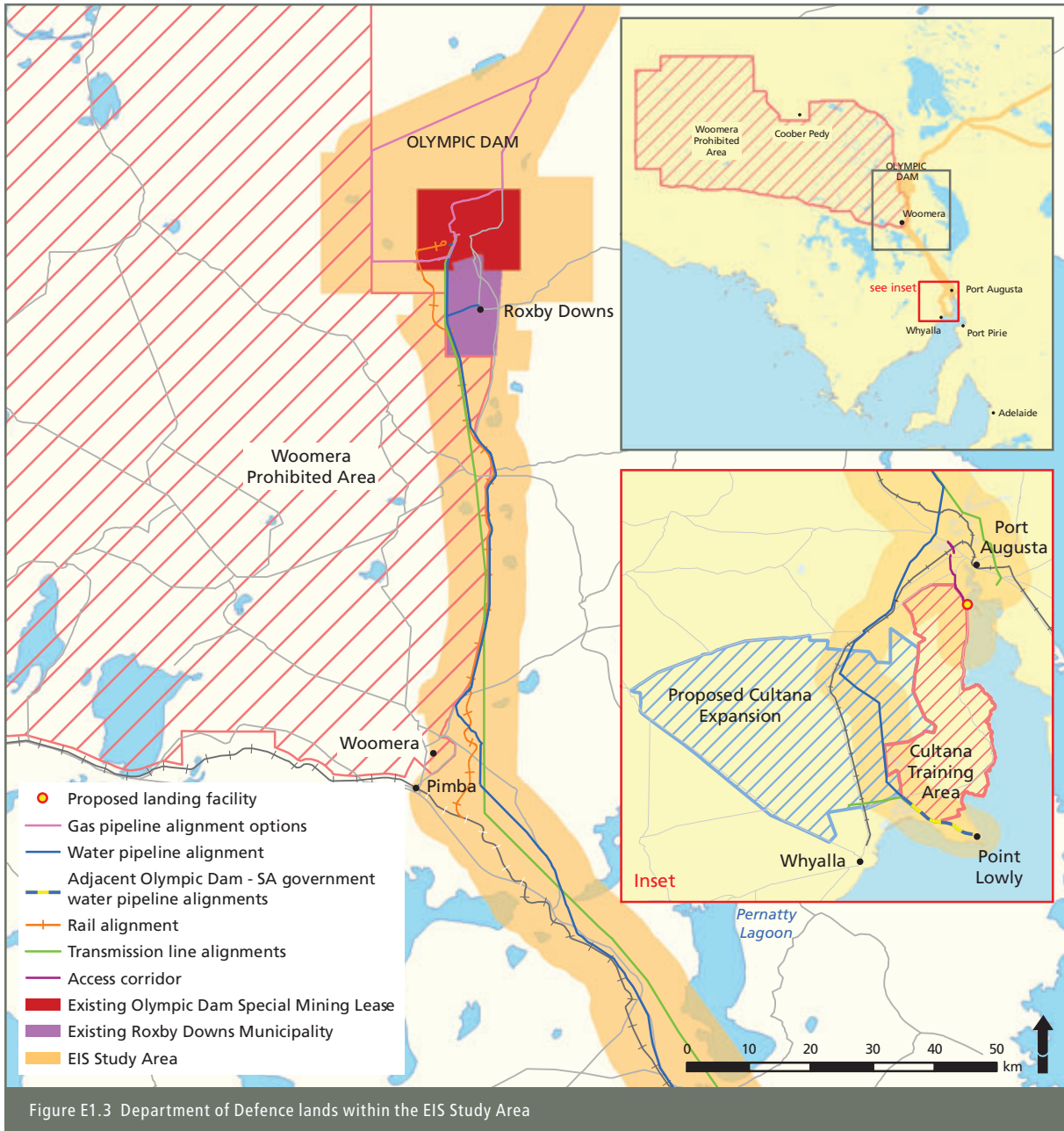


Figure E1.3 Department of Defence lands within the EIS Study Area

National Rail

The land owned by Australian Rail Track Corporation Pty Ltd (National Rail) is a corridor surrounding the existing rail network (see Figure E1.4). This corridor varies in width over different sections (from 50 to 80 m from Whyalla to Port Augusta and approximately 400 m from Port Augusta to Pimba).

For the majority of National Rail property within the EIS Study Area, the land is not impacted by the proposed expansion infrastructure. However, 30 ha of the proposed Pimba intermodal facility would be located on an area of Commonwealth land (National Rail). Although the land use change would be long-term, in the context of the vast areas of like habitat in the local environs, the impact to the environment would be insignificant.

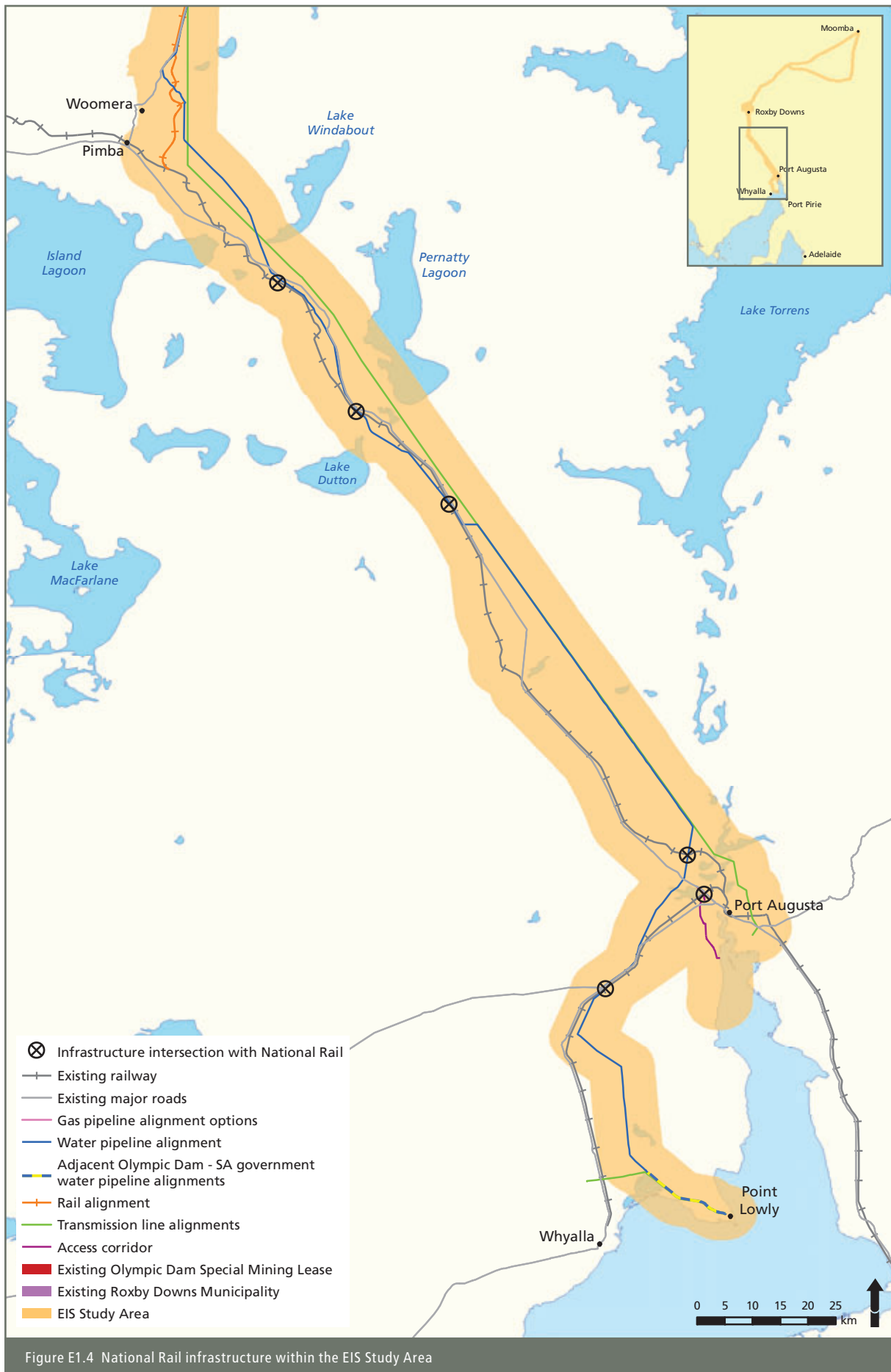


Figure E1.4 National Rail infrastructure within the EIS Study Area

E1.4 SUMMARY AND CONCLUSIONS

Nationally threatened species potentially occurring within the EIS Study Area included 13 plant species and 25 animal species in South Australia, and 15 animal species in the Northern Territory. Nationally listed migratory species included 39 bird species and seven marine species in South Australia, and 24 bird species and 14 marine species in the Northern Territory.

These species were initially screened to derive a list of species at credible risk from the proposed expansion project (see Tables E1.2, E1.3 and E1.4), and then assessed against the DEWHA guidelines. It is concluded that the residual impact on each species would not be significant as per the criteria defined in the DEWHA guidelines (see Table E1.5).

The assessment findings that relate to controlling provisions for the proposed Olympic Dam expansion under the EPBC Act are summarised in Table E1.6.

Table E1.5 Assessment of nationally listed species at credible risk of being affected by the expansion project

Species name	Common name	Status (Aus)	Significant impact ¹	Comment
Plants				
<i>Eleocharis papillosa</i>	Dwarf Desert Spike-rush	V	No	Negligible impact on species resulting from corridor clearance
<i>Frankenia plicata</i>		E	No	As above
Mammals				
<i>Dasyercus hillieri</i>	Ampurta	E	No	Some mortalities may occur associated with the open trench, but effects on the population size would be insignificant
<i>Notomys fuscus</i>	Dusky Hopping-mouse, Wilkiniti	V	No	As above
<i>Pseudomys australis</i>	Plains Rat	V	No	As above
Arid Recovery spp.				
<i>Bettongia lesueur lesueur</i>	Boodie Burrowing Bettong	V	No	Species introduced to Arid Recovery. Air emissions and noise may reduce the value of some habitat, but the impact would not interfere substantially with the recovery of the species
<i>Leporillus conditor</i>	Wopilkara, Greater Stick-nest Rat	V	No	As above
<i>Macrotis lagotis</i>	Bilby	V	No	As above
<i>Myrmecobius fasciatus</i>	Numbat	V	No	As above
<i>Perameles bougainville</i>	Western Barred Bandicoot	E	No	As above
Reptiles				
<i>Nephurus deleani</i>	Pernatty Knob-tailed Gecko	V	No	Some mortalities may occur associated with the open trench, but effects on the population size would be insignificant
Bush birds				
<i>Amytornis textilis modestus</i>	Thick-billed Grasswren (Eastern sub-species)	V	No	Some preferred habitat would be cleared (Cottonbush <i>Maireana aphylla</i>), but there is abundant similar habitat in the region
Migratory birds				
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi	No	Ongoing mortalities would occur on the TRS, but effects on population sizes would be insignificant
<i>Ardea alba</i>	Great Egret	Mi, Ma	No	As above
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Mi, Ma	No	As above
<i>Calidris ruficollis</i>	Red-necked Stint	Mi	No	As above
<i>Pluvialis squatarola</i>	Grey Plover	Mi	No	As above
<i>Sterna caspia</i>	Caspian Tern	Mi	No	As above

¹ Assessment based on DEH (2006) guidelines.

Table E1.6 Summary of assessment findings

Matters of NES	Number of species or features			Total records to consider	No. species or features risk of significant impact
	Spencer Gulf	OD and corridors	Darwin		
Wetlands of international significance (RAMSAR)		2		2	0
Threatened ecol. communities		2		2	0
Threatened terrestrial species					
Plants		13		13	0
Mammals		11	3	14	0
Birds		6	3	9	0
Reptiles		1		1	0
Threatened marine species					
Marine Mammals	3			3	0
Fish/Sharks	1		3	4	0
Reptiles	4		6	10	0
Listed migratory species					0
Birds		39	24	61	0
Marine species (whales, turtles etc.)	7		14	21	0

E1.5 REFERENCES

DEH (2006) EPBC Act Policy Statement 1.1 Significant Impact Guidelines. Australian Government Department of Environment and Heritage. <<http://www.environment.gov.au/epbc/publications/pubs/nes-guidelines.pdf>>.

DEWR (2007) EPBC Act Policy Statement 3.7 Nationally Threatened Species and Ecological Communities Peppermint Box (*Eucalyptus odorata*) Grassy Woodland of South Australia and Iron-grass Natural Temperate Grassland of South Australia, June 2007. Department of the Environment and Water Resources.

Brandle R, Adams M, Moseby KE (1999) The distribution, habitat requirements and conservation status of the Plains Rat, *Pseudomys australis* (Rodentia: Muridae). *Wildlife Research* 26, 463-477.

Brandle, R and Moseby, KE (1999) Comparative ecology of two populations of *Pseudomys australis* in northern South Australia. *Wildlife Research* 26: 541-564.

Ehmann, H (2005) *South Australian Rangelands and Aboriginal Lands Wildlife Management Manual*. Department of Water, Land and Biodiversity Conservation, Adelaide.

Moseby KE, Owens H, Brandle R, Bice JK and Gates J (1999) Variation in population dynamics and movement patterns between two geographically isolated populations of the Dusky Hopping-mouse (*Notomys fuscus*). *Wildlife Research* 33: 223-232.

Kinhill (1998) 'Olympic Dam Expansion Project 275 kV Transmission Line Construction Environmental Review.' Prepared for WMC (Olympic Dam Corporation) Pty Ltd, Parkside, South Australia.

ATTACHMENT A

POTENTIAL IMPACTS ON NATIONALLY LISTED FAUNA AT THE PORT OF DARWIN IN A 50 SQUARE KILOMETRE AREA CENTRED ON EAST ARM

Status

Letters under columns AUS and NT represent the category listed in the *Environment Protection and Biodiversity Conservation Act 1999* and the *Territory Parks and Wildlife Conservation Act* (CE = critically endangered, E = endangered, V = vulnerable, Mi = migratory, Ma = marine, W = whales and other cetaceans).

Letters under column CAMBA/JAMBA/CMS represent allocation of species to international migratory bird agreements (C = China – Australia Migratory Birds Agreement, J = Japan – Australia Migratory Birds Agreement, B = Bonn Convention).

Attachment A

Species name	Common name	Status			Distribution, ecology and behaviour	Potential impact	Credible risk to species
		AUS	NT				
Threatened species							
Mammals							
<i>Dasyurus hallucatus</i>	Northern Quoll	E	CE		It occurs in a wide range of habitats, but the most suitable habitats appear to be rocky areas. It is also common in many eucalypt open forests. It has been recorded from the Charles Darwin National Park. Cane toads represent the primary threat to the Northern Quoll	No preferred habitat for this species would be impacted	No
<i>Megaptera novaeangliae</i>	Humpback Whale	V, Mi, W, Ma			The Humpback Whale occurs in all major oceans, mostly in coastal and continental shelf waters. There are two main populations in Australian waters that migrate along the east coast and west coast. The Humpback Whale breeds in warm waters at low latitudes, and migrates to summer in higher latitudes	No oceanic habitat would be impacted	No
<i>Xeromys myoides</i>	False Water Rat	V			In the Northern Territory, it is known from only 10 records at 6 sites (South Alligator River in 1903, Daly River floodplain in 1972, two sites on the Tomkinson River in 1975, Melville Island in 1975 and Glyde River floodplain in 1998 and 1999) (Threatened Species of Northern Territory Fact Sheet). Its habitats comprise mangrove forests, freshwater swamps and floodplain saline grasslands	No mangroves, freshwater swamps or saline grasslands would be removed	No
Terrestrial Birds							
<i>Erythrotriorchis radiatus</i>	Red Goshawk	V	V		Tropical open woodland, edges of rainforest and dense riverine vegetation. Nests in trees that are taller than 20 m and within 1 km of a permanent watercourse or wetland. Foraging usually occurs in open forests and gallery forests, taking mostly medium to large birds	No preferred habitat for this species would be impacted	No
<i>Erythrura gouldiae</i>	Gouldian Finch	E, Mi			Dry environments such as open woodland and grassy areas	No preferred habitat for this species would be impacted	No
<i>Geophaps smithii smithii</i>	Partridge Pigeon	V	V		The diet of the Partridge Pigeon comprises seeds, mostly of grasses but also from <i>Acacia</i> and other woody plants. It is largely sedentary, although may make local-scale movements (up to 5-10 km) in response to seasonal variations in water and food availability	No preferred habitat for this species would be impacted	No

Attachment A (cont'd)

Species name	Common name	Status			Distribution, ecology and behaviour	Potential impact	Credible risk to species
		AUS	NT				
Reptiles							
	Loggerhead Turtle, Green Turtle, Leatherback Turtle, Olive Ridley Turtle, Hawksbill Turtle, Flatback Turtle	E, V, Mi, Ma	E, V, Not Threatened		Only the Loggerhead and Leatherback Turtles are threatened in the NT, though the Loggerhead Turtle does not breed in the NT. Leatherbacks have been reported to breed from the Sir Edward Pellew Islands, near Maningrida, Danger Point on Cobourg Peninsula and Palm Bay on Croker Island. All species have global oceanic habitats, with diets varying from shellfish, crabs, sea urchins and macroplankton to seagrass	No preferred foraging or nesting habitat would be impacted for any of the five marine turtles	No
Sharks							
<i>Pristis microdon</i>	Freshwater Sawfish	V	V		Sawfish have a saw-like snout, called a rostrum, which has electro-sensitive pores that allow sawfish to detect movement of buried prey in the ocean floor. The rostrum acts like a metal detector as the sawfish hovers over the bottom, looking for hidden food. It is also used as a digging tool to unearth buried crustaceans. The species inhabits sandy or muddy bottoms of shallow coastal waters, estuaries, river mouths and freshwater rivers and lakes. Usually found in turbid channels of large rivers over soft mud bottoms	No preferred habitat for this species would be impacted	No
<i>Pristis zijsron</i>	Green Sawfish	V	V		The Green Sawfish is widely distributed in the northern Indian Ocean, around Indonesia and Australia. It is the most commonly encountered sawfish species in Australian waters. In the Northern Territory, specimens have been collected only in Buffalo Creek in Darwin Harbor	No preferred habitat for this species would be impacted	No
<i>Rhincodon typus</i>	Whale Shark	V, Mi, Ma			The whale shark has a broad distribution across most tropical and warm temperate seas. The best known populations in Australia are around Ningaloo Reef, in north-western Australia. Its distribution and status in waters around the Northern Territory is poorly known, although there are at least some anecdotal records (Threatened Species of Northern Territory Fact Sheet). It feeds primarily by suction filter feeding, and its diet includes a broad range of plankton, small crustaceans and small schooling fish	No oceanic habitat would be impacted	No
Migratory species							
<i>Actitis hypoleucos</i>	Common Sandpiper	Mi		C, J, B	Inhabits coastal and inland wetlands. It breeds in Eurasia and migrates to Australia	No preferred habitat for this species would be impacted	No
<i>Anseranas semipalmata</i>	Magpie Goose	Ma			Open wetlands, swamps, farmlands and major watercourses	No preferred habitat for this species would be impacted	No
<i>Apus pacificus</i>	Fork-tailed Swift	Mi, Ma		C, J	Except at their breeding grounds in the northern hemisphere, individuals of this species spend all day, and most if not all night, hunting insects, resting and sleeping	No potential to impact this species	No

Attachment A (cont'd)

Species name	Common name	Status			Distribution, ecology and behaviour	Potential impact	Credible risk to species
		AUS	NT				
<i>Ardea alba</i>	Great Egret	Mi, Ma		C, J	Found in most of the tropical and warmer temperate parts of the world. Prefers shores of lakes, ponds and rivers; freshwater and saltwater marshes, mudflats, shallow lagoons, estuaries. Requires trees or shrubs near the water for nesting	No preferred habitat for this species would be impacted	No
<i>Ardea ibis</i>	Cattle Egret	Mi, Ma		C, J	Found on most continents and across most of Australia. Common and widespread throughout northern and eastern Australia. Found in grasslands, woodlands and wetlands and also uses pastures and croplands. Commonly forages in wetland areas	No preferred habitat for this species would be impacted	No
<i>Arenaria interpres</i>	Ruddy Turnstone	Mi		C, J	Turnstones are non-breeding migrants in Australia, breeding in eastern Siberia and Alaska and arriving in Australia about October each year. Preferred habitat is beaches where shingle and masses of seaweed are mixed with stretches of sand	No preferred habitat for this species would be impacted	No
<i>Calidris alba</i>	Sanderling	Mi			Sanderlings are non-breeding migrants to Australia, preferring sea beaches and sandy ocean shores. They seldom move further inland than coastal lagoons. They eat insects and other small invertebrates in the sand as the waves ebb	No preferred habitat for this species would be impacted	No
<i>Calidris tenuirostris</i>	Great Knot	Mi		C, J, B	Mobile species, mainly inhabits coastal area. Thousands flock from north-eastern Siberia to Eighty-Mile Beach, around Arnhem Land and the Gulf of Carpentaria each year. They prefer tidal muds and sand flats, feeding on gastropods and other invertebrates	No preferred habitat for this species would be impacted	No
<i>Charadrius leschenaultii</i>	Large Sand Plover	Mi			This species can be found around the whole coast of Australia between October and January. They prefer tidal muds and sand flats, feeding on small crustaceans and molluscs, crabs and shrimps being preferred	No preferred habitat for this species would be impacted	No
<i>Charadrius mongolus</i>	Mongolian Plover	Mi, Ma			Arrives in September-October each year from breeding grounds in eastern Siberia. The species inhabit tidal and mud flats in bays, inlets, and estuaries around the Australian coast	No preferred habitat for this species would be impacted	No
<i>Charadrius veredus</i>	Oriental Plover	Mi, Ma			Arrives in October each year from breeding grounds in Asia. The species inhabits inland bare ground, often bare plains, road verges and flat edges of lakes and lagoons. Occasional visitor to sea shores	No preferred habitat for this species would be impacted	No
<i>Coracina tenuirostris melvillensis</i>	Melville Cicadabird	Mi			This species lives in monsoon forests and mangrove swamps from Broome to the Macarthur River in the Northern Territory, and including Melville Island. It eats fruit, seeds, insects and their larvae	No preferred habitat for this species would be impacted	No
<i>Glareola maldivarum</i>	Oriental Pratincole	Mi			Arrives in October-November each year from breeding grounds in Asia. Although related to shorebirds, they differ in that they flock like swallows to feed aerially on swarming beetles, termites, grasshoppers and crickets	No preferred habitat for this species would be impacted	No
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Mi	V		Coast and near coastal areas across Australia. Mainly coastal but is also found in large rivers and lakes. Feeds mainly on aquatic animals such as fish, turtles and sea snakes, but takes birds and mammals as well	No preferred habitat for this species would be impacted	No

Attachment A (cont'd)

Species name	Common name	Status			Distribution, ecology and behaviour	Potential impact	Credible risk to species
		AUS	NT				
<i>Hirundo rustica</i>	Barn Swallow	Mi, Ma			Most populations breed in Asia but some southern populations appear sedentary. Forages in open country and cultivated lands	No preferred habitat for this species would be impacted	No
<i>Limosa lapponica</i>	Bar-tailed Godwit	Mi		C, J, B	Arrives in August-September each year from breeding grounds in north-eastern Siberia and Alaska. The species inhabit saline and tidal mud flats and sands of coastal inlets and nearby salt pans	No preferred habitat for this species would be impacted	No
<i>Limosa limosa</i>	Black-tailed Godwit	Mi		C, J, B	Arrives in September each year from breeding grounds in northern Eurasia. Unlike the Bar-tailed Godwit, this species ranges inland to frequent shallow open muddy lagoons and swamps. They return to staging beaches along the north-west coast and in the Gulf of Carpentaria before leaving Australia in March to breed	No preferred habitat for this species would be impacted	No
<i>Merops ornatus</i>	Rainbow Bee-eater	Mi, Ma		J	Widely distributed across Australia except in desert areas. Commonly found in woodland and timbered plains throughout Australia capturing insects whilst in flight. Breeds throughout most of its range. Southern populations move to northern Australia, New Guinea and Indonesia over winter	No preferred habitat for this species would be impacted	No
<i>Numenius minutus</i>	Little Whimbrel	Mi			Arrives in September-October each year from breeding grounds in central and north-eastern Siberia. The species inhabit bare, dry sub-coastal plains, airfields and suburban lawns	No preferred habitat for this species would be impacted	No
<i>Numenius phaeopus</i>	Whimbrel	Mi			Breeds in Arctic, inhabiting coastal environments such as mangroves, mud flats and islets while in Australia	No preferred habitat for this species would be impacted	No
<i>Pluvialis squatarola</i>	Grey Plover	Mi			Arrives in September each year from breeding grounds in Russia, Alaska and Canada. The species inhabit tidal sand and mud flats, feeding on crustaceans, marine worms and other invertebrates	No preferred habitat for this species would be impacted	No
<i>Poecilodryas superciliosa cerviniventris</i>	Derby White-browed Robin	Mi			The species lives in tropical monsoon forests and mangrove swamps from Derby in Western Australia across to western Queensland. It eats mainly insects and larvae and occasionally small crabs and molluscs	No preferred habitat for this species would be impacted	No
<i>Rhipidura rufifrons</i>	Rufous Fantail	Mi			There are two distinct races of this species, the migratory race moves from Australia into islands in the south-western Pacific in March-April and back into Australia in September-October. This race inhabits rainforests and wet sclerophyll forests	No preferred habitat for this species would be impacted	No
<i>Sterna albifrons</i>	Little Tern	Mi, Ma	V		Migrating from eastern Asia, found on the north, east and south-east Australian coasts. Coastal, preferring sheltered environments, although it may occur several kilometres from the sea in harbours, inlets and rivers. Nests in small, scattered colonies in low dunes or on sandy beaches just above high tide mark near estuary mouths or adjacent to coastal lakes and islands	No preferred habitat for this species would be impacted	No

Attachment A (cont'd)

Species name	Common name	Status			Distribution, ecology and behaviour	Potential impact	Credible risk to species
		AUS	NT				
Marine species							
<i>Balaenoptera edeni</i>	Bryde's Whale	Mi, W, Ma			Pronounced, 'broo-dess' whale, they prefer tropical and temperate waters, and coastal rather than pelagic. Their diet is composed almost entirely of fish	The proposed works may contribute to a cumulative impact on this species in tropical waters due to increased shipping	No
<i>Crocodylus porosus</i>	Saltwater Crocodile	Mi, Ma			Coastal rivers and swamps extending well inland via major rivers and billabongs	Several hundred saltwater crocodiles are removed from Darwin Harbour each year. The proposed project would not impact this species	No
<i>Dugong dugon</i>	Dugong	Mi, Ma			The Dugong prefers calm, sheltered, shallow and nutrient-rich waters that support seagrass	No seagrass would be impacted by the proposed works	No
<i>Orcaella heinsohni</i>	Australian Snubfin Dolphin	Mi, W			Australian Snubfin Dolphin occurs in tropical waters of New Guinea and northern Australia. They prefer shallow estuaries, and are quiet and inconspicuous	The proposed works may contribute to a cumulative impact on this species in tropical waters or estuaries due to increased shipping	No
<i>Orcinus orca</i>	Killer Whale	Mi, W			Killer Whales are voracious predators. They hunt singly or in groups feeding on fish, seals and other cetaceans. They are usually found in groups and are commonly seen in Australian waters, and occasionally close inshore	The proposed works may contribute to a cumulative impact on this species in tropical waters due to increased shipping	No
<i>Sousa chinensis</i>	Indo-Pacific Humpback Dolphin	Mi, W			This species is usually found in near shore tropical waters. When undisturbed they are slow swimmers	The proposed works may contribute to a cumulative impact on this species in tropical waters or estuaries due to increased shipping	No
<i>Tursiops aduncus</i> (Arafura Sea / Timor Sea population)	Spotted Bottlenose Dolphin	Mi, W			This population has geographic variation to other bottlenose dolphins – in particular, morphological variation between inshore and offshore animals	The proposed works may contribute to a cumulative impact on this species in tropical waters or estuaries due to increased shipping	No
<i>Pseudorca crassidens</i>	False Killer Whale	W			False Killer Whales are found in tropical to warm temperate zones, generally in relatively deep, offshore waters, but also in semi-enclosed seas and bays. They eat primarily fish and cephalopods	The proposed works may contribute to a cumulative impact on this species in tropical waters due to increased shipping	No