BHP

Olympic Dam Smelter and Refinery Expansion Project

Environmental Impact Statement

Appendix D

October 2026

BHP

Olympic Dam Smelter and Refinery Expansion Project

Environmental Impact Statement

Appendix D

October 2026

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BHP

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Olympic Dam Smelter and Refinery Expansion Project

Ecological Impact Assessment

LATHWIDA ENVIRONMENTAL

BHP



May 2026

Final

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The sole purpose of this report and the associated services performed by Lathwida is to assess environmental effects and impact-related matters associated with the Smelter and Refinery Expansion (SRE) Project. This document and associated data will support the development of primary approval documentation required for the SRE Project. The report is based on a desktop review of available data and reports outlining survey findings within the survey area and buffers and the activities proposed for the SRE Project as provided by BHP. The scope of services, as described in this report, was developed with the Client.

In preparing this report, Lathwida has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Lathwida has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

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Note on currency

Where possible, information contained in this Document is up to date as at 18 May 2026. This was not possible for supporting appendices, and information based on those appendices, which were prepared by third parties (as discussed in the second paragraph in the Disclaimer above) prior to the Document being finalised.

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Executive summary

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (SRE Project) in the far north of South Australia.

EMM Consulting Pty Ltd and Lathwida Environmental Pty Ltd (Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2016*.

Lathwida was commissioned by BHP to undertake an ecological assessment of the proposed SRE Project activities to:

- determine if the activities have the potential to result in changes to the baseline ecological environment; baseline assessment
- determine the likely magnitude of the change to the baseline pathways that may then impact upon baseline ecological values as a result of the SRE Project; effects assessment
- quantify the likely impacts resulting from the predicted change to baseline ecological values on identified receptors; impact assessment.

The SRE Project is located at the Olympic Dam mining operations, approximately, 580 km north of Adelaide in the far north of South Australia. The existing BHP Olympic Dam includes a mining concentrator, smelter and refinery, with the smelter treating high grade copper concentrates through a single-stage Direct-to-Blister Flash Furnace smelter, with an average output of approximately 200,000 tonnes per annum (tpa) of total copper (and associated products). The closest township is Roxby Downs which is approximately 15 km south of the mine site.

Baseline ecological assessments have been undertaken across the SRE Project Area. The ecological assessments were undertaken with particular focus on the identification of State and Nationally threatened species, threatened ecological communities, vegetation and fauna habitat characterisation. Results from desktop database searches (including the Australian Government's Department of Climate Change, Energy, the Environment and Water Protected Matters database and the Government of South Australia's Department for Environment and Water Biological Databases of South Australia) in conjunction with the baseline assessments have indicated several threatened species may occur within the Project Area, with one nationally threatened species (Southern Whiteface) known to occur.

A preliminary identification of potential impact events relevant to ecology was undertaken, identifying 22 grouped potential ecological impact events. A review of environmental pathway assessment of effects studies was undertaken, focussing on the potential impacts to flora, vegetation, fauna and fauna habitat from the effects of the following SRE Project-related pathways:

- noise and vibration
- air quality
- radiation
- land and soils

- groundwater
- surface water
- traffic.

The assessment of effects relating to potential impacts on ecological receptors found that of the 22 potential grouped impact events, 4 were found to have no linkage between the source and the pathway and/or the pathway and the receptor, leaving 18 potential grouped impact events with a confirmed linkage.

These confirmed impact events were assessed to quantify the likely significance of the impact against the SRE Project's Environmental Impact Assessment Framework impact significance criteria. The outcomes of the ecological impact assessment concluded the impact events to be not significant, with all assessed as being significance Level 2 or lower.

Proposed management and mitigation measures are described for each confirmed impact event. These are considered standard industry measures.

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1 Introduction

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (SRE Project) at the Olympic Dam mining operations, in the far north of South Australia (Figure 1.1).

EMM Consulting Pty Ltd and Lathwida Environmental Pty Ltd (EMM+Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2016* (SA) (PDI Act).

EMM+Lathwida were commissioned by BHP to undertake an ecological assessment of the proposed SRE Project activities to:

- determine if the activities have the potential to result in changes to the baseline ecological environment; baseline assessment (baseline condition assessment in Chapter 2)
- determine the likely magnitude of the change to baseline pathways that may then impact upon baseline ecological values as a result of the SRE Project (assessment of effects in Chapter 3)
- quantify the likely impacts resulting from the predicted change to baseline ecological values on identified receptors (impact assessment in Chapter 4).

This report supports the EIS, which will be submitted to the Government of South Australia's Minister for Energy and Mining as the relevant Minister for the SRE Project under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

1.1 Project area definitions

To maintain consistency throughout the EIS and supporting technical assessments, the following terminology related to project infrastructure has been defined for the SRE Project where the **SRE Project Area (Project Area) (**Figure 1.1**)** is defined as the boundary around the SRE Project for which BHP is seeking approval for under PDI Act, including:

- **Special Mining Lease (SML) Area**, located within the SML (Figure 1.2), which is further delineated into the following areas:
    - **SRE Area:** the extent of the proposed SRE Project infrastructure required for construction and operation of the SRE Project within the SML. Includes the existing brownfield plant area, proposed facility relocation(s), proposed plant and laydown areas.
    - **General Infrastructure Area:** the extent of the proposed ancillary infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed infrastructure laydown areas, proposed stormwater dam location, proposed topsoil and subsoil storage areas.

- **Water Infrastructure Area:** the extent of the proposed water infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed water pipeline and water storage dam locations.

- **Electricity Infrastructure Ground Re-profiling Area (EIGR Area):** the extent of the isolated proposed vegetation disturbance required to maintain regulatory clearance distances between the 275 kilovolt (kV) transmission line and the ground surface within Clause 28 land. It is noted that the transmission line and infrastructure are already in place, but additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging and therefore changes to existing clearance distances to enable safe operation. This includes 11 discrete areas (Figure 1.3).

1.2 Regulatory context

Legislation and regulation relevant to the determination of ecological values, the assessment of ecological effects and impacts and the planning and delivery of the SRE Project is summarised below.

1.2.1 *Planning Development and Infrastructure Act 2016* (SA)

Development approval is required for the Action under the PDI Act. The SRE Project was declared an Impact Assessed development pursuant to section 108(1)(c) and 108(7) of the PDI Act in August 2024. The declaration subjects the SRE Project to an EIS process requiring detailed environmental, social and economic assessment.

A Scoping Application was prepared by BHP to inform the development of EIS Assessment Requirements by the State Planning Commission (SPC). The EIS Assessment Requirements issued by the SPC summarise all potential issues needing to be addressed by BHP and highlight any further information required by the Minister to enable a proper assessment of the proposed SRE Project. Specific Assessment Requirements for ecology-related matters are listed in Appendix A.

1.2.2 *Environment Protection and Biodiversity Conservation Act 1999* (Cth)

The *Environment Protection and Biodiversity Act* 1999 (Cth) (EPBC Act) is the Australian Government's primary environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as Matters of National Environmental Significance (MNES). Under the environmental provisions of the EPBC Act, actions that are likely to have a significant impact on MNES cannot be undertaken without referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for consideration and approval under the EPBC Act.

The 9 MNES identified in the EPBC Act are:

- world heritage areas
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)

- listed threatened species and ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- water resources (that relate to coal seam gas development and large coal mining development).

The EPBC Act also legislates for other planning-related matters (e.g. actions proposed on Commonwealth Land) which are not relevant to the SRE Project.

1.2.3 *Native Vegetation Act 1991* (SA) and Native Vegetation Regulations 2017 (SA)

The *Native Vegetation Act 1991* (SA) (NV Act) and the associated Native Vegetation Regulations 2017 (SA) (the Regulations) outline incentives, education measures, and assistance to landowners in relation to the preservation and enhancement of native vegetation and acts to control the clearance of native vegetation. Under the NV Act, legal clearance of native vegetation may be permissible through one of two mechanisms, either:

- clearance under the Regulations which requires no application fee but must achieve consent from the Native Vegetation Council (NVC) and an offset
- clearance under the NV Act by an application to the NVC, requiring an application fee, approval from the NVC and an offset.

Vegetation clearance applications must meet requirements of the Native Vegetation Regulations 2017 (NVC 2024a). There are associated guidelines related to assessment and offset for approved vegetation clearance (NVC 2024a, 2024c, 2024d, 2025).

The Native Vegetation Regulations require consideration of the mitigation hierarchy for applications to clear native vegetation, specifically:

- avoidance—measures must be taken to avoid clearance of native vegetation
- minimisation—if clearance of native vegetation cannot be avoided, measures must be taken to minimise the duration, intensity and extent of impacts of the clearance on biological diversity to the fullest possible extent (whether the impact is direct, indirect or cumulative)
- rehabilitation or restoration—measures should be taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been destroyed, by impacts of clearance of native vegetation that cannot be avoided or further minimised
- offset—where required under these regulations, any adverse impact on native vegetation or ecosystems that cannot be avoided or minimised must be offset by the achievement of a significant environmental benefit (SEB) that outweighs that impact (NVC 2024c, 2024d, 2025).

The SRE Project will require some clearance of remnant native vegetation. Approval to clear native vegetation in South Australia is required under the NV Act or the Regulations depending on the activity

and approval pathway. Native vegetation clearance approval will occur concurrently with the EIS process under the PDI Act.

1.2.4 *National Parks and Wildlife Act 1972* (SA)

The *National Parks and Wildlife Act 1972* (SA) (NPW Act) allows for the protection of habitat and wildlife through the establishment of parks and reserves (both on land and in State waters) and provides for the use of wildlife through a system of permits allowing certain actions, i.e. keeping, selling, trading, harvesting, farming, hunting and the destruction of native species. The NPW Act assigns flora and fauna species to State conservation categories (i.e. assigning the species as a threatened species); Endangered (Schedule 7), Vulnerable (Schedule 8), and Rare (Schedule 9).

Potential impacts to State-listed species are considered within vegetation clearance approvals and offset calculations. Presence of State-listed species contributes to condition scores of vegetation (e.g. Unit Biodiversity Scores) (NVC 2024b) and ultimately influences the environmental offset required for any clearance. Regional stakeholders may also have an interest in State-listed species.

1.2.5 *Landscape South Australia Act 2019* (SA)

The *Landscape South Australia Act 2019* (SA) (LSA Act) is the key framework promoting the sustainable and integrated management of the State's natural resources (land, water, biodiversity) and for the management of pest plants and animals.

Under the LSA Act, South Australia is divided into 8 regional Landscape Boards managed by the Government of South Australia. Each board develops its own Regional Plan designed to meet the needs of the local regions and contribute to State-level planning.

The SRE Project falls within the South Australian Arid Lands (SAAL) Region, with the LSA Act providing guidance for biodiversity management including management of pests, exotic flora and fauna, and plant diseases if relevant. The location of the SRE Project also influences the type of vegetation assessments required for any proposed impacts to native vegetation and associated approvals.

1.3 Project description

The objective of the SRE Project is to expand BHP's smelter and refinery capacity, enabling the Copper SA growth plan by:

- increasing copper production capacity up to 650,000 tonnes per annum (tpa) of total copper plus associated products from the current average production of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet
- ensuring the Cu:S ratio is resolved at Olympic Dam for copper concentrate production
- delivering reliable and predictable production outcomes following the 2023 acquisition of OZ Minerals' Carrapateena and Prominent Hill mining operations to realise Copper SA province opportunities.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable total production of up to 650,000 tpa copper plus associated products
- introduction of a two-stage smelting involving the installation of a new primary flash-smelting furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing direct-to-blister flash furnace (DBF) to a flash-converting furnace (FCF), which would process the matte into blister
- addition of an acid plant of similar nature and scale to the existing acid plant and subsequent upgrade of the existing acid plant
- expansion of the electrorefinery and precious metals recovery facilities to produce cathode copper, gold, and silver.

Associated with these key elements, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the SML Area.

External to the SML Area, electricity would be supplied to the SRE Project through the existing 275 kV line from Davenport substation (near Port Augusta) to Olympic Dam mine, located within Clause 28 land[1] (EIGR Areas). Whilst the transmission line and infrastructure are already in place, additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging, reducing the existing electrical clearances that are required to enable safe operation. The maintenance of the required electrical clearances between the 275 kV line and the ground surface would necessitate isolated areas of land and associated vegetation clearance (Figure 1.3).

The SRE Project would be constructed and operated in a staged manner to enable production capacity up to 650,000 tpa of total copper and associated products, with stages detailed in Table 1.1.

This technical assessment has been prepared based upon the maximum potential impacts associated with Stage 2 (i.e. the greatest impact scenario) to ensure that the full extent of all potential impacts is identified and assessed.

The indicative location of key infrastructure is shown in Figure 1.2 and Figure 1.3 while the key project characteristics are outlined in Table 1.2.

[1] Clause 28 land as defined under the *Roxby Downs (Indenture Ratification) Act 1982* (SA)

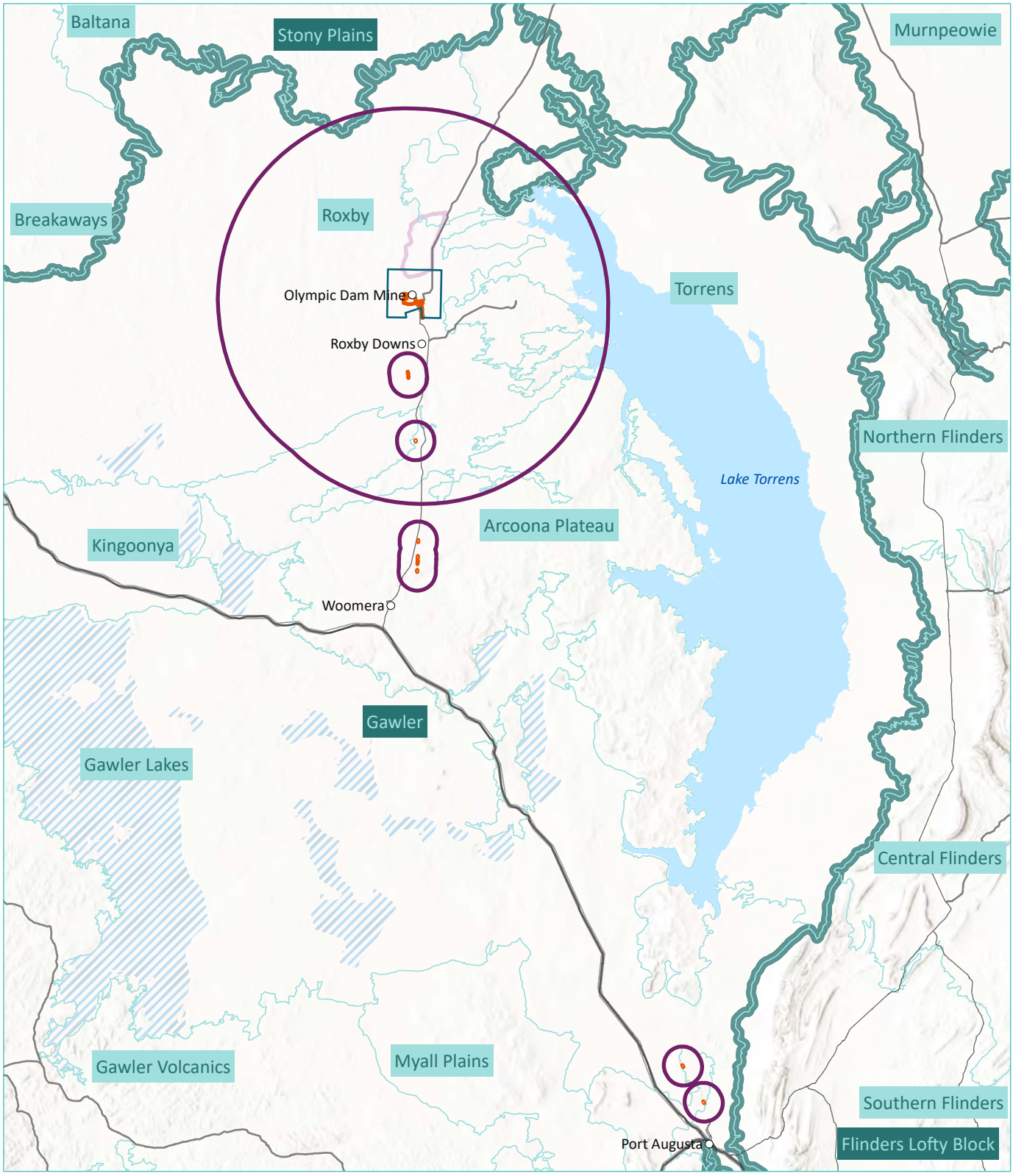
Table 1.1: Project stages and timing

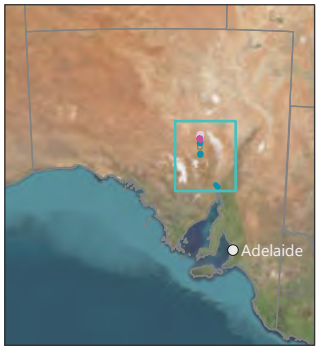
Stage	Smelter concentrate throughput (tpa)	Description	Anticipated timing
Stage 1a	1,100,000	Stage 1a includes: • an increase of smelter throughput to approximately 1,100,000 tpa of concentrate producing an output of approximately 390,000 tpa of total copper • a new regional concentrate receiving, handling and blending facility • upgrade and expansion of the existing smelter feed preparation, including additional concentrate storage, blending and a new steam dryer • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to an FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure and decommissioning of the existing electric slag reduction furnace (EF) if required • expansion of the brownfield slag concentrator supported by FSF slag cooling pits, a new interim slag stockpile and associated environmental management infrastructure • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant, additional acid storage and an associated acid loading station to allow the export of acid • a new electrorefinery and associated anode preparation infrastructure • a new slimes treatment plant • expansion of the precious-metals refinery (PMR) facility.	2028 to 2032
Stage 1b	1,400,000	Stage 1b includes: • an increase in smelter throughput to approximately 1,400,000 tpa of concentrate producing an output of approximately 500,000 tpa of total copper • installation of additional concentrate leach thickening and filtration infrastructure • development of greenfield slag concentrator, associated stockpile, and decommissioning of the brownfield slag concentrator • incremental expansion of Stage 1a infrastructure and services, including: o the installation of additional electrorefinery modules o expansion of feed preparation, FCF feed system (including lime addition), off-gas management, acid plant, slimes treatment and PMR capacities.	2032 to 2036
Stage 2	2,000,000	Stage 2 includes: • an increase in smelter throughput to approximately 2,000,000 tpa of concentrate producing an output of approximately 650,000 tpa of total copper • installation of new concentrate leach circuit for treatment of imported concentrate • incremental expansion of Stage 1b infrastructure and services, including: o the installation of additional electrorefinery modules o the installation of an additional anode furnace and associated off-gas management infrastructure o expansion of feed preparation, FSF and FCF feed systems, off-gas and slag management, acid plant, slimes treatment and PMR capacities.	2038 to closure

Table 1.2: Key characteristics of the SRE Project

Project element	Summary
Smelter and refinery expansion and additions	Expansion of, and additions to, the existing smelter and refinery to enable production of up to 650,000 tpa copper plus associated products (gold, silver, uranium and acid). This would include: • a new concentrate handling and blending facility • additional concentrate leach capacity • upgrade and expansion of the existing smelter feed preparation • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to a FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure • upgrade of the existing slag concentrator circuit and subsequent development of a new slag concentrator circuit • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant and upgrade of the existing acid plant • a new electrorefinery and associated infrastructure • a new slimes treatment plant • expansion of the PMR facility • slag stockpile and treatment.
Electricity demand, supply and distribution	An electricity demand of up to 68 megavolt-amperes (MVA) net load increase would be required for the SRE Project. The additional electrical demand due to the SRE Project would be met by capacity from the national grid via the existing 275 kV transmission line (noting potential for below-line land disturbance and associated vegetation clearance outside of the SML). Minor augmentation of existing onsite electricity supply infrastructure at Olympic Dam within the SML would be required to ensure the additional capacity could be achieved and maintained. New high voltage and low voltage power supply and reticulation infrastructure would be required to all smelter infrastructure.
Water demand	Water demand of between 2 and 16 megalitres per day (ML/day) is required for the SRE Project in addition to the existing supply for current operations.
Water supply and distribution	The SRE Project proposes no additional water abstraction from the Great Artesian Basin (GAB) above daily average business-as-usual (BAU) volumes. Water supply for the SRE Project would nominally be provided from the Department for Infrastructure and Transport (DIT) Northern Water Project (NWP) infrastructure, following commissioning of the initial 90 ML/d capacity of the NWP. This would require new water storage and distribution infrastructure to connect the SRE Project to the NWP connection point at the SML boundary. The NWP water supply may be supplemented or offset by the provision of local groundwater supply (subject to further approvals). This water supply would occur via existing process storage dams, the desalination plant at the Olympic Dam site, and/or through the distribution of the existing water supply within daily average BAU volumes. The additional water supplies are likely to require augmentation of the existing desalination water treatment plant and water distribution network, and a demineralised water plant would be required to support the SRE Project operations.
Supporting infrastructure	Supporting infrastructure includes: • civil infrastructure works, such as roads and stormwater infrastructure • new offices and crib rooms • new workshops • new laydown areas • process control system upgrades • concrete batching • other supporting infrastructure as required to facilitate the implementation and operation of the SRE Project.
Waste management	Development of the SRE Project may require decommissioning of the existing processing plant components including dryers, the electric furnace and the existing concentrate storage and transfer system. Some of the decommissioned infrastructure would be retained in-situ to preserve operational flexibility or for future management under the site Closure Management and Rehabilitation Plan, however some elements may require disposal as a component of the SRE Project. Waste generated during construction would be managed as follows: • where practicable, demolition materials would be removed from site and recycled • materials not suitable for removal from site would be managed on the SML via existing waste management facilities. All waste generated from construction of the SRE Project would be managed in accordance with existing site procedures and approved management plans. Operational wastes associated with the SRE Project consist of processing and non-processing wastes where: • processing wastes are limited to low-copper slags generated from the smelting and slag concentrator operations that are not suitable for reprocessing and effluent streams from various process operations that are directed to tailings, including from the PMR and smelter off-gas systems • non-processing wastes including reagent packaging wastes and operational consumables.

<table>
<tr><th>Project element</th><th>Summary</th></tr>
<tr><td>Workforce</td><td>100% fly-in/fly-out (FIFO) workforce is assumed for construction and the SRE Project operational workforce. Estimated peak construction workforce numbers (in full time equivalents (FTE)) are summarised below.
<table>
<tr><th>Construction stage</th><th>Average FTE</th><th>Peak FTE</th></tr>
<tr><td>Stage 1a</td><td>~708</td><td>~1,313</td></tr>
<tr><td>Stage 1b</td><td>~260</td><td>~515</td></tr>
<tr><td>Stage 2</td><td>~519</td><td>~978</td></tr>
</table>
Following construction, the SRE Project would require the permanent operational workforce summarised below:
<table>
<tr><th>Operational stage</th><th>Additional SRE Project operational workforce</th><th>Total Olympic Dam smelter and refinery workforce</th></tr>
<tr><td>Stage 1a</td><td>~207</td><td>766</td></tr>
<tr><td>Stage 1b</td><td>~57 (additional to Stage 1a)</td><td>823</td></tr>
<tr><td>Stage 2</td><td>~244 (additional to Stage 1b)</td><td>1,067</td></tr>
</table>
SRE Project construction and operational workforce is proposed to utilise existing and new accommodation to be established by BHP for the scheduled campaign maintenance 2027 (SCM27) shutdown, Olympic Dam future campaign maintenance accommodation, and/or greenfield accommodation (subject to separate approvals).</td></tr>
<tr><td>Concentrate import</td><td>Import of copper concentrate from Prominent Hill and Carrapateena mining operations, as well as possible future mining operations (e.g. Oak Dam), and maintain the ability to receive copper concentrate from other third-party suppliers.
Prominent Hill concentrate may be passed through concentrate leach to remove fluorides prior to smelter feed preparation. Carrapateena concentrate to pass directly to smelter feed preparation. Other, third-party concentrates may be passed through concentrate leach to remove deleterious elements (e.g. fluorides) prior to smelter feed preparation as required.</td></tr>
<tr><td>Production and export</td><td>Total production volumes of up to:
~650,000 tpa of cathode copper
~893,000 ounces per annum of gold
~3,950,000 ounces per annum of silver
~4,900 tpa of uranium oxide concentrate; note that the SRE Project does not materially change existing uranium production, with an increase of approximately 1% expected as a result of the leaching of Prominent Hill concentrate to remove fluoride. No upgrade or modification of uranium production facilities is proposed as a part of the SRE Project.
~1,700,000 – 1,900,000 tpa of 98% sulphuric acid (H_2SO_4), of which up to approximately 810,000 tpa may be exported from Olympic Dam (i.e. operations become net sulphuric acid producer).</td></tr>
</table>





SRE Project Area
Study Area
Arid Recovery Reserve
Wetlands of National Importance
IBRA Regions
IBRA Subregions

N

0 12.5 25 50

Kilometres

GDA2020 MGA Zone 53
A4 1:1,500,000

Figure 1.1: Location of key project infrastructure
SRE Project Ecological Assessment

LATHWIDA

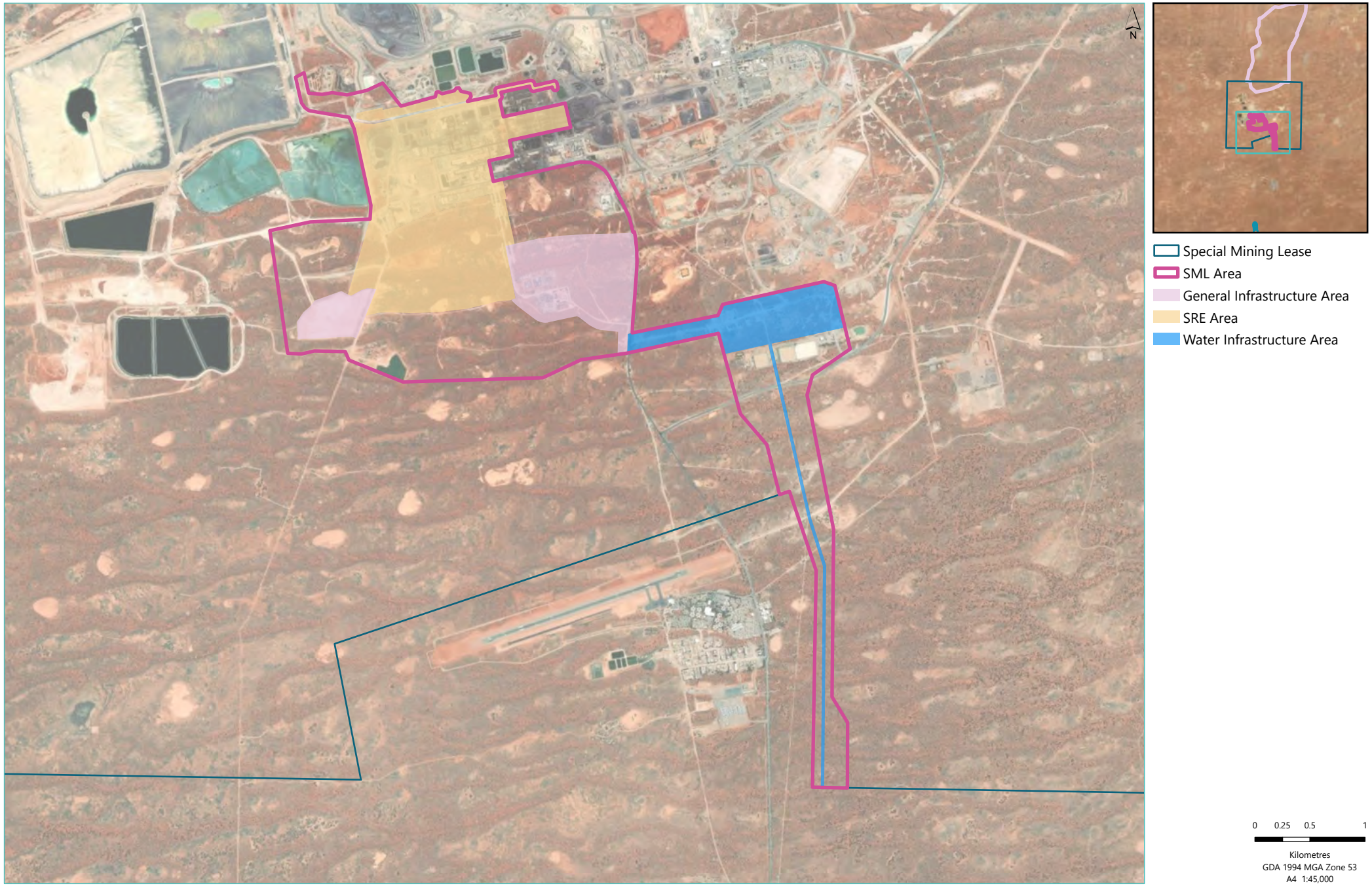
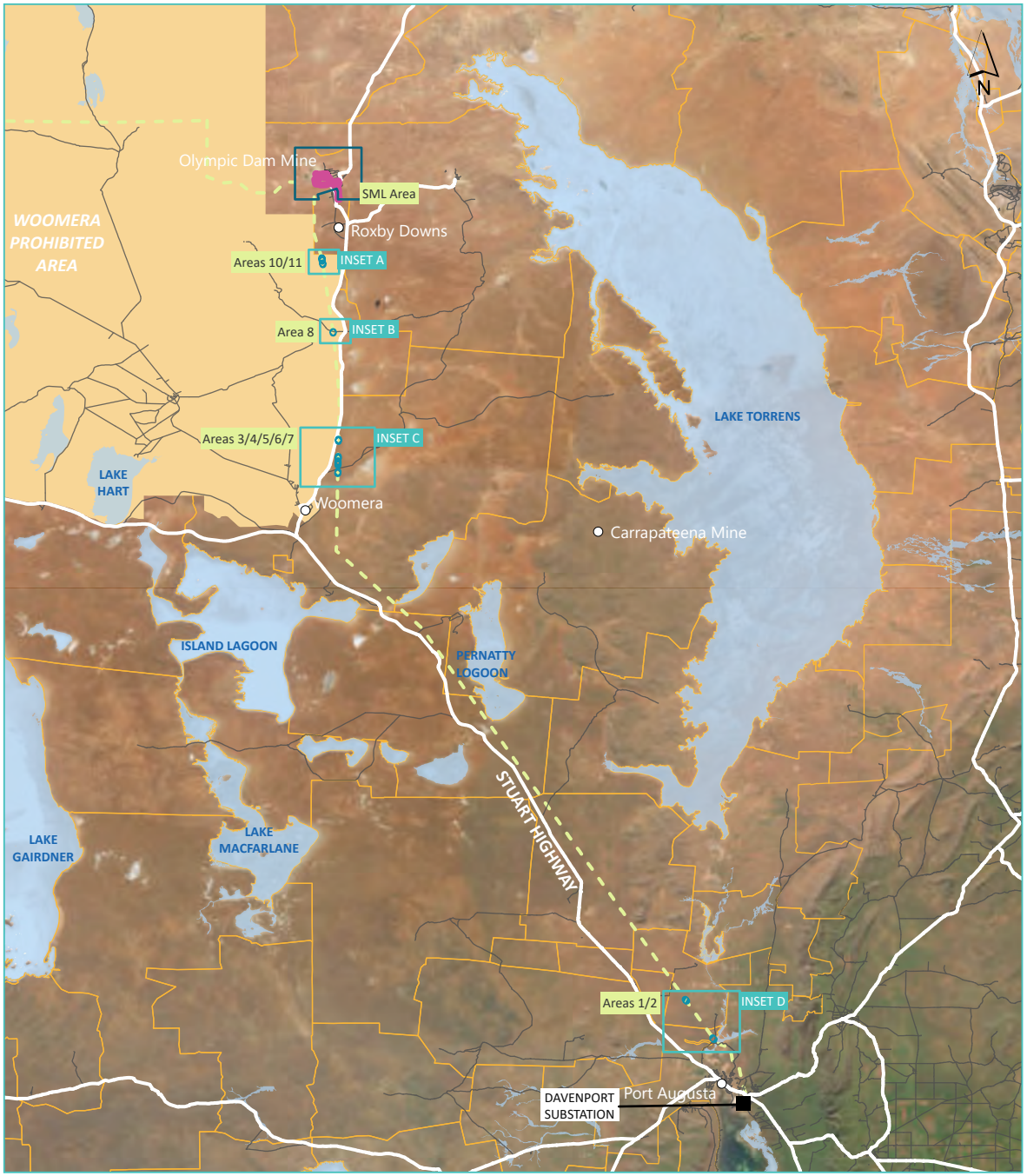
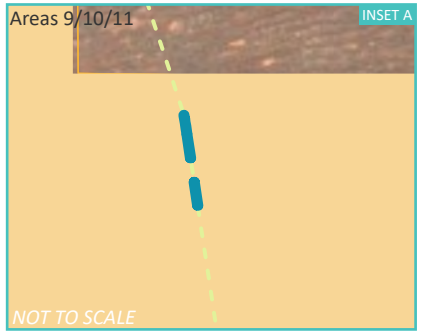
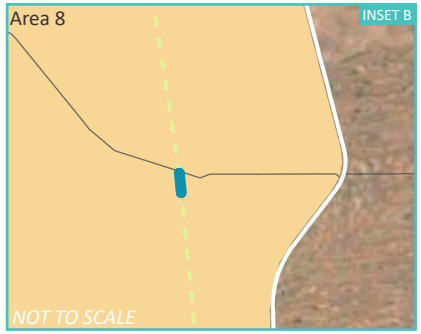


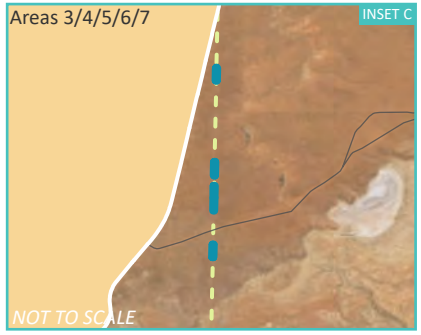
Figure 1.2: Key project components in the SML Area
SRE Project Ecological Assessment

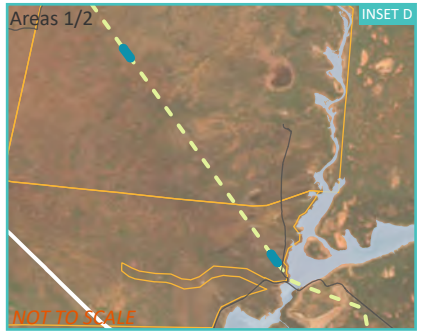
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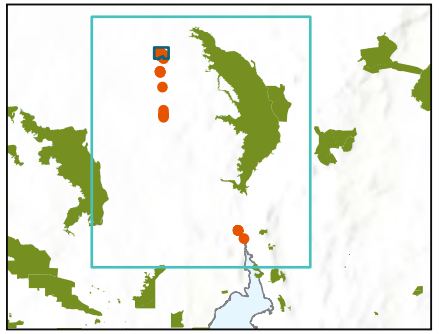












LOCALITY KEY

- National Park
- SRE Project Area

KEY

- SML Area
- EIGR Areas
- Special Mining Lease
- Transmission substation
- BHP private transmission line (275 kV)
- Pastoral Stations
- Waterbody
- Woomera Prohibited Area

0 18.75 37.5 75

Kilometers

GDA2020
A4 1:1,650,000

LATHWIDA

Figure 1.3: SRE Project areas - EIGR Areas
SRE Project Ecological Assessment

2 Baseline condition assessment

In order to quantify the potential effects of the SRE Project on ecological values and the subsequent impacts to receptors, it is necessary to understand the existing baseline environment, and specifically:

- to classify and describe the existing ecological environment prior to the development of the SRE Project; baseline assessment
- to provide a basis for project activities aimed at describing the likely change in the baseline environment as a result of the development of the SRE Project and quantifying the significance of resultant impacts to receptors; impact assessment.

2.1 Environmental context

2.1.1 Study Area

Definitions relevant to the Study Area for the assessment of baseline ecological values for the SRE Project are presented in Section 1 and Figure 1.1. The Study Area represents a 50 km buffer around the Olympic Dam SML, and 5 km buffers around discrete EIGR Areas, due to the relatively small size of each discrete parcel.

The landscape and topographical context for the SRE Project is provided Section 2.1.2.1 and Section 2.1.2.2.

This baseline assessment draws upon existing desktop information and field-based data available at the time of preparation, including:

- Protected Matters Search Tool (PMST) Reports (provided in Appendix A of Appendix B) for:
  - the Olympic Dam SML, applying a 50 km buffer
  - 11 discrete locations along the existing 275 kV transmission line, where vegetation disturbance works are proposed, applying a 5 km buffer to each location.
- Site specific studies and monitoring (outlined in Section 2.2):
  - Olympic Dam Expansion Draft Environmental Impact Statement (BHP Billiton 2009) – Chapter 15 Terrestrial Ecology
  - ongoing compliance monitoring to support the Olympic Dam Environment Protection and Monitoring Program (EPMP), including sites within the SRE Project Area, Olympic Dam SML and control sites in the Arid Recovery Reserve (ARR) north of mining activities
  - monitoring undertaken by Arid Recovery within and outside the fenced ARR.
- Site visits conducted in July and October 2024 by Lathwida.

This information has been compiled and used to describe the baseline ecological environment of the SRE Project.

2.1.2 Environmental aspects

The broad aspects of the environment that influence the baseline ecological environment within the SRE Project Area are described in this section.

2.1.2.1 Landscape and land use

The SRE Project Area is located within the Gawler Interim Biogeographic Regionalisation of Australia (IBRA) Bioregion which spans approximately 123,605 km^2 (Thackway and Cresswell 1995). The Gawler Bioregion is characterised by semi-arid to arid flat to rounded landscapes, rocky hills, plains and salt-encrusted lake beds. Vegetation types across the bioregion include open woodlands of Black Oak (*Casuarina pauper*) and Wattles, open mallee scrub, chenopod shrublands (bluebush/saltbush) and tall Mulga (*Acacia aneura*) shrublands. The native vegetation across the area is generally relatively intact, but highly disturbed in some areas particularly near stock watering points or infrastructure. More specifically, the majority of the SRE Project Area sits within the Roxby IBRA Subregion (SML Area and 4 northern most EIGR Areas, totalling approximately 8.62 ha) which is characterised by low sand dunes with low open woodland and mixed grasses, sandy interdune swales within Acacia low open woodland over Chenopod low open shrubland and interdune swales with clay soils supporting Cane-grass tall grasslands. The remaining 7 EIGR Areas occur across the adjacent Arcoona Plateau Subregion (~19.95 ha). The location of the SRE Project in the context of the IBRA Bioregion and subregions is shown in Figure 1.1.

The surrounding landscape of the majority of SRE Project Area includes the Olympic Dam mine, Airport, and Village, and the nearby township of Roxby Downs which is connected by a network of established roads. Beyond this, there are large areas of native vegetation which are subject to pastoral leasing (with a long history of livestock grazing) and/or other land uses such as the Woomera Prohibited Area (Department of Defence) (Figure 2.1). The closest gazetted conservation area Lake Torrens (National Park) is located approximately 40 km to the east of the SML Area (Figure 2.1). There are no vegetation Heritage Agreements located within 50 km of the SRE Project Area, with the nearest being HA 1572 west of Island Lagoon (just over 50 km from a central discrete EIGR Area) and HA 1573 (over 75 km north-west of Olympic Dam) (DEW 2025) (Figure 2.1).

The ARR is located 20 km north of Roxby Downs. The reserve spans a total of 12,300 ha across 6 large fenced areas (referred to as exclosures). It is located north of the Olympic Dam mine (partially within the SML) and spanning over 4.5 to 23 km from the SML Area (Figure 1.1, Figure 1.2). The reserve is used to protect and research local native fauna including a number of national and state-listed fauna; Kowari, Western Quoll, Greater Bilby, Plains Mouse, Burrowing Bettong and Shark Bay Bandicoot (Arid Recovery 2025a, DEW 2025).

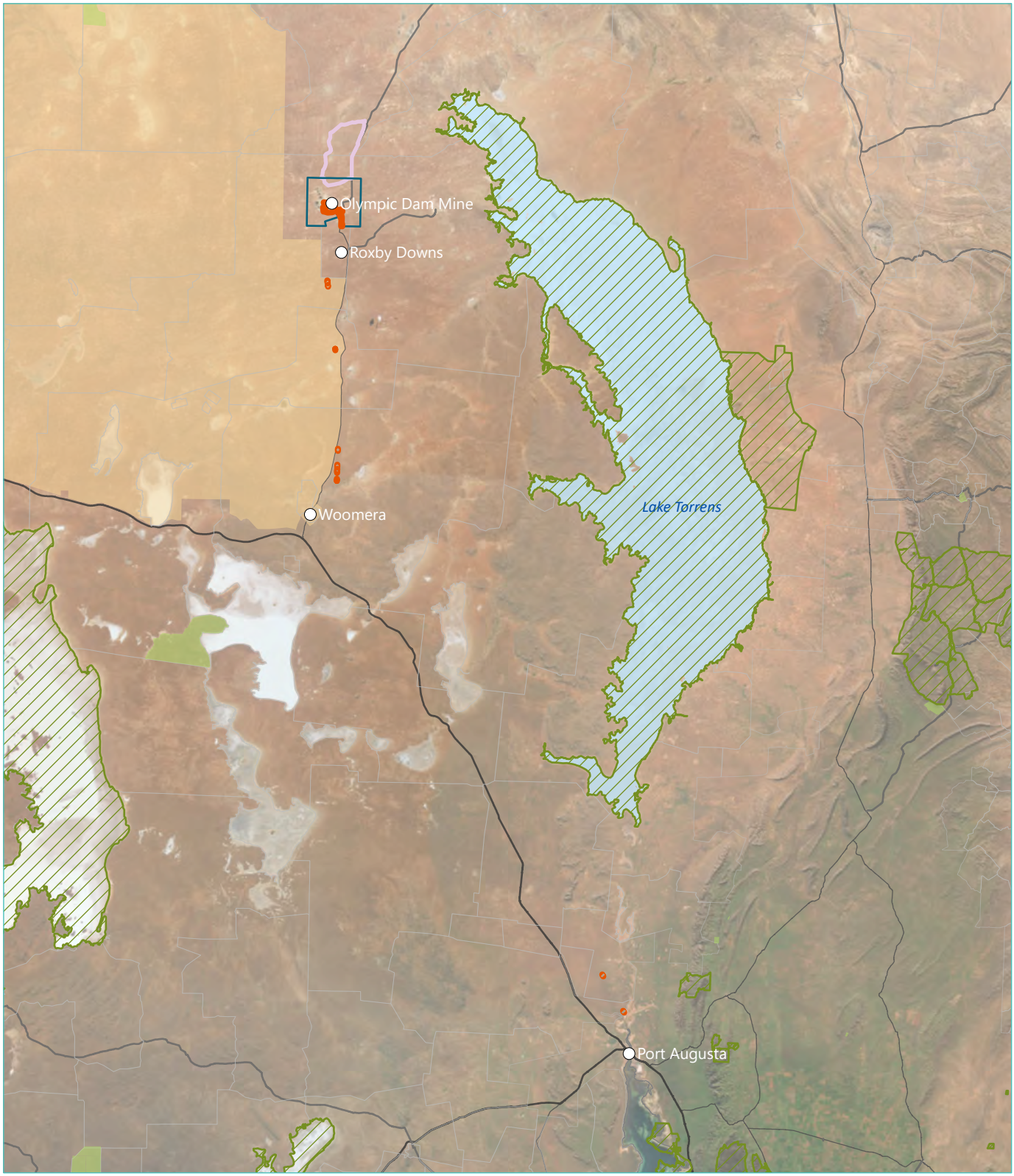
Within the wider region, arid inland lakes collectively form a 'Nationally Important Wetland' known as 'Inland Saline Lakes'. The collective wetland includes Lake Torrens (570,000 ha) and Lake Frome (259,000 ha). When these areas are in flood, they provide suitable inland habitat for large wader populations and migratory birds. Lake Callabonna and Lake Torrens are known to support 30 waterbird species. This includes 9 breeding species and these lakes are migration stop-over sites for Marsh Sandpiper, Common Greenshank, Red-necked Stint, Sharp-tailed Sandpiper, Curlew Sandpiper and Australian Pratincole (DCCEEW 2021a). Another area of important shorebird habitat in the wider region includes the Arcoona Lakes important shorebird habitat. This system represents 12,000 ha of inland lakes between Woomer

and Roxby Downs with diverse hydrology. Some are large and highly saline and provide rich ephemeral shorebird habitat. Others provide deep freshwater for several years. They fill and remain inundated following above-average rainfall. Wet and dry cycles provide abundant resource pulses for waterbirds. This system is represented by 13 wetlands: Coorlay Lagoon, Chances Swamp, Lake Mary, Lake Bessie, Purple Lake, Purple Swamp, Red Swamp, Lake Koolymilka, Lake Echo North, Lake Echo South, Lake Campbell, Arcoona Lake, and Lake Richardson (Weller et al. 2020). None of these key wetlands or shorebird habitats are in proximity to the SML Area, with the closest being Coorlay Lagoon and Chances Swamp (over 30 km south-east and south-west of Olympic Dam respectively) and Lake Torrens, which is over 40 km east of Olympic Dam (DEW 2025, Lathwida 2026b)

2.1.2.2 Topography

The topography of the SRE Project Area is generally flat with elevations of approximately 100 m Australian Height Datum (mAHD). Local soils are part of low dunes, sandy swales and clay pans. There are no gibber plains in the SRE Project Area, but some occur in the EIGR Areas. The region around Olympic Dam is dominated by a landform of low undulating dunes, swales and clay plans. To the north of Olympic Dam the land is generally flat to undulating and comprised mainly of gibber plains and rises, outwash plains and dunefields. To the south are various tablelands, dunefields and alluvial plains, occasionally separated by plateaus and steep escarpments (BHP Billiton 2009).

The Soil and Groundwater Impact Assessment suggests that previous soil surveys did not indicate metal and nutrients concentrations above the National Environment Protection (Assessment of Site Contamination) Measure (as amended in May 2013, ASC NEPM 2013) health and ecological guidelines and no potential Acid Sulfate Soils (ASS) occur regionally or around the existing Olympic Dam mine.





SRE Project Area
Special Mining Lease
Pastoral Stations
Arid Recovery Reserve
Woomera Prohibited Area
Wetlands of National Importance
National Park
Vegetation Heritage Agreement Area

N

0 12.5 25 50

Kilometres

GDA2020 MGA Zone 53
A4 1:1,500,000

Figure 2.1: Landscape of the SRE Project
SRE Project Ecological Assessment

LATHWIDA

2.1.2.3 Existing disturbance

The SML Area located within the SML includes substantial areas (almost 40%) of existing disturbance associated with Olympic Dam mine infrastructure including a pilot plant, tracks, borrow pits, transmission lines, turkey nests, historical grazing and areas of approved vegetation clearance (Figure 2.2, Plate 2.1, Plate 2.2, Table 3.3). At the northern extent of the SML Area, within the controlled area adjacent to the existing TSF, there are disposal areas within waste bunds and small areas of degraded vegetation that provide very little habitat for common fauna let alone any threatened species (Plate 2.3, Figure 2.2). There is existing background noise and emissions from the adjacent processing plant. There is also an existing level of fauna presence throughout the SML (e.g. European Rabbit, Feral Cat and European Fox). It is likely rabbits have contributed to the lack of recruitment of some flora species in the degraded areas (e.g. Mulga). There are also areas of vegetation that are less degraded and these are discussed further below in Section 2.2.3.

Outside of the SML, the 9 discrete locations that constitute the EIGR Areas are also subject to existing disturbance associated with maintenance of vegetation clearance distances for safe operation of the existing transmission line.



Plate 2.1: Existing disturbance in the SRE Area (LEOP03, borrow pit)



Plate 2.2: Existing disturbance in the SRE Area (LEOP02, transmission line and tracks)



Plate 2.3: Existing disturbance in the SRE Area (LEVC20, degraded vegetation near waste bunds in the controlled area)

2.1.2.4 Climate

Meteorological monitoring stations are located at Roxby Downs (Olympic Dam Aerodrome, # 016096), Andamooka and Woomera Aerodrome (BoM 2025a). The majority of data presented in the following sections derive from the Roxby Downs station unless otherwise noted.

Temperature

The SRE Project lies in an arid to semi-arid region, subject to hot summers and cool to mild winters. Temperatures are consistently higher in the north, with long-term mean maximum and minimum annual temperature are 27.8°C and 12.7°C respectively (BoM 2025a). January is the hottest month (mean maximum 37°C) and July the coldest month (mean minimum 4.3°C).

Rainfall and evaporation

Rainfall in the region of the SRE Project is low, with no clear seasonal pattern. Rainfall is unpredictable and sporadic throughout the year, often occurring in intense short bursts. The SRE Project Area receives approximately 151.7 mm of annual rainfall, with the highest mean rainfall in January (17.1 mm) (BoM 2025a).

Evaporation data is not available for Roxby Downs or Andamooka. Data from Woomera Aerodrome indicates evaporation is consistently an order of magnitude higher than rainfall, and peaks in the summer months. Mean daily evaporation at Woomera Aerodrome ranges from 3 mm in June to 14.5 mm in January (BoM 2025a).

Wind speed and direction

The Air Quality Impact Assessment (AQIA) summarises the annual wind rose for wind speed and direction at the BoM Olympic Dam Aerodrome. The prevailing winds were from the southern quadrant (south-east to south-west), with a lower frequency northern component. The annual average wind speed in 2023 are summarised in Table 2.1. The frequency of calm conditions ranged from 0.1% in summer to 3.1% in winter. During spring, summer and autumn there was a higher proportion of wind from the southern quadrant, while winds from the north-east were more common during winter.

Wind patterns also vary between the day and night-time periods with patterns at night dominated by airflow from the south, and a more even distribution between southern and northerly air flow experienced during the day. On average wind speeds and frequency of calm conditions are comparable between day and night periods.

Table 2.1: Annual average wind speeds and frequency of calm conditions (BoM 2025a)

Season	Wind speed	Frequency of calm condition
Annual average	4.2 m/s	1.8%
Autumn	3.7 m/s	-
Summer	4.9 m/s	0.1%

2.1.2.5 Radiation

The Radiological Impact Assessment indicates that the radionuclide content of copper concentrates depends upon the mineralogy of the mined material and copper concentrate production process. The radiological characteristics of the Olympic Dam copper concentrate are well known (for example, BHP Billiton 2009, BHP 2023a, 2025) with the uranium decay chain radionuclides in the copper concentrate not in secular equilibrium. (Note that secular equilibrium occurs when the radionuclides have the same activity concentration).

For the Carrapateena, Prominent Hill and Oak Dam copper concentrates, the uranium content has been determined, however ongoing radionuclide concentration characterisation test work is occurring. For the Radiological Impact Assessment, it was assumed that radionuclide concentration of the Carrapateena, Prominent Hill and Oak Dam copper concentrates were in the same ratio as that of the Olympic Dam copper concentrate.

2.1.2.6 Emissions

At Olympic Dam, 3 types of emissions have been identified that have the potential to impact vegetation:

- dust
- saline aerosols
- sulphur dioxide (SO_2).

Dust and SO_2 are regularly monitored as part of EPA licence requirements (EPA Licence 1301), and changes to perennial vegetation are monitored to determine long-term changes due to operational emissions (BHP 2023b).

The dust sources at the existing OD area associated with the mine and processing plant. These sources include Mine and Mill (conveyance of ore and waste rock), Smelter (blister production, feed production, anode production), Quarry and crushing (backfill material), Tailings Storage Facility construction and operations and vehicle movements.

Saline aerosol emissions originate from the mine raise bores (ventilation shafts). These shafts are used for circulating fresh air underground and intercept 2 saline aquifers. The water from these aquifers flows into the shafts and is carried to the surface by up-cast ventilation shafts in the form of a saline mist. The saline aerosol is released into the environment where it accumulates on vegetation and in the soil, which causes acute impacts in the immediate vicinity of ventilation fans. This is due to constructed pollution control devices of inverted exhaust fans, 20 m long inception/enclosures which capture most of the water and results in saline fallout within 200 m of the raise bore, land of which is mostly cleared for the construction of the raise bore. The 200 m radius potentially impacted by saline aerosols fallout is mapped as disturbed and offset via consumption of SEB credits.

The principal point sources of SO_2 at OD are Smelter 2 and the Acid Plant. Very small quantities of SO_2 are also emitted from diffuse sources such as process vessels. Off gas from the Flash Furnace is directed to the electrostatic precipitator which removes particulate matter for recycling to the furnace before being directed to the Acid Plant, here, the SO_2 is converted to sulphur trioxide (SO_3) and absorbed to produce sulphuric acid for use in the processing plant, unconverted SO_2 is directed to the acid plant tails gas stack

(APTS) and discharged to the atmosphere. These low-level emissions are continuous and may result in localised chronic impacts on vegetation. High concentration of SO_2 emissions can occur in the event of system failures, which may in-turn result in discrete, but acute impacts on vegetation. SO_2 emissions from both the APTS and main smelter stack (MSS) are monitored using continuous emission monitoring analysers. The long-term perennial vegetation monitoring program includes 62 sites located in a radial sample grid from the MSS.

Beyond the existing operational emissions at the Olympic Dam site, the Study Area is located in arid South Australia, including surrounding desert and outback landscapes. Baseline air quality in the local airshed is influenced by:

- dust entrainment from vehicle movements along unsealed and sealed town and rural roads with high silt loadings
- minor industrial operations in the BHP and Roxby Downs industrial precincts
- fuel combustion-related emissions from on-road and non-road engines
- long-range transport of fine particles into the region
- wind-generated dust from exposed areas within surrounding region
- more remote sources which contribute episodically to suspended particles in the region (e.g. dust storms and bushfires).

2.2 Baseline ecological environment

This section outlines the sources of information used for determining the baseline ecological environment, assesses the adequacy of these sources and provides a description of the baseline ecological environment of the SRE Project Area and broader Study Area.

A number of field studies and reports have been completed for Olympic Dam which provide valuable data to inform the current understanding of vegetation, habitat and existing ecological values of the SRE Project Area and broader Study Area. The coverage and methods used across the various studies make them suitable for detection of both flora and fauna species across the broader Study Area, including threatened and migratory species protected under the EPBC Act. As such, they provide a historical context over several years and are relevant to informing the description of the baseline ecological environment. This includes targeted threatened species surveys, vegetation and habitat mapping and full biological surveys as part of the Olympic Dam Expansion Draft EIS (BHP Billiton 2009). There are also Arid Recovery monitoring sites inside and outside of the ARR exclosure, with some of these sites located within the SML.

These combined recent and historical studies, coupled with publicly available information and 2 site surveys (one on SML, one off SML) to validate current site conditions have been used as the basis for describing the baseline ecological environment.

2.2.1 Survey effort – previous studies

2.2.1.1 Olympic Dam Expansion Draft EIS

Chapter 15 of the Draft EIS (BHP Billiton 2009) provides a summary of the Terrestrial Ecology present within the EIS Study Area applicable to the Olympic Dam Expansion as of 2009. The document outlines the applicable bioregions, flora and fauna of the existing environment as a result of historical desktop review and fields surveys. Additionally, the document discusses the applicable SEB and supporting impact and risk assessment process and design modification to protect environmental values.

A suite of ecological studies were used as part of the EIS including regional studies about threatened species and migratory birds, flora and fauna records from Western Mining Corporation (WMC 1997), Biological Surveys (Brandle 1998 and Slaytor 1999), Biological Databases of South Australia (BDBSA) data, PMST searches and supplementary studies undertaken in 2006 and 2008 (BHP Billiton 2009).

Across the region habitat has been extensively modified through grazing, livestock and rabbits, along with the introduction of feral predators (cats and foxes), this has resulted in the extinction of many small to medium-sized mammals (Morton 1990 cited in BHP Billiton 2009).

The most significant habitat for mammals in the Olympic Dam region is in the ARR, which is subject to independent monitoring as outlined in Section 2.2.1.3.

2.2.1.2 Compliance monitoring to support the EPMP

The Olympic Dam EPMP includes both flora and fauna monitoring programs which set out the measures BHP use to quantify any change in the extent or significance of impacts of its activities on flora and fauna, to assess the performance of control measures employed to limit these impacts, and to meet relevant legal and other requirements (BHP 2023a, 2023b, 2025).

Ongoing site monitoring occurs around the mine in control and impact areas. Control sites are located within the ARR north of the mine site and historical impact sites are within the 'controlled active mine area' and adjacent. There are a number of historical monitoring sites in the SML, relevant to the SRE Area, that ceased in 2015 (e.g. EV387, EV393, EV386, EV410, EV404, EV394, EV409, EV430, EV321, EV320 and EV326). The first 8 monitoring sites were bird survey sites and the latter 3 sites were mammal trapping sites (refer to Appendix B).

2.2.1.3 Arid Recovery

Arid Recovery is an independent body that researches and monitors ecological restoration in Australia's Arid Lands. The ARR north of Olympic Dam was established in 1997, as an extensive ecosystem restoration initiative. ARR is a collaboration between BHP, Department for Environment and Water (DEW), the University of Adelaide, Bush Heritage Australia, Indigenous Partners (Kokatha people) and the community group Friends of Arid Recovery. Arid Recovery monitoring overlaps some of the SML, within 4.7 km the SML Area (Arid Recovery 2025a).

There are numerous publications and ongoing monitoring at trapping and bird survey sites within and outside the fenced area north of the Olympic Dam mine. Initially the area was 8,600 ha, but is now expanded to 12,300 ha. The area is home to a number of threatened species (MNES), including Plains Mouse, Kowari, Burrowing Bettong and Greater Bilby. A number of other native fauna have also re-established within the fenced area (Arid Recovery 2025a).

Extensive annual pitfall trapping surveys at ARR have revealed that common reptiles are more abundant outside ARR than inside ARR. It is considered that decline in reptiles within ARR is related to abundant Sand Goanna (*Varanus gouldii*) and potentially Bilbys, which are omnivores. Despite lower numbers a total of 42 reptile species have been detected with ARR (Arid Recovery 2025a).

A total of 7 small mammals species are known to occur within the ARR and the fenced area has facilitated an abundance of small mammals such as Spinifex Hopping Mice (*Notomoys alexis*) and the Stripe-faced Dunnart (*Sminthopsis macroura*). Although, within the ARR where Plains Mouse thrive, other smaller rodents are showing a declining trend (e.g. Sandy Inland Mouse (*Pseudomys hermannsburgensis*) and Bolam's Mouse (*Pseudomys bolami*) (Arid Recovery 2025a).

2.2.1.4 Other regional surveys

In addition, information gained from other surveys in the region is also used in the current assessment. For example, field and desktop studies being undertaken south of the SML with recent detection of threatened species, such as EPBC listed Southern Whiteface and state-listed species (Lathwida 2026a).

2.2.2 Survey effort – current vegetation and habitat assessment

2.2.2.1 Desktop assessment

Desktop assessments were undertaken both prior to field assessments and following field assessments to inform baseline ecological conditions and likelihood of occurrence assessments for threatened and migratory species. Desktop searches of the Protected Matters database via the online PMST for the SRE Project were undertaken in July 2024 (for the SML Area) and October 2024 (for the EIGR Areas), refer to Appendix A of Appendix B.

Naming conventions for flora and fauna common names are as per Department for Environment and Water (DEW) BDBSA taxonomy, which is based on the Census of SA Vascular Plants and Vertebrates of SA (DEW 2024a, 2024b).

Following the initial review of the likelihood of occurrence of conservation significant species, a review of relevant guidelines, recovery plans and literature was undertaken to identify suitable assessment methods for key species considered to potentially occur within the SRE Project Area, including the following:

- survey guidelines for Australia's threatened birds (DEWHA 2010)
- survey guidelines of Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act (DSEWPaC 2011a)

- conservation advice, including Thick-billed Grasswren (TSSC 2016b), Southern Whiteface (DCCEEW 2023c), and Blue-winged Parrot (DCCEEW 2023h)
- National Recovery Plan for the Plains Mouse (Moseby 2012b)
- identification of critical habitat for the Plains Mouse (Moseby 2012a).

Targeted surveys in accordance with the relevant guidelines were only undertaken if the species preferred habitat was present. As no critical refuge habitat was identified during site assessments and vegetation mapping for Plains Mouse, no targeted survey or trapping was undertaken.

2.2.2.2 Field surveys

Specific to the SRE Project, a site survey was undertaken between 23 and 26 July 2024 (Survey One). The aim of the survey was to confirm current vegetation type and condition to align with current NVC assessment methods (NVC 2024a, 2024b, 2025) and to assess for potential MNES habitat values. A follow up on-ground assessment of the isolated disturbance areas associated within the EIGR Areas to assess the suitability of habitat for relevant MNES was undertaken between 23 and 25 October 2024 (Survey Two). The results of the site surveys are documented in the Ecology Baseline Assessment report (Appendix B). Survey One established 10 Rangeland Assessment Method (RAM) sites and Survey Two established 7 RAM sites. In addition, data was collected at rapid 'Vegetation Check' points to inform mapping across the SRE Project Area (23 for Survey One and 4 for Survey Two, respectively)

During both surveys, vegetation was also considered in terms of its suitability as habitat for EPBC listed threatened or migratory species that have potential to occur. Following desktop assessments, the key species considered potentially relevant to the SRE Project Area were Southern Whiteface (known to occur), Thick-billed Grasswren (potential to occur) and Plains Mouse (potential to occur). Vegetation within the SRE Project Area was assessed for habitat suitability for the 3 key species, and if habitat was present, further assessment was undertaken (e.g. targeted bird survey). General surveys and opportunistic records were also collected to add to the baseline understanding of the SRE Project Area.

It is noted that given the lack of suitable critical refuge habitat for Plains Mouse, no targeted surveys for this species was undertaken, i.e. there was no suitable areas of cracking clays present within the SRE Project Area which represented important habitat for Plains Mouse. In addition, there were only very limited small, isolated areas of taller denser shrublands considered suitable for Thick-billed Grasswren, so opportunities for targeted call-playback were limited during the bird surveys undertaken.

As the habitat present was considered most suitable to Southern Whiteface, the targeted surveys undertaken focused mostly on detecting the presence of the Southern Whiteface (EPBC listed as Vulnerable).

2.2.3 Vegetation

Within the SRE Project area located within the SML, 5 broad vegetation communities and unvegetated claypans were characterised and mapped as part of the site survey. The broad vegetation communities were represented by 10 vegetation associations. Outside of the SML, within the EIGR Areas, 5 broad vegetation communities were characterised, represented by 6 vegetation associations. Each vegetation association is defined as being associated with different landforms and soil characteristics.

The vegetation communities and associations identified are summarised in Table 2.2. Vegetation communities are mapped in Figure 2.2 and Figure 2.3. It should be noted that there is 0.25 ha of planted vegetation located on the boundary of the SML Area, and as such is not clearly visible on Figure 2.2. Further detail about the vegetation within the SRE Project Area is provided in Appendix B.

Table 2.2: Summary of vegetation communities of the SRE Project

Broad vegetation community	Vegetation association
SML Area	
Loamy swales with chenopod low open shrubland and emergent Mulga	Bladder Saltbush (*Atriplex vesicaria*)/Low Bluebush (*Maireana astrotricha*) low open shrubland and tussock grasses (interdune swale)
	Chenopod low open shrubland (degraded, interdune swale)
Sand dunes with Umbrella Bush / Bullock Bush tall shrubland over mixed shrubs/tussock grasses	Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius*) tall open shrubland over Tall Kerosene Grass (*Aristida holathera*) (low dunes)
	Umbrella Bush tall shrubland (degraded, low dune)
Sand dunes with White Cypress-pine open woodland over mixed tall shrubs/tussock grasses	White Cypress-pine open woodland +/- Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius*) tall open shrubland +/- sparse tall shrubs and tussock grasses (tall dunes)
	White Cypress-pine Open Woodland over Umbrella Bush/Bullock Bush tall open shrubland (dunes)
Sandy swales with mixed Acacia tall shrubland and tussock grasses	Slender Mulga (*Acacia aptaneura*) low open woodland over sparse Chenopods and tussock grasses +/- Umbrella Bush (*Acacia ligulata*) over a patchy mid-storey of woody forbs (interdune swales / dune foot slopes)
	Slender Mulga low open woodland (sandy interdune swales)
Run-on depression with River Red Gum / Willow Wattle open woodland	Northern River Red Gum (*Eucalyptus camaldulensis* ssp. *arida*)/Willow Wattle (*Acacia salicina*) +/- River Cooba (*A. stenophylla*) Woodland over tall chenopods (run on depression/drainage line)
Claypans	Small shallow unvegetated clay-based basins that may hold water for short-periods of time, no cracking clays present, some have small amount of salt crust (interdune swales)
Planted vegetation	Roadside strip of mixed natives (WA Eucalypt species, Native Pine, Sheoak)
EIGR Area, outside SML	
Low open chenopod shrubland	Low Bluebush (*Maireana astrotricha*)/Bladder Saltbush (*Atriplex vesicaria*), low open shrubland over Woolly Bluebush (*M. eriantha*) and Bindyi (*Sclerolaena* sp.)
Stony plains with low open chenopod shrubland and minor shallow gilgai formations	Low Bluebush (*Maireana astrotricha*), Bladder Saltbush (*Atriplex vesicaria*), Samphire (*Tecticornia medullosa*) low shrubland (stony plains)
	Bladder Saltbush, Pale-fruit Bluebush (*Maireana apressa*) low open shrubland +/- Barley Mitchell Grass (*Astrebla pectinata*) (stony plains)
Stony plains with low open chenopod shrubland, minor gilgai formations and shallow drainage lines with Cotton-bush	Low open chenopod shrubland, minor gilgai formations, and shallow drainage lines +/- Cotton-bush (*Maireana aphylla*) (stony plains)
Chenopod low open shrubland and emergent Dead Finish	Dead Finish (*Acacia tetragonophylla*) / Senna (*Senna artemisioides* ssp. *petiolaris*) over Pearl Bluebush (*Maireana sedifolia*), Tate's Bindyi (*Sclerolaena tatei*), Round Sea-heath (*Frankenia subteres*) and Bristly Love-grass (*Eragrostis setifolia*)
Sand dunes with mixed Acacia tall shrubland and tussock grasses	Mulga (*Acacia aneura*) and emergent White Cypress-pine (*Callitris glaucophylla*) over Bullock Bush (*Alectryon oleifolius*), Umbrella Bush (*Acacia ligulata*) and Curly Wire-grass (*Aristida contorta*) (low dunes)

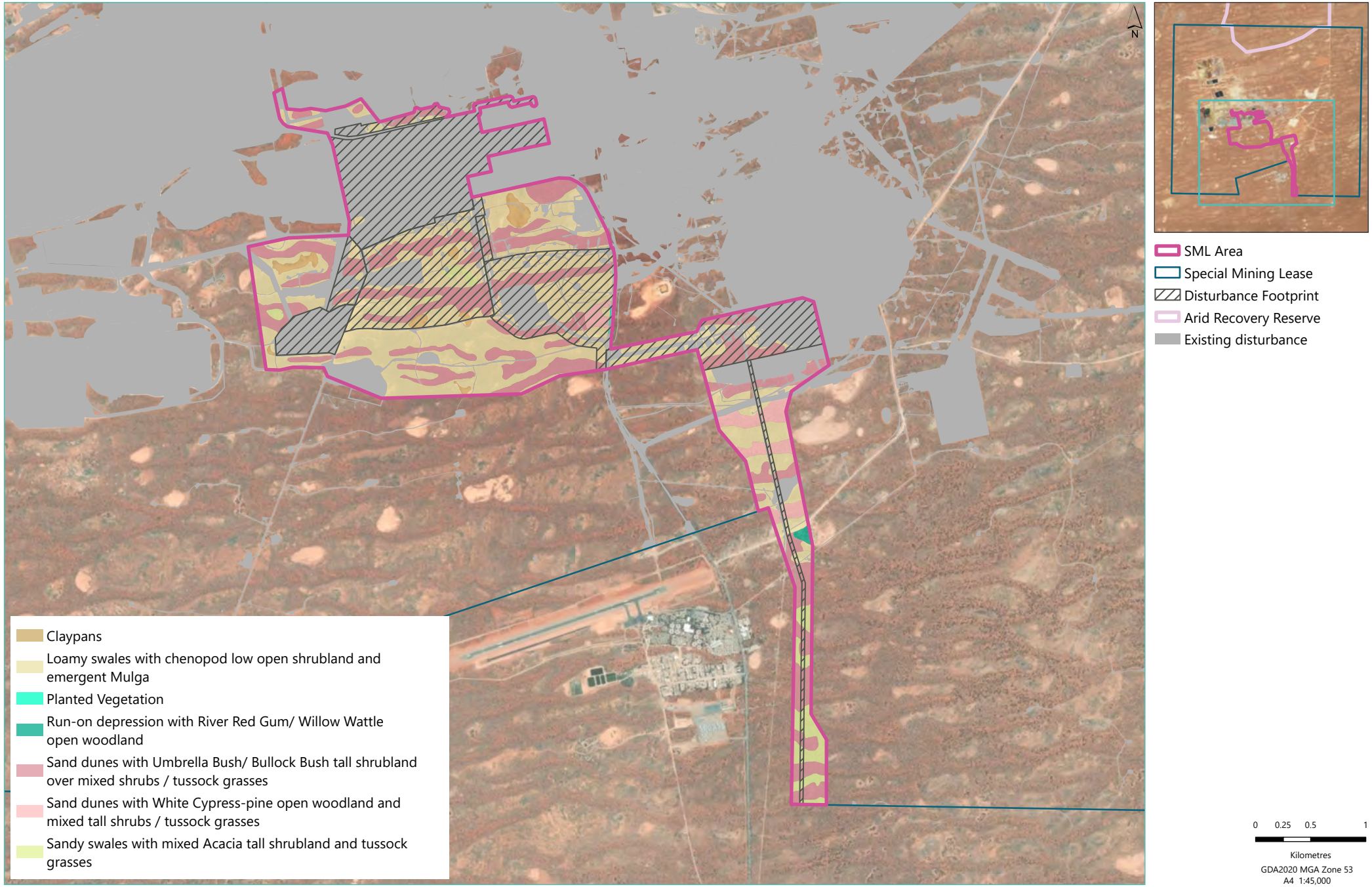


Figure 2.2: Vegetation Communities and SML Area Disturbance Footprint
SRE Project Ecological Assessment

LATHWIDA

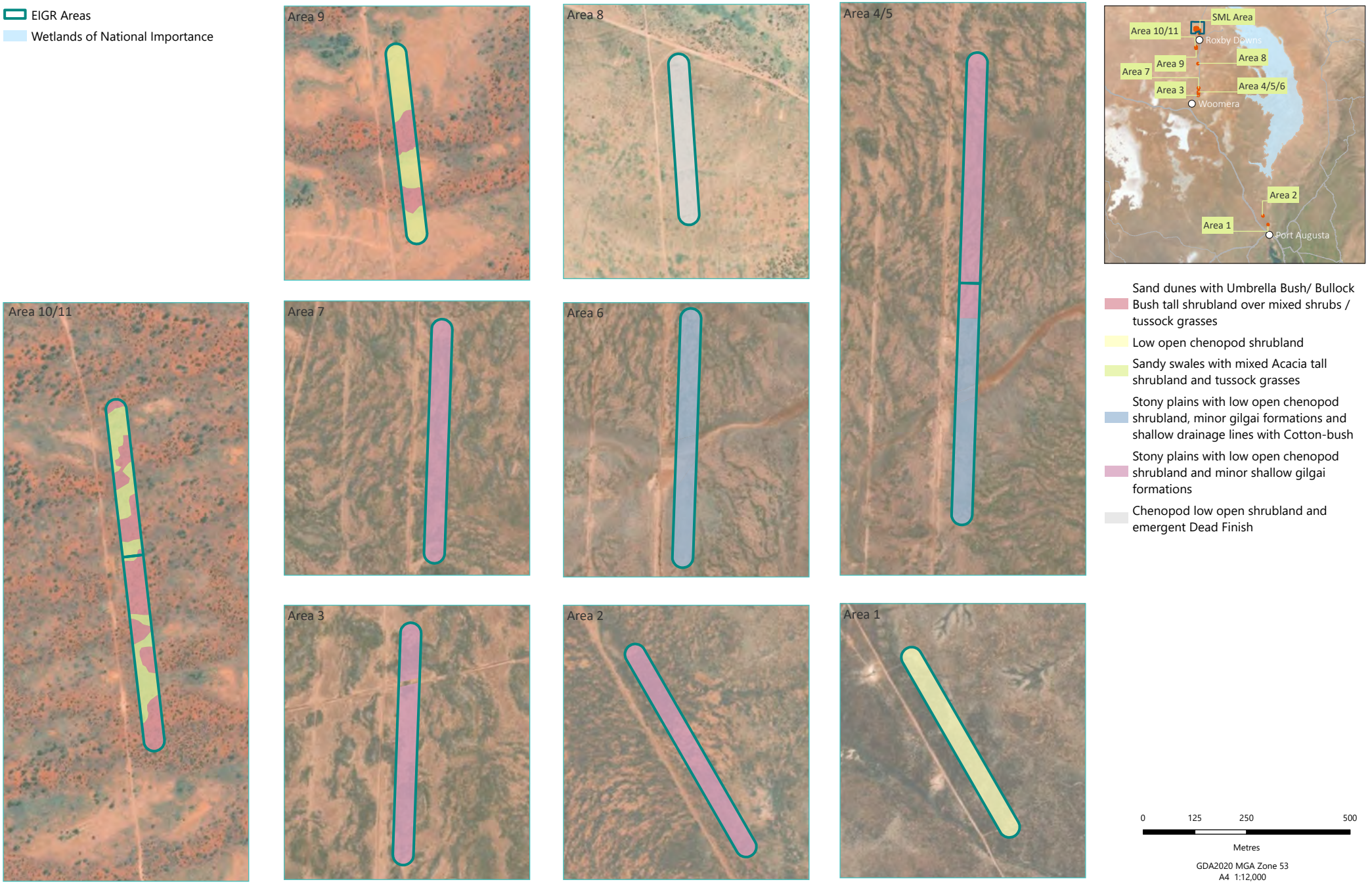


Figure 2.3: Vegetation communities in the EIGR Areas
SRE Project Ecological Assessment

2.2.4 EPBC Act-listed species and communities

PMST searches were undertaken for the SML and each EIGR Area, referenced here as 'feature areas'. As per Section 2.1.1, the PMST outputs include buffers around the SML (50 km buffer) and each EIGR Area (5 km buffer). A summary of the number of MNES identified by the PMST searches for each area is presented in Table 2.3.

A total of one EPBC TEC, 41 EPBC listed flora and fauna species are considered below (2 threatened flora, 32 threatened fauna and 7 migratory fauna that are not also listed as threatened). There are also 2 fauna that were not highlighted by the PMST, but had records within the Study Area. Of these species only one species has previously and currently been detected as part of surveys for the project; Southern Whiteface. An additional, 4 species have potential to occur; Plains Mouse (potential during irruptive years), Blue-winged Parrot (potential during non-breeding winter migration), Grey Falcon (potential overfly foraging) and Fork-tailed Swift (potential flyover species). The remaining species are considered unlikely or do not occur in the SML Area or EIGR Areas. A summary and likelihood of EPBC Act-listed species identified using the PMST and BDBSA is presented in Table 2.4. Species records are presented in Figure 2.4 and Figure 2.5.

No Threatened Ecological Communities (TECs) are considered relevant to the SRE Project, and none have been identified onsite. One TEC is considered for the EIGR Areas (refer Table 2.4).

Table 2.3: Summary of MNES identified as potential relevant to the SRE Project in PMST Report

MNES	SML Area feature area		EIGR Area feature area	
	In feature area only	In buffer area only (50 km)	In feature area only	In buffer area only (5 km)
Listed Threatened Ecological Communities	0	0	0	1
Listed Threatened Species	18	1	20	21
Listed Migratory Species	10	1	13	17
Wetlands of International Importance (Ramsar)	0	0	0	0
Commonwealth Marine Areas	0	0		
World Heritage Properties	0	0	0	0
National Heritage Places	0	0	0	0
The Great Barrier Reef Marine Park	0	0	0	0

MNES species were excluded from the results that were unlikely to occur within the terrestrial Project Areas; i.e. marine dwelling species such as marine mammals, marine turtles, sharks, fishes and birds which utilise oceanic habitats (e.g. albatrosses, petrels, fairy prions and shearwaters). Fifteen threatened and 17 migratory species were excluded for the EIGR Areas. No species were excluded from the SML, however species listed as threatened and migratory are only assessed once in the threatened section; Common Greenshank, Curlew Sandpiper, Latham's Snipe, Red Knot and Sharp-tailed Sandpiper. It is also noted that Listed Marine species are only relevant if the Action is within Commonwealth waters, hence these are not relevant to this SRE Project and are not discussed further. Feature Areas = search area as per PMST output.

Table 2.4: Summary and likelihood of occurrence EPBC Act-listed species and TEC in the SRE Project Area

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Threatened Ecological Community				
Subtropical and Temperate Coastal Saltmarsh	V		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested that this community is 'likely to occur' in the buffer area only. The EIGR Areas are inland and not tidally connected in any way. As such, this TEC does not occur in the SRE Project Area	Does not occur
Threatened flora				
Braided Sea-heath *Frankenia plicata*	EN	V	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the SML Area and 'likely to occur' in the EIGR Areas. The species occurs in a variety of arid environments including small hillside channels where it receives run-off following rain and in a wide range of vegetation communities with good drainage. There are only 7 records just outside the Study Area buffer, all from 1996 and all in the vicinity of Stonewall Dam and Netting Dam; located over 47 km south-east of the SML Area, closer to Lake Torrens (BDBSA 2024).This is a cluster of records north of the Carrapateena mine, which have been confirmed as mis-identified by the SA Herbarium (Jacobs 2021, Helen Vonow pers. comm). Considering this, the next closest record is approximately 78 km south of the SML Area just outside of Woomera in the Woomera Prohibited Area. This record is approximately 10.5 km from the southern-most of a central cluster of EIGR Areas. The species has not been identified by any of the baseline or vegetation surveys undertaken to date within the Study Area, and no suitable habitat is present within the SRE Project Area (BHP Billiton 2009, Appendix B).	Unlikely
Desert Greenhood (*Pterostylis xerophila*)	VU	V	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat 'may occur' within the feature area (both areas). This species is known to occur on the Eyre Peninsula in dry woodland and specifically around rocky outcrops, and in association with Broombush (*Melaleuca uncinata*), Ridge-fruited Mallee (*Eucalyptus incrassata*), Beaked Red Mallee (*E. socialis*) and/or Narrow-leaved Red Mallee (*E. leptophylla*) (Duncan 2010). There are no records within the Study Area (50 km buffer) (BDBSA 2024). The nearest record is approximately 278 km west of the SML Area in Yellabinna Regional Reserve (DEW 2025. This species occurs in association with rocky outcrops and mallee that is not present in the SRE Project Area (BHP Billiton 2009, Appendix B).	Unlikely
Threatened mammals				
Australian Sea-lion (*Neophoca cinerea*)	EN	VU	The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested this species or species habitat 'may occur' in the buffer area only. There is no oceanic or beach habitat to support this marine mammal in the SRE Project Area (DEW 2025).	Does not occur
Burrowing Bettong (Shark Bay), Boodie (*Bettongia lesueur lesueur*)	VU	-	The SML PMST output (Appendix A1 of Appendix B) suggested a translocated population is 'known to occur' within the 'feature area'. While originally widespread over mainland Australia, the Boodie was reduced to only 3 remnant island subpopulations (Barrow, Dorre and Bernier Island (WA)). Several translocation populations have become established, including introduction to the ARR (20 km north of Roxby Down, 4.7 km north of the SML Area) in SA (DCCEEW 2023b). Populations that are considered important include the remnant and translocated populations (DCCEEW 2023b). Being nocturnal, the species generally occupies borrows during the day in sand dunes but also use calcrete burrows on stony swales. Generally, the species have been recorded in areas of spinifex, claypan, low heath, scrub, saltbush scrub, sandhills, desert, limestone karst, grassy/herbaceous loam flats, mulga, ironwood parks and sand ridge areas (DCCEEW 2023b). There are over 2,895 BDBSA records for this species in the Study Area (BDBSA 2024). These records are primarily in the ARR Main Enclosure. The species has not been recorded outside ARR in the Study Area to date (BDBSA 2024). There is one record near the SML Area (2019, ARR cage trap), but this record appears to be an error given it is from a building within Olympic Dam Village (BDBSA 2024, DEW 2025). In SA the only other records are in the Murray Mallee (DEW 2025). There are no records for this species in the Olympic Dam Small Mammal and Reptile database (BHP 2024b). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2025). Whilst there are sand dunes which may provide suitable habitat within the SRE Project Area, based on the above it is considered unlikely to occur**,** particularly given they are only known from the ARR translocation area, and occur in the Study Area as a result of the ARR.	Unlikely

[2] EPBC Act Status: Critically Endangered (CE); Endangered (EN); Vulnerable (VU); Migratory Marine (MM); Migratory Terrestrial (MT); Migratory Wetland (MW).
[3] *National Parks and Wildlife Act 1972* (SA) Status: Endangered (E); Rare (R); Vulnerable (V).

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Chuditch, Western Quoll (*Dasyurus geoffroii*)	VU	E	The PMST outputs (Appendix A of Appendix B) suggested a translocated population is 'known to occur' within the 'feature area' (both areas). This species historically ranged across nearly 70% of the continent, however drastic decline in numbers has occurred since that time. The last report of the species was in the arid zones of SA in the mid-1950s. Free-ranging populations are now restricted to Western Australia in varying densities in Jarrah (*Eucalyptus marginata*) forests and woodlands, and in mallee shrublands and heaths (Arid Recovery 2025c). There are occasional records in drier woodland and mallee shrubland (DEC 2012). All populations are considered important, and key habitat includes adequate hollow logs, burrow and rock crevices (DEC 2012). There are over 299 BDBSA records of this species in the SML Study Area, and the majority of these are all from the translocated population within ARR (BDBSA 2024). There are no records for this species in the Olympic Dam Small Mammal and Reptile database (BHP 2024b). There is no suitable jarrah forest or mallee habitat in the Project Area, no rock crevices and no hollows of suitable size to support this species (Appendix B). There are some records that appear to occur outside the ARR, these records are all north of Olympic Dam adjacent the ARR. There is one record near the SML Area (2019, ARR cage trap), but this record appears to be an error given it is from within the Olympic Dam Village (BDBSA 2024, DEW 2025). There are records for another population in the Flinders Ranges National Park (DEW 2025). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2025). Based on the above it is considered unlikely to occur, particularly given they are only known from the ARR translocation area, and occur in the Study Area as a result of the ARR.	Unlikely
Dusky Hopping-mouse, Wilkiniti (*Notomys fuscus*)	VU	V	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'likely to occur' within the SML Area and 'may occur' in the buffer area of the EIGR Areas. The Dusky Hopping-mouse occurs in arid areas of Australia, and prefers continuous soft sandy dunes, hills and ridges with a mixture of shrubs and grasses, with Sandhill Cane-grass (*Zygochloa paradoxa*), Sandhill Wattle (*Acacia ligulata*), Sticky Hopbush (*Dodonaea viscosa*), Nitrebush (*Nitraria billardierei*) and other annual and perennial shrubs forming important habitat (TSSC 2008). In good seasons the species may extend onto gibber plains. In SA, the species is found in areas of continuous sand dune habitat (DCCEEW 2024a). Dense populations are known to occur within the vicinity of major drainage systems. In SA, the species is known to occur in the southern Strzelecki Regional Reserve (RR) and the Cobblers Deserts, Carraweena Montecollina Bore and Quinyambie Station, Lake Eyre NP and Innamincka RR (Menkhorst and Knight 2004, TSSC 2008, DCCEEW 2024a, DEW 2025). The majority of the records in SA east and north-east of the Study Area around Maree, Lake Eyre and Lake Frome and across to Innamincka (DEW 2025). There are no records in the SML Study Area (BDBSA 2024). There are no records in the BHP small mammal and reptile database for this species (BHP 2024b). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2025). Key threats relate to predation by feral cats and foxes. Grazing pressure from stock and competition for food and habitat resources from the European Rabbit (*Oryctolagus cuniculus*) and House Mouse (*Mus musculus*) (TSSC 2008). Subspecies are known to persist in low stable numbers, and other populations may exhibit "boom and bust" lifecycle with numbers rapidly increasing and decreasing rapidly in response to rainfall and resource availability following good conditions (Moseby et al. 2006). The Study Area location is not listed as a known or important population in the Conservation Advice (TSSC 2008) for the species, hence the SRE Project Area is unlikely to support an important population of the species.	Unlikely
Greater Bilby (*Macrotis lagotis*)	VU	E	The SML PMST output (Appendix A1 of Appendix B) suggested a translocated population is 'known to occur' within the 'feature area'. The Greater Bilby is a medium sized desert dwelling marsupial. Wild populations persist only in remote parts of the Northern Territory, Queensland and Western Australia (TSSC 2016a). The Greater Bilby is considered extinct in SA, occurring only within the fenced ARR (20 km north of Roxby Downs, 4.7 km north-west of the SML Area), and 2 other re-introduction sites. The greatest threat to this species is predation by cats and foxes. The remaining populations of the species occupy 3 main habitats: open tussock grassland on uplands and hills, Mulga (*Acacia aneura*) woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas (Woinarski et al. 2014). Males range (average of 316 ha) more widely than females (average of 18 ha) from their home burrows, and home ranges can vary considerably in size in different locations. Greater bilbies can use up to 18 burrows concurrently over several months, as well as construct a new burrow on average every 2.5 weeks (Moseby & O'Donnell 2003 in TSSC 2016a). There are also many active and disused burrows within the home range. Whilst no important populations are listed in the species' conservation advice, translocated populations like within the ARR remain important to conservation priorities for the species (TSSC 2016a). There are over 333 BDBSA records in the SML Study Area, all located within the ARR (main enclosure, main expansion area) (BDBSA 2024, DEW 2025). Whilst the sand dune and plains in the SML Area may support the species, the vegetation is generally sparse and Mulga is limited or dead. There are also limited tussock grasslands, and known habitat occurs within the fenced ARR translocation area, north of the active mine site. There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2025). Based on the above, it is considered unlikely to occur in the SRE Project Area, particularly given they are only known from the ARR translocation area north of the SML.	Unlikely
Kowari (*Dasyuroides byrnei*)	EN	E	Species not highlighted in PMST. In 2023 status was upgraded from Vulnerable to Endangered. They occur in stony gibber plains with little shrub and ground cover in the Sturt Stony Desert of outback SA and Qld (Arid Recovery 2025a). 62 records (from 2022-2023) in the SML Study Area all within ARR (BDBSA 2024, DEW 2025).	Unlikely
Numbat (*Myrmecobius fasciatus*)	EN	E	Species not highlighted in PMST. Once occurred across arid southern Australia, now restricted to Powderbark or Jarrah forests in WA and translocated locations (Menkhorst and Knight 2004; DCCEEW 2025a); 4 records (2006) in the SML Study Area all within ARR (BDBSA 2024, DEW 2025). The translocation attempts failed and the species no longer occurs in this location.	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Plains Rat, Palyoora, Plains Mouse (*Pseudomys australis*)	VU	V	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the SML and 'likely to occur' in the EIGR Areas. The species is restricted to the Stony Plains Bioregion in SA and the NT and persists where large open gypseous cracking clay depressions occur within stony gibber country. Any large population which persists through drought conditions is considered important, including those of the Arcoona Tablelands in SA and the ARR (Moseby 2012a). There are 5 broad contiguous areas where Plains Mouse are known to occur; the Arcoona Tableland including Pernatty Station SA (over 100 km south of the SML Area), Southern Lake Eyre region SA (includes Roxby Downs ARR), Moon Plain region around Coober Pedy to Evelyn Downs SA, Oodnadatta region extending from SA into southern NT, and Andado Station and Mac Clark Conservation Reserve NT (Moseby 2012a). The ARR (4.7 km north-west of the SML Area and separated by the active Olympic Dam mine site) is important because it supports high densities of the species and is protected from predation via fencing (Moseby 2012a, ARR 2025a). An overall extent of occurrence for the species is estimated at 100,000 km^2 (10,000,000 ha) which excludes some outlying recent records of the species. An area of occupancy within the extent of occurrence is assumed to be approximately 20,000 km^2 (2,000,000 ha) (Moseby 2012a), though this may be much smaller due to the fragmented nature of populations particularly during drought conditions when numbers retract to critical refuge habitat. There are over 700 BDBSA records of Plains Mouse located within the SML Study Area (BDBSA 2024). The species is known from within and adjacent the ARR since 2005 (BDBSA 2024, BHP pers com., BHP 2024b). There are 51 records in the BHP database for the species, but no records from the 3 mammal monitoring sites located in the proposed SRE Area (sites EV321, EV320, EV326). Of the 51 records, the majority are north of the mine site (outside the SRE Project Area) and are within the ARR. However, there are 2 records from 2 sites that are adjacent (EV325, from 1998) and south of (EV338A, from 2010) the SRE Area, and 5 records immediately north of the SRE Area within established infrastructure areas, that may not be spatially reliable (2010, 2013, 2017). There are also 3 records from site EV331A (adjacent the south-west boundary of the ARR) and EV333A (adjacent the eastern boundary of the Olympic Dam SML) (BHP 2024b). In addition, Moseby (2012b) broadly mapped Plains Mouse/Rat habitat in and adjacent the SML. Figure 1 of Moseby (2012b) suggests that vegetation within the SML is Bladder Saltbush dominant and that critical refuge habitat occurs north and east of the SML, with 2 small areas within the eastern portion of the SML. There is no Plains Mouse critical refuge habitat mapped as occurring within the SRE Area, only generic 'boom' foraging habitat (Moseby 2012b, Appendix B). This aligns with the outcomes of the recent (July 2024) survey and vegetation/habitat classification of the SRE Area used to develop Figure 2.2 and Figure 2.3. The nature of the historic and recent records is reflective of the irruptive nature of this species, with multiple detections during boom years followed by 'bust' periods where the species is difficult to detect, sometimes for several years. An important distinction for the species related to this irruptive lifecycle, is the difference between critical habitat which represents a refuge for populations during the extended drought periods of the occupied regions, and the broader 'opportunistic' habitat used by the species during favourable conditions and the short population 'booms'. The critical refuge habitat for the species includes discrete areas of deeper cracking clays within natural depressions or along drainage features (e.g. gilgais, Cane-grass Swamps) where the species nests and organic material is accumulated. This species is most commonly associated with large open gypseous cracking clay areas or minor drainage features and in depressions (gilgais, Cane-grass Swamps) of the gibber stony plains, which are common north of the SML Area and existing mine. There is no suitable habitat for the species in the SRE Area which comprises low dunes and swales and no cracking clay or drainage features, besides several non-vegetated claypans which do no exhibit deep cracking clay. There are no Cane-grass (*Eragrostis australasica*) swamps present in the SRE Area (Appendix B). Minor areas of potential generic foraging / boom habitat (i.e. minor gilgai features within stony plains or open chenopod shrublands were identified at 6 of the 11 EIGR Areas, representing a total area of 17.32 ha (Lathwida 2026b). An additional 11.19 ha of boom only habitat (sandy dunes and swales), also occurs within the EIGR Areas. Based on the above, whilst there is a lack of suitable critical refuge habitat, there are several records of the species during 'boom' periods within proximity to the SRE Project Area, and potential habitat for the species during boom periods was identified in the EIGR Areas, and therefore the species is considered as a possible occurrence (in irruption years only) in the SRE Project Area.	Possible
Shark Bay (Western Barred) Bandicoot (*Perameles bougainville*)	EN	E	The SML PMST output (Appendix A1 of Appendix B) suggested a translocated population is 'known to occur' within the 'feature area'. While originally widespread across western and southern Australia, the only remnant wild populations occur on Bernier and Dorre Island in Shark Bay within the World Heritage Property (WA). Translocated populations have been reintroduced at Heirisson Prong (south of Shark Bay), but the population became extinct in 2008. With more successful translocated populations at Faure Island and Mt Gibson Wildlife Sanctuary (WA), ARR at Roxby Downs (SA), and Sturt National Park, Pilliga State Conservation Area and Mallee Cliffs (NSW) (DCCEEW 2023a). All populations are considered important (wild and translocated) (DCCEEW 2023a). The present range of the wild population species appear to have a broad habitat preference but prefer dense vegetation cover and leaf litter that provides refuge from predators. The vegetation of the nearest translocated population in SA (ARR, 4.7 km north-west of the SML Area, immediately north of the existing mine) is open with a hot and dry climate. The vegetation in the fenced recovery area occupied by the species includes sand dunes with Sandhill Wattle (*Acacia ligulata*) and Sticky Hopbush (*Dodonaea viscosa*), sandplains with Mulga (*A. aneura*)), chenopod swales with Bladder Saltbush (*Atriplex vesicaria*) and *Maireana astrotricha*, ephemeral swamps with Swamp Cane-grass (*Eragrostis australasica*) and creek lines (Moseby 2012 in DCCEEW 2023a). No ephemeral Cane-grass swamps or creek lines are present in the SML Area, but sand dunes with Sandhill Wattle are present. There are over 260 BDBSA records for this species in the SML Study Area and these are all within the fenced ARR north of the existing mine site (BDBSA 2024, DEW 2025). In this location the species is dependent on the predator-proof fence for survival (Arid Recovery 2025b). There are no records for this species in the Olympic Dam Small Mammal and Reptile database (BHP 2024b). The species has not been recorded outside of the ARR (DEW 2025). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2025). Based on the above, considered unlikely in the SRE Project Area.	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Wopilkara, Greater Stick-nest Rat (*Leporillus conditor*)	VU	V	The SML PMST output (Appendix A1 of Appendix B) suggested a translocated population is 'known to occur' within the 'feature area'. The only natural extant population is found on Franklin Island (SA), while a translocated population was reintroduced to ARR (20 km north of Roxby Downs), however they have been extinct there since 2019. The species inhabits perennial shrublands, especially succulent and semi-succulent plant species (e.g. Bladder Saltbush) (DEWHA 2008a, Arid Recovery 2025d). Key threats are the re-introduction of feral predators into managed reserves (DEWHA 2008a). Whilst no populations are listed as important in the species' conservation advice, the translocated population in ARR was initially considered key to supporting ongoing recovery initiatives (DEWHA 2008a). There are 13 records in the SML Study Area, the majority of records are from the ARR (BDBSA 2024, DEW 2025). The most recent and last record from 2019. There are 2 records (2003) from the mine pits monitoring site EV329, which is located 4.7 km from the SML Area within the ARR fenced area (BDBSA 2024, BHP 2024b). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2025). Based on the above it is considered unlikely to occur in the Project Area, particularly given they were only known from the ARR translocation area up until 2019 and are now extinct within the ARR.	Unlikely
Threatened fish				
Blue Warehou (*Seriolella brama*)	CD	-	The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested this species or species habitat is 'likely to occur' in the buffer area only. There is no oceanic habitat to support this marine species in the SRE Project Area.	Does not occur
Threatened reptile				
Flinders Ranges Worm-lizard (*Aprasia pseudopulchella*)	VU		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggests this species or species habitat 'may occur' in the feature area. The Flinders Ranges Worm-lizard is a small, slender burrowing legless lizard, typically known from the Flinders Ranges of South Australia, extending south to the western slopes and northern and central Mt Lofty Ranges (Cogger et al. 1993). The species has also been recorded in the northern suburbs of Adelaide, with 8 individuals recorded within the Cobbler Creek Recreation Reserve in Salisbury (Cogger et al. 1993 cited in DEWHA 2008b). The species occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates (Cogger et al. 1993), where it prefers stony soils or clay soils with a stony surface. It may also be found sheltering in soil beneath stones and rotting stumps, where it is difficult to observe (Cogger et al. 1993 cited in DEWHA 2008b). There are no records in the SML Study Area and no records between Olympic Dam and Port Augusta in proximity to the EIGR Areas (DEW 2025). There are no reported important populations of this species, or any listed habitat which is critical to the survival of the species. As all of the EIGR Areas are outside of the Flinders Ranges and well removed from the other known locations of this species (i.e. Mount Lofty Ranges), and there are no rocky outcrops, it is considered unlikely that the species occurs in the SRE Project Area.	Unlikely
Threatened birds				
Australian Fairy Tern (*Sternula nereis nereis*)	VU		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggests that breeding 'may occur' in the buffer area only. Occurs along coasts and estuaries, and breeds on sandy beaches or spits (Menkhorst et al. 2023, DSEWPaC 2011b). Along the coast, this sub-species generally nests on sandy beaches and banks above the high tide line and below vegetation. Will roost on jetty structures. The sub-species' distribution extends along the coasts of South Australia, Tasmania, and central Western Australia, and there are a number of breeding sites along the EP, some near Coffin Bay, Port Lincoln and across the Gulf at the base of Yorke Peninsula (ALA 2025, DEW 2025). The closet records to the Project Area are in the Whyalla Salt fields or Yatala Harbour, both well over 60 and 50 km (respectively) from the nearest EIGR Area. As there is no wetland or coastal habitat which is preferred by this species within any of the EIGR Areas, it is considered unlikely that the species occurs in the SRE Project Area.	Unlikely
Australian Painted Snipe (*Rostratula australis*)	EN		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggests this species or species habitat 'may occur' in the feature area. The Australian Painted Snipe a medium shorebird, endemic to Australia, widespread, but rarely observed. This species prefers inland swamps and temporary water regimes, marshes with moderate cover, and can be nomadic, appearing in response to rainfall (Geering et al. 2008). The species is most often observed in well vegetated margins and shallow water and shorelines of wetlands, nesting in temporary freshwater wetlands, particularly in the Murray -Darling Basin (Geering et al. 2008, Menkhorst et al. 2023), which are not present in the Project Area. Records of the species in South Australia are predominantly surrounding the Adelaide region, Fleurieu Peninsula or South East. There are no records of this species occurring within the Eyre Peninsula or between Port Augusta and Olympic Dam (DEW 2025, ALA 2025). Therefore, this species is considered unlikely to occur within the Project Area.	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Blue-winged Parrot (*Neophema chrysostoma*)	VU	V	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both areas). Blue-winged Parrots breed on mainland Australia south of the Great Dividing Range in southern VIC and sometimes in the far south-east of SA (DCCEEW 2023h). During non-breeding periods (from autumn to early spring), they occur from northern Victoria, eastern SA, south-western QLD and western NSW (Higgins 1999). They inhabit a range of coastal, sub-coastal and inland areas through to semi-arid zones, favouring grassy woodlands and areas near wetlands. Critical habitats include foraging and staging habitats in coastal, sub-coastal and inland areas, through to semi-arid zones (e.g. grasslands, grassy woodlands and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs), coastal and semi-arid wetlands used for staging and foraging, eucalypt forests and woodlands (including live and dead trees, suitable size hollows) for breeding (in Tasmania, southern Victoria and south-eastern SA) (DCCEEW 2023h). Whilst no important populations are listed as such in the species' conservation advice, the Tasmanian and Victorian breeding subpopulations (DCCEEW 2023h) would be considered important. The Area of Occupancy of the species is considered to be 1,100,000 ha (Holdsworth et al. 2021 cited in DCCEEW 2023h). There are no BDBSA records of the species within the Study Area (BDBSA 2024, DEW 2025). There are 3 birdlife records (1998-2004) of the species within the Study Area near Olympic Dam village (1998, 1999) and between Andamooka and Lake Torrens (2004) (BDBSA 2024). There are numerous records in inland SA in the broader region (e.g. Woomera, Carrapateena Mine, near Lake Eyre). There are no records in the BHP Birds Database (BHP 2024a). There are suitable occasional foraging habitats in the Project Area that would support the species if present during winter migration, such as Sandhill Wattle low shrubland on dunes and low chenopod shrubland on swales. These habitats are extensive in the region. No breeding habitat is present (Appendix B), and the species does not breed in SA (DCCEEW 2023h). Based on the above this species is considered possible in the SRE Project Area during winter migration (foraging only).	Possible during winter migration (foraging only)
Common Greenshank, Greenshank (*Tringa nebularia*)	EN, MW	-	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'likely to occur' within the 'feature area' (both areas). Common Greenshank have extensive breeding grounds. They extend from the northern British Isles, Scandinavia, east Estonia and north-east Belarus, through Russia. Outside of this breeding range, the species is widespread being found in Europe, Africa, Asia, Melanesia and Australasia (DCCEEW 2024b) Within Australia, the species is widespread in coastal regions, occurring in all types of wetlands and has one of the widest distributions of any shorebird in Australia. The species is found throughout most of eastern SA (DCCEEW 2024b). The species forages at the edge of wetlands, in soft mud on mudflats, in channels or within shallows around the edge of waterbodies. They roost both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops (DCCEEW 2024b). Habitat critical to the survival of this species includes a mosaic of feeding and roosting habitat such as a variety of freshwater, marine, and artificial wetlands, swamps, open muddy or rocky shores of lakes and large rivers, sewage farms, saltworks, inundated rice-fields, ponds, reservoirs, flooded grasslands, saltmarshes, sandy or muddy coastal flats, mangroves, estuaries, lagoons, pools on tidal reefs or in areas of exposed coral (DCCEEW 2024b).The estimated Australian population is over 23,700 mature individuals (Garnet and Baker 2021). No critical habitat to support the species is known from the Project Area. Whilst the species may be a transient visitor if there are areas of temporary low-lying water, this is not considered critical habitat that would sustain individuals or the species. It is expected that if the small shallow ephemeral clay pans within the Project Area are holding water, there would be more significant water features regionally. There are 14 BDBSA records (1991-1993) of the species in the SML Study Area (BDBSA 2024). These records are from Coorlay Lagoon and Lake Mary; which are over 25 km south of the SML Area. There are also 8 Birdlife records (1998-2006), these records are from Coorlay Lagoon and artificial habitats in the Olympic Dam Village, and Roxby sewage treatment dams (DEW 2025). The small claypans that occur in and adjacent the Project Area would not provide suitable habitat, and if water is present in these very small shallow pans, more suitable habitat would be present in inland lakes and dams of the Study Area. Given the lack of suitable habitat within the Project Area and limited recent records within the Study Area, the species is considered unlikely in the Project Area.	Unlikely
Curlew Sandpiper (*Calidris ferruginea*)	CE, MW	E	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both areas). The Curlew Sandpiper is a migratory wader which breeds outside of Australia (Menkhorst et al. 2017). The species mostly occur on intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (Geering et al. 2008). They have also been recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (DCCEEW 2023g). They can occur in both fresh and brackish waters. There are 4 BDBSA records within the Study Area from 1993-1994. These records are from Lakes Echo, Coorlay, Campbell and Mary (BDBSA 2024, DEW 2025). There is one Birdlife record from a Cane-grass Swamp on Borefield Rd in 2000 (BDBSA 2024, DEW 2025). There are no suitable core shorebird habitats (e.g. inland lakes, ephemeral drainage lines, Cane-grass Swamp) in the SML Area. The small claypans that occur in and adjacent the SML Area would not provide suitable habitat, and if water is present in these very small shallow pans, more suitable habitat would be present in inland lakes and dams of the Study Area. No ephemeral lakes or waterbodies are present within the EIGR Areas (Appendix B). Given the lack of suitable habitat within the Project Area and limited recent records within the Study Area, the species is considered unlikely in the Project Area.	Unlikely
Diamond Firetail (*Stagonopleura guttata*)	VU		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested that this species or species habitat 'may occur' in the buffer area only. The species has a broad distribution across south-eastern Australia from southern Queensland to the Eyre Peninsula in South Australia but previously extended into north Queensland (inland from Cardwell) (DCCEEW 2023f). Within South Australia the Diamond Firetail appears to have been separated into 3 isolated subpopulations (i.e. Eyre Peninsula, Mt Lofty to Southern Flinders Ranges, and the South East) (Higgins et al. 2007 cited in DCCEEW 2023f). The species occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats (including farmland and grassland with scattered trees), preferring areas with relatively low tree density, few large logs, and little litter cover but high grass cover (Menkhorst et al. 2017, DCCEEW 2023f). The nearest historic records of this species to the Project Area is closest to the southern-most EIGR Area within the Flinders Ranges, to the east and north-east of Port Augusta (DEW 2025). This record is over 20 km from the Project Area in very different habitat; hence the species is considered unlikely to occur in the SRE Project Area.	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Eastern Curlew Far Eastern Curlew (*Numenius madagascariensis*)	CE		The EIGR Areas PMST output suggested that this species or species habitat 'may occur' in the feature area. Migratory wader/large shorebird. Breeds in NE Asia, Siberia and is a spring migrant to Australia where it is found in all states. Within Australia, has a primarily coastal distribution, with very few inland records. Its preferred habitat is coastal lakes, inlets, bays and estuaries where it occupies intertidal mudflats, particularly exposed seagrass beds (Geering et al. 2008, Menkhorst et al. 2017, DCCEEW 2023d). Critical habitat includes areas for breeding (which are outside of Australia), foraging, roosting or dispersal. Important habitat in Australia includes those areas listed in the national Directory of Important Migratory Shorebird Habitat (Weller et al. 2020; DCCEEW 2023d). In South Australia areas listed as important habitat in the Shorebird Directory include the Coorong and associated lakes, Gulf St. Vincent (Weller et al. 2020). These important habitat areas are not in the Project Areas. No suitable seagrass habitat in the Project Areas. No BDBSA records within 40 km the closest record is from Yatala Harbour in the Upper Spencer Gulf. Hence this species is considered not to occur in the SRE Project Area.	Does not occur
Grey Falcon (*Falco hypoleucos*)	VU	R	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both areas). An elusive species occurring across almost all of Australia but noted in arid and semi-arid Australia including the Murray-Darling Basin, Eyre Basin, central Australia and WA (Marchant and Higgins 1993). Preferred habitat includes timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined watercourses, where they like to forage and breed (Garnett and Baker 2021). The species is considered a single monotypic population across Australia with no specific important populations identified (TSSC 2020). The species may forage widely, generally across open plains, if present, and feeds exclusively on other birds such as finches, doves, pigeons and parrots to the size of a Galah (Menkhorst et al. 2017, Garnet and Baker 2021). Critical habitat and important populations are not defined in the species' conservation advice, given the species occurs at such low densities (TSSC 2020). The area of occupancy is estimated at 1,690,000 km^2 (169,000,000 ha) within an extent of occurrence of 2,500,000 km^2 (250,000,000 ha) (Garnet and Baker 2021). There are no BDBSA records, but one Birdlife record of the species within the Study Area (BDBSA 2024). The species was recorded in 2000 near a Cane-grass Swamp on Borefield Road, over 51 km from the SML Area. There is a single Birds SA record on the eastern fringes of Port Augusta from 2001 (on NatureMaps DEW 2025) and this is approximately 13 km to the south-east of the southern-most EIGR Areas. There are no suitable timbered plains or tree-lined watercourses in the SRE Project Area for breeding and foraging; the sparse dune and swales, and chenopod gibber areas may be suitable for foraging only. Based on the above, whilst there are limited records, this rarely encountered species is considered possible (foraging only) in the SRE Project Area.	Possible (foraging only)
Latham's Snipe, Japanese Snipe (*Gallinago hardwickii*)	VU, MW		The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat 'may occur' within the 'feature area' (both areas). This shorebird species breed in Hokkaido and highland areas of Honshu in Japan and islands east of Russia. When not breeding, the species visit south-eastern Australia and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern SA, including the Adelaide plains, Mount Lofty Ranges, and the Eyre Peninsula (DCCEEW 2024c). The omnivorous species feeds of reed and grass seeds and invertebrates in soft mudflats or shallow water typically a night, early morning or evening. The species roost in small wetlands including urban water bodies, saltmarshes, creek edges, crops and pastures (DCCEEW 2024c). Critical habitats for the species include freshwater wetlands with low dense vegetation. They may also occur in saline or brackish water or grasslands, but in proximity to surface water (DCCEEW 2024c). Important habitats include those listed as internationally important or areas that support at least 18 individuals of the species (DCCEEW 2024c). There are 2 Birdlife records of the species within the SML Study Area (BDBSA 2024). These records are from Olympic Dam village and Roxby sewage treatment dams. There are no records of the species in the BHP Bird Database (BHP 2024a). There are no records near the EIGR Areas (DEW 2025). There are no suitable vegetated aquatic habitats that would support the food resources required for this species. The shallow ephemeral non-vegetated clay pan areas in the SML Area would not support the species and there are no ephemeral wetlands identified within the EIGR Areas (Appendix B). Given the lack of suitable vegetated aquatic habitat or records, this species is considered unlikely in the SRE Project Area.	Unlikely
Malleefowl (*Leipoa ocellata*)	VU	V	The EIGR Areas PMST output (Appendix A2 of Appendix B) suggests this species or species habitat is 'likely to occur' in the feature area. This species is a large ground-dwelling bird found mostly in mallee-dominated shrublands and low woodlands in the southern half of Australia. Within South Australia, the majority of records of the species are from the Eyre Peninsula and Murray Darling Basin region. Critical habitat needs include a sandy substrate and an abundance of leaf litter within which incubator style nests are built (DCCEEW 2024f). Densities of birds are greatest in areas of higher rainfall and on more fertile soils where shrub diversity is greatest (DCCEEW 2024f). No specific important populations have been defined for the species, however, all populations and areas occupied by Malleefowl are considered of equal importance (DCCEEW 2024f). Records of the species occurrence are typically associated with the mid Eyre Peninsula across to the Nullarbor Plain, with limited records of the species on the lower portion of the Eyre Peninsula and a notable absence of records from the upper north-west Eyre Peninsula, with the exception of 3 recent (2019) records of the species occurring near Point Lowly Road north of Whyalla (possibly the same individual) and an uncertain record within the Whyalla township from 1999 (DEW 2025). As there are no areas of mallee within the SRE Project Area; it is considered that the species does not occur in the SRE Project Area.	Does not occur
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit (*Limosa lapponica baueri*)	EN		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested that this species or species habitat 'may occur' within the feature area. Recent listing status change from Vulnerable to Endangered (Jan 5 2024). Three subspecies occur in Australia; the other 2 being *L. l. anadyrensis* and *L l. menzbieri* (DCCEEW 2024g). All of these large migratory shorebirds do not breed in Australia, but rather Siberia and Alaska (DCCEEW 2024g). When in Australia, the sub-species mainly occurs along the north and east coasts, in SA it mainly occurs form the coast near Lake Alexandrina (Coorong) to Denial Bay (past Ceduna) (DCCEEW 2024g), distant from the Project Area. They prefer edges of water or water with shallow tidal estuaries, as well as intertidal sandflats and beaches (Geering et al. 2008, DCCEEW 2024g). There are no records in the Project Area (DEW 2025).	Does not occur

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			As there is no wetland or coastal habitat which is preferred by this species within any of the EIGR Areas, it is considered that the species does not occur in the SRE Project Area	
Painted Honeyeater (*Grantiella picta*)	VU		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggests this species or species habitat 'may occur' in the feature area. The Painted Honeyeater is nomadic and sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory and may be a vagrant to South Australia (DotE 2015a). The species occurs in dry open forests and woodlands which contain a high number of mature trees (prefers *Acacia* woodland/*Allocasuarina* woodland) and is strongly associated with the presence of mistletoe. The species may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. Individuals of the species are rare throughout its range (Menkhorst et al. 2017). Key habitats include Boree/Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. Within South Australia, records for the species occurring are extremely sparse, typically associated near several heritage agreements north of Waikerie (DEW 2025). There are no records of the species occurring in proximity to the SML Area or the EIGR Areas (DEW 2025). Therefore, this species is considered unlikely to occur within the SRE Project Area.	Unlikely
Plains-wanderer (*Pedionomus torquatus*)	CE	E	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat 'may occur' within the 'feature area' (both areas). Plains-wanderer are distributed across north-central VIC, southern NSW, west-central QLD and across eastern SA. The species formerly was found in the south-east of SA, however, is considered to potentially be extinct from these areas (DotE 2015b). The species has core sites within NSW and Victoria but is known to inhabit QLD and SA where more marginal habitat exists (DotE 2015b). The species is rare and elusive, and typically occurs in sparse, treeless and lowland native grasslands with a strong preference to areas that have approximately 50% bare patches, with most vegetation less than 5 cm in height and widely spaced plants up to 30 cm (DotE 2015b). They inhabit sparse low grasslands where 50% of the bare ground supports cryptogramic crust and cannot persist in an agricultural landscape with introduced grasses and pesticide use (Garnet and Baker 2021). Records for the species within SA are typically sparse. There are no BDBSA or Birdlife records within the Study Area (BDBSA 2024, DEW 2025). The closest records (historical) for the species occur near Bon Bon Homestead within the Woomera Prohibited Area approximately 130 km west from the Action (DEW 2025). There is no suitable grassland habitat within the SML Area, or within the EIGR Areas (Appendix B). Based on the above, this species is considered unlikely in the SRE Project Area.	Unlikely
Princess Parrot, Alexandra's Parrot (*Polytelis alexandrae*)	VU	V	The SML PMST output (Appendix A1 of Appendix B) suggested that this species or species habitat 'may occur' within the 'buffer area only'. This species irregularly occurs across the arid zone from Oodnadatta (SA) to Coolgardie (WA), with core distribution in the Great Sandy Desert (Menkhorst et al. 2017). The species will spread into non-core areas following good rains, the Project Area is however well outside the species core and occasion ranges (Menkhorst et al. 2017). Princess Parrots are usually recorded from shrubland in swales between sand dunes, with occupied sites typically having a variety of shrubs (including *Grevillea, Hakea, Cassia* and *Eremophila* species) among scattered emergent trees, with ground-cover of spinifex (*Triodia*) species (TSSC 2018.They also occur in stands of Mulga and Sheoak (Menkhorst et al. 2017). There are no critical habitats listed for the species in the conservation advice (TSSC 2018). The Area of Occupancy (AOO) of the species is 10,000 km^2 (1,000,000 ha) (Garnet and Baker 2021). There are no BDBSA or Birdlife records of the species within the Study Area (BDBSA 2024). The nearest records in SA are over 700 km north-west of the SML Area in Mamungari Conservation Park (DEW 2025). Whilst the sparsely covered sand dune and swale vegetation in the Project Area may provide transient habitat for the species, key species such as Spinifex are not present (Appendix B). Given the lack of core habitat, distance from known clusters of records (over 700km away) and lack of records within the Study Area, this species is considered unlikely in the SRE Project Area.	Unlikely
Red Knot (*Calidiris canutus*)	VU, MW		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested that this species or species habitat is known to occur within the feature area. A migratory wader that is found across all coastal areas of Australia, but more commonly in the northern and eastern parts of Australia (DCCEEW 2024d). This species does not breed in Australia. Preferred habitat is intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours, and sometimes terrestrial saline wetlands near the coast (Higgins and Davies 1996). They rarely use inland lakes or swamps (Higgins and Davies 1996). There are limited recent and reliable records of the species occurring within South Australia (DEW 2025). There is one Birdlife record in the Study Area of the southern-most EIGR Area, from 2000 (ALA 2025). Following this, the nearest BDBSA records (2022, 2023) occur over 60 km away from Point Lowly north-east of Whyalla (DEW 2025). Given limited records in the Study Area, no records or suitable habitat within the SRE Project Area, the species is considered to unlikely to occur within the SRE Project Area.	Unlikely
Sharp-tailed Sandpiper (*Calidris acuminata*)	VU, MW	-	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both areas). This species maintains the migratory wetlands EPBC listing but has also been newly listed as a threatened under the EPBC Act (5 January 2024). The Sharp-tailed Sandpiper breeds in Siberia and migrates to New Guinea and Australia during the summer months (Geering et al. 2008, DCCEEW 2024e). During the non-breeding season, the Sharp-tailed Sandpiper migrates south to Australia where it occurs within all states, preferencing the south-east of the country in both inland and coastal localities, including freshwater and saline habitats (DCCEEW 2024e), but it prefers non-tidal fresh or brackish wetlands, damp grasslands, and will also utilise farms dams, wastewater irrigation areas, tidal flats, and beaches (Geering et al. 2008, Menkhorst et al. 2017, DCCEEW 2024e). The species is considered widespread across the eastern half of SA, and may be found as far north as Lake Eyre, extending to areas on the eastern margin of the Nullarbor Plain (Higgins and Davies 1996). Critical habitat includes areas for breeding (outside of Australia), foraging, roosting or dispersal. The highest density of this species generally occurs around grassy edges of shallow inland freshwater wetlands, as well as sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches (BirdLife Australia 2021). Important habitat includes those listed in the National Directory of Important Migratory Shorebird Habitat (DCCEEW 2024e). A site is considered a nationally important site if >85 individuals regularly occur (DCCEEW 2024e). No important populations have been identified in the Study Area or Project Area. There are 20 BDBSA records (1991-2020) and 9 Birdlife records (1998-2013) of the species within the Study Area (BDBSA 2024). The majority of records are from Lakes Coorlay, Purple Downs, Campbell, Mary and Shell Lagoon, which are all south of Roxby Downs over 25 km from the SML Area (DEW 2025). Some of the records are also from Lake Torrens, Roxby Downs sewage treatment pond and 2 of the records are south of Olympic Dam Village (1998-1999) (DEW 2025). Several scattered records exist between Olympic Dam and Port Augusta, within	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			broad proximity to the EIGR Areas, but all are from within inland ephemeral lakes which are not present within the EIGR Areas (DEW 2025). There are no records in the BHP birds database (to 2014) (BHP 2024a). There are however historical records in the SML (e.g. mortality in the Tailing Retention System (TRS) (BHP Billiton 2009). The SRE Project Area does not include inland freshwater wetland habitats. Whilst several small unvegetated claypans temporarily hold water for short periods, these are unlikely to support resources that would attract the species and the species has not been recorded within the SRE Project Area do date. These small clay pans also occur extensively across the region and the species is more likely to be attracted to more permanent water sources in the region when present (e.g. inland lakes, artificial dams, Roxby sewage treatment area). Based on the above, whilst there are some records and given the lack of habitat, this species is considered unlikely in the SRE Project Area.	
South-eastern Hooded Robin (*Melanodryas cucullata cucullata*)	EN		The EIGR Areas PMST output (Appendix A2 of Appendix B) suggested that this species or species habitat 'may occur' in the feature area. The South-eastern Hooded Robin prefer dry Eucalypt and Acacia woodland and shrublands with open understorey, patches of grassy areas and a complex ground layer for foraging (DCCEEW 2023e). Historic records of the subspecies within South Australia are restricted to the Yorke Peninsula, Mount Lofty Ranges and Fleurieu Peninsula region, the Murraylands and the South East region. There are no records for the threatened subspecies on the Eyre Peninsula or arid northern and central portions of SA in proximity to any of the Project Area. There are only records for the common Hooded Robin subspecies (*Melanodryas cucullata westralensis*) (DEW 2025, Menkhorst et al. 2023). As such, the species is considered unlikely to occur in the SRE Project Area.	Unlikely
Southern Whiteface (*Aphelocephala leucopsis*)	VU	-	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the feature area (both areas). Southern Whiteface was recently listed under the EPBC Act with conservation advice issued on 31 March 2023. It is distributed across most of mainland Australia south of the tropics (Schodde and Mason 1999; DCCEEW 2023c). The species occupies a wide range of open woodlands and shrublands which support an understorey of grasses and/or shrubs, often dominated by Acacias or Eucalypts on ranges, foothills and lowlands, and plains (Higgins and Peter 2002; DCCEEW 2023c). They forage at ground level preferring areas with low tree densities and patchy litter cover between understorey, feeding on invertebrates and seeds (Higgins and Peter 2002). The species is considered to be sedentary, occurring in small family groups up to flocks of 20 and often with thornbills (Readers Digest 1977, Menkhorst et al. 2017). There are 2 subspecies; South-west Southern Whiteface (*A. l. castaneiventris*), occurs in central and southern Western Australia and South-east (*A. l. leucopsis*), occurs in eastern WA to southern NT, southern Queensland all of SA and NSW, and northern Victoria (Menkhorst et al. 2017, Garnet and Baker 2021 DCCEEW 2023c). The latter subspecies is considered to have the larger more stable estimated population of the 2; 400,000 individuals. The entire species AOO is 7,000,000 ha across an Extent of Occupancy (EOO) of 419,000,000 ha (DCCEEW 2023c). The AOO estimate for the South-east subspecies is 6,000,000 ha within an EOO of 380,000,000 ha (Garnet and Baker 2021). From a bioregional perspective the Gawler IBRA Bioregion AOO is 375,600 ha (within an EOO of 15,085,800 ha), the Roxby IBRA subregion AOO is 49,200 ha (within an EOO of 1,445,100 ha), Arcoona Plateau AOO is 20,000 ha (within EOO of 1,671,600 ha and Gawler Lakes AOO is 56,000 ha (within an EOO of 2,965,100 ha) (as calculated within ALA spatial portal using IBRA shapefile import, 0.02 degree grid, ALA 2025). No important populations are defined in the Conservation Advice for the species, and the species has no conservation listing in SA. Habitat deemed critical for the survival of the species is defined as areas of relatively undisturbed open woodland and shrublands with an understorey of grasses of shrubs, habitat with low tree densities and an herbaceous understorey with litter cover which provides essential foraging habitat, and living and dead trees with hollows and crevices which are essential for roosting and nesting (DCCEEW 2023c). There are 23 BDBSA records (1990-2017) and 164 Birdlife records (1982-2015) of the species within the SML Study Area (BDBSA 2024, DEW 2025)). There are also 232 records within the BHP Birds Database, including from 6 regular monitoring sites in/adjacent the SRE Area (EV386, EV394, EV398, EV404, EV409, EV41 (BHP 2024a). In addition, the species was detected during targeted surveys of the SML Area in July 2024 (4 sites, 3 pairs and one individual (sites LEVC11 in the WIA, and EV393, EV409, EV394 in the SRE Area) (Appendix B). Based on the above, this species is considered known in the SRE Project Area.	Known
Thick-billed Grasswren (*Amytornis modestus*)	VU	V	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both areas). Thick-billed Grasswren occurs within 4 discrete populations within SA in the arid and semi-arid zones (Black et al. 2011), TSSC 2016b). One of the populations extends from the far north of SA down to the northern portions of the western margins of Lake Torrens, potentially to within proximity of the Action. The relevant subpopulation to the Project Area is known as Thick-billed Grasswren (north-west) (*Amytornis modestus indulkanna*) (Black et al. 2011, SA Museum 2021). If the species is present, it may be considered to be part of this important population of the species. *A. m indulkanna* prefers Oodnadatta Saltbush (a dwarf form of Old-man Saltbush, (*Atriplex nummularia*) or Cotton-bush (*Marieana aphylla*) north-west and west of Lake Eyre and Lake Torrens. Known landforms utilised by the subspecies include Oodnadatta Saltbush low shrubland on gibber, and atypical habitat includes low dunes near Lake Eyre South in Sandhill Cane-grass (*Zygochloa paradoxa*) (Black and Gower 2017). Black et al. (2011) also suggest that the "North West population" (*A. m. indulkanna*) occur in low shrublands dominated by chenopods, all heights of Oodnadatta Saltbush and less commonly in Cotton-bush or Black Bluebush (*Maireana pyramidata*) low shrubland. Other habitats where the "North West subspecies" were rarely detected included those dominant with Old Man Saltbush (*Atriplex nummularia* ssp. *spathulata*), Nitre Goosefoot (*Chenopodium nitrariaceum*), Nitrebush (*Nitraria billarderii*), Low Bluebush (*Maireana asterotricha*), Pearl Bluebush (*M. sedifolia*), and Spiny Saltbush (*Rhagodia spinescens*) (Black et al. 2011). Denser patches of shrub are often associated with flood out areas, run-on zones, and watercourses (DCCEEW 2024a, TSSC 2016b). Moseby (2012b) also suggests that deeper gilgais within stony tablelands country and run on areas supporting dense Swamp Cane-grass (*Eragrostis australasica*) and Cotton-bush low-lying areas and swales with gilgais and cracking clays provide suitable habitat for Thick-billed Grasswren. There are 5 BDBSA records (1996–2014) and 4 Birdlife records (2004-2006) of the species within the Study Area (BDBSA 2024, DEW 2025). There are no records for the species in the BHP birds database (BHP 2024a). The nearest 2 BDBSA/Birdlife records are ~18–20 km north-west of the Project Area within and adjacent the eastern and northern boundary of the ARR from 2006/2014 and further north-east (27 km from 2008) (BDBSA 2024). There are also 2 bird life records over 36 km east near Lake Torrens (2004, 2006) (BDBSA 2024, DEW 2025). Limited suitable habitat is present in the Project Area. No Oodnadatta Saltbush was present and a small patch of Cotton-bush was only present around a very small artificial low lying area in close proximity to the existing mine site. Whilst very low chenopod shrublands are present on swales within the Project area, the density and cover is very sparse and considered unsuitable for Thick-billed Grasswren. The species was not detected during recent vegetation assessments and bird surveys across the Project Area, and the EIGR Areas are considered to be south of the species' distribution (Appendix B).	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			Based on the above, this species is considered unlikely in the SRE Project Area.	
Western Grasswren (*Amytornis textilis myall*)	VU	V	The EIGR Areas PMST output (Appendix A2 of Appendix B) suggests this species or species habitat 'may occur' in the feature area. The Western Grasswren (*Amytornis textilis myall*) is scattered and widespread in the Myall Creek and Pine Creek drainages of the north-eastern Eyre Peninsula, bounded in the south by Munyaroo Conservation Park, and in the north towards Lake MacFarlane and eastern Lake Gairdner and Lake Gilles Conservation Park (Garnett and Baker 2021). The species prefers low dense chenopod shrublands, mainly comprising Black Bluebush (*Maireana pyramidata*) and Australian Boxthorn (*Lycium australe*) and spiny shrubs, however, it also prefers semi-arid low open woodlands, mostly comprising Western Myall (*Acacia papyrocarpa*) and Senna shrublands (Black et al. 2009, Menkhorst et al. 2017). Preferred habitats are in drainage lines as well as low rocky hills (DotE 2014). Core habitats are known to occur in the Whyalla to Iron Knob corridor (Garnett and Baker 2021). The species' conservation advice suggests all populations of the species are considered to have high conservation value and that the species occurs in severely fragmented isolated subpopulations at 10 locations (DotE 2014). More recently the Action Plan for Australian Birds and International Union for Conservation of Nature (IUCN) assessment data suggests there is one subpopulation of approximately 12,000 individuals and this subpopulation is not severely fragmented (Garnett and Baker 2021). This population is known to extend west to north-west of Whyalla for approximately 170 km. The species does not extend as far north as Port Augusta, as evidenced by historic records, and as the southern-most EIGR Areas is north of Port Augusta, the species is considered unlikely to occur in the SRE Project Area.	Unlikely
Migratory species (not considered threatened species above)				
Migratory wetland (functional group – waders)				
Common Sandpiper (*Actitis hypoleucos*) (PMST suggests likely/known)	MW	R	The PMST outputs (Appendix A of Appendix B) suggested that these species or species habitat is 'likely to occur', is 'known to occur' or 'may occur' within the 'feature area'. These species all migrate from the northern hemisphere, and are non-breeding visitors to Australia (Geering et al. 2008; DCCEEW 2024a). Habitats preferences vary from predominantly coastal or near-coastal (Pectoral Sandpiper) to shallow water generalists that range between coastal and inland wetted environments (Common Sandpiper, Oriental Plover) (Geering et al. 2008). There are only records for the Common Sandpiper within the Study Area, predominantly Birdlife records from nearby dams (e.g. Olympic Dam Village, Roxby sewage treatment dam and a farm dam 15 km south-east of Project Area (DEW 2025). There are no records in the Project Area in the BHP Birds Database (BHP 2024a). Suitable habitat for these wading species in the Project Area only includes several highly ephemeral non-vegetated clay pans when water is present. These clay pans are unlikely to support suitable food resources for migratory waders. There are no Cane-grass swamps or watercourse and the clay pans, would only hold water for short durations of time. There are no ephemeral water bodies located within any of the EIGR Area (Appendix B). Hence suitable habitat for these migratory waders is very limited, extremely localised, and temporary, and these species are considered as only possible occurrences in the Study Area and unlikely in the SRE Project Area.	Unlikely
Pectoral Sandpiper (*Calidris melanotos*) (PMST suggests known/may)	MW	R		
Oriental Plover, Oriental Dotterel (*Charadrius veredus*) (PMST suggests may occur)	MW	-		
Migratory wetland				
Osprey (*Pandion haliaetus*)	MW	-	The SML PMST output (Appendix A1 of Appendix B) suggested that this species or species habitat 'known to occur' within the 'buffer area only'. Large coastal fish-eating raptor. Species distribution includes all coastal areas of Australia, also occurs around the world. Nests on coastal cliffs in SA, but also known to use artificial substrates, transmission line towers, utility poles, boat masts in marinas (Menkhorst et al. 2017, ALA 2025). Key known breeding areas are largely coastal (cliffs), and in South Australia the species extends from the head of the Bight to Cape Spencer and Kangaroo Island (DCCEEW 2024a) and occurs in small and fragmented locations (Dennis 2007). Records for this species more commonly occur on the west coast and southern portion of EP, over 230 km south-west of the SML Area, and south of the southern-most EIGR Areas (DEW 2025). Critical aquatic habitat does not occur in the Study Area or Project Area. Core populations and breeding areas occur well outside the Study Area, Project Area (DEW 2025). No BDBSA or Birdlife records within the SML Study Area (BDBSA 2024), with only a single recent record located over 4 km to the west of Port Augusta, approximately 11.5 km to the south of the southern-most EIGR Areas (BDBSA 2025, DEW 2025). No known nests have been detected in the Project Area to date. No suitable aquatic habitat supporting fish as a food resource in the Project Area (Appendix B). Based on the above, this species is considered unlikely in the SRE Project Area.	Unlikely
Migratory terrestrial (functional group)				
Grey Wagtail (*Motacilla cinerea*)	MT	-	The PMST outputs (Appendix A of Appendix B) suggested that these species or species habitat 'may occur' within the 'feature area' (both areas). The Grey and Yellow Wagtails are terrestrial migratory species, both rarely seen, occasional visitors to Australia in their non-breeding seasons (DCCEEW 2024d). The Grey Wagtail prefers higher altitudes, near fast-running water, rocky substrates, lakes and marshes (DotE 2015c). The Yellow Wagtail prefers lower altitude, well-watered open grassland, fringes and wetlands, and may roost in Mangroves and other dense vegetation (DotE 2015c). There are no records for either species within the SRE Study Area (BDBSA 2024) or the EIGR Areas (DEW 2025). There is no suitable habitat for either species in the Project Area. Both species are considered unlikely to occur in both Project Area.	Unlikely
Yellow Wagtail (*Motacilla flava*)	MT	-		

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Migratory marine				
Fork-tailed Swift/Pacific Swift (*Apus pacificus*)	MM	R	The PMST outputs (Appendix A of Appendix B) suggested that this species or species habitat 'is likely to occur' within the 'feature area' (both areas). The Fork-tailed Swift is a non-breeding visitor to Australia and is almost exclusively an aerial species. In SA the species is widespread from the VIC border west to Spencer Gulf, and also across southern Eyre Peninsula and extending north to Flinders Ranges, the Lake Eyre drainage basin, Lake Eyre south and Marree (DCCEEW 2024e). They occur aerially, over mostly dry inland plains, as well as foothills, coastal areas, cliffs and beaches, and populated areas. In SA the species is present from October–May but is most common from December–March (DCCEEW 2024a, Menkhorst et al. 2017). It does not breed in Australia. There are no BDBSA record, but 3 Birdlife records (1986, 1999, 2001) for the species within the SML Study Area (at the Olympic Dam Airport and the Roxby Downs Sewage Treatment works) (BDBSA 2024). No records near the EIGR Areas (DEW 2025). Species was recorded flying over Whyalla in December 2023 (G. Smith pers. comm). There is no suitable habitat in the Project Area (Appendix B). If present the species would only occur as a flyover species. Based on the above, this species is considered possible as flyover species.	Possible (flyover species)

[1] EPBC Act Status: Critically Endangered (CE), Endangered (EN), Vulnerable (VU), Migratory Marine (MM), Migratory Terrestrial (MT), Migratory Wetland (MW), Conservation Dependent (CD);

[1] *National Parks and Wildlife Act 1972* (SA) Status: Endangered (E), Rare (R), Vulnerable (V)

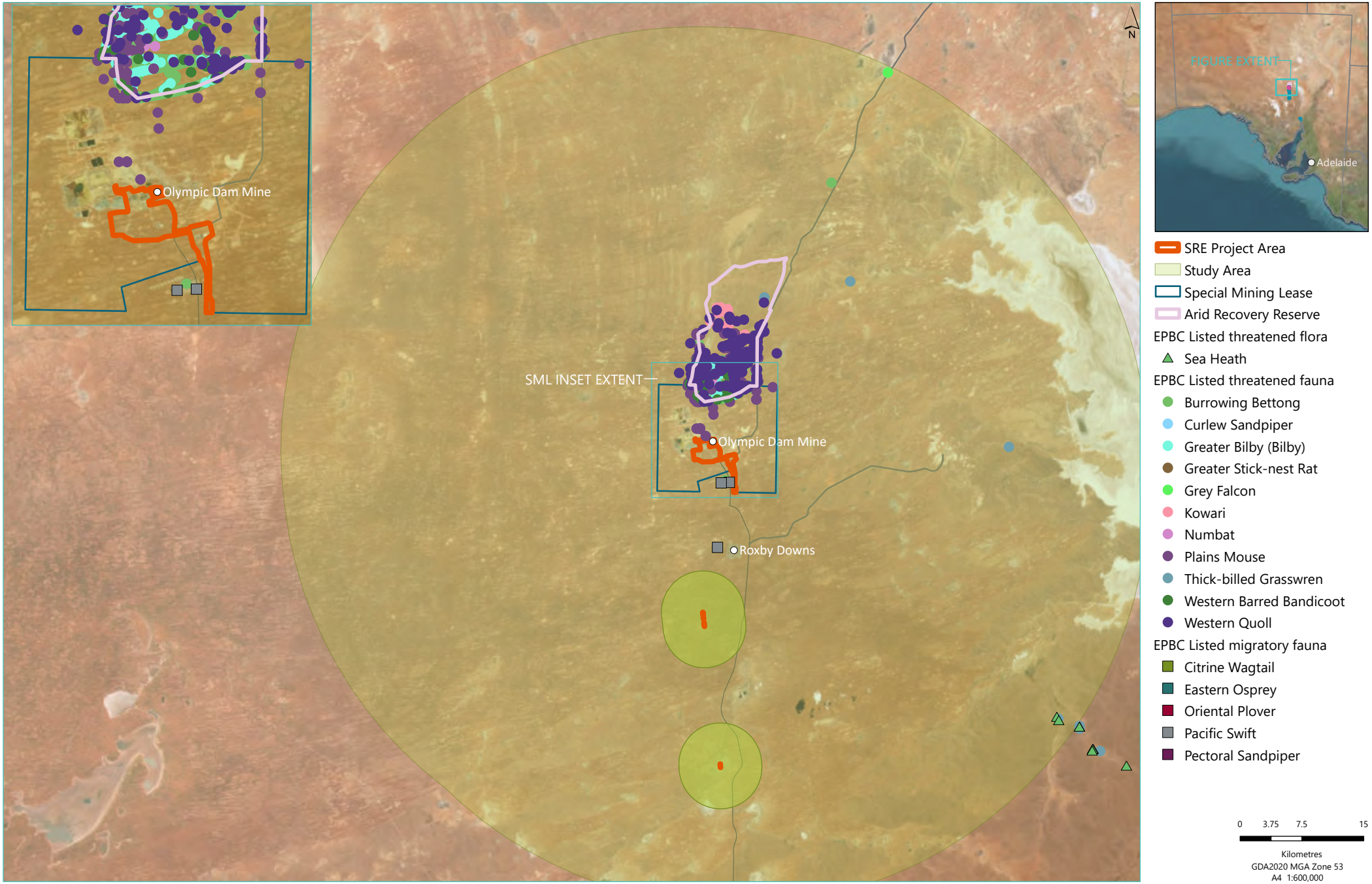


Figure 2.4: EPBC-listed flora and fauna in the SML Study Area
SRE Project Ecological Assessment

LATHWIDA

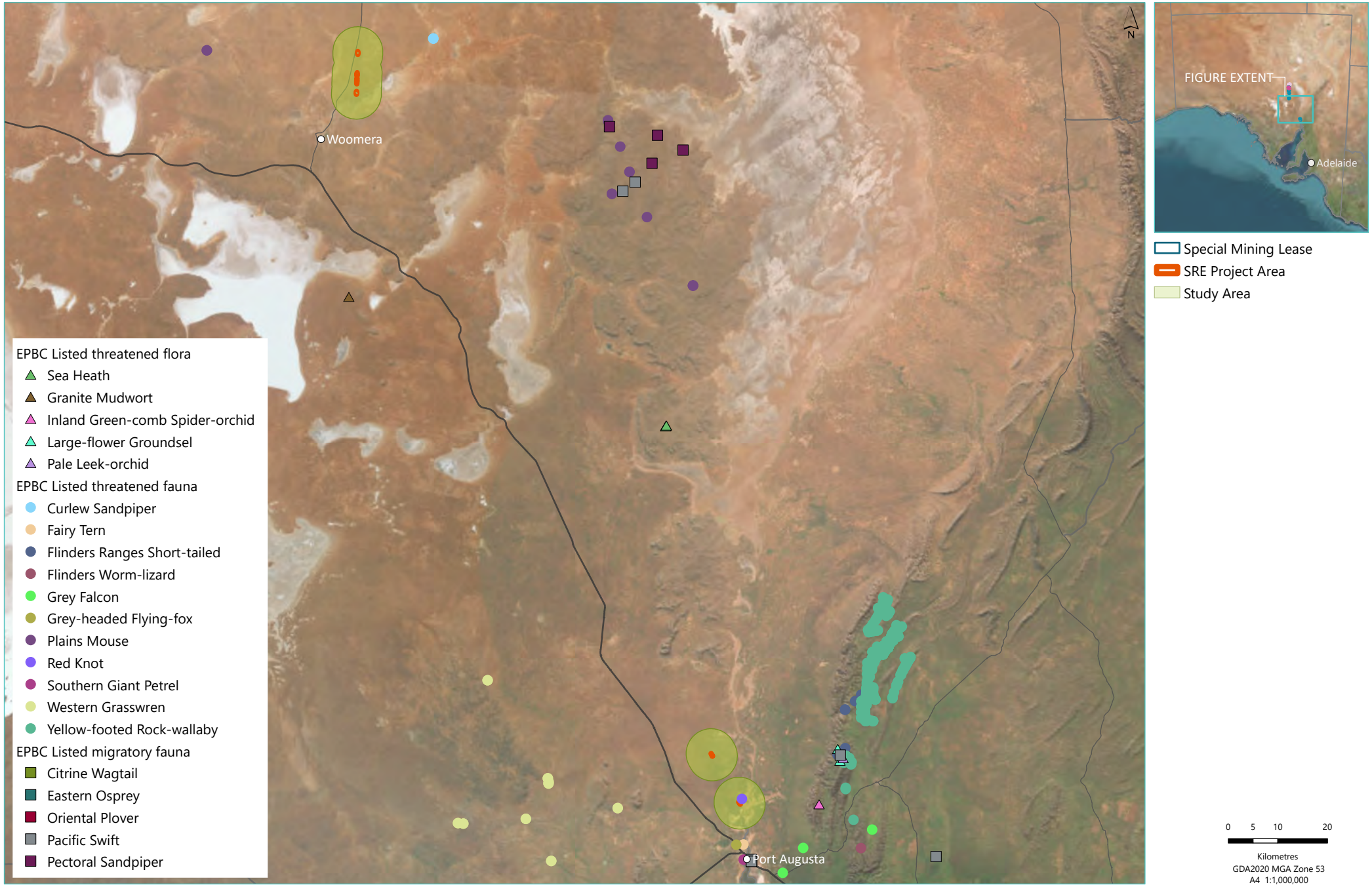


Figure 2.5: EPBC-listed flora and fauna near/adjacent the EIGR Areas
SRE Project Ecological Assessment

LATHWIDA

2.2.5 State-listed species or habitat

A search of the BDBSA identified 10 NPW Act-listed flora species and 24 NPW Act-listed fauna that may occur within 50 km of the SML Area and 5 km of the EIGR Areas (Figure 2.6 and Figure 2.7). Of those, 4 NPW Act listed flora species and 7 NPW Act-listed fauna species are considered likely or possible to occur within the Project Area (Figure 2.6 and Figure 2.7). The likelihood of occurrence assessment was informed by vegetation assessments undertaken in July 2024 (SML Area) and October 2024 (EIGR Areas) to characterise the vegetation associations of the SRE Project Area (Appendix B).

Whilst there are no records within the SRE Project Area (BDBSA 2024), NPW Act-listed flora species, additional to those that also have an EPBC Act rating, that are considered likely to occur or which may possibly occur within the SRE Project Area are:

- Cupped Sea-heath (*Frankenia cupularis*) (Rare, possible to occur)
- One-bristle Everlasting (*Gratwickia monochaeta*) (Rare, possible to occur)
- Sandalwood (*Santalum spicatum*) (Vulnerable, likely to occur)
- Clay-pan Swainson-pea (*Swainsona oligophylla*) (Rare, possible to occur).

Whilst there are no records for the SRE Project Area (BDBSA 2024), NPW Act-listed fauna species, additional to those that also have an EPBC Act rating, that are considered likely to occur or which may possibly occur within the SRE Project Area are:

- Australian Bustard (*Ardeotis australis*) (vulnerable, possible to occur)
- Black Falcon (*Falco subniger*) (rare, likely to occur)
- Flock Bronzewing (*Phaps histrionica*) (rare, likely to occur)
- Little Eagle (*Hieraaetus morphnoides*) (vulnerable, likely to occur)
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) (rare, possible to occur)
- Peregrine Falcon (*Falco peregrinus macropus*) (rare, likely to occur)
- Scarlet-chested Parrot (*Neophema splendida*) (rare, possible to occur).

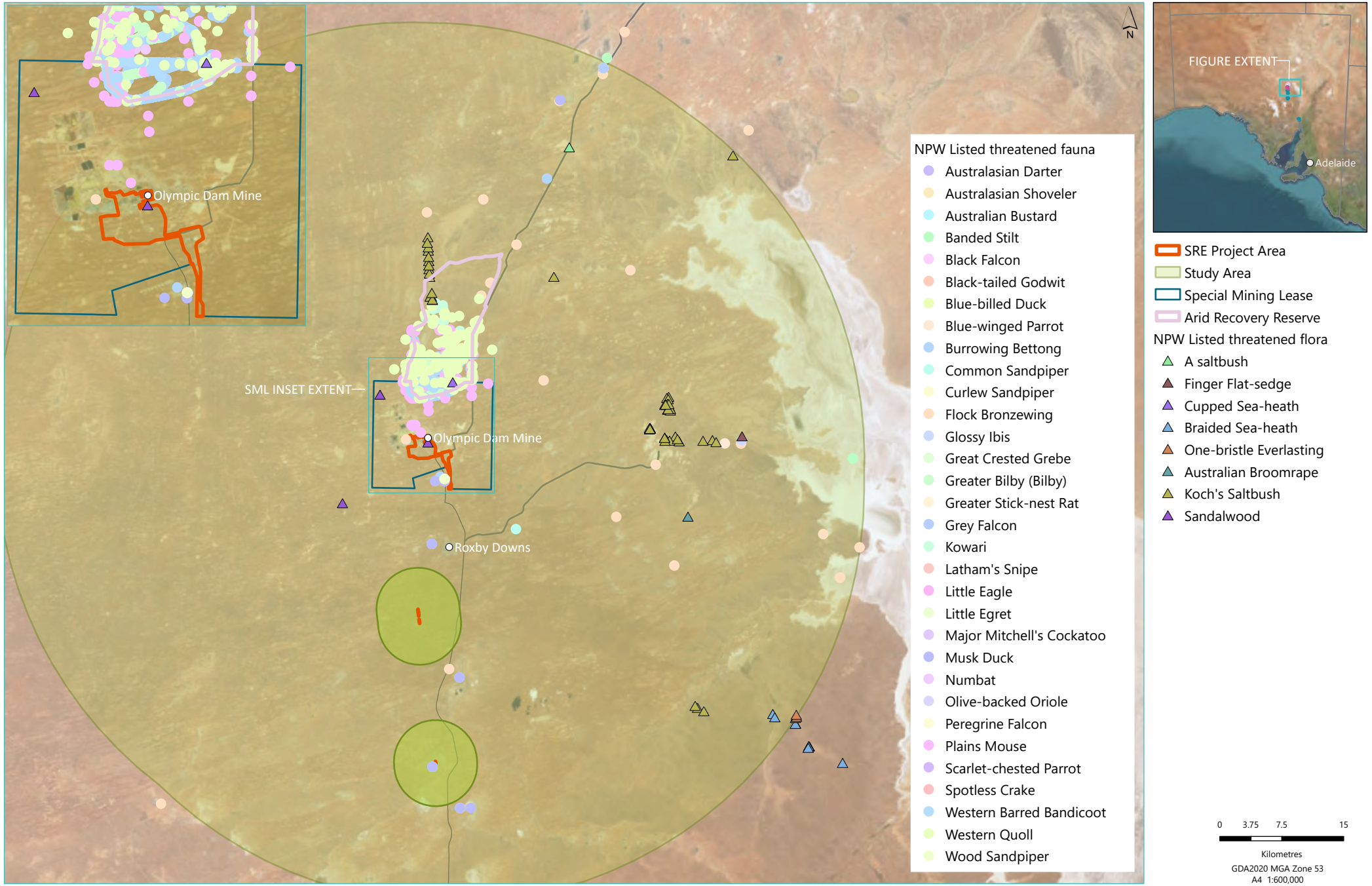


Figure 2.6: NPW-listed flora and fauna in the SML Study Area
SRE Project Ecological Assessment

LATHWIDA

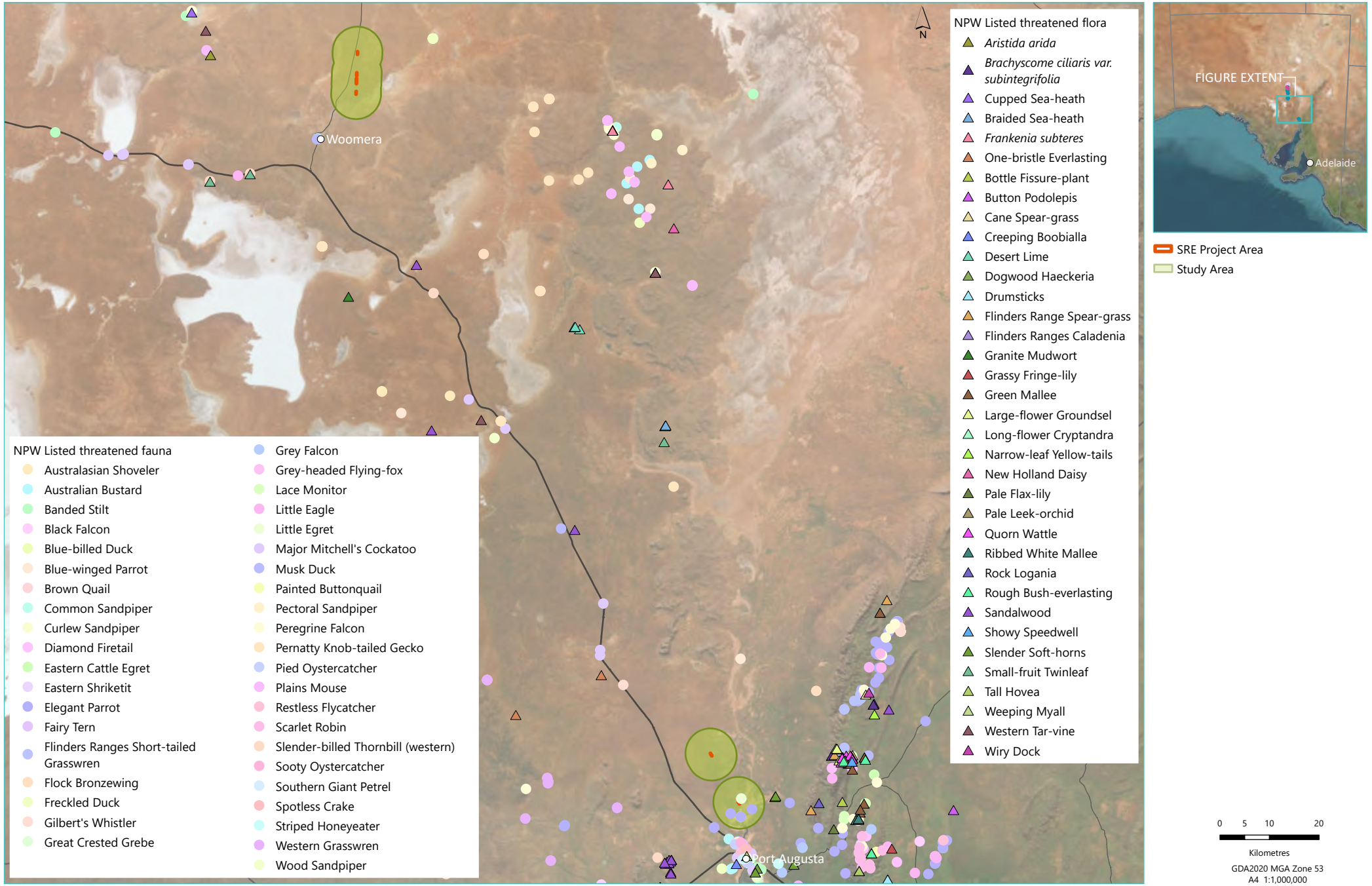


Figure 2.7: NPW-listed flora and fauna near/adjacent the EIGR Areas
SRE Project Ecological Assessment

LATHWIDA

Table 2.5: Records for NPW Act threatened flora and fauna (from 1995, excluding species already listed under EPBC Act)

Species	EPBC Act[4]	NPW Act[5]	Justification	Likelihood
Threatened Flora				
Swamp Chinese-lantern (*Abutilon oxycarpum* ssp. *Prostrate* (A. A. Mitchell PRP 1266))	-	R	One record in the Study Area (2007) (BDBSA 2024). Only 3 records in whole of SA (DEW 2025). Recorded several plants in clay flats between sand dunes of Mulga and Umbrella Bush over low herbs and shrubs. Whilst suitable habitat is present, record is very distant from SRE Project Area and no records near Project Area to date.	Unlikely
Weeeping Myall (*Acacia pendula*)	-	V	One BDBSA record in Study Area from 2023, in Roxby Village. Recorded in *Acacia salicina, Acacia papryocarpa, Casuarina glauca, Eucalyptus spp., woodland over Acacia ligulata, Typha domingensis, Enchylaena tomentosa var.* and *Einadia nutans (*BDBSA 2024). No other records in the region (DEW 2025). Potentially planted.	Unlikely
Koch's Saltbush (*Atriplex kochiana*)	-	V	Endemic to SA, known from a few sites around Lake Torrens and Oodnadatta (SSA 2025). Many records in the Study Area (52 recent records and 19 historical records) (BDBSA 2024). Most recent record 2008. Clusters known from near Lake Torrens (Andamooka) and 16 km north of Olympic Dam. No records near SRE Project Area (BDBSA 2024, DEW 2025).	Unlikely
A saltbush (*Atriplex morrisii*)	-	V	One record from 2015, from Borefields Road north of Roxby Downs (BDBSA 2024). No other records in SML Study Area or EIGR Study Areas (DEW 2025)	Unlikely
Finger Flat-sedge (*Cyperus dactylotes*)	-	V	One record from 2004 between Andamooka and Lake Torrens (BDBSA 2024). No other records in SML Study Area or EIGR Area Study Areas (DEW 2025). No suitable aquatic habitat in SRE Project Area.	Unlikely
Cupped Sea-heath (*Frankenia cupularis*)	-	R	Grows on sand flats and saltpans (SSA 2025) Records from 2012 (plants located inside and outside ARR) (BDBSA 2024). No other records in SML Study Area or near EIGR Areas (DEW 2025). Although no records in the Project Area, given presence near ARR, may emerge on edges of clay pans if conditions are suitable.	Possible
One-bristle Everlasting (*Gratwickia monochaeta*)	-	R	Three historical records from 1996 near Stonewall Dam (BDBSA 2024). Occurs in sandy swales (SSA 2025). Records near Stuart Highway between Pernatty Lagoon and Port Augusta (DEW 2025). Suitable habitat present. Responds to rainfall. Recorded near Oak Dam on sandy swales / low dunes in spring 2024 (Lathwida pers. comm.)	Possible
Native / Australian Broomrape (*Orobanche cernua* var. *Australiana*)	-	R	Grows in sand dunes and sandy creek beds, parasitic on native *Senecio* species, 50 cm tall erect conspicuous shrub with purple flowers (SSA 2025). One record from 2004 from White Dam near Andamooka closer to Lake Torrens (BDBSA 2024). No other records in Study Area or SRE Project Area (DEW 2025).	Unlikely
Sandalwood (*Santalum spicatum*)	-	V	Numerous records in Study Area, 9 historical records (1966-1989) and 30 recent records (1996-2024) in the Study Area (BDBSA 2024). Three records near the SML / edges of SRE Area. Few records near EIGR Areas (DEW 2025). Conspicuous shrub to 5 m high, leathery dark green leaves in pairs (SSA 2025), not detected within the SRE Project Area to date (Appendix B).	Likely
Clay-pan Swainson-pea (*Swainsona oligophylla*)	-	R	One record from 2007 north of Project Area in SML where it is locally common on low clay flats between dunes with Mulga and Umbrella Bush over low herbs and shrubs (BDBSA 2024). Occurs on red sand, clay pans and plains, purple pea flowers (SSA 2025). Can be dormant, flowers between August and October (SSA 2025). No other records in Project Area (DEW 2025).	Possible
Threatened birds				
Australasian Darter (*Anhinga novaehollandiae novaehollandiae*)	-	R	SRE Project Area is within species known range. Occurs solitarily or in groups. Forages for fish in smooth inland waters, rarely estuaries and will nest in trees over water (Menkhorst et al. 2023). 3 birdlife records (1998-2000) from Olympic Dam Village and Roxby WWTP. Also, 5 BDBSA records (1991-1993 from Lake Coorlay). Suitable habitat in the Study Area includes the WWTP lagoons, nearby lakes and dams. There is no suitable aquatic habitat in the SML Area or EIGR Areas.	Unlikely
Australasian Shoveler (*Spatula rhynchotis*)	-	R	SRE Project Area is within species known range. Can be a breeding resident in permanent wetlands or nomadic elsewhere. Prefers permanent, well-vegetated wetlands, but will also use most freshwater habitats (Menkhorst et al. 2023). 5 Birdlife records (1999-2002) from Olympic Dam Village and Roxby WWTP lagoons. Suitable freshwater habitat in the Study Area includes the WWTP lagoons, nearby lakes and dams. There is no suitable freshwater habitat in the SRE Project Area.	Unlikely
Australian Bustard (*Ardeotis australis*)	-	V	SRE Project Area is within species known range. Occurs in the open country of inland Australia, that includes dry grasslands, open woodlands, sand plains with spinifex, low semi-arid heath, pasture, stubble and ploughed fields. Is usually present in pairs, families or larger groups if resources are abundant (e.g. following mouse or locust plagues, or recently burnt country (Menkhorst et al. 2023). One Birdlife record (1998) from Olympic Dam Village. No records in BHP database to 2015. Limited records, but may occur in swale habitats of the SRE Project Area if prey resources were abundant.	Possible

[4] EPBC Act Status: Critically Endangered (CE); Endangered (EN); Vulnerable (VU); Migratory Marine (MM); Migratory Terrestrial (MT); Migratory Wetland (MW).
[5] *National Parks and Wildlife Act 1972* (SA) Status: Endangered (E); Rare (R); Vulnerable (V).

Species	EPBC Act[4]	NPW Act[5]	Justification	Likelihood
Banded Stilt (*Cladorhynchus leucocephalus*)	-	V	SRE Project Area is within species known range. Resident shorebird that prefers salt lakes and other large saline areas (e.g. saline wetlands, saltworks, sheltered marine inlets or lagoons. Nesting occurs on islands in inland salt lakes after floods facilitate boom in invertebrate prey (Menkhorst et al. 2023). 10 Birdlife records (1998–2001, 2 with no spatial reliability, and 12 historical BDBSA records (1990-1994), BDBSA 2024). Has been recorded at the Olympic Dam and Roxby WWTPs, Coorlay Lagoon, Shell Lagoon, Lake Mary, Lake Torrens, cane-grass swamp on Borefield road (BDBSA 2024). However, given there is no suitable saline habitat in the SRE Project Area, species is only an occasional visitor to the nearby aquatic areas.	Unlikely
Black Falcon (*Falco subniger*)	-	R	SRE Project Area is within species known range. Generally occurs in open inland habitats, and will move to coastal areas in when conditions are good. Will forage above agricultural machinery or similar and fires awaiting prey to be flushed (e.g. pigeons, cockatoos) (Menkhorst et al. 2023). 3 Birdlife records (1998-2015) near SML, Olympic Dam Village and Andamooka (low spatial reliability) (BDBSA 2024). Although there are no records in the SRE Project Area, given open swale habitats occur and common birds such as pigeons and cockatoos are present, species is considered likely.	Likely
Blue-billed Duck (*Oxyura australis*)	-	R	SRE Project Area is on the edge of species' occasional range. Occurs in deep aquatic waters, freshwater wetlands and rarely seen ashore (Menkhorst et al. 2023). There are Birdlife records in Olympic Dam WWTP and Roxby WWTP (5 from 1998 to 2011, 2 of these have not spatial reliability), and 7 historical BDBSA records (1991-1993) from Lakes Coorlay, Campbell and Mary (BDBSA 2024). Also ~20 were detected in Roxby WWTP during CNPI survey, August 2024 (Lathwida 2026a) No suitable deep water aquatic habitat is present in the SRE Project Area.	Unlikely
Bluebonnet (Eastern and Naretha) (*Northiella haematogaster SA:* ssp.)	-	Ssp.(R)	Listing is for Western ssp. / Naretha Bluebonnet (*Northiella narethae*). Project Area not within listed species range (Menkhorst et al. 2023). The common eastern and central SA Bluebonnet *Northiella haematogaster* is known to occur in the SRE Project Area (BDBSA 2024).	NA
Flock Bronzewing (*Phaps histrionica*)	-	R	The SRE Project Area occurs on the edge of the species occasional range. They inhabit semi-arid areas, open grasslands, and particularly favour Mitchell Grass downs, savanna, saltbush and spinifex flats. The population fluctuates widely, retreating to the Barkely Tableland in the NT / QLD during drier periods (Menkhorst et al. 2023). There are 23 BDBSA records in Study Area (from 2013), including one record in the SML (tailings ponds (BDBSA 2024). The majority of records for the species are around Roxby and north to north-east SA on the edge of dams, borrow bits and lagoons (DEW 2025). Suitable open saltbush habitat occurs in the SRE Project Area, likely to be present during better conditions and may be attracted to shallow areas of water.	Likely
Freckled Duck (*Stictonetta naevosa*)	-	V	SRE Project Area is within the species range. Sedentary species that occurs around permanent freshwater, unless conditions are poor. Will also occur on large wetlands. Feeds mostly in shallow water around large open lakes, roosting in dense foliage, on the water or on secluded banks (Menkhorst et al. 2023). 3 Birdlife records in Study Area from Coorlay Lagoon, and Roxby WWTP (2002-2009, no spatial reliability) (BDBSA 2024). No records in SML or SRE Project Area (DEW 2025). No suitable aquatic habitat in the SRE Project Area.	Unlikely
Glossy Ibis (*Plegadis falcinellus*)	-	R	SRE Project Area is on the edge of species occasional range. Feeds on invertebrates in shallow freshwater, and occasionally in estuarine waters or dry grasslands. Roosts in trees near water (Menkhorst et al. 2023). 3 Birdlife record in Study Area from Coorlay Lagoon, Olympic Dam Village and Chimney Hole Dam (1999-2009, one with no spatial reliability), 7 historical BDBSA records from Lakes Purple and Coorlay (BDBSA 2024). No records in SML or SRE Project Area (DEW 2025). No suitable aquatic habitat in the SRE Project Area (Appendix B).	Unlikely
Great Crested Grebe (*Podiceps cristatus australis*)	-	R	SRE Project Area is on the edge of species occasional range. Breed on freshwater wetlands with open water (for feeding on fish) and vegetation (for nest anchorage). Prefers larger deep freshwater bodies, but will also congregated on large saline lakes and sheltered coastal waters (Menkhorst et al. 2023). 3 Birdlife records in Study Area from Olympic Dam Village and Lake Mary (1999-2007), 10 historical BDBSA records from Lake Coorlay (BDBSA 2024). No records in SML or SRE Project Area (DEW 2025). No suitable aquatic habitat in the SRE Project Area (Appendix B).	Unlikely
Grey Currawong (*Strepera versicolor*)	-	Ssp. (E)	The rating is for Pied Currawong (south-east subspecies, *Strepera graculina ashbyi*) and Grey Currawong (far western subspecies, *Strepera versicolor plumbea*). Record (which is over 50 km north-east of the SML) is for a common subspecies likely *S. v. melanoptera*.	NA
Hooded Robin (*Melanodryas cucullata*)	-	Ssp. (R)	The rating is for south-eastern *Melanodryas cucullata cucullata*. At this location the record is likely for common western subspecies *M. c. westralensis*	NA
Jacky Winter (*Microeca fascinans*)	-	Ssp. (R)	The rating is for eastern subspecies *Microeca fascinans fascinans*. At this location the record is likely common subspecies *M. f. assimilis*.	NA
Little Eagle (*Hieraaetus morphnoides*)	-	V	SRE Project Area is in species range. A mostly solitary specie that occurs in open, wooded habitats across Australia. Preys on birds and rabbits (Menkhorst et al. 2023). 10 Birdlife records (1998-2001) from Olympic Dam Village and Roxby Downs, one historical BDBSA record from Lake Mary (BDBSA 2024). Widespread records across SA (DEW 2025). Suitable habitat, records and prey (birds and rabbits in the SRE Project Area). Likely to occur foraging over study area.	Likely
Little Egret (*Egretta garzetta nigripes*)	-	R	SRE Project Area occurs on the edge or outside of species range. Occurs in a variety of wetlands, usually with open water 10-15cm deep. The Australian subspecies also occurs in saline wetlands, tidal flats, mangrove-lined estuaries, saltworks and beaches (Menkhorst et al. 2023). One Birdlife record in SML Study Area (5 km SSE of Olympic Dam from 2001, BDBSA 2024). Prefers fresh or saltwater wetlands, which do not occur in the SRE Project Area.	Unlikely
Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)	-	R	SRE Project Area occurs is on the edge of the range of the listed species. Occurs rarely and patchily in semi-arid woodlands, including mallee, mulga and native pine (*Callitris*), feeding in trees or on the ground (Menkhorst et al. 2023). The subspecies likely to occur would be *Lophochroa leadbeateri mollis* (does not currently have EPBC rating). One record in the SML Study Area (1999, 5 km SSE of the Olympic Dam Village), multiple records across the northern EP (BDBSA 2024, DEW 2025). Suitable foraging habitat in the Project Area would include mulga and *Callitris* woodlands.	Possible

Species	EPBC Act[4]	NPW Act[5]	Justification	Likelihood
Musk Duck (*Biziura lobata menziesi*)	-	R	SRE Project Area is partially within species range (southern areas). Occurs in deep freshwater wetlands with patches of dense aquatic vegetation, non-breeding individuals also congregate in marine waters (Menkhorst et al. 2023). Over 35 Birdlife and BDBSA records in SML Study Area from nearby lakes or Olympic Dam and Roxby WWTPs (1998-2011, BDBSA 2024). No records in SML or SRE Project Area. No suitable deep aquatic habitat in the SRE Project Area.	Unlikely
Olive-backed Oriole (*Oriolus sagittatus sagittatus*)	-	R	SRE Project Area is outside of species range, which includes Vic, NSW, QLD and northern NT/WA. The species is a resident in northern Aus and migrates to southern/eastern areas in the summer. Occurs in eucalypt open forest and woodlands, rainforest edges, riparian and coastal vegetation, treed farmland, parks and gardens (Menkhorst et al. 2023). One BDBSA record (2012) in the SML Study Area, captured in mist net in ARR (DEW 2025). No suitable habitat in the SRE Project Area.	Unlikely
Peregrine Falcon (*Falco peregrinus macropus*)	-	R	SRE Project Area is within species range. Occurs in most habitats across Australia with suitable nest sites; cliff faces are preferred, including man-made. Will also use stick nests made by other species. Preys on other birds, primarily parrots, pigeons, waterfowl, starlings and small seabirds (Menkhorst et al. 2023). 3 Birdlife records in the Study Area (1998-2002) from Olympic Dam Village and WWTP, historical BDBSA record (1988) from Roxby Downs (BDBSA 2024, DEW 2025. Wide-ranging species. No suitable cliff nesting habitat in Project Area, but may nest in other raptor nests nearby and common prey species do occur in SRE Project Area.	Likely
Scarlet-chested Parrot (*Neophema splendida*)	-	R	SRE Project Area is within species occasional range. Occurs across mid and north SA in arid mallee and *Acacia* woodland with a diverse understorey, also in recently burnt areas. A nomadic species that will feed on the ground or in low vegetation (Menkhorst et al. 2023). 2 Birdlife records in the Study Area (2001, Olympic Dam), 2 historical BDBSA records (1975-1993) and 3 recent BDBSA records (2023), however these were NVC data upload errors (BDBSA 2024, DEW pers. com). There are no records in the SRE Project Area (DEW 2025). Suitable non-essential habitat occurs in the Project Area, primarily in denser areas with diverse understorey.	Possible
Spotless Crake (*Zapornia tabuensis*)	-	R	SRE Project Area is on the edge of species occasional range. A waterbird that occurs in wetlands with dense vegetation, particularly freshwater wetlands with Bullrush (*Typha*). Forages in shallow water and mud, may have seasonal dispersion (Menkhorst et al. 2023). Two Birdlife records (1998, 2000), from SSE Olympic Dam Village (BDBSA 2024). No records in Project Area or suitable aquatic habitat in the SRE Project Area ((DEW 2025, Appendix B).	Unlikely
Wood Sandpiper (*Tringa glareola*)	-	R	SRE Project Area is on the edge of species range. A migratory shorebird that is more common in northern Aus. Occurs in freshwater wetland, particularly with sedges and taller vegetation, forages near shorelines in mud or water (Menkhorst et al. 2023). 5 Birdlife records in Study Area from Olympic Dam and Roxby WWTPs, Coorlay Lagoon (2000-2009), historic BDBSA records (1991-1994) in Lake Purple and Lake Coorlay and one record in 2020 (BDBSA 2024). No records in SML or Project Area (BDBSA 2024, DEW 2025). No suitable aquatic habitat in the SRE Project Area.	Unlikely

2.2.6 Other MNES

Additional MNES, including Ramsar Wetlands of international importance, Commonwealth marine areas, world heritage areas, national heritage places, the Great Barrier Reef Marine Park and water resources (that relate to coal seam gas development and large coal mining development) have been assessed and have been deemed as either not relevant or having no potential impact due to excessively large distances from the SRE Project.

Distances of the SRE Project to other MNES and a description are presented in Table 2.6.

Table 2.6: Summary of distances of the SRE Project to other MNES

MNES	Distance to SRE Project (km)	Description
Ramsar Wetlands of International Importance	>250	A review of the location of listed Ramsar wetland locations (DCCEEW 2021a) indicates that the nearest Ramsar Wetland to the proposed SRE Project is the Coongie Lakes; located over 250 km north-east of the Project Area. Given no Ramsar wetlands occur in the Study Area or the Disturbance Footprint and the distance between the Action and the nearest Ramsar wetlands, no impacts to this MNES are expected.
Commonwealth marine areas	>400	The nearest Commonwealth marine area to the proposed SRE Project is the Western Eyre Marine Park, located over 400 km to the south-west of the Project Area off the coast of Streaky Bay (DEW 2025). Given the SRE Project does not interact with the marine environment in any way, no impacts to this MNES are expected.
World heritage areas	>660	A review of the World Heritage Properties was undertaken using Australia's World Heritage List and NatureMaps (DCCEEW 2021b, DEW 2025). The nearest world heritage site to the SRE Project is the Willandra Lakes Region in NSW, located over 660 km to the south-east from the Project Area (DEW 2025). Given the distance between the proposed SRE Project and the nearest world heritage place, no potential impacts to this MNES are expected.
National heritage places	>110	A review of Australia's National Heritage List (DCCEEW 2021c) found the nearest national heritage places to the proposed SRE Project are the Ediacara Fossil Site in Nilpena (located over 110 km to south-east of the Project Area on the eastern side of Lake Torrens) and Kati Thanda-Lake Eyre National Park and Elliot Price Conservation Park/Lake Eyre South (located over 110 km north-east of the Project Area (DEW 2025). Given the distance between the proposed SRE Project and the nearest national heritage places, no potential impact to this MNES are expected.
Great Barrier Reef Marine Park	>1500	The closest point of the Great Barrier Reef Marine Park to the SRE Project is located over 1,500 km north-east of the Project Area. Given the distance between the proposed SRE Project and the Great Barrier Reef Marine Park, no potential impacts to this MNES are expected.
Water resources that relate to coal seam gas development and large coal mining development	NA	The SRE Project is not directly or indirectly associated with a coal seam gas development or large coal mining development. Therefore, it is considered the proposed SRE Project does not trigger the MNES and thus do not require an assessment of the potential for significant impacts to the whole of the environment.

2.2.7 Hydrology

The Olympic Dam location receives very little rainfall and has a high evaporation rate (BoM 2025b). Despite this, rain events are often of a high intensity, which can lead to localised flooding given the flat topography of the local area. Stormwater is temporarily held in swales or clay pans before it evaporates or infiltrates. Larger rainfall events can take several weeks to infiltrate or evaporate, however regional saline lakes, would provide better quality ephemeral habitat for aquatic fauna and flora. There are no rivers, creeks or floodplains within the vicinity of the SRE Project (Surface Water Impact Assessment Appendix of the EIS).

The SML occurs within the Roxby land system, which is characterised by many small, enclosed catchments that are each bound by east-west trending dunes (on average up to 8 m high). These individual catchments typically contain a boundary that is formed by the crest of the dunes, a swale and a lower depression, often a clay pan (BHP Billiton 2009, Surface Water Impact Assessment Appendix of the EIS).

All stormwater within the Olympic Dam mine and processing plant is managed and diverted to stormwater ponds to prevent discharge of contact water from the SML to the environment (BHP 2024d).

2.2.7.1 Surface water and flooding

There is an absence of permanent surface water in the vicinity of Olympic Dam, however flooding in the area occurs at various scales and frequencies. Mechanisms for flooding include (BHP Billiton 2009):

- Mainstream flooding: when the volume of water exceeds the channel's carrying capacity and the water flows out to the floodplain. Floodwater recedes as water moves down the catchment, usually relatively quickly (hours or days after a storm event)
- Surface ponding: caused by either regional inundation of flat areas or surface run-off collecting in terminal catchment depressions. No or minimal movement of floodwater means water may be present for long periods of time (typically weeks, occasionally months, rarely years).

Historically, during flooding events near Olympic Dam it is relatively common for closure of unsealed roads (particularly north of Olympic Dam) and this has also occurred for major roads and train lines (e.g. in 1989 and 2022 (BHP Billiton 2009; DIT 2023).

The proposed SRE Project is not at risk from regional flooding. There are no rivers, creeks or floodplains in the vicinity of the SRE Project (including the EIGR Areas). Stormwater which collects in dune swales will be excluded from the site by bunding and the building up of pads above the stormwater pooling level. Rainfall runoff collected from proposed infrastructure will be directed to the existing Olympic Dam stormwater management system. Additional storage capacity will be constructed to allow for collection of water from the SRE Project Area.

At the interface of the proposed infrastructure and the natural environment, future dune swale stormwater water levels may vary from current in the order of ±10 cm in a 1% Annual Exceedance Probability (AEP) storm, with negligible change in pooling water levels during typical more frequent runoff events (Surface Water Impact Assessment Appendix of the EIS).

2.2.7.2 Groundwater dependent ecosystems

Groundwater within the broader Olympic Dam region generally occurs in the fractured rocks tens of meters below the surface. Groundwater generally moves very slowly, from west to east, and ultimately discharges to Lake Torrens, a regional evaporative sink approximately 30 km to the east (BHP Billiton 2009). The primary aquifers with the ability to transmit groundwater relevant to the SRE Area are the Andamooka Limestone Aquifer and the deeper Tent Hill Aquifer (Soil and Groundwater Impact Assessment).

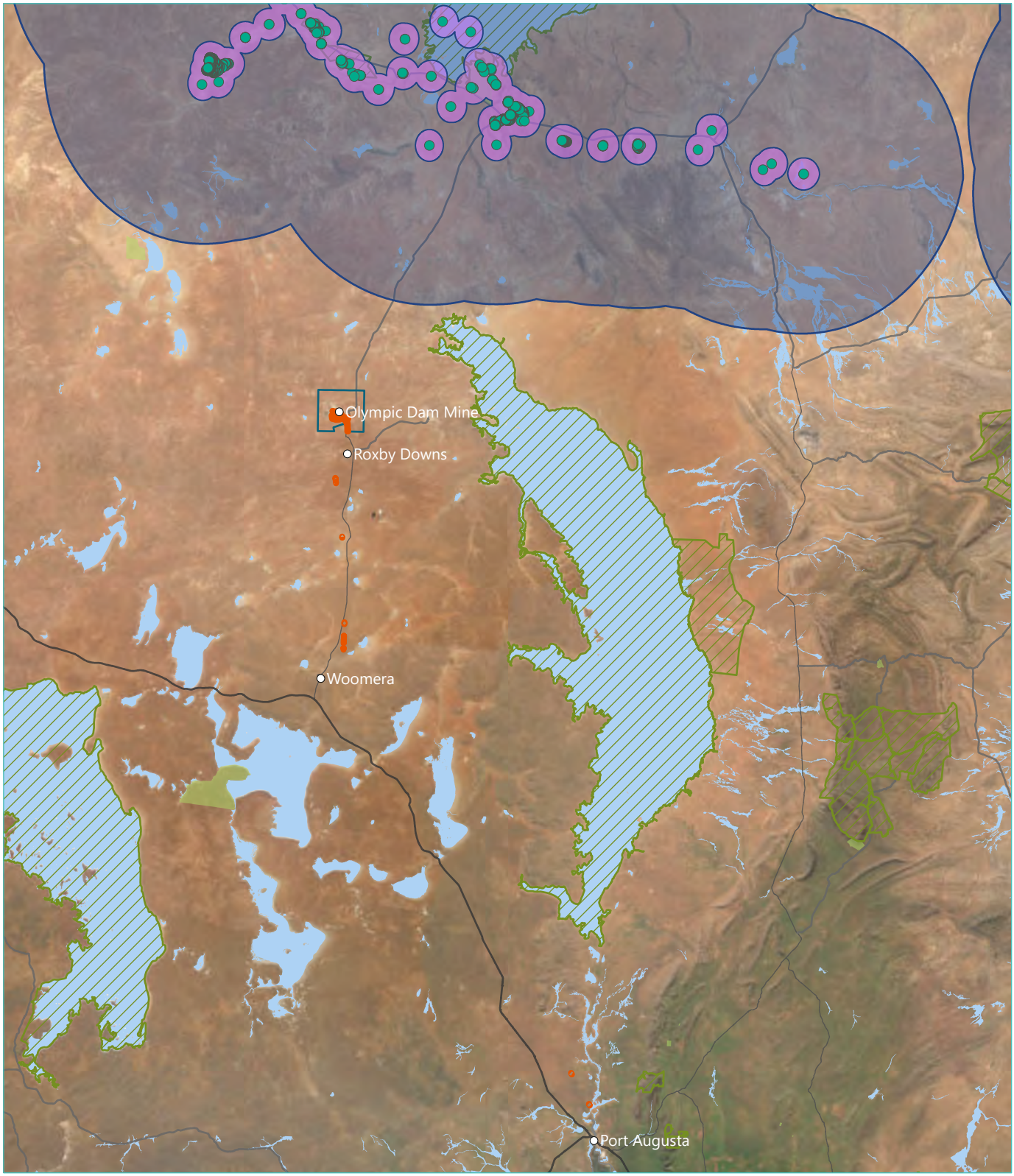
The presence of groundwater dependent ecosystems was investigated as part of the draft Olympic Dam Expansion EIS (BHP Billiton 2009). The baseline groundwater dependent ecosystem assessment identified Yarra Wurta Spring (one of a complex of springs) as the closest groundwater dependent ecosystem to Olympic Dam, lying about 45 km to the north-east of Olympic Dam.

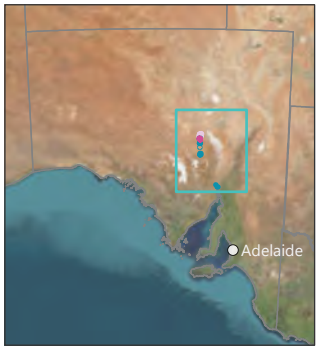
The Soil and Groundwater Impact Assessment Appendix to the EIS has also concluded there are no potential GDEs located in proximity to the SRE Area, being the primary location for project activities. However potential aquatic GDEs were identified in the SML Area, namely claypans that can accumulate sediments and can hold water for a period of time. The Soil and Groundwater Impact Assessment indicates that any groundwater opportunistically accessed by GDEs would be hydraulically separate from the Andamooka and Tent Hill Aquifers, and such GDEs are considered unlikely to utilise the high salinity groundwater (Soil and Groundwater Impact Assessment). It should also be noted that the limited number of claypan areas within the SML were devoid of vegetation during the baseline survey, in particular no deep-rooted vegetation (commonly associated with GDEs) was present (refer Appendix B).

From a regional perspective, the extent of the Great Artesian Basin is mapped as occurring within proximity to Olympic Dam, however the Far North Prescribed Wells Area (PWA) (Zone A and Zone B in Figure 2.8) is north of Olympic Dam and the SML Area (not in a PWA) (DEW 2025). There is no riparian vegetation that represents those associated with a GDE in the vicinity of the SRE Project Area (DEW 2025). One EIGR Area is located between Purple Swamp and Purple Lake but does not intersect watercourses; 4 EIGR Areas are west of Lake Richardson and avoid intersecting watercourses. The southern most EIGR Area north of Port Augusta, largely avoids ephemeral watercourse (DEW 2025).

There are no Wetlands of National Importance in or adjacent the SRE Project Area; the nearest being Lake Torrens to the east and south-east of the SML Area (DEW 2025, Figure 2.8). Lake Torrens and potential watercourse springs which may have reliance on groundwater associated with Lake Torrens are the nearest sensitive groundwater receptors to the SML Area. These sensitive receptors are considered unlikely to be affected by the SRE Project given they are located over 30 km away (Soil and Groundwater Impact Assessment).

Based on the above it is considered there are no GDEs in the SRE Project Area and surrounds, additionally no drawdown is required as part of the Project.





SRE Project Area
Special Mining Lease
Far North PWA GAB Springs
Far North PWA Zone A
Far North PWA Zone B
National Park
Vegetation Heritage Agreement Area

N

0 15 30 60

Kilometres

GDA2020 MGA Zone 53
A4 1:1,750,000

Figure 2.8: Potential GDEs in proximity to the SRE Project
SRE Project Ecological Assessment

LATHWIDA

2.2.7.3 Aquatic ecology

Aquatic ecology refers to the environmental values of temporary inland waters or wetlands within and adjoining the SRE Project Area. A baseline aquatic ecology assessment was undertaken for the Oak Dam Retention Lease Proposal, located approximately 65 km south-east of Olympic Dam (Lateral 2022). The assessment took into consideration a desktop review including database searches of the Atlas of Living Australia (ALA), NatureMaps (DEW 2025), the PMST, EPA SA Aquatic Ecosystem Condition Reports, DEW's Water Data SA and previous aquatic ecology studies in and around the Arcoona Plateau region. Lateral (2022) identified that the dominant wetland types in the region are claypans, Cane-grass swamps and ephemeral river pools.

Aquatic environments were also reviewed as part of the draft Olympic Dam Expansion EIS, which describes the Olympic Dam region as supporting few natural permanent water bodies with drinkable water (BHP Billiton 2009). Noted exceptions were springs of the Great Artesian Basin and waterholes on the larger rivers in the north-east of the region (such as Clayton and Frome Rivers and Strzelecki Creek), which can persist for months after infrequent but large flows. Saline springs in the region were also identified in the region, including Yarra Wurta Spring near Lake Torrens, and large ephemeral lakes that provide important waterbird habitat.

The key features of Yarra Wurta Spring are described in BHP Billiton (2009), and include:

- no aquatic flora or plant associations of conservation significance were recorded at the spring or surrounding areas
- the main biological feature of Yarra Wurta Spring is that is supports a population of fish species, the Desert Hardyhead/Lake Eyre Hardyhead (*Craterocephalus eyresii*)
- a community of aquatic invertebrates, including Brine Shrimp (*Parartemia minuta*), the small cladocerans (*Daphniopsis queenslandesnsis* and *Moina baylyi*), several species of ostracods, chironomids and rotifers have previously been recorded in Yarra Wurta Spring (Williams et. al. 1998 cited in BHP Billiton 2009)
- none of the aquatic invertebrates identified were identified as rare, threatened or otherwise significant.

No aquatic taxa of conservation significance were identified during the desktop review of the SRE Project Area and Study Area. The Soil and Groundwater Impact Assessment Appendix to the EIS has also concluded there are no aquatic ecosystems located in proximity to the SML Area, being the primary location for project activities.

Based on the above it is considered there are no aquatic ecology environments or aquatic ecological values in the SRE Project Area and surrounds.

2.2.8 Weeds and pests

A search of the BDBSA extract for the Study Area identified 20 species with national and/or state weed status that potentially occur in the SRE Project Area, as presented in Figure 2.7. Monitoring conducted by BHP during Financial Year (FY) 2022 to 2023 (FY23) identified the following pest plant species declared under the LSA Act in the Olympic Dam area of influence:

- Prickly Pear (*Opuntia* sp.)
- Buffel Grass (*Cenchrus ciliaris*)
- Innocent Weed (*Cenchrus incertus*)
- Fountain Grass (*Cenchrus setaceus*)
- Caltrop (*Tribulus terrestris*)
- Salvation Jane (*Echium plantagineum*)
- Athel Pine (*Tamarix aphylla*).

None of these species were detected during the recent surveys of the Project Area but are likely present. There are records for all of these species within the SRE Project Area in the BHP Pest Plants database, and some are within areas mapped as 'Existing Disturbance' (e.g. Athel Pine near LEOP09, Lathwida 2026a). There are also areas of Buffel Grass south of Roxby Downs along the Olympic Dam Highway west of Coorlay Lagoon (Figure 2.9).

There are also records for non-declared weeds in the SML Area; Paddy Melon (*Cucumis myriocarpus ssp. myriocarpus*), Rosy Dock (*Rumex vesicarius*) and Saffron Thistle (*Carthamus lanatus*) (BDBSA 2024) and an additional 49 species recorded across Olympic Dam in the BHP Pest Database (BHP 2024c, Figure 2.9). Additional non-declared weeds in the EIGR Areas included Wild Turnip (*Brassica tournefortii*), Chilean Brome (*Bromus lithobius*) and sparse cover of Ward's Weed (*Carrichtera annua*) (Section 5.1.2 of Appendix B).

Table 2.7: Summary of weeds identified in Study Area and SRE Project Area (BDBSA 2024)[1]

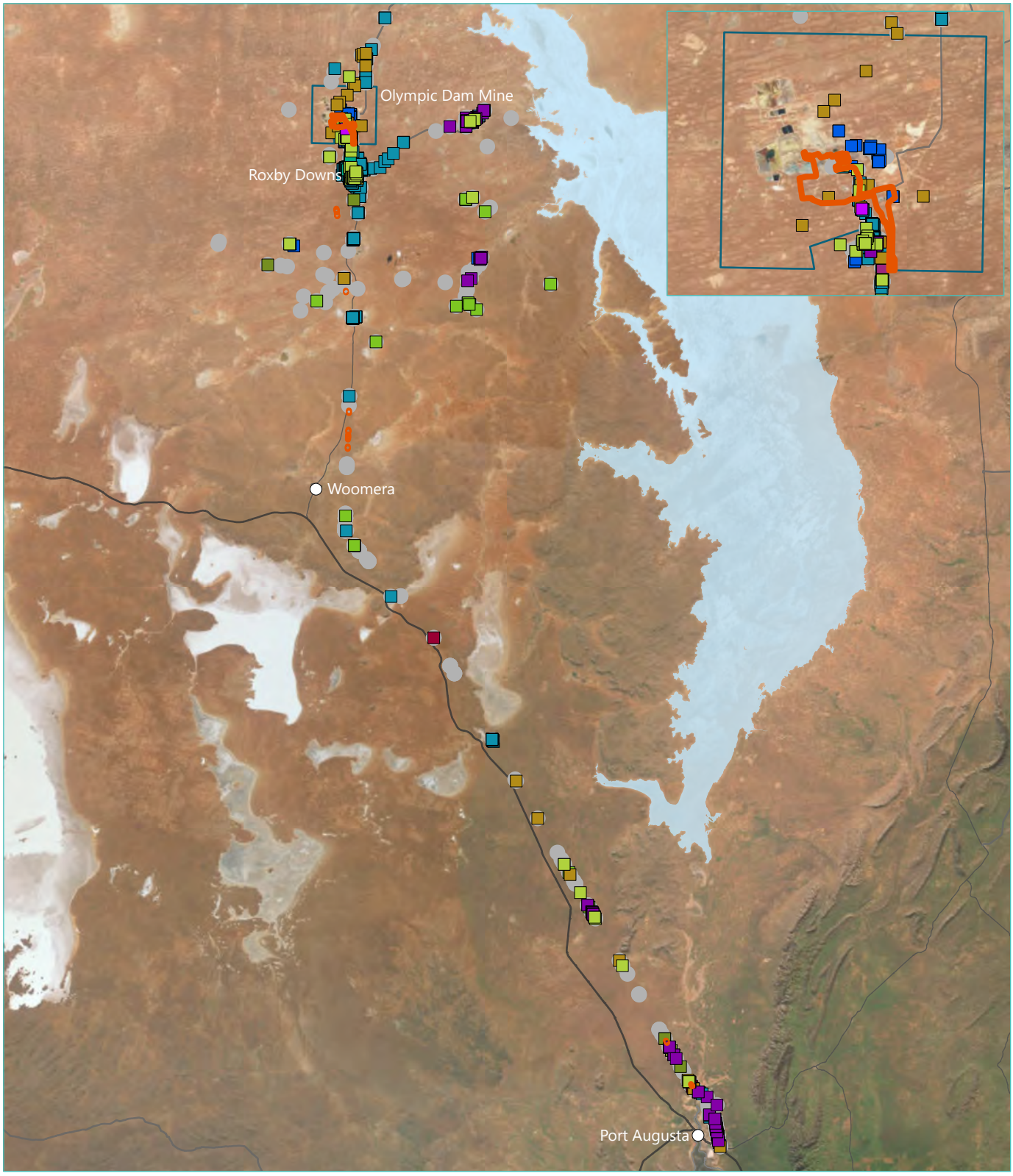
Common name	Scientific name	Weed status		Records within SRE Project Area
		State (LSA Act)	Commonwealth	
Khaki Weed	*Alternanthera pungens*	Declared	-	
Buffel Grass	*Cenchrus ciliaris*	Declared	-	1 (2017)
Spiny Burr-grass	*Cenchrus longispinus*	Declared	-	
Fountain Grass	*Cenchrus setaceus*	Declared	-	
Boxing Glove Cactus	*Cylindropuntia fulgida* var. *mamillata*	Declared	WoNS	
Devil's Rope Pear	*Cylindropuntia imbricata*	Declared	WoNS	
Salvation Jane	*Echium plantagineum*	Declared	-	1 (2016)
Gazania	*Gazania linearis*	Declared	-	

Common name	Scientific name	Weed status		Records within SRE Project Area
		State (LSA Act)	Commonwealth	
Common Lantana	*Lantana camara*	Declared	-	
African Boxthorn	*Lycium ferocissimum*	Declared	WoNS	
Horehound	*Marrubium vulgare*	Declared	-	
Calomba Daisy	*Oncosiphon suffruticosum*	Declared	-	
Riverina Pear	*Opuntia elata*	Declared	WoNS	
Red-flower Prickly Pear	*Opuntia elatior*	Declared	WoNS	
Grizzly Bear Cactus	*Opuntia polyacantha* var. *hystricina*	Declared	WoNS	
Erect Prickly Pear	*Opuntia stricta*	Declared	WoNS	
Three-corner Jack	*Rumex hypogaeus*	Declared	-	
Athel Pine	*Tamarix aphylla*	Declared	WoNS	9 (2000-2014)
Caltrop	*Tribulus terrestris*	Declared	-	1 (2007)
Bathurst Burr	*Xanthium spinosum*	Declared	-	

[1] BHP's FY22–23 Annual Environmental Protection and Management Program Report identified Innocent Weed (*Cenchrus incertus*) as present in the Olympic Dam region (BHP 2023b)

Thirteen introduced vertebrate species have been recorded in the SML. The main introduced pests are the Red Fox (*Vulpes vulpes*), Cat (*Felis catus.*), House Mouse (*Mus musculus*), House Sparrow (*Passer domesticus*) and Rabbit (*Oryctolagus cuniculus*). Monitoring of feral animal populations is undertaken regularly by BHP and control undertaken when required (IMS Element 8 Monitoring Program Fauna, BHP 2023c).

Monitoring of introduced pests and abundant species during FY25 showed that kangaroos and rabbits continue to exist in higher densities compared to other introduced species (i.e. foxes, cats and wild dogs). Kangaroo numbers remain relatively high, however rabbit numbers overall have continued to remain below numbers observed before the release of rabbit haemorrhagic disease virus in March 2017 (BHP 2025). Evidence of rabbits was detected during the 2024 baseline survey and lack of recruitment of some palatable overstorey species (e.g. Mulga) also concurs with this. Cat and fox tracks were also observed in sand dune environments during the survey (Appendix B).





SRE Project Area
Special Mining Lease
Non-Declared Weeds

Declared Weeds

- African Boxthorn
- Athel Pine
- Bathurst Burr
- Buffel Grass
- Calomba Daisy
- Caltrop
- Devils Rope Cactus
- Fountain Grass
- Gazania
- Horehound
- Khaki Weed
- Prickly Pear
- Salvation Jane
- Three-corner Jack

N

0 10 20 40

Kilometres

GDA2020 MGA Zone 53
A4 1:1,250,000

Figure 2.9: Declared and non-declared weeds in proximity of the SRE Project Area

2.3 Conclusion

The baseline ecological environment of the SRE Project Area is characterised by typical vegetation communities for the arid zone region in SA. The SML Area include sand dunes with Umbrella Bush, Bullock Bush and or White Cypress-pine and swales of chenopod shrubland with tall shrubs including Mulga. The condition of the vegetation varies from degraded to medium/high quality with few weeds, but impacts from rabbits are evident and there are areas with dead stands of Mulga and reduced recruitment of the taller shrubs, particularly the native pines and Mulga. The SML Area is also immediately adjacent the existing Olympic Dam mine and includes areas of existing disturbance (e.g. tracks, pilot plant, transmission line). Outside of the SML, the EIGR Areas are comprised of low chenopod shrubland on stony gibber plains, clay plains or low sand dunes with mixed Acacia tall shrublands. These areas are in moderate condition occurring beneath an existing transmission line with existing access tracks.

The SRE Project Area does not include any areas with deep cracking clays which would provide potential critical refuge habitat for Plains Mouse, and there are no permanent aquatic habitats which would support migratory waders. There are limited ephemeral drainage areas, and none with dense Cane-grass Swamp vegetation or tall dense Chenopod shrubland suitable for key threatened species such as Plains Mouse or Thick-billed Grasswren. Given the lack of suitable habitat for Plains Mouse, targeted surveys involving trapping or camera deployment were not undertaken. Whilst there were limited opportunities for targeted survey involving call-playback for Thick-billed Grasswren due to the lack of suitable habitat, survey for the species occurred as part of general bird surveys and the targeted survey for Southern Whiteface. This included a focus on any high-pitched calls heard (e.g. those from fairy wrens) to confirm (via observation) they were not Thick-billed Grasswren calls.

Based on the surveys undertaken and the habitat availability and suitability for MNES, the following was found for the SRE Project:

- No EPBC Act-listed TECs occur in the SRE Project Area.
- No EPBC Act-listed threatened flora are considered known, likely or possible to occur in the SRE Project Area.
- Of thirty threatened EPBC Act-listed fauna species identified in the Protected Matters database, and 2 additional species identified from BDBSA historic records, one is considered known to occur and 3 are considered as possible occurrences, based on surveys to date and habitat availability within the SRE Project Area. These are:
    - Southern Whiteface was considered to be present with the SRE Project Area. Nine individuals were recorded at 5 locations within the SRE Project Area and at least 8 individuals were recorded on a subsequent survey immediately south of the SML (Appendix B).
    - Plains Mouse was considered as a possible occurrence, but only during irruptive years when the species expands into a broader range of non-critical habitat types. No cracking clay habitats occur in the SRE Project Area.
    - Blue-winged Parrot was considered as a possible occurrence, during non-breeding winter migration only.

- Grey Falcon was considered as a possible occurrence (foraging only), no treed watercourses were present for nesting.
- The remaining 28 fauna species were considered unlikely to occur, or to not occur, in the Project Area (Table 2.4). It is notable that no suitable habitat of drainage areas with Old Man Saltbush or similar tall dense chenopods were identified for the Thick-billed Grasswren within the SRE Project Area, and the species is considered unlikely to occur.

- Of an additional 7 migratory species that are not EPBC-listed as threatened, one has potential to occur:
  - Fork-tailed Swift was considered possible flyover species (Table 2.4).

Three State-listed (NPW Act) flora species are considered as possible occurrences within the Project Area ((Cupped Sea-heath (*Frankenia cupularis*), One-bristle Everlasting (*Gratwickia monochaeta*), Clay-pan Swainson-pea (*Swainsona oligophylla*)) and one species is considered likely to occur, but has not been detected within the SRE Area to date; Sandalwood (*Santalum spicatum*).

There are also 3 State-listed (NPW Act) fauna species which are considered as possible occurrences (Australian Bustard, Major Mitchell's Cockatoo (western) and Scarlet-chested Parrot), and 4 species are considered likely to occur; Black Falcon, Flock Bronzewing, Little Eagle and Peregrine Falcon.

3 Assessment of effects

An assessment of effects was undertaken to determine the change in the existing pathway environment as a result of the proposed SRE Project activities. The assessment of effects included the following works:

- obtain input data (i.e. baseline environment) as required for the development of all effects assessments
- review of the SRE Project activities and the identified potential impact events to determine representative scenarios for the effects assessment
- complete subsequent effects assessment studies.

3.1 Potential impact events

BHP has identified potential impact events associated with likely changes to the baseline ecological environment as a result of the implementation of the SRE Project. These events represent scenarios for which there is, or is likely to be, a linkage between SRE Project activities (sources), air, land, groundwater and surface water (pathways) and the identified ecological baseline environment (receptors).

To ensure a consistent approach to impact assessment for the SRE Project, sources, pathways, and receptors (SPR) are defined and applied in this assessment as follows:

- Source – the SRE Project activities (i.e. potential impact event) which, alone or in combination, has the potential to impact a receptor
- Pathway – the pathway, means or route (with consideration of any natural barriers) by which the receptor can be exposed to, or may reasonably be expected to be impacted by, the source
- Receptor – the receptor that may be impacted by the source via the pathway.

The detailed list of potential impact events is provided in the Environmental Impact Assessment Tables Appendix to the EIS and are summarised for the air, land, groundwater and surface water pathways in Table 3.1. The scope of this assessment of effects presented herein has considered these identified potential impact events.

Table 3.1: Preliminary SPR assessment – potential impact events

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
Air pathway					
A34, A35, A42, A43	During construction, the emission of noise and vibration from infrastructure or access road construction, including vehicle movement noise results in an increase to noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.	Transport and logistics	Air (noise and vibration)	Terrestrial fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
A38, A39, A46, A47	During operation, the emission of noise and vibration from plant, equipment and mobile fleet associated with project activities results in an increase in noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.	All project activities	Air (noise and vibration)	Terrestrial fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
A30, A31	During operations, lighting required for safety and security during night-time operations results in a change to the current lit environment, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened fauna species	All night-time artificial lighting activities/all project-related activities	Air (light)	Terrestrial fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
A15, A16, A17	During construction, the movement of soil materials and the creation of cleared areas subject to wind erosion results in the emission of dust that reduces air quality, impacting the abundance and diversity of terrestrial flora and vegetation, habitat and State and Nationally threatened flora species.	All dust generating construction activities	Air (air quality)	Flora and vegetation	Unconfirmed
				Fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
A20, A21, A22	During operation, the emission of particulate matter from stacks or material handling activities results in concentrations that impact terrestrial flora and vegetation, habitat and State and Nationally threatened flora species.	Emissions of particulate matter	Air (air quality)	Flora and vegetation	Unconfirmed
				Fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
A8, A9, A10	During operation, emission of off-gases and fugitive gases from smelting, acid plant and refinery operations results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species.	Emission of off-gases and fugitive gases	Air (air quality)	Flora and vegetation	Unconfirmed
				Fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
A25, A26, A27	During operations, the emission of radon and/or radionuclides (e.g. from stacks or materials handling activities) results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species.	Emission of radon and/or radionuclide bearing materials	Air (radiation)	Flora and vegetation	Unconfirmed
				Fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
Land pathway					
L1, L2, L3	During construction, clearing of native vegetation for SRE Project infrastructure results in a reduction in abundance and diversity of native vegetation, habitat and threatened species.	Land clearance	Land (quantity)	Flora and vegetation	Yes
				Fauna and habitat	Yes
				State and Nationally threatened species	Unconfirmed
L6, L7, L8	During construction, land clearing associated with the construction of SRE Project infrastructure results in conditions that are favourable for an increase in the abundance and diversity of weed species and an associated reduction in abundance and diversity of native vegetation, habitat and threatened species.	Land clearance	Land (quality)	Flora and vegetation	Yes
				Fauna and habitat	Yes
				State and Nationally threatened species	Unconfirmed
L9, L10, L11	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, with changes to the prevailing surface water catchments resulting in a reduction in abundance and diversity of native vegetation, habitat and threatened species.	All surface water-related project activities	Land (quality)	Flora and vegetation	Unconfirmed
				Fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
L13	During construction, placement of SRE Project infrastructure, and particularly the installation of electricity distribution lines, results in an increase in fauna interactions resulting in impacts to fauna abundance and diversity.	Electricity supply and distribution	Land (quality)	Fauna and habitat	No
L18	During operations increased occupancy of Olympic Dam accommodation due to the SRE Project Workforce results in an increase in feral/pest fauna numbers that results in a decrease in native fauna abundance and diversity.	Accommodation related activities	Land (quality)	Fauna and habitat	Yes
L14, L15, L16, L17, L22, L23, L24, L25, L29, L30, L31, L32	During construction, operation and closure project activities, including planned construction and maintenance activities and unplanned equipment and plant failures, create conditions that result in a bushfire, resulting in destruction of habitat and vegetation and impacting the abundance and diversity of flora, fauna, State and Nationally threatened species and protected areas.	All project-related activities	Land (quality)	Flora and vegetation	Yes
				Fauna and habitat	Yes
				State and Nationally threatened species	Unconfirmed
				State and Commonwealth matters	Unconfirmed
L19, L20, L21	During construction and operation, the release of chemicals or hydrocarbons used in the SRE Project, including temporary storages, transport and unloading/loading activities, metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in the contamination of land, impacting the abundance and diversity of native vegetation, habitat and threatened species.	Chemical and fuel management	Land (quality)	Flora and vegetation	Unconfirmed
				Fauna and habitat	Unconfirmed
				State and Nationally threatened species	Unconfirmed
L26, L27, L28	During closure. the rehabilitation of cleared land following closure results in conditions that are favourable for an increase in the abundance and diversity of weed species resulting in a reduction in the abundance and diversity of native vegetation, habitat and threatened species.	Rehabilitation and closure activities	Land (quality)	Flora and vegetation	Yes
				Fauna and habitat	Yes
				State and Nationally threatened species	Uncertain

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
Groundwater pathway					
GW1, GW2	During operations additional water demand from the GAB or local groundwater wellfields to meet SRE water demand results in aquifer drawdown impacting aquatic ecology and groundwater dependent ecosystems.	Groundwater affecting activities/water supply and distribution	Groundwater (quantity)	Aquatic ecology	No
				Groundwater dependent ecosystems	No
GW5, GW6	During construction and operations, infiltration of chemicals and/or hydrocarbons used in the SRE Project, including metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in changes to groundwater quality, impacting the abundance and diversity of aquatic species and groundwater dependent ecosystems.	Chemical and fuel management	Groundwater (quality)	Aquatic ecology	Uncertain
				Groundwater dependent ecosystems	Uncertain
Surface water pathway					
SW1, SW2, SW3, SW4	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure disrupts, reduces or increases surface water flows, impacting abundance and diversity of native vegetation, habitat, threatened species and aquatic species.	All surface water-related project activities	Surface water (quantity)	Flora and vegetation	Uncertain
				Fauna and habitat	Uncertain
				State and Commonwealth threatened species	Uncertain
				Aquatic ecology	Uncertain
SW5, SW6, SW7	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, impacting the abundance and diversity of native vegetation, habitat and threatened species.	All surface water-related project activities	Surface water (quality)	Flora and vegetation	Uncertain
				Fauna and habitat	Uncertain
				State and Commonwealth threatened species	Uncertain
SW12, SW13, SW14, SW16, SW17, SW18	During construction and operation, the release of chemicals or hydrocarbons used in SRE Project operations, including temporary storages, transport and unloading/loading activities, metals mobilised via acid rock drainage from stockpiles and/or	Chemical and fuel management	Surface water (quality)	Flora and vegetation	Uncertain
				Fauna and habitat	Uncertain

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
	the TSF or effluent released from WWTPs, results in impacts to the downstream environment, impacting the abundance and diversity of native vegetation, habitat and threatened species.			State and Commonwealth threatened species	Uncertain
SW19, SW20, SW21	During closure, erosion of closed structures and rehabilitated areas results in the sedimentation of the downstream environment	Rehabilitation and closure activities	Surface water (quality)	Flora and vegetation	Uncertain
				Fauna and habitat	Uncertain
				State and Commonwealth threatened species	Uncertain
SW8, SW9, SW10	During construction, the use of water for dust suppression activities results in saline water run off into surrounding environments, causing salinisation which impacts the abundance and diversity of native vegetation, habitat and threatened species.	Dust suppression water	Dust suppression water (quality)	Flora and vegetation	Uncertain
				Fauna and habitat	Uncertain
				State and Commonwealth threatened species	Uncertain

3.2 Assessment of effects on ecological values

The assessment of effects studies for each pathway are provided within the Environmental Assessments (Pathway) appendices to the EIS and the conclusions of these studies are summarised here for completeness.

3.2.1 Source – noise and vibration

The Noise and Vibration Impact Assessment Appendix of the EIS has modelled the increase in noise associated with surface infrastructure noise and traffic noise during construction and operation of the SRE Project. The assessment identified that the SRE Project will result in an increase in surface infrastructure and road traffic noise generating activities during construction and operation.

3.2.1.1 Surface infrastructure

The increase in noise levels associated with surface infrastructure is predicted to be below the noise limits set out in the Environment Protection (Commercial and Industrial) Noise Policy 2023 for both construction and operation. The highest predicted noise levels under worst case noise enhancing conditions at nearby residential receptors were 47 dB(A) L_{eq} during construction and 50 dB(A) L_{eq} during operations. This is an increase from the predicted baseline of 1 dB(A) during construction and 3 dB(A) during operations.

A review of the noise sources presented in the Noise and Vibration Impact Assessment Appendix of the EIS, indicates the single greatest noise source during:

- construction activities would be excavator operation (117 dB(A))
- operations would be the flash smelting furnace (132 dB(A)).

3.2.1.2 Road traffic noise

Road traffic noise at associated with the SRE Project (measured at 10 m from the road) was predicted to increase by a maximum of 1 dB for all roads except for Olympic Way to Roxby Downs and Olympic Highway between Pimba and Olympic Way turnoff. An increase of less than 2 dB represents a minor impact that is considered barely perceptible to the average person. Olympic Dam Way at Roxby Downs and Olympic Dam Highway from Pimba to Olympic Way turnoff have a predicted maximum relative increase of 3.8 dB during operations. This is due to the low existing traffic volumes along these roads.

3.2.1.3 Aircraft noise

Aircraft volumes or types at Olympic Dam Airport are not expected to change from business-as-usual (BAU) operations as a result of the SRE Project. As such, an assessment of aircraft noise has not been included in Noise and Vibration Impact Assessment.

3.2.1.4 Vibration

There is no blasting proposed as part of the SRE Project. Construction and operational vibration sources are not expected to generate perceptible levels of vibration at distances greater than a few hundred metres from the source. Vibration levels from project activities are expected to be negligible at the nearest residential receptor which is approximately 3 km from the any potential vibration source.

3.2.2 Pathway – air quality

The Air Quality Impact Assessment Appendix of the EIS has modelled the SRE Project operational emissions for air pollutants including dust and gaseous emissions. Construction phase emissions were qualitatively assessed.

The construction of the SRE Project is expected to be undertaken progressively over Stage 1a, Stage 1b and Stage 2.

Sources of air pollution during the construction phase are likely to be fugitive releases of particulate matter (e.g. earthworks, wind erosion of exposed areas, wheel-generated dust from the movement of plant and vehicles, etc.) and pollutants associated with the combustion of diesel fuel (e.g. particulate matter, NOx, VOCs).

Throughout the construction periods, it is considered that the assorted earthworks phases progressively staged in 4 to 6 month campaigns will have the greatest potential for air pollutant emission generation. However, the emissions intensity during these phases is expected to be lower than BAU operations or future operations involving the operation of the SRE Project. Furthermore, any construction-related air pollution emissions will be generated well within the SML and distant from sensitive receptor locations to the south. Consequently, air quality impacts from the construction phase are expected to be lower than the BAU or future SRE operations.

3.2.2.1 Dust, off-gases and fugitive gases

Fugitive dust and diesel combustion emission sources associated with the SRE Project were quantified in the Air Quality Impact Assessment through the application of USEPA AP-42 emission factor equations. Particulate matter emissions were quantified for the t3 size fractions – TSP, PM_{10} and $PM_{2.5}$. Emission rates for PM_{10} and $PM_{2.5}$ were estimated using ratios for the different particle size fractions available in the literature (principally the USEPA AP-42).

Fugitive dust emission totals were distributed across the proposed layout SRE project area, using a combination of line-volume sources, volume sources and area sources. Emissions from wind erosion were scaled proportional to the cube of the wind in order to allocate higher emissions to periods of elevated wind conditions. Emissions from other fugitive emission sources were modelled on a continuous hourly-average basis.

Emissions of metals and metalloids from the SRE project were derived by adopting the relationship between the annual emission totals for PM_{10} and each individual element from the BAU operations scenario and combining with the calculated fugitive PM_{10} emissions for the SRE Project.

The total annual emissions by pollutant from BAU operations and SRE Project plus BAU operations are presented in the AQIA, along with the calculated percentage increase in emissions. All pollutants are estimated to have an increase relative to BAU operations, however the magnitude of increase varies. The most significant increase in annual emissions occurs for SO_2, which is estimated to increase by up to 440% relative to BAU operations. Despite the predicted increase in air quality emissions, the predicted concentrations and deposition rates for all pollutants and averaging periods are below the applicable SA EPA assessment criterion at all receptor locations for SRE Project emissions.

As summarised in the AQIA, representative ambient baseline concentrations have been derived for TSP, PM_{10}, $PM_{2.5}$, SO_2 and NO_2 based on reviewed air quality monitoring data. For all other pollutants modelled in the AQIA, it was assumed that the baseline beyond the contributions from BAU operational emissions were negligible (i.e. reference should be made to the increment results in Section 3.3.1 of the AQIA).

A summary of predicted cumulative concentrations from the BAU operations and SRE Project plus BAU operations emission scenarios are presented in Table 3.15 and Table 3.16 respectively of the AQIA. As per the incremental results tables, is noted that the results presented in these 2 tables are the highest predicted values by pollutant and averaging period across the sensitive receptor area grids.

The predicted concentrations for all presented pollutants and averaging periods are below the applicable EPA assessment criterion (or adopted NSW EPA criterion) at all sensitive receptor areas.

3.2.2.2 Radiation

The assessment of radiation related to the SRE Project is provided in the Radiological Impact Assessment Appendix to the EIS, indicating the following:

- during operations, the handling of copper concentrate containing elevated concentrations of radionuclides results in an increased potential for emissions of radon and radionuclides leading to potential changes in airborne concentrations in local communities and residences and indigenous communities.
- gamma radiation and groundwater pathways were not assessed to be credible exposure pathways.
- the conservative estimates of total doses to humans at the receptors, due to the SRE Project, are low and below the recognised public dose limit of 1 mSv/y and dose constraint of 0.3 mSv/y.
- The radiological impact to flora and fauna, conservatively assessed using the ERICA tool (Tier 2 assessment), showed dose rates considerably below the screening level of 10 micrograys per hour (µGy/h), with the maximum absorbed dose rate being 6.93 µGy/h for Australian reptiles.

The primary recognised method for determining the potential radiological impacts to non-human biota (terrestrial, freshwater and marine biota) in Australia is the ERICA assessment method (Environmental Risk from Ionising Contaminants: Assessment and Management, ERICA 2019, ARPANSA 2010), which uses the ERICA Software Tool. The assessment determined a relative radiological risk factor for various species of animals and plants based on changes in the radionuclide concentrations of media (for example soil).

The modelled dust deposition results, from the Air Quality Impact Assessment Appendix to the EIS, were combined with the weighted radionuclide concentrations of the source terms, to determine the radionuclide deposition rates. The deposition rates were used to calculate the change in soil radionuclide

concentrations, above the naturally occurring concentrations, due to operational emissions. The changes in soil concentrations (in Bq/kg) were then used as input data for the ERICA software.

The output of the ERICA assessment tool is a standardised measure of the impacts to a reference set of plants and animals (ARPANSA 2010). The software calculates a dose rate to the reference plants and animals based on a database of effects. The calculated dose rate is compared to a screening level which is 10 µGy/h. The screening level is the absorbed dose rate above which additional assessment is required due to possible impact to species. The outputs of the assessment are listed in the Radiological Impact Assessment Appendix to the EIS.

The results show that all species were well below the screening levels of 10 µGy/h (e.g. <1 µGy/h) with the exception of reptiles at the Olympic Village location (modelled to be 6.93 µGy/h, but still below the screening level). The Radiological Impact Assessment concluded that:

- the output is considered to be acceptable given that reptiles inhabit the entire region and it is highly unlikely that any particular species would be at risk across the broader region
- as the non-human biota assessment is intended to consider species impacts, a localised impact is unlikely to affect the overall health of a broad ranging species.
- there were no confirmed radiation-related impact events assessed as having the potential for a significant impact.
- the dose assessment indicates that radiological impacts will be low and below the recognised public dose limit of 1 mSv/y and dose constraint of 0.3 mSv/y (i.e. not significant).
- in accordance with the ICRP [ICRP 2007-103] and the IAEA [IAEA 2014] statement that controls are to be commensurate with the magnitude of the impact, no additional controls for the purposes of radiation protection are considered necessary, other than standard controls.
- the assessment of potential radiological impact to flora and fauna is low with no additional controls are justified due to the very low potential impacts (i.e. not significant).
- The standard emission and dust controls that all mining and processing operations generally employ, and are currently used for existing operations at Olympic Dam, would act to control potential impacts.

3.2.2.3 Light

Anthropogenic lighting as a result of SRE Project-related activities, such as plant and infrastructure, is likely to reach nocturnal fauna species, including but not limited to invertebrates (including insects), bats and other nocturnal mammal and bird species. However, light emissions from the SRE Project are likely to represent a marginal increase compared to light sources from the existing Olympic Dam operations.

Whilst the effects are difficult to quantify, it is widely accepted that similar to the existing site infrastructure, lights used during continuous operations on a 24-hour cycle facilitate increased numbers of flying insects that may result in a change in feeding behaviour of terrestrial nocturnal fauna. Lights with a particular wavelength are known to be less attractive to insects and can be used to reduce the numbers of insects. The overarching effect of light emissions are poorly understood and therefore a degree of uncertainty exists associated with the potential impacts.

3.2.3 Pathway – land

3.2.3.1 Land disturbance

The construction of SRE Project-surface infrastructure would require the clearance of native vegetation and therefore associated fauna habitat.

Disturbance data used for the calculations is based upon the current infrastructure layer and buffers and existing disturbance within the SML. A total Project Area of approximately 895.52 ha will be required for the proposed SRE Project, including areas of existing infrastructure. The total Project Area includes approximately 866.96 ha within the SML Area, incorporating the SRE Area, General Infrastructure Area and the Water Infrastructure Area (Figure 3.1), and approximately 28.56 ha for the EIGR Areas (Figure 3.2).

The Total Disturbance area for the SRE Project is 479.90 ha, which includes substantial areas of existing disturbance. The Disturbance Footprint represents the area of direct impact to native vegetation and habitat including the Total Disturbance area minus areas of existing disturbance. The Disturbance Footprint for the SRE Project is 234.04 ha, with the breakdown by Project component shown in Table 3.2 and breakdown by vegetation community in Table 3.3. Figure 3.1 and Figure 3.2 indicate the Disturbance Footprint.

Table 3.2: Project Area, Total Disturbance and Disturbance Footprint by project component

Project component		Approximate area (ha)			
		Project Area	Existing Disturbance within Project Area (ha)	Total Disturbance (including existing disturbance) (ha)	Disturbance Footprint (excluding existing disturbance) (ha)
SML Area	SRE Area	866.96	335.60	263.30	101.71
	General Infrastructure Area			112.55	64.01
	Water Infrastructure Area			75.49	39.82
EIGR Areas		28.56	0.06	28.56	28.50
Total area (ha)		**895.52**	**335.66**	**479.90**	**234.04**

Table 3.3: Areas of vegetation communities within SRE Project Area and Disturbance Footprint (excluding areas of existing disturbance)

Vegetation Community	Within Project Area (ha)	Within Disturbance Footprint (ha)
SML Area (SRE Area, Water Infrastructure Area and General Infrastructure Area)	**531.40**	**205.48**
Loamy swales with Chenopod low open shrubland and emergent Mulga	283.41	114.40
Sand dunes with Umbrella Bush (Acacia ligulata)/Bullock Bush tall shrubland over mixed shrubs/tussock grasses	188.28	77.35
Sand dunes with White Cypress-pine open woodland and mixed tall shrubs/tussock grasses	21.70	4.71
Sandy swales with mixed Acacia tall shrubland and tussock grasses	23.40	5.66
Claypans	12.65	3.11
Planted vegetation	0.25	0.25
Run-on depression with River Red Gum (/Willow Wattle open woodland	1.71	0.00
EIGR Areas	**28.56**	**28.56**
Sand dunes with Umbrella Bush /Bullock Bush tall shrubland over mixed shrubs/tussock grasses	3.12	3.12
Sandy swales with mixed Acacia tall shrubland and tussock grasses	3.49	3.49
Undulating plain with Chenopod low open shrubland and emergent Dead Finish	2.01	2.01
Stony plains with low open chenopod shrubland and minor gilgai formations, and shallow drainage lines containing Cotton-bush	5.55	5.55
Stony plains with varied low open chenopod shrubland and minor shallow gilgai formations	11.77	11.77
Sandy plain with low open chenopod shrubland	2.56	2.56
Existing disturbance	0.06	0.06
SRE Project Area totals	**559.96**	**234.04**

Minor differences are related to rounding

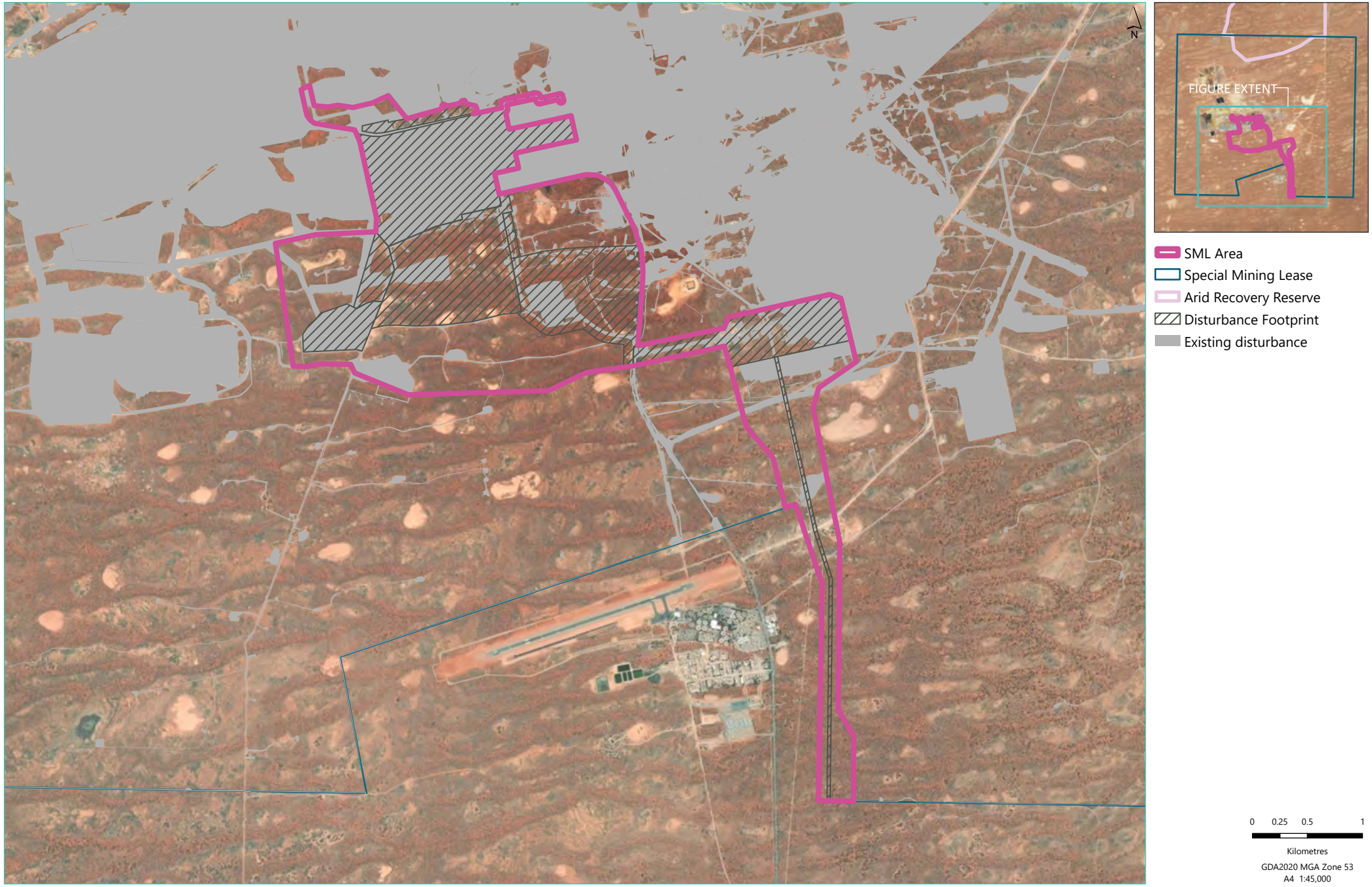


Figure 3.1: Project disturbance in the SML Area
SRE Project Ecological Assessment

LATHWIDA

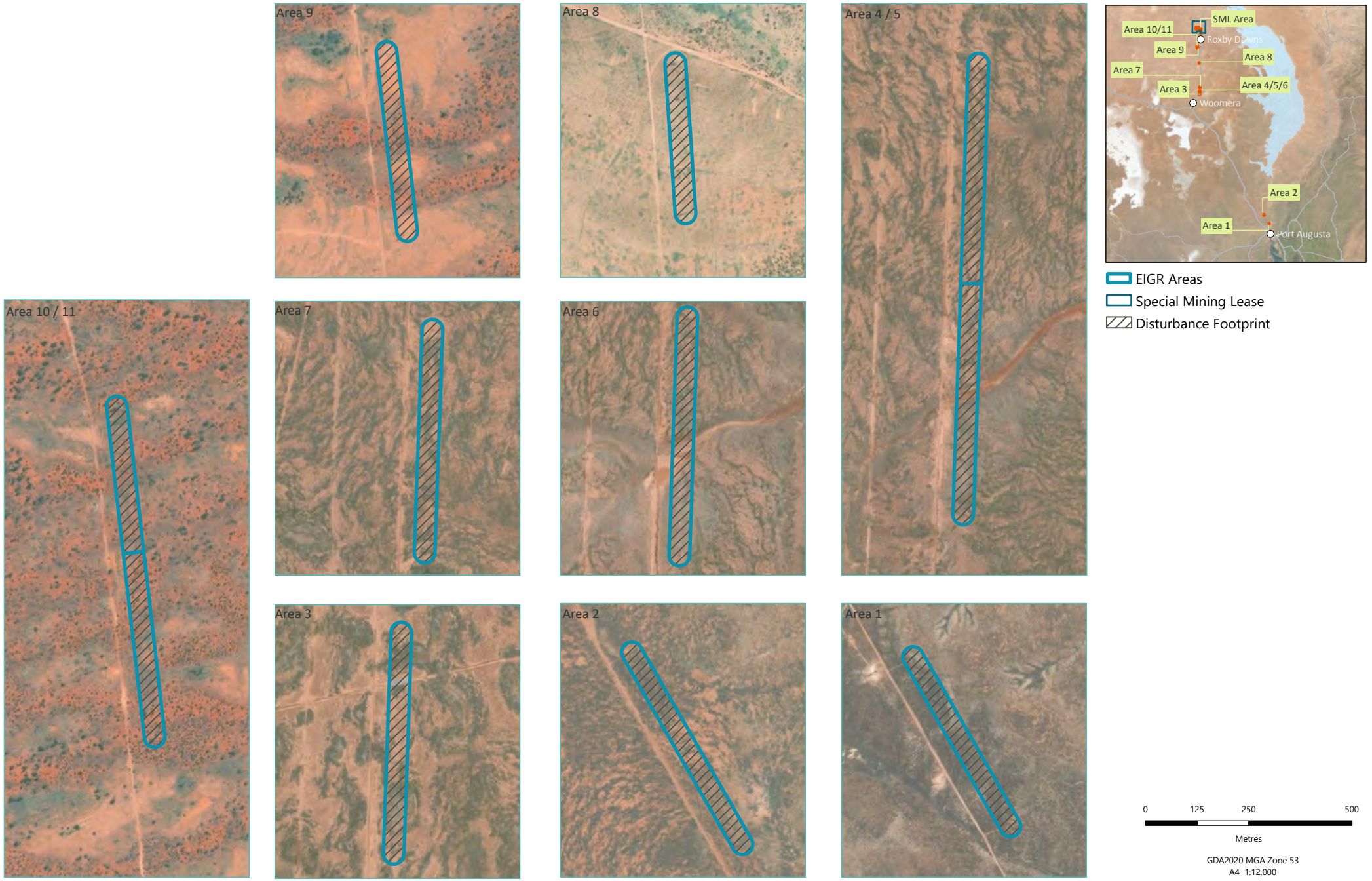


Figure 3.2: Project disturbance in the EIGR Areas
SRE Project Ecological Assessment

LATHWIDA

3.2.3.2 Land quality

The Soil and Groundwater Impact Assessment Appendix of the EIS has characterised the materials within and adjacent to the SRE Area. Based on the samples collected from the targeted soils and geochemistry sampling program, the following conclusion are made:

- no exceedances of contaminants of potential concern (CoPC) above the site assessment criteria (SAC) were identified within the 19 investigated test pit locations (2 samples per test pit)
- trace concentrations of metals (arsenic, chromium, copper, nickel and zinc) were detected in all analysed samples. Arsenic, copper and lead exceeded the background values taken in the Field Geologist Manual, Monograph 9 (AIMM 2011), however all concentrations were below the adopted human health
- local soils were classified as non-acid forming, with generally low metal and metalloid concentrations and low risk of leachate. The only exception is copper leachate concentrations that suggested that leachate copper may become more significant as whole-sample copper concentrations reach and exceed ~ 5,000 mg/kg (0.5 % Cu). Any leaching from material disturbed by SRE Project activities is likely to have less of an impact on the receiving environment than mine affected water already present on site (such as the TSF) and can be appropriately management in accordance with Olympic Dam's waste management plan.
- the preliminary Conceptual Site Model (CSM) did not identify any complete SPR linkages related to the SRE Area, being the primary location for proposed smelter and refinery expansion infrastructure for the SRE Project.
- the potential contamination risk related SRE Project operations and construction are considered low risk and can be appropriately mitigated and managed in accordance with best practice to relevant Australian Standards, construction environmental management and operational control measures to relevant environmental legislation, guidelines and policies.
- whilst no targeted sampling was undertaken within the General Infrastructure Area, Water Infrastructure Area and EIGR Areas of the SRE Project, given the typical construction activities proposed in these location (i.e. ancillary infrastructure comprising water storage dams, water pipelines, soil stockpiles, laydown areas and access roads) it considered that additional investigations can be undertaken as part of the construction contract scope.

3.2.4 Pathway – groundwater

The Soil and Groundwater Impact Assessment Appendix to the EIS concluded there are no aquatic ecosystems or potential GDEs located in proximity to the SML Area, being the primary location for project activities.

The Soil and Groundwater Impact Assessment suggested there are potential aquatic GDEs in the Study Area associated with accumulation of sediments that can hold water for a period of time within the SML (e.g. claypans). Regionally, Lake Torrens is the largest sensitive receptor for groundwater discharge with a number of hypersaline springs and seeps, including the Yarra Wurta Spring Group (BHP Billiton 2009), as

well as Eliza Creek, Salt Creek and Bosworth Creek drainage lines (OZ Minerals 2017a). These receptor locations are over 30 km from the SML, and thus are unlikely to be affected by any SRE Project activities.

The SRE Project proposes no additional water extraction above current Olympic Dam daily average business-as-usual volumes with additional water supply via the Office of Northern Water Delivery's NWP infrastructure. On this basis, the SRE Project would not change or influence current groundwater effects of existing Olympic Dam operations.

Terrestrial vegetation considered to be potential GDEs within the SML are typically associated with an accumulation of sediments that can hold water for a period of time (e.g. claypans). The groundwater opportunistically accessed by GDEs is hydraulically separate from the Andamooka Limestone Aquifer and Tent Hill Aquifer, with most GDEs unable to utilise the high salinity groundwater and are therefore considered unlikely to be effected by SRE Project activities (Soil and Groundwater Impact Assessment). It is noted that the small claypans within the SRE Area were devoid of vegetation at the time of on ground surveys (Appendix B).

There are also no areas mapped as high potential Aquatic GDE or Terrestrial GDE in or immediately adjacent the EIGR Areas (BoM 2025b). The nearest high potential GDE areas mapped in the GDE Atlas and NatureMaps are:

- Areas mapped as 'intermittent lakes near EIGR Area SRETRM08 (Purple Swamp located 300 m north and Purple Lake located 550 m south-west)
- Lake Richardson (mapped as an 'intermittent lake'), which is over 4 km east of the 3 southern most EIGR Areas.

3.2.5 Pathway – surface water

The assessment of surface water related to the SRE Project is provided in the Surface Water Impact Assessment Appendix to the EIS.

Flooding is not expected to adversely impact the surrounding environment. Flows produced on-site will be kept on-site or within existing inundation limits for all tested AEP events except the 0.2% AEP events which overwhelmed the stormwater management systems. The volume of water produced by a 0.2% AEP event will ensure dilution of any contaminants that leave site. It is generally an unreasonable to design condition, due to the significant infrastructure requirements to contain the resultant flows. As flows are expected to remain on-site under all reasonable conditions, the surface water quality of the surrounding area will not be adversely impacted.

3.3 Conclusion

Table 3.4 presents the revised SPR assessment with respect to ecology following completion of the assessment of effects. Those potential impact events for which a linkage has been demonstrated have been carried forward for impact assessment (see Section 4).

Table 3.4: Preliminary SPR assessment – confirmed impact events

SPR ID No.	Potential impact event	Receptor	Linkage	Linkage justification
Air pathway				
A34, A35, A42, A43	During construction, the emission of noise and vibration from infrastructure or access road construction, including vehicle movement noise results in an increase to noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.	Terrestrial fauna and habitat	Yes	Plant, equipment and mobile fleet associated with project activities will marginally increase noise and vibration over baseline levels during construction, potentially impacting common fauna species. Vehicle traffic will marginally increase noise over baseline levels during construction, potentially impacting common fauna species.
		State and Nationally threatened species	Yes	Construction activities, including vehicle traffic will marginally increase noise and vibration over baseline levels, potentially impacting threatened fauna species. Only the EPBC listed Southern Whiteface has been detected in the project area. There are no records of other EPBC listed or State listed fauna in the Project Area, but some threatened species are considered likely to, or to possibly, occur in the Project Area.
A38, A39, A46, A47	During operation, the emission of noise and vibration from plant, equipment and mobile fleet associated with project activities results in an increase in noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.	Terrestrial fauna and habitat	Yes	Plant, equipment and mobile fleet associated with project activities will marginally increase noise and vibration over baseline levels during operation, potentially impacting common fauna species. Vehicle traffic will marginally increase noise over baseline levels during operations, potentially impacting common fauna species.
		State and Nationally threatened species	Yes	Plant, equipment and mobile fleet associated with project activities will marginally increase noise and vibration over baseline levels during operation, potentially impacting threatened fauna species. Only the EPBC listed Southern Whiteface has been detected in the Project Area. There are no records of other EPBC listed or State listed fauna in the Project Area, but some threatened species are considered likely to, or to possibly, occur in the Project Area.
A30, A31	During operations, lighting required for safety and security during night-time operations results in a change to the current lit environment, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened fauna species	Terrestrial fauna	Yes	During operation lighting required for the SRE Project activities will result in a marginal increase in the overall lighting required for the current Olympic Dam operation, to ensure safe and efficient operations. Whilst this increase in lighting is expected to be extremely minor (compared with the current lighting environment), it may impact the behaviour of common nocturnal species as a result of increased light spill and potential increases in insect activity around lights. As no State or Nationally listed species which are identified as potentially present in the Project Area are nocturnal, no impacts through behavioural change to these species are anticipated.
		State and Nationally threatened species	No	
A15, A16, A17	During construction, the movement of soil materials and the creation of cleared areas subject to wind erosion results in the emission of dust that reduces air quality, impacting the abundance and diversity of terrestrial flora and vegetation, habitat and threatened species	Flora and vegetation	Yes	Dust emissions will occur as a result of construction for the SRE Project activities, which may impact vegetation and hence habitat for fauna. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted in the short-term during construction.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
A20, A21, A22	During operation, the emission of particulate matter from stacks or material handling activities results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species	Flora and vegetation	Yes	Emissions of particulate matter will occur as a result of SRE Project activities, which may impact vegetation and hence habitat for fauna. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted during operation.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	

SPR ID No.	Potential impact event	Receptor	Linkage	Linkage justification
A8, A9, A10	During operation, emission of off-gases and fugitive gases from smelting, acid plant and refinery operations results in concentrations that impact terrestrial flora and vegetation, habitat and State and Nationally threatened flora species	Flora and vegetation	Yes	Emissions of gases will occur as a result of SRE Project activities, which may impact vegetation and hence habitat for fauna. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted during operation.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
A25, A26, A27	During operations, the emission of radon and/or radionuclides (e.g. from stacks or materials handling activities) results in concentrations that impact terrestrial flora and vegetation, habitat and State and Nationally threatened flora species	Flora and vegetation	Yes	Emissions of emissions of radon and/or radionuclides will occur as a result of SRE Project activities, which may impact vegetation and hence habitat for fauna. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted during operation.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
Land pathway				
L1, L2, L3	During construction, clearing of native vegetation for SRE Project infrastructure results in a reduction in abundance and diversity of native vegetation, habitat and threatened species	Flora and vegetation	Yes	Land clearing will be required to establish the SRE Project infrastructure adjacent to existing infrastructure, resulting in a reduction in the extent of vegetation, and non essential habitat for fauna. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
L6, L7, L8	During construction, land clearing associated with the construction of SRE Project infrastructure results in conditions that are favourable for an increase in the abundance and diversity of weed species and an associated reduction in abundance and diversity of native vegetation, habitat and threatened species	Flora and vegetation	Yes	Land clearing will be required for the SRE Project infrastructure, and whilst not planned, weed species may establish preferentially in disturbed areas, or be transported to site on construction machinery, thereby reducing the amount of and quality of native vegetation, and degrading habitat for common flora and fauna species. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted by the introduction of weeds.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
L9, L10, L11	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, with changes to the prevailing surface water catchments resulting in a reduction in abundance and diversity of native vegetation, habitat and threatened species	Flora and vegetation	Yes	Surface water flows in newly developed areas of the SRE Project will flow back to existing operational areas. Clean flows will be maintained to adjacent undisturbed areas. There may however be a loss or reduction of surface water flow volume from the newly developed areas which may reduce the abundance and diversity of native vegetation, which represents potential habitat for common and threatened species.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
L13	During construction, placement of SRE Project infrastructure, and particularly the installation of electricity distribution lines, results in an increase in fauna interactions resulting in impacts to fauna abundance and diversity	Fauna and habitat	No	Activities in the EIGR Areas will be limited to vegetation disturbance beneath existing lines. As there will be no installation of new electricity distribution lines, there will be no increase in potential for fauna interactions.
L18	During operations, increased occupancy of Olympic Dam accommodation due to the SRE Project workforce in an increase in feral/pest fauna numbers that results in a decrease in native fauna abundance and diversity	Fauna and habitat	Yes	Increased occupancy of Olympic Dam accommodation due to the SRE Project workforce may result in an unplanned increase in feral/pest animal numbers compared with the existing numbers, the impacts of which could be a reduction in native fauna abundance (and potentially localised diversity).
L14, L15, L16, L17, L22, L23, L24, L25, L29, L30, L31, L32	Construction, operation and closure project activities, including planned construction and maintenance activities and unplanned equipment and plant failures, create conditions that result in a bushfire, resulting in destruction of habitat and vegetation which impacts the abundance and diversity of flora, fauna, State and Nationally threatened species and protected areas.	Flora and vegetation	Yes	Whilst not planned, project activities may result in the creation of a bushfire, the impacts of which could be a reduction in native vegetation and habitat, and therefore subsequently to the abundance (and potentially local diversity) of flora and fauna species. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore potentially be impacted by a bushfire as a result of project activities.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
		State and Commonwealth matters	No	There are no Protected Areas in the immediate vicinity of SRE Project. The closest Protected Area to the SRE Project Area is the Lake Torrens National Park, located approximately 40 km to the east of the SML. Whilst the ARR is located approximately 4.7 km to the north of the SRE Project Area, it is not formally considered a Protected Area (or State or Commonwealth matter).

SPR ID No.	Potential impact event	Receptor	Linkage	Linkage justification
L19, L20, L21	During construction and operations, the release of chemicals or hydrocarbons used in the SRE Project, including metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in the contamination of land, impacting the abundance and diversity of native vegetation, habitat and threatened species.	Flora and vegetation	Yes	Whilst not planned, spillage or leakage of material storage vessels may occur, and although the volumes are likely to be sufficiently low, there is the potential that these spilled materials may be transported to surface water drainages during subsequent rainfall events, the impacts of which could be a reduction in native vegetation and habitat condition, and therefore subsequently to the abundance (and potentially local diversity) of flora and fauna species. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore potentially be impacted by the release of chemicals or hydrocarbons as a result of project activities.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
L26, L27, L28	During closure, the rehabilitation of cleared land following closure results in conditions that are favourable for an increase in the abundance and diversity of weed species resulting in a reduction in the abundance and diversity of native vegetation, habitat and threatened species.	Flora and vegetation	Yes	Rehabilitation of cleared areas is proposed during site closure, and whilst not planned, weed species may establish preferentially in disturbed areas, or be transported to site on machinery which is used during site closure and land rehabilitation, thereby reducing the quality of native vegetation, and degrading habitat for common flora and fauna species. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore be impacted by the introduction of weeds during site closure.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
Groundwater pathway				
GW1, GW2	During operations additional water demand from the GAB or local groundwater wellfields to meet SRE water demand results in aquifer drawdown impacting aquatic ecology and groundwater dependent ecosystems.	Aquatic ecology	No	No drawdown is required as part of the SRE Project, hence impacts to aquatic ecology and GDEs are not expected
		Groundwater dependent ecosystems	No	
GW5, GW6	During construction and operations, infiltration of chemicals and/or hydrocarbons used in the SRE Project, including metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in changes to groundwater quality, impacting the abundance and diversity of aquatic species and groundwater dependent ecosystems.	Aquatic ecology	No	Whilst spillage or leakage of material storage vessels may occur, no aquatic ecological values or moderate to high potential GDE's have been identified in proximity to the SRE Project, so there is no potential for impact to these values.
		Groundwater dependent ecosystems	No	
Surface water pathway				
SW1, SW2, SW3, SW4	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure disrupts, reduces or increases surface water flows, impacting abundance and diversity of native vegetation, habitat, threatened species and aquatic species.	Flora and vegetation	Yes	Surface water flows in newly developed areas of the SRE Project will flow back to existing operational areas. There may be a loss or reduction of surface water flow volume from the newly developed areas which may reduce the abundance and diversity of native vegetation, which represents potential habitat for common and threatened species.
		Fauna and habitat	Yes	
		State and Commonwealth threatened species	Yes	
		Aquatic ecology	No	No aquatic ecological values have been identified in proximity to the SRE Project, so there is no potential for impact to these values as a result of changes surface water flows.
SW5, SW6, SW7	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, impacting the abundance and diversity of native vegetation, habitat and threatened species.	Flora and vegetation	Yes	Surface water flows in newly developed areas of the SRE Project will flow back to existing operational areas. Clean flows will be maintained to adjacent undisturbed areas. There may however be a loss or reduction of surface water flow volume from the newly developed areas which may reduce the abundance and diversity of native vegetation, which represents potential habitat for common and threatened species.
		Fauna and habitat	Yes	
		State and Commonwealth threatened species	Yes	
SW12, SW13, SW14, SW16, SW17, SW18	During construction and operations, the release of chemicals or hydrocarbons used in SRE Project operations, including temporary storage, unloading / loading activities, metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in impacts to the downstream environment, impacting the abundance and diversity of native vegetation, habitat and threatened species.	Flora and vegetation	Yes	Whilst not planned, spillage or leakage of material storage vessels may occur, and although the volumes are likely to be sufficiently low, there is the potential that these spilled materials may be transported to surface water drainages during subsequent rainfall events, the impacts of which could be a reduction in native vegetation and habitat condition, and therefore subsequently to the abundance (and potentially local diversity) of flora and fauna species. Although EPBC Act-listed threatened flora species are considered unlikely to occur in the SRE Project Area, one EPBC Act-listed fauna species is known to occur, and several State threatened species are considered likely to, or to possibly occur in the Project Area, and may therefore potentially be impacted by the release of chemicals or hydrocarbons as a result of project activities.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	

SPR ID No.	Potential impact event	Receptor	Linkage	Linkage justification
SW19, SW20, SW21	During closure, erosion of closed structures and rehabilitated areas results in the sedimentation of the downstream environment	Flora and vegetation	Yes	While not planned, sediment-laden run-off from areas where structures have been removed and cleared land rehabilitated may occur as a result of SRE Project activities, which may impact adjacent vegetation, and habitat for common flora and fauna species, as well as for threatened species which have been determined to be potentially present.
		Fauna and habitat	Yes	
		State and Nationally threatened species	Yes	
SW8, SW9, SW10	During construction, the use of water for dust suppression activities results in saline water run off into surrounding environments, causing salinisation which impacts the abundance and diversity of native vegetation, habitat and threatened species.	Flora and vegetation	No	Water for dust suppression activities will be sourced from the existing Reverse Osmosis plant, and as such, any run-off from areas where dust suppression water has been added will not have salinity levels which would cause impacts to surrounding environments.
		Fauna and habitat	No	
		State and Nationally threatened species	No	

4 Impact assessment

The impact significance of confirmed impact events associated with the proposed SRE Project activities is described in this section.

4.1 Confirmed impact events

Based on the assessment of effects, the impact events presented in Table 4.1, have been confirmed.

Table 4.1: Confirmed impact events

Pathway	SPR ID No.	Impact Event
Air (noise and vibration)	A34, A35, A42, A43	During construction, the emission of noise and vibration from infrastructure or access road construction, including vehicle movement noise results in an increase to noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.
	A38, A39, A46, A47	During operation, the emission of noise and vibration from plant, equipment and mobile fleet associated with project activities results in an increase in noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.
Air (light)	A30	During operations, lighting required for safety and security during night-time operations results in a change to the current lit environment, impacting the abundance and diversity of terrestrial fauna
Air (quality)	A15, A16, A17	During construction, the movement of soil materials and the creation of cleared areas subject to wind erosion results in the emission of dust that reduces air quality, impacting the abundance and diversity of terrestrial flora and vegetation, habitat and State and Nationally threatened flora species
	A20, A21, A22	During operation, the emission of particulate matter from stacks or material handling activities results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species
	A8, A9, A10	During operation, emission of off-gases and fugitive gases from smelting, acid plant and refinery operations results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species
Air (radiation)	A25, A26, A27	During operations, the emission of radon and/or radionuclides (e.g. from stacks or materials handling activities) results in concentrations that impact terrestrial flora and vegetation, habitat and State and Nationally threatened flora species
Land (land disturbance)	L1, L2, L3	During construction, clearing of native vegetation for SRE Project infrastructure results in a reduction in abundance and diversity of native vegetation, habitat and threatened species
Land (land quality)	L6, L7, L8	During construction, land clearing associated with the construction of SRE Project infrastructure results in conditions that are favourable for an increase in the abundance and diversity of weed species and an associated reduction in abundance and diversity of native vegetation, habitat and threatened species
	L9, L10, L11	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, with changes to the prevailing surface water catchments resulting in a reduction in abundance and diversity of native vegetation, habitat and threatened species
	L18	During operations increased occupancy of Olympic Dam accommodation due to the SRE Project workforce results in an increase in feral/pest fauna numbers that results in a decrease in native fauna abundance and diversity
	L14, L15, L16, L17, L22, L23, L24, L25, L29, L30, L31, L32	Construction, operation and closure project activities, including planned construction and maintenance activities and unplanned equipment and plant failures, create conditions that result in a bushfire, resulting in destruction of habitat and vegetation which impacts the abundance and diversity of flora, fauna and State and Nationally threatened species
	L19, L20, L21	During construction and operations, the release of chemicals or hydrocarbons used in the SRE Project, including temporary storage, loading/unloading activities, metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in the contamination of land, impacting the abundance and diversity of native vegetation, habitat and threatened species.
	L26, L27, L28	During closure. the rehabilitation of cleared land following closure results in conditions that are favourable for an increase in the abundance and diversity of weed species resulting in a reduction in the abundance and diversity of native vegetation, habitat and threatened species
Surface water (quantity)	SW1, SW2, SW3, SW4	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure disrupts, reduces or increases surface water flows, impacting abundance and diversity of native vegetation, habitat, threatened species and aquatic species.
Surface water (quality)	SW5, SW6, SW7	During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment , impacting the abundance and diversity of native vegetation, habitat and threatened species.
	SW12, SW13, SW14, SW16, SW17, SW18	During construction and operations, the release of chemicals or hydrocarbons used in SRE Project operations, including temporary storage, loading/unloading activities, metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in impacts to the downstream environment, impacting the abundance and diversity of native vegetation, habitat and threatened species.
	SW19, SW20, SW21	During closure, erosion of closed structures and rehabilitated areas results in the sedimentation of the downstream environment impacting the abundance and diversity of native vegetation, habitat and threatened species.

4.2 Impact significance criteria

For the purposes of this EIS, an Environmental Impact Assessment Framework (EIAF), including an impact significance determination matrix, was developed specifically for the SRE Project with consideration to significance requirements under the PDI Act, other relevant state legislation and BHP's internal risk management classifications. Consequence definitions and significance ratings under the EIAF relate specifically to the SRE Project and apply different and distinct criteria from those assignments of significance under the EPBC Act. Assessments of 'significant' under the EIAF allow for the development of relevant Environmental Outcomes and associated Annual Targets and Actions which may subsequently be incorporated into the Olympic Dam Environment Protection and Management Program required by the Indenture scheduled to the *Roxby Downs (Indenture Ratification) Act 1982* (SA) to provide assurance regarding the requirements for implementation of mitigation and management measures to reduce impact significance.

The impact significance criteria are presented in the EIAF Appendix to the EIS. Criteria relevant to the assessment of the ecology-related impact significance is repeated in Table 4.2.

Table 4.2: Consequence definitions and significance determination

Severity level	1	2	3	4	5
Environmental value	Not significant		Significant		
Listed species and ecological communities (threatened and listed species)	Unmeasurable effect	Localised and short-term reduction in threatened species habitat with little or no reduction in species or community viability	Localised and long-term reduction in threatened species habitat resulting in some change to community viability	Regional and long-term reduction in threatened species habitat resulting in significant change to community viability	Regional or total extinction of the threatened species and/or community viability
Other flora and fauna (terrestrial and aquatic species, vegetation and habitat)	Unmeasurable effect	Localised and short-term reduction in species habitat resulting in little or no change to community viability	Localised and long-term reduction in threatened species habitat resulting in some change to community viability	Regional and long-term reduction in threatened species habitat resulting in significant changes to community viability	Regional or total extinction of threatened species habitat and/or community viability
Radiological impacts to non-human biota (terrestrial and aquatic species, vegetation and habitat, threatened and listed species)	Dose rate assessed to be less than natural background or less than the ERICA screening level (10 µGy/y)	Dose rate assessed to be greater than the ERICA screening level (10 µGy/y) but less than 40 µGy/h (level of potential effects on biota reproductive success)	Dose rate assessed to be greater than 40 µGy/h (level of potential effects on biota reproductive success) but less than 400 µGy/h (level of potential effects on biota populations)	Dose rate assessed to exceed 400 µGy/h (level of potential effects on biota populations)	Demonstrated radiological impacts to non-human biota outside the RL boundary

4.3 Impact assessment

The impact significance associated with the proposed SRE Project activities is described below and summarised in Table 4.3.

4.3.1 Noise and vibration

4.3.1.1 Impact of noise and vibration on terrestrial fauna

The potential impact of noise on terrestrial fauna may result in disturbance responses in individual animals or other behavioural changes. Sources of potential impact include but are not limited to noise from surface infrastructure from proposed SRE project activities, road traffic noise, and vibration from construction and operation activities. As per Section 3.2.1, the Noise and Vibration Impact Assessment modelled only very marginal noise level increases above background noise levels arising from the proposed surface infrastructure and road traffic of 1dB(A) during construction and 4 dB(A) during operation. The single greatest noise sources from construction (117 db(A)) were excavator operation, and during operation (135 db(A)) were the flash smelting furnace. These activities either already occur immediately adjacent to, or within the SML Area (e.g. excavator operation), and are unlikely to occur in immediate proximity to vegetation or fauna (e.g. flash smelting furnace). Existing vegetation and fauna would already exhibit a level of distance from noise sources of equivalent levels associated with the existing plant, with the exception of excavations associated with the Water Infrastructure Area (water pipeline to the south) and EIGR Areas during construction only. In addition, potential noise impacts would be managed as per the mitigation measures outlined in Section 4.4.1.

Given no blasting is proposed as part of the SRE Project, vibration levels are expected to be negligible. Impacts to the nearest sensitive residential receivers were considered to be not significant when compared against the EIAF.

It is acknowledged that anthropogenic noise can affect communication, distribution, foraging, homeostasis and habitat quality of fauna species (Kunc and Schmidtt 2019, Duarte et al. 2015)). Fauna using audible cues for breeding activity, may also experience disruption to breeding cycles or reduced breeding success (Duarte et al. 2015). Different taxonomic groups also respond differently to noise, and there may be positive and negative impacts for prey and predator species. In terrestrial ecosystems, noise may also be influenced by the structural complexity of vegetation and noise effects may be attenuated by vegetation (Kunc and Schmidtt (2019). Many studies have demonstrated the negative impact of noise pollution of animal communication, species diversity, richness and abundance. Studies of open-cast mining in Brazil suggest significant noise impacts in a neighbouring species-rich tropical forest (Duarte et al. 2015).

At a local level, literature review of available studies and monitoring results from other, similar, operations was undertaken to describe the expected impacts of noise and vibration on fauna abundance and diversity. OZ Minerals (2017a) described the results of fauna monitoring at the Prominent Hill operation, concluding that "monitoring surveys undertaken at a variety of operational mine sites show no statistical variation in the abundance or species richness of fauna species at distances of approximately 200 m or less to operational areas such as waste rock dumps, access roads and tailings storage facilities. Short-term

blasting may result in a short-term movement of fauna out of the area, however a return to these areas would be anticipated with no longer-term impact."

Similarly, Biota (2015) studied the impact of noise on bat species at BHP's Mining Area C and 'found no evidence of disturbance response in a colony of Orange Leaf-nosed Bat (*Rhinonicteris aurantius*) with blasting as close as 120 m to the roost site. A small number of Ghost Bats also utilised that roost and no evidence of disturbance response was detected for Ghost Bat either.

In a worst-case scenario, masking impacts could occur up to several hundred metres or more from these temporary noise sources. Masking can occur when birds are subject to continuous noise of sufficient intensity in the frequency region of bird hearing that has a detrimental effect on their detection and discrimination of vocal signals (Dooling and Popper 2016). However, given the frequency of the noise and mitigation measures proposed in Section 4.4.1, masking impacts are likely to be considerably less, particularly, given the species is known to occur adjacent busy highways and near other active mine sites on the Eyre Peninsula (e.g. Iron Baron)

In addition to the above, the baseline assessment indicates the habitat in the SML Area is not essential to threatened species, or to common fauna, and is widespread throughout the region. This type of habitat is present immediately adjacent (south of) the existing Olympic Dam mine and the ARR is located immediately north of the existing Olympic Dam mine, where both threatened and common fauna persist (Arid Recovery 2025a). Outside the SML, the EIGR Areas occur in non-urbanised areas adjacent and beneath an existing transmission lines and associated tracks. Noise impacts would occur only during construction (clearance of vegetation to achieve safe clearance beneath the existing transmission line), and not operation (given the transmission line is already present and there would be no additional noise sources).

The baseline assessment also indicates only one EPBC-listed species is known in the SRE Project Area, the highly mobile Southern Whiteface. Several highly mobile and broadly distributed State-listed fauna are considered to have potential to occur but have not been recorded in the SRE Project Area to date (Australian Bustard, Black Falcon, Flock Bronzewing, Little Eagle, Peregrine Falcon and Scarlet-chested Parrot). However, 3 Peregrine Falcon were observed flying over the SML, immediately north-east of the Project Area in 2025 (G. Smith and Z. Bull, pers. comm).

In summary, it is acknowledged that noise can impact fauna, but due to the existing high background noise levels at and surrounding the existing Olympic Dam mine and associated plant, only marginal (almost unmeasurable) localised increases in noise levels are predicted as a result of the SRE Project construction and operation. Construction impacts further away from the existing operation (e.g. the southern portion of the Water Infrastructure Area and the EIGR Areas) are localised and short-term. The impact significance to both threatened and non-threatened terrestrial fauna as a result of noise changes is therefore considered to be low to negligible and therefore has been rated as Level 2 (not significant).

4.3.2 Air quality

4.3.2.1 Impact of dust deposition on terrestrial flora

Increased amounts of dust deposition can occur due to, but not limited to, the following:

- vehicle movement on unsealed roads, and increased degradation or unsealed roads (construction and operation)
- material movement of soil material and the creation of laydown areas (construction)
- land clearance removing topsoil layer and vegetation, and stockpiling of materials (construction)
- increased particulate matter from stacks and material handling activities (operation).

With consideration of the potential impact on the abundance and diversity of terrestrial flora and vegetation; is it noted that increased rates of dust concentration can cause a reduction in the growth, yield, flowering and reproduction of vegetation (Saunders and Godzik 1986, cited in Prajapati 2012). This can be attributed to the following principal mechanisms:

- changes in energy exchange (i.e. the absorption and conversion of radiation)
- reductions in light absorptions (i.e. effects on vegetation photosynthesis)
- inhibition of water vapour exchange (i.e. gas diffusion between leaves and air) (Doley 2006).

Doley (2006) suggests that plant capability can be significantly altered as a result of critical dust loads, whereby particle size distribution and the colour of dust can have an impact. This being dust from approximately 1 g/m^2 for ultra-fine carbon black particles to about 8 g/m^2 for more coarse road or limestone particles with a median diameter of more than 50 µm. When considering direct physical effects of mineral dust on vegetation it has been shown that vegetation becomes negatively impacted at relatively high surface loads of greater than 7 g/m^2 (Farmer 1993). Roadside deposition of dust on vegetation adjacent unpaved roads can also be subjected to up to 10 g/m^2/day (Everett 1980, cited in Farmer 1993). Thompson and colleagues (1984) also determined that for roadside vegetation to show a reduction in photosynthesis between 18 and 30 per cent, the dust deposition would need to be 10 g/m^2. It was established that dust may have an appreciable effect at concentrations ranging between 5 and 10 g/m^2, and that dust may affect photosynthesis by shading and obstructing diffusion (Thompson et al. 1984).

Dust can physically block the stomata of vegetation, inhibiting water vapour exchange. Where reductions in photosynthesis and inhibition of water vapour exchange, combined with an increase in leaf temperature is likely to make vegetation more susceptible to drought (Farmer 1993). It is noted, however, some desert plants have glandular hairs covering stomata which can result in increased tolerance to dust deposition (Doley 2006).

Dust deposition measured at BHP's Olympic Dam site averages around 1 g/m^2/month, with the nearby BHP's Carrapateena Mine averages around 1.6 g/m^2/month (including the deposition of regionally generated saline aerosols). Significant additional project-related dust deposition is noted as being confined to the immediate 500 m surrounding the dust-generating operations.

In a study are Carrapateena, dust totals in the amount of 7 g/m^2 were deemed to be the level at which changes in plant health become evident (OZ Minerals 2017a), and the actual impact is likely to be variable based on the period between rainfall events and high wind speed events, which remove dust deposition from the leaf surface. It would, therefore, require several months without rainfall before some species may begin to demonstrate impacts, and the significance of these impacts are expected to be greater near the operations versus across the baseline environment. Periodic rainfall events or even high winds are expected to remove dust from vegetation, having a re-setting effect on the potential for impacts.

In relation to chemical effects associated with deposition of reactive materials, it is noted this can also have an impact. Dust with a higher pH (greater than 9) may cause direct injury to the vegetation onto which they're deposited or through accumulation in the soil (Doley 2006).

Considering this information in relation to the SRE Project, immediate road-side vegetation has potential to be impacted as a result of increased vehicle traffic, with the effect correlating to the amount of vehicle use and the effectiveness of dust mitigation measures. It is expected that the impact would be limited to the immediate vicinity of the roads and disturbed areas and that BHP would routinely deploy mitigation measures such as dust suppression on roads and cleared laydowns. Impacts to flora species and vegetation as habitat for common and threatened species are therefore likely to be very localised and short-term, particularly during construction when disturbance first occurs. In addition, no EPBC-listed flora species, or State-listed flora species are known from the Project Area, with only the highly mobile and broadly distributed Southern Whiteface (EPBC Vulnerable) known to occur in the Project Area. Several highly mobile State-listed fauna also have potential to occur in the Project Area but have not been recorded to date.

A relatively low rate of dust deposition is predicted in the SML Area during construction and operation due to project related-activities and vehicle traffic. The AQIA suggests that while not quantified, emissions and associated impacts from SRE Project Construction are expected to be localised and lower than BAU operations or SRE Project plus BAU operations. As a relatively low rate of dust deposition is predicted, and given the availability of existing and effective mitigation measures (refer to Section 4.4.1), impacts of dust on terrestrial flora around the SRE Project are considered minor. Disturbance will only occur within the EIGR Areas for the required vegetation clearance associated with meeting the safety requirements of the existing line, and any impacts from dust deposition on both listed and non-listed native vegetation will be temporary. Overall, the impacts of dust deposition on flora have been assessed as significance Level 2 (not significant).

4.3.2.2 Impacts of dust deposition on terrestrial fauna

Studies of the effect of dust deposition on the abundance and diversity of fauna in proximity to unsealed roads found little change in abundance of species as a result of dust. For example, Jones et al. (2015) found that pre-upgrades to roads (i.e. road produced dust) trapping surveys confirmed that a forest environment supported a diversity and abundance of ground-dwelling mammal species in highly dust-affected sites which was equivalent to that detected following road upgrades. They suggested the results indicated that, in certain environments, dust may have far less impact on ground-dwelling mammals than expected (Jones et al. 2015). In addition, given the existing dust levels in the semi-arid environment of the SRE Project Area, any impacts that occur (primarily during construction) are likely to be localised and short-term.

Considering this information in relation to the SRE Project, immediate road-side vegetation has potential to be impacted as a result of increased vehicle movements and disturbance areas, with the effect correlating to the amount of vehicle use and the effectiveness of dust mitigation measures. Impacts to fauna are primarily likely to arise as a result of reduced habitat quality. As per the impacts of dust deposition to flora, impacts to vegetation (as habitat for common and threatened species) are likely to be localised and minor due to relatively low predicted dust deposition during construction and operation. Only the highly mobile EPBC-listed (Vulnerable) Southern Whiteface is known to occur in the SRE Project Area, and several highly mobile State-listed fauna have potential to occur, but all have broad distributions and extensive available habitat away from the SRE Project Area.

Due to the relatively low rate of dust deposition expected in the SML Area from related-activities and vehicle traffic, and the availability of demonstrated effective dust mitigation measures (refer to Section 4.4.1), impacts to both listed and non-listed fauna species are expected to be very minor within and surrounding the SML Area. The EIGR Areas will only be disturbed for vegetation clearance associated with meeting safety requirements under the existing transmission line, and ongoing impacts as a result of dust deposition on both listed and non-listed fauna are not expected. Overall, the impacts of dust deposition on terrestrial fauna are expected to be unmeasurable and have been assessed as significance Level 1 (not significant).

Based on the above and the outcomes of the AQIA, the potential for threatened and non-threatened fauna impacts associated with dust from the roads is therefore assessed as Level 1 (not significant).

4.3.2.3 Impact of off-gases and fugitive gases

Limited technical studies have been undertaken with reference to the impacts of gaseous pollutants on arid zone fauna and flora, although it is presumed that emissions from gaseous pollutants during the combustion of fossil fuels have the potential to negatively impact nearby vegetation. However, the air quality modelling undertaken suggests that increases in concentrations of off-gases and fugitive gases would be restricted to the immediate vicinity of the SRE plant activities, within an area which is already subjected to such emissions.

With respect to off-gases and fugitive gas emissions more generally, the overall effect is climate change, the impacts of which may include:

- changes in the timing of ecological seasonal lifecycle events (e.g. nesting, breeding, migrations)
- range shifts (e.g. changes in population distributions to maintain similar climatic conditions)
- food web disruptions (e.g. availability of food resources)
- buffer and threshold effects (e.g. change in the ability of ecosystems to temper the impacts of extreme conditions such as retreating of reefs, wetlands that absorb floodwaters, etc.)
- pathogens, parasites and disease (e.g. increase in the conditions that support the spread of these)
- extinction risks (e.g. inability of particular species to cope with climate change).

Off-gases and fugitive gases from the SRE Project plant would be emitted into an already established industrial plant within the existing Olympic Dam operation. The Air Quality Impact Assessment Appendix of the EIS suggests emissions of sulphur-related pollutants are estimated to increase as a result of the

SRE Project relative to BAU operations. However, the predicted impacts are below applicable health and safety impact assessment criteria at all sensitive receptor location areas. Therefore, the likelihood of adverse odour impacts is considered low. As such, the impact of fugitive gases on terrestrial ecology is considered to result in little or no reduction or change (likely immeasurable change) in species viability and is assessed at worst as Level 2 (not significant).

4.3.2.4 Impact of radiation exposure

ARPANSA is the governing body for radiation and nuclear safety in Australia. The National Directory for Radiation Protection (ARPANSA 2021) outlines if concentrations of naturally occurring uranium (and thorium) in material exceeds a total of 1 Bq/g, then the material is defined as radioactive. Under the EPBC Act, radiological triggers and potential impacts are assessed at theoretical sensitive receptor locations, being 0.5, 1 and 5 km from the SRE Project.

Like all environments, there is naturally occurring background radionuclide levels associated with the SRE Project. During stockpiling and smelting of copper concentrates, emission of dust and from stacks and subsequent deposition /release into the surrounding environment, results in an increased potential for exposure of flora and fauna to radionuclides, impacting the diversity of terrestrial flora and terrestrial fauna.

In relation to flora and thereby extension to supporting terrestrial fauna, the accepted method for assessing potential risk is the ERICA Assessment Tool (ARPANSA 2010), whereby the method uses changes in soil concentrations and standard species uptake factors to calculate radiological risk. The Assessment of Impact Significance indicated potential radiological impact to flora and fauna is low with no additional controls are justified due to the very low potential impacts.

Olympic Dam has a long history of safe radiation management, with assessments of the impacts of radiation on workers, the public and the environment occurring since commencement of operations. Results to date indicate that radiation impacts to workers, the public and to the environment have been well managed and are well below relevant regulatory dose limits. BHP holds current radiation licences for Olympic Dam operations, which will be reviewed and conditions amended to reflect the proposed SRE Project, as applicable (BHP 2024d). These results are considered negligible to low for impacts to both threatened and non-threatened terrestrial flora and fauna and the significance has been assessed as Level 1 (not significant).

4.3.2.5 Impact of lighting on terrestrial fauna

DCCEEW (2023i) outlines that light pollution has the potential to disrupt terrestrial fauna behaviour, particularly for nocturnal species. Disruption may include impacts to breeding, foraging and migration which in turn can stall recovery of threatened species. This is supported by research by the University of Melbourne, where nocturnal insects exposed to artificial light are found to prolong the time between egg-to-adult stages of lifecycle, resulting in delayed timing of sexual maturity and potentially producing fewer offspring in a season (Durrant et al 2018). Similarly, a study focused on mitigating impacts of night-time light pollution on wildlife suggested artificial light can alter the timing of breeding as the change in day length (indicated by light) is an important cue for reproductive activation in seasonal breeders (Robert 2018). Artificial light in urbanised areas was found to mask seasonal changes resulting in

suppressed melatonin levels and delayed births in free-ranging Tammar Wallaby (Robert 2018). There are, however few studies that have documented effects of human-made light pollution at night on free-ranging mammals (Roberts 2018). Several case studies have found benefits in managing lighting to reduce impacts to marine reptiles (turtles) and marine birds (shearwaters) (documented in DCCEEW 2023i).

The impacts of light emissions on fauna are poorly documented and there is uncertainty associated with direct impacts. It is expected that the lighting required for the SRE Project may have potential to impact fauna on the basis of altering feeding patterns, whereby increased light pollution may attract higher concentrations of insects resulting in a potential increase of nocturnal fauna within the immediate SML Area, and noted this particularly would apply to bats and nocturnal avian fauna. However, the SRE Project is adjacent an existing brownfield site with substantial existing light emissions arising from the operational Olympic Dam mine and associated processing plant and accommodation villages. Any changes as part of the SRE Project is expected to be negligible, and would consider both human focused guidelines and the National Light Pollution Guidelines for Wildlife (DCCEEW 2023i) and mitigation measures as per Section 4.4 below. Any potential impacts are expected to be very localised, and it is noted that no nocturnal flying species of conservation significance (EPBC-listed or State-listed) have been identified in the Project Area.

Considering the locality of the SRE Project in relation to the existing Olympic Dam operation and accommodation areas which are already well-lit environments, it is predicted that there would be negligible impact as a result of the additional artificial lighting required for the SRE Project. Given no EPBC or State listed species which potentially occurring the Project Area are nocturnal, impacts to listed species are assessed as Level 1 (not significant). Minor behavioural changes as a result of the additional lighting are plausible for common nocturnal fauna, and impacts are assessed as Level 2 (not significant).

4.3.3 Land

4.3.3.1 Impact of land clearance

Vegetation communities identified within the SRE Project Area are well represented within the wider region. Where clearance of land, and consequently habitat, is expected to occur, there would be localised impacts on both flora and fauna species within that immediate area. Home ranges of many small mammals and reptiles are small and therefore those individuals within the clearance area are likely to be directly impacted, however, vegetation (and thus habitat clearance) is not expected to have significant impacts to those species at a local population, or species as a whole, level (i.e. it is clearance of non-essential, or not critical habitat only). The SRE Project is expected to result in a total Disturbance Footprint (excluding existing disturbance) of 234.04 ha as presented in Table 3.2 (101.71 ha for the SRE Area, 64.01 ha for the General Infrastructure Area, 39.82 ha for the Water Infrastructure Area and 28.50 ha for the EIGR Areas). Disturbed areas without infrastructure (e.g. construction buffer areas, or where infrastructure is buried) would be rehabilitated either progressively following construction, or at final closure of the site.

Vegetation that would be cleared to accommodate the SRE Project (for infrastructure and other areas as described in Section 1.3, including buffers) is locally and regionally common and widespread. Impacts to non-threatened flora and fauna species are not expected to have a significant effect on either abundance or diversity of species present in the region. Impacts to common flora and fauna species are therefore considered to be localised only, and short-term during construction where rehabilitation following construction is proposed (e.g. over the buried water pipeline). As such, impacts to common species are assessed as Level 2 (not significant).

For threatened fauna species, whilst localised land clearing is expected to have only minor impacts on local habitat and therefore local populations of species, the removal of habitat may result in a short-term reduction in abundance of those species, if present. Only the EPBC listed (Vulnerable) Southern Whiteface is known to occur within the Project Area, but several State listed species are considered to be likely to be present, or to be potentially present, within the Project Area. Impacts to threatened fauna have been conservatively assessed as an impact significance of Level 2 (not significant); as a result of the potential short-term removal of non-essential habitat for Southern Whiteface, known to occur in the SRE Project Area.

All clearance activities would be undertaken in accordance with the requirements of the EPBC Act, NV Act, NV Regulations and the Policy and Gide for a Significant Environmental Benefit (NVC 2024a, 2024b, 2024c, 2024d, 2025). As part of these requirements, suitable environmental offsets would be applied (including under the EPBC Act if required, as well as an SEB offset for native vegetation removal). It is noted that offset strategies and offset payments take into consideration impacts to threatened fauna where applicable. Clearance activities would apply specific mitigation measures, as described in Section 4.4, to minimise impacts to flora and fauna during clearance.

4.3.3.2 Impact of increased weed and pests

During construction, whilst vehicles and machinery can act as vectors for weed dispersal, vehicle movements associated with SRE Project-related activities are not expected to result in a significant increase in the abundance or diversity of weed species. It is assumed weed monitoring within the disturbance areas would be undertaken on a routine basis and management activities undertaken as required to control any outbreaks, with an emphasis on declared weeds (as listed under the LSA Act) or WoNS, as per the existing EPMP (BHP 2025) and mitigation measures proposed in Section 4.4. Waste management practices are expected to control waste from workers which may attract pest species to the Project Area. Therefore, no increase in the abundance or diversity of weed species is expected over the long-term, and the impact of weeds and pests on ecological values has been assessed as significance Level 2 (not significant).

Similarly, during operation, increased occupancy of Olympic Dam accommodation due to the SRE Project workforce may result in unmanaged food waste materials that cause an increase in pest fauna species. This may in turn result in a decrease in native fauna abundance and diversity through elevated predation pressure (e.g. if there are increases to existing presence of feral predators such as European Fox and Feral Cat). An increase in European Rabbits may result in competition and grazing of emerging flora. It is assumed that standard waste management practices will be deployed for the required worker accommodation, as per current practice at Olympic Dam (BHP 2025, Section 4.4). Pest monitoring and management programs where required within the disturbance areas would be undertaken, as per the

established waste management practices outlined in the existing EPMP (BHP 2025) and Section 4.4. Therefore, no increase in the abundance feral/pest fauna that result in a change in abundance and diversity to native flora and fauna is expected over the long-term, and impacts to ecological values as a result of weeds and pest animals attributable to the SRE Project have been assessed as significance Level 2 (not significant).

4.3.3.3 Impact of sedimentation

The transport of sediments in surface water run off from recently cleared areas during construction, or from unsealed areas throughout operation, represents a potential impact to receiving ecological environments. This potential impact event is addressed as part of the Surface Water Impact Assessment Appendix to the EIS.

4.3.3.4 Impact of bushfires

Bushfires can be an important factor in shaping the overall diversity and health of ecosystems, however, the level of dependence on bushfires varies greatly across different vegetation communities within Australia. Within the Project Area, which is largely dominated by sandy swales with chenopod vegetation and low dunes Acacia or Native Pine woodlands, it is assumed that dependence on bushfires for succession of vegetation and general landscape function is less than, for example, some mallee communities which are located further south.

The nature and extent of a bushfires in different regions can also vary greatly. A review of the fire history surrounding the SML indicated no fires have been recorded within 100 km of the SML with the most recent fire in the broader region recorded in 2012 (DEW 2025). At and surrounding the SML Area, there are existing levels of degradation from the existing Olympic Dam operation, from historical grazing, and evidence of impacts from rabbits. Ground cover and litter levels at the surface are very low, meaning any bushfires will likely be of relatively low intensity.

There are no known EPBC-listed or State-listed flora in the Project Area. Only one highly mobile EPBC-listed fauna (Southern Whiteface) has been identified in the Project Area, and a number of mobile State-listed fauna that have not been identified are considered to possibly or likely occur (Australian Bustard, Black Falcon, Flock Bronzewing, Little Eagle, Peregrine Falcon and Scarlet-chested Parrot). All have broad ranges. Impacts of bushfires caused by the SRE Project are therefore predominantly on common flora and fauna species which are wide ranging throughout the arid lands of South Australia (and beyond).

Fire risk management processes will be in place during construction and available across the Project Area once operational, as is standard across all of the Olympic Dam operation. As such, it is expected that most incidents of fire would be able to be controlled immediately following ignition.

Given the sparse nature of vegetation in and around the SRE Project Area, particularly areas with little or no dense understorey and a lack of plant litter cover, and the low likelihood of fires as a result of the SRE Project getting out of control, it has been assumed that if a bushfire were to start as a result of the SRE Project, it would be relatively small in extent and therefore the impact to ecological values has been assessed as significance of Level 2 (not significant).

4.3.4 Surface water

4.3.4.1 Impact of altered flow regimes

Surface water flows in newly developed areas of the SRE Project will flow back to existing operational areas. There may be a loss or reduction of surface water flow volume from the newly developed areas, however this will be localised and is expected to result in negligible changes to existing surface water catchments in the SRE Area due to the absence of significant surface water features.

No impact is expected at the EIGR Areas as no infrastructure development will occur.

Impacts to ecological values because of changes to altered surface water flow regimes will be limited to the SML Area, minor and localised. As such, the impact of altered flow regimes has been assessed as significance Level 2 (not significant).

4.3.4.2 Impact of released chemicals or hydrocarbons

During construction and operation, there is the potential for the SRE Project to affect surface water quality, through spills of contaminants, which may subsequently be transported by rainfall runoff into swales, or through erosion of disturbed areas. This represents a potential impact event to the abundance and local diversity of native vegetation which represents habitat for both common and threatened species. With regard to threatened species, no EPBC-listed or State-listed flora are expected to occur in the Project Area, and only one highly mobile EPBC-listed fauna species (the Southern Whiteface) and a number of State-listed fauna (that have not been recorded to date, but have potential to occur) are considered to potentially occur in the Project Area.

During all phases of construction and operation, contamination due to chemical or hydrocarbon release is anticipated to be low or no risk due to the provision of bunding in accordance with:

- AS1940-2017: The storage and handling of flammable and combustible liquids (Standards Australia 2017)
- AS1894-1997: The storage and handling of non-flammable cryogenic and refrigerated liquids (Standards Australia 1997)
- AS 4897-2008: The design, installation and operation of underground petroleum storage systems (Standards Australia 2008)
- SA EPA liquid storage guidelines (EPA 2016).

As per Section 3.2.5, all SRE Project-related site run-off would be retained on-site within existing stormwater management systems. Run-off events of greater than 2 mm in the region occur infrequently and run-off events of greater than 10 mm occur on average 20 times in every one hundred years. During smaller rainfall events, the Project developed area would not contribute water to the surrounding environment. However, during large (rare) storm events, it is expected run-off rates may increase marginally due to stormwater discharges (such as from hardstand areas, compacted cleared ground, and stormwater basins). Transport infrastructure such as roads and culverts may result in backwater effects occurring upstream from culverts, creating temporary local pooling during rainfall runoff events. However, the chemical composition of runoff water, including pH, salinity, and potential metalloids and metal

contaminants of the run-off water during high rainfall events is expected to be within the baseline measurements for the environment, therefore, impacts to vegetation due to the chemical composition of run-off from the Project are not expected.

In summary, management / mitigation measures proposed include:

- SRE Project smelter and refinery plants will be enclosed within buildings, such that rainfall is excluded
- no stormwater discharge points will be created by the SRE Project
- stormwater runoff velocities in the natural environment will remain unchanged, thus there will be no change to erosion potential contaminant sources such as fuel storage and stockpiles would be bunded and located away from stormwater flow paths, preventing interaction with stormwater the dunal catchment system means that any contaminant, if one were to be released, would not be transported through a waterway network, but would be captured locally, facilitating cleanup.

The Surface Water Impact Assessment concludes that peak flood water levels for water pooling in swales affected by the development are expected to vary in the order of ±10 cm from current flood behaviour in a 1% AEP storm, with less change in frequent storms. This magnitude of change in water availability to the local swale flora and fauna was considered negligible.

Further, due to the lack of surface water in areas of proposed chemical or hydrocarbon storage (including temporary storage, and loading/offloading areas) and the nature of the topography of the SRE Project, it is considered that in the event a spill did occur, the lateral spread of contaminants would be generally contained to a very localised area, and remediated prior to reaching any waterways of environmental areas of significance, as per Section 4.4.1. As such, impacts to ecological values as a result of the spread of chemicals or hydrocarbons through surface water is considered very unlikely and localised only, and has been assessed as significance Level 1 (not significant).

During operation, this impact event would only apply to the SRE Area, and is not relevant to the EIGR Areas, where activities only include short-term vegetation management associated with safety requirements, and no storage of chemicals or hydrocarbons.

4.3.4.3 Impact of increased sedimentation

Impacts of increased sedimentation may occur, if uncontrolled, during construction (particularly relevant in areas of recent ground disturbance), operation (where surface water is unmanaged on unsealed surfaces) and during closure (where erosion of surfaces beneath recently demolished structures and rehabilitated areas may occur). Sediments transported to adjacent environments may impact the abundance and local diversity of native vegetation which represents habitat for common and threatened species. As above, for threatened species, it is noted that no EPBC-listed or State-listed flora are expected to occur in the Project Area, and only a single highly mobile EPBC-listed fauna species (the Southern Whiteface) has been identified in the area. A number of State-listed fauna (that have not been recorded to date but have potential to occur) are considered to potentially occur in the Project Area, which may be impacted by degradation of non-critical habitat.

As per Section 3.2.5 and as noted above, all SRE Project-related site run-off is planned to be retained on-site within existing stormwater management systems, and the Project developed area would not

contribute water to the surrounding environment during smaller rainfall events. Only large (rare) storm events are expected to marginally increase run-off due to stormwater discharges (such as from hardstand areas, compacted cleared ground, and stormwater basins).

Regarding erosion and sediment control, when disturbed through surface water flows, the presence of sandy / clay loam soils has the potential to mobilise and transport sediments before in evaporates or infiltrates in enclosed catchments or bunded areas. This process, therefore, has a low potential to carry sediments across the landscape and smother surrounding vegetation, particularly small herbaceous species which are of lower prevalence in the makeup of vegetation communities. Sandy soils will naturally allow rapid infiltration of surface waters, meaning the distance of sediment transport across the landscape is likely to be relatively small, except during the most extreme uncontrolled run-off events. So although impacts as a result of sedimentation are unlikely in terms of frequency, and most likely to be localised, the impacts may lead to a temporary reduction in overall local diversity or abundance of common flora species.

Erosion and sediment control measures will be developed as a part of detailed design and implemented during construction. Suitable controls to mitigate potential adverse effects of surface water run-off and sedimentation, may include the establishment of sediment ponds for the containment of surface water that has traversed disturbed areas, erosion protection in areas downstream of SRE Project related infrastructure, and roadway designs in accordance with Austroads requirements (and refer Section 4.4). As such, impacts to ecological values are expected to be minor in the context of the volumes of water required to overtop run-off collection dams, or other impacts as a result of sedimentation within surface water run-off from the SRE Project, and therefore impacts from sedimentation on flora, fauna and habitat is assessed at a significance Level 2 (not significant).

4.3.5 Summary of impact significance

The ecological impact assessment, including the determination of impact significance and the understanding of uncertainties, is summarised in Table 4.3.

Table 4.3: Ecological impact assessment

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
Air (including noise, vibration, air quality, lighting and radiation)				
During construction, the emission of noise and vibration from infrastructure or access road construction, including vehicle movement noise results in an increase to noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.	A34, A35, A42, A43	Level 2 – Not significant	Any noise impacts would be short-term during construction. Elevated noise levels from SRE-related traffic would be localised and minor. Existing roads would be used as access routes for construction. A review of available literature from other, similar operations indicates that abundance and diversity of terrestrial fauna does not materially change at locations close to noise-generating activities.	Low – Ecological surveys and historical monitoring have been undertaken to determine the presence of terrestrial fauna species, including threatened species. Noise levels associated with traffic noise are generally well understood, there are comparable existing noise sources already present, and there is a significant body of research into the effects of traffic noise on terrestrial ecology.
During operation, the emission of noise and vibration from plant, equipment and mobile fleet associated with project activities results in an increase in noise and vibration, impacting the abundance and diversity of terrestrial fauna and State and Nationally threatened species.	A38, A39, A46, A47	Level 2 – Not significant	The outcomes of the assessment of effects indicate that elevated noise levels would be localised and would occur in an area where there is existing background noise from current Olympic Dam mining and processing operations. Existing roads would be used as access routes operation. A review of available literature from other, similar operations indicates that abundance and diversity of terrestrial fauna does not materially change at locations close to noise-generating activities.	Low – Ecological surveys and historical monitoring have been undertaken to determine the presence of terrestrial fauna species, including threatened species. Noise levels associated with industrial noise and traffic noise are generally well understood, there are comparable existing noise sources already present, and there is a significant body of research into the effects of industrial noise on terrestrial ecology.
During operations, lighting required for safety and security during night-time operations results in a change to the current lit environment, impacting	A30	Level 1 – Not significant	The SRE Project will result in an incremental increase to existing lighting on the Olympic Dam SML.	Low – Limited studies have been undertaken specifically in relation to disruption of natural behaviours of fauna due to artificial lighting associated with mine site and industrial operations, however, in this instance the additional light from the

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
the abundance and diversity of terrestrial fauna.			While artificial lighting has the potential to disrupt the behaviour of some species of fauna, particularly nocturnal fauna, potential impacts are considered highly localised and are unlikely to result in negative impacts. There are no conservation significant nocturnal fauna species.	SRE Project is an incremental increase only, and there are no conservation significant nocturnal fauna species in the area.
During construction, the movement of soil materials and the creation of cleared areas subject to wind erosion results in the emission of dust that reduces air quality, impacting the abundance and diversity of terrestrial flora and vegetation, habitat and threatened species.	A15, A16, A17	Level 2 – Not significant	Dust emissions as a result of wind erosion associated with the movement of soil material and the creation of cleared areas are expected to be highly localised. Mitigation measures such as water cart dust suppression activities can largely negate any negative impacts to terrestrial flora.	Low – Dust suppression activities are planned as part of the SRE Project construction, and have been used effectively at construction sites across the country.
During operation, the emission of particulate matter from stacks or material handling activities results in concentrations that impact terrestrial flora and vegetation, habitat and State and Nationally threatened flora species.	A20, A21, A22	Level 2 – Not significant	The outcomes of the assessment of effects indicate that elevated particulate matter levels would be localised. SRE Project will include design controls such as adequate stack height and scrubbers as well as mitigation at material handling and transfer points.	Low – Ecological surveys and historical monitoring have been undertaken to determine the presence of terrestrial flora and fauna species, including threatened species. Emission levels have been modelled based on conservative assumptions. Particulate matter concentrations associated with industrial processing operations are generally well understood, and there is a sufficient body of research into the effects of particulate matter on terrestrial ecology.
During operation, emission of off-gases and fugitive gases from smelting, acid plant and refinery operations results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species.	A8, A9, A10	Level 2 – Not significant	The outcomes of the assessment of effects indicate that elevated levels of gaseous pollutants would be localised. SRE Project will include design controls to minimise loss of off-gases and fugitive emissions.	Moderate – Ecological surveys and historical monitoring have been undertaken to determine the presence of terrestrial flora and fauna species, including threatened species. Emission levels have been modelled based on conservative assumptions. Gaseous pollutant concentrations associated with industrial processing operations are generally well understood, but there are limited technical studies on the effect of gaseous pollutants on arid zone ecology.

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
During operations, the emission of radon and/or radionuclides (e.g. from stacks or materials handling activities) results in concentrations that impact terrestrial flora and vegetation, habitat and threatened species.	A25, A26, A27	Level 1 – Not significant	The assessment of potential radiological impact to flora and fauna indicate that no additional controls are justified due to the very low potential impacts. The standard dust and emission controls that all processing operations generally employ would act to control potential impacts.	Low – Ecological surveys and historical monitoring have been undertaken to determine the presence of terrestrial flora and fauna species, including threatened species. Standard dust and emission controls that all processing operations generally employ would act to control potential impacts.
Land				
During construction, clearing of native vegetation for SRE Project infrastructure results in a reduction in abundance and diversity of native vegetation, habitat and threatened species.	L1, L2, L3	Level 2 – Not significant	Localised land clearing required for the SRE Project is expected to impact on local and commonly occurring habitat types, and therefore local fauna populations. No critical threatened species habitat, or habitat which any common or conservation significant fauna are reliant on, has been identified in the SRE Project Area, however there may be potential short-term removal of non-essential habitat for Southern Whiteface, which is known to occur in the SRE Project Area.	Low – Baseline ecological surveys have not identified unique vegetation or communities within the SRE Project that are not represented in the wider region. No State or EPBC threatened flora species have been recorded within the SRE Project Area and no critical threatened species habitat would be impacted by the SRE Project.
During construction, land clearing associated with the construction of SRE Project infrastructure results in conditions that are favourable for an increase in the abundance and diversity of weed species and an associated reduction in abundance and diversity of native vegetation, habitat and threatened species.	L6, L7, L8	Level 2 – Not significant	Should an increase in weed species or an introduction of new weed species occur, it is unlikely this would result in a widespread change in abundance or diversity of native flora and fauna. Should declared weeds or WoNS be recorded within the SRE Project these will be required to be controlled as defined within the relevant legislation. Current weed monitoring and management for Olympic Dam operations would be expanded to	Low – Project activities are not expected to significantly alter the current abundance or diversity of weed species where the impacts would result in a change in abundance or diversity to native flora and fauna. Routine weed monitoring and management at Olympic Dam demonstrates a capacity and capability to manage weeds on the SML.

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
			include disturbance associated with the SRE Project, with an emphasis on declared weeds (as listed under the LSA Act) or WoNS.	
During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, with changes to the prevailing surface water catchments resulting in a reduction in abundance and diversity of native vegetation, habitat and threatened species.	L9, L10, L11	Level 2 – Not significant	When disturbed, sandy / clay loam soils do not readily transport sediments across the landscape due to high permeability. Project designs aim to capture surface water run-off within the Project Area, with the exception of only rare very large stormwater events. Local vegetation and habitat is broadly represented throughout the region and does not provide critical habitat for any conservation significant species.	Low - Surface water run-off and associated erosion and sediment control can be managed across the SRE Project with robust engineering design, including mitigation structures such as the use bunding, sediment ponds and erosion protection where appropriate. Baseline ecological surveys have not identified unique vegetation or communities within the SRE Project that are not represented in the wider region. No State or EPBC threatened flora species have been recorded within the SRE Project Area and no critical threatened species habitat would be impacted by the SRE Project.
During operations increased occupancy of Olympic Dam accommodation due to the SRE Project workforce results in an increase in feral/pest fauna numbers that results in a decrease in native fauna abundance and diversity.	L18	Level 2 – Not significant	Project activities are not expected to change current accommodation practices or increase the potential for increased weed or pest diversity. Should an increase in weed or pest species or an introduction of new weed or pest species occur, it is unlikely this would result in a widespread change in abundance or diversity of native flora and fauna. Should declared weeds or WoNS be recorded within the SRE Project these will be required to be controlled as defined within the relevant legislation. Current weed monitoring and management for Olympic Dam operations would be expanded to include disturbance associated with the SRE Project, with an emphasis on	Low – Project activities are not expected to significantly alter the current abundance or diversity of weed or pest species where the impacts would result in a change in abundance or diversity to native flora and fauna. BHP has established and effective waste management practices for accommodation villages located on and off the SML.

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
			declared weeds (as listed under the LSA Act) or WoNS.	
Construction, operation and closure project activities, including planned construction and maintenance activities and unplanned equipment and plant failures, create conditions that result in a bushfire, resulting in destruction of habitat and vegetation which impacts the abundance and diversity of flora, fauna and State and Nationally threatened species.	L14, L15, L16, L17, L22, L23, L24, L25, L29, L30, L31, L32	Level 2 – Not significant	Emergency preparedness and response is well established on the SML as part of current Olympic Dam operations. Should a bushfire occur due to unplanned SRE Project-related activities it is unlikely the results of the fire will result in destruction to the effect that the abundance and diversity of flora and fauna will be impacted (the vegetation is sparse in nature), i.e. any impacts would be expected to be localised and short-term. Vegetation disturbance within the EIGR Areas is intended to reduce the potential for fire due to increased electrical loads through existing infrastructure.	Low/Moderate – Bushfires are unpredictable by nature, however, a range of mitigation strategies are able to be employed in accordance with Olympic Dam's integrated management system and regulation. There is limited fuel load in the Project Area and surrounds, and vegetation is low and very low open shrublands, as described by the ecological assessments.
During operations, the release of chemicals or hydrocarbons used in the SRE Project, including metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in the contamination of land, impacting the abundance and diversity of native vegetation, habitat and threatened species.	L19, L20, L21	Level 1 – Not significant	Should a failure of a primary chemical or hydrocarbon storage vessel occur it is expected it would occur within a highly localised area and would not be significant to impact the soil quality long term. Therefore, negligible impact is expected to the abundance or diversity of native vegetation or fauna. Existing spill mitigation and management practices for Olympic Dam operations would be extended to SRE Project activities.	Low – There are established requirements for hydrocarbon and chemical storage, handling, management and containment associated with the relevant Australian Standards AS1940, AS1894, EPA (SA) Guidelines (2016) and BHP practices.

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
During closure, the rehabilitation of cleared land following closure results in conditions that are favourable for an increase in the abundance and diversity of weed species resulting in a reduction in the abundance and diversity of native vegetation, habitat and threatened species.	L26, L27, L28	Level 2 – Not significant	Should an increase in weed species or an introduction of new weed species occur, it is unlikely this would result in a change in abundance or diversity of native flora and fauna. Should declared weeds or WoNS be recorded within the SRE Project these will be required to be controlled as defined within the relevant legislation. Current weed monitoring and management for Olympic Dam operations would be expanded to include disturbance associated with the SRE Project, with an emphasis on declared weeds (as listed under the LSA Act) or WoNS.	Low – Project activities are not expected to significantly alter the current abundance or diversity of weed species where the impacts would result in a change in abundance or diversity to native flora and fauna. Routine weed monitoring and management at Olympic Dam demonstrates a capacity and capability to manage weeds on the SML.
Surface water				
During construction, placement of SRE Project infrastructure and associated surface water management infrastructure disrupts, reduces or increases surface water flows, impacting abundance and diversity of native vegetation, habitat, and threatened species.	SW1, SW2, SW3	Level 2 – Not significant	The SRE Project is expected to result in localised and negligible changes to existing surface water catchments in the SRE Area due to the absence of significant surface water features. No impact expected at the EIGR Areas as no infrastructure development will occur.	Low - Surface water run-off and associated erosion and sediment control can be managed across the SRE Project with robust engineering design, including mitigation structures such as the use of bunding, sediment ponds and erosion protection where appropriate.
During construction, placement of SRE Project infrastructure and associated surface water management infrastructure results in the sedimentation of the downstream environment, impacting the abundance and diversity of native	SW5, SW6, SW7	Level 2 – Not significant	The SRE Project is expected to result in localised and minor changes to existing surface water catchments in the SRE Area due to the absence of significant surface water features No impact expected at the EIGR Areas as no infrastructure development will occur.	Low - Surface water run-off and associated erosion and sediment control can be managed across the SRE Project with robust engineering design, including mitigation structures such as the use of bunding, sediment ponds and erosion protection where appropriate.

Confirmed impact event	SPR ID No.	Impact significance*	Significance justification	Uncertainty
vegetation, habitat and threatened species.				
During operations, the release of chemicals or hydrocarbons used in SRE Project operations, including metals mobilised via acid rock drainage from stockpiles and/or the TSF or effluent released from WWTPs, results in impacts to the downstream environment, impacting the abundance and diversity of native vegetation, habitat and threatened species.	SW12, SW13, SW14, SW16, SW17, SW18	Level 2 – Not significant	Should a failure of a primary chemical or hydrocarbon storage vessel occur it is expected it would occur within a highly localised area and would not be significant to impact the soil quality long-term or negatively impact the abundance or diversity of native vegetation or fauna. Existing fuel and chemical storage and spill mitigation and management practices for Olympic Dam operations would be extended to SRE Project activities.	Low – There are established requirements for hydrocarbon and chemical storage, handling, management and containment associated with the relevant Australian Standards AS1940, AS1894, EPA (SA) Guidelines (2016) and BHP practices.
During closure, erosion of closed structures and rehabilitated areas results in the sedimentation of the downstream environment impacting the abundance and diversity of native vegetation, habitat and threatened species.	SW19, SW20, SW21	Level 2 – Not significant	Rehabilitation of the SRE Project Area is expected to result in localised and minor changes to existing surface water catchments due to the absence of significant surface water features	Low - Surface water run-off and associated erosion and sediment control can be managed across the SRE Project with robust engineering design, including mitigation structures such as the use of bunding, sediment ponds and erosion protection where appropriate.

Note: * Impact significance in accordance with Table 4.2

4.4 Mitigation and management

Each confirmed impact event is required to have a description of proposed management and mitigation measures applied, aimed at either breaking the SPR linkage (i.e. avoiding the impact) or otherwise reducing the impact significance to as low as reasonably achievable (ALARA). These are presented in the following sections.

4.4.1 Impact significance level 1 and level 2 (not significant)

A total of 18 confirmed impact events have been assessed as level 1 or level 2, i.e. not significant.

The list of potential mitigation and management measures that would be applied to reduce the significance of ecology-related impacts is presented in Table 4.4.

4.4.2 Impact significance level 3, level 4 and level 5 (significant)

There were no confirmed impact events assessed as having the potential for a significant impact.

Table 4.4: Indicative ecological mitigation and management measures

Type of measure	Description of mitigation and management measures
Air	
Surface infrastructure noise	Impacts will be mitigated in accordance with the standard operating procedures and designs to minimise the impact from noise as far as reasonably practicable
Lighting	Compliance with obtrusive lighting standards
	Use of lighting only where needed (i.e. not for decorative purposes)
Dust	BAU pollution control on stacks and future stacks. Controls as described in the Air Quality Impact Assessment Appendix to the EIS
Off-gas and fugitive gas emissions	Control of fugitive emission releases from RC handling and storage through the use of covers, wind breaks, enclosures and dust extraction to baghouse Controls including flue gas treatment as described in the Air Quality Impact Assessment Appendix to the EIS
Radiation (design controls)	A wheel wash and vehicle washdown bay to minimise the spread of potential contamination around the site and off the site
	Provision of hose down facilities and sumps, access ways and sufficient room for equipment (such as bobcats) for clean-up of material spillages
	Secure compounds, appropriate ventilation, use of dedicated extraction systems in appropriate areas
	Consideration of control of process stream recirculation, to ensure that recirculating loads do not act to concentrate radionuclides
	Management of stormwater to ensure adequate containment of all run-off water
	Tailings pipeline corridor bunded to control spillage in the event of pipeline failures
	Specific spillage containment and ease of clean up designs for the core processing facility. This includes all tanks having concrete bunds, as secondary containment, to store at least the volume of the tank.
Radiation (administrative controls)	Specific procedures to segregate, isolate and clean contamination or contaminated equipment
	Defined restricted access areas
	Specific procedures for equipment or materials leaving work areas of the SRE Project
	Radiation instruction and education for all workers associated with the SRE Project, including standards for the prevention of contamination release from the project, and monitoring to determine the effectiveness of control and for dose equipment
Land	
Land disturbance	When choosing construction access track or infrastructure locations, where possible avoid environmentally and culturally sensitive and restricted areas, avoid disturbance of important native vegetation and fauna habitat (e.g. areas prone to erosion such as dunes with taller vegetation, old growth vegetation containing hollows)
	Wherever possible, all disturbances will be staged and progressively rehabilitated to help control total dust levels and limit erosive potential
	Where earthworks are required for new construction access tracks, laydown areas, or other infrastructure, the disturbance of vegetation will be limited as far as practicable
	Minimise vegetation removal by trimming limbs rather than removing entire trees or bushes, and leave rootstock in the ground to assist revegetation and to stabilise the soil
	Stockpile vegetative cuttings for respreading as mulch, soil protection and seed material for regeneration on completion

Type of measure	Description of mitigation and management measures
	Existing roads and fence lines will be utilised, where possible, to limit disturbance
	During construction, where there are no established tracks and it is intended to traverse the same ground more than once, where possible, the same wheel tracks will be used each time
	The width of access tracks shall be kept to the minimum required. Tracks should be just wide enough to safely meet the needs of the largest vehicle
	Development of a site specific CEMP including an unexpected find protocol to manage ground disturbance
Water (surface water and groundwater)	
Surface water quality and quantity	Stormwater catchments in dune swales will be excluded from the site by bunding and the building up of pads above the stormwater pooling level
	An erosion and sediment control plan to be developed as part of detailed design, will be implemented during construction
	Erosion protection (rock armour) would be applied at site discharge points, designed by an engineer with relevant qualifications
	Culverts and associated rock aprons would be designed to Aust Roads standards
	Excess stormwater would be conveyed to the existing Olympic Dam stormwater management system for reasonable design storm scenarios
	Update the site stormwater management plan to include the proposed SRE Project infrastructure.
	Regular maintenance of on-site stormwater management systems.
Chemical and fuel management	Ensure hydrocarbon materials are securely captured within designed drains (i.e. oily water separators) within workshop areas
	All hydrocarbon and chemical storage locations and stockpiles would be bunded (includes temporary storage) and located away from stormwater flow paths in accordance with relevant Australian Standards
	All refuelling locations would be bunded
	BHP's fuel and chemical spills management procedure would be implemented

4.5 Conclusion

Following completion of the assessment of effects investigation, it was determined that there was a total of 18 confirmed grouped impact events on ecological receptors associated with:

- noise emissions from project related vehicle traffic and surface infrastructure
- light from night-time operations
- air quality emissions including construction dust generation and operational emissions (particulate matter and gaseous pollutants)
- radiation emissions during operations from activities including stack operations and materials handling
- land clearing activities

- alteration of surface water catchments and drainage associated with placement of infrastructure and surface water management
- increased occupancy of Olympic Dam accommodation due to the SRE Project workforce
- rehabilitation of cleared land and erosion of closed structure
- unplanned events such as loss of containment of chemicals and hydrocarbons
- unplanned events such as and bushfire.

These events were assessed to quantify the likely significance of the impact against the EIAF impact significance criteria, all of which have been assessed a significance Level 1 or Level 2 (not significant).

Irrespective of this outcome, mitigation and management measures are proposed to reduce the impact significance to ALARA.

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6 Abbreviated terms

6.1 Abbreviations and acronyms

Acronym	Expansion
AEP	Annual Exceedance Probability
ALA	Atlas of Living Australia
AOO	Area of occupancy
APTS	acid plant tails gas stack
AQIA	Air Quality Impact Assessment
ARR	Arid Recovery Reserve
ASS	Acid Sulfate Soils
BAU	Business-as-usual
BDBSA	Biological Database of South Australia
BHP	BHP Olympic Dam Corporation Pty Ltd
CoPC	contaminants of potential concern
CSM	Conceptual Site Model
Cth	Commonwealth
DBF	Direct-to-Blister Flash Furnace
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEW	Department for Environment and Water
EF	electric slag reduction furnace
EIAF	Environmental Impact Assessment Framework
EIGR Areas	Electricity Infrastructure Ground Re-profiling Areas
ERICA	Environmental Risk from Ionising Contaminants: Assessment and Management (assessment tool)
EIS	Environmental Impact Statement
EOO	Extent of occupancy
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPMP	Environment Protection and Monitoring Program
FCF	flash converting furnace
FIFO	fly-in/fly-out
FSF	flash smelting furnace
FTE	full time equivalents
FY	Financial Year
GAB	Great Artesian Basin
H_2SO_4	Sulphuric acid
IBRA	Interim Biogeographic Regionalisation of Australia
IUCN	International Union for Conservation of Nature

Acronym	Expansion
LSA Act	*Landscape South Australia Act 2019* (SA)
MNES	Matters of National Environmental Significance
MSS	main smelter stack
NPW Act	*National Parks and Wildlife Act 1972* (SA)
NSW	New South Wales
NT	Northern Territory
NV Act	*Native Vegetation Act 1991* (SA)
NVC	Native Vegetation Council
NWP	Northern Water Project
PDI Act	*Planning Development and Infrastructure Act 2016* (SA)
PMR	precious-metals refinery
PMST	Protected Matters Search Tool
PWA	Prescribed Wells Area
QLD	Queensland
RAM	Rangeland Assessment Method
SA	South Australia
SAAL	South Australian Arid Lands
SAC	site assessment criteria
SCM27	scheduled campaign maintenance 2027
SEB	significant environmental benefit
SML	Special Mining Lease
SPC	State Planning Commission
SPR	Source-Pathway-Receptor
SRE	Smelter Refinery Expansion
TEC	Threatened Ecological Community
WA	Western Australia

6.2 Units of measure

Table 6.1: Units of measure

Abbreviation	Expansion of Unit
µGy/h	microgray per hour
Bq/kg	becquerel per kilogram
dB	decibel
dB(A)	decibels A
g/m^2	grams per metre squared
g	grams per metre squared per day
g/m^2/month	grams per metre squared per month
ha	hectare
km	kilometre
km^2	square kilometre
kV	kilovolt
LAeq	equivalent continuous sound level, in decibels
mAHD	metres above Australian Height Datum
ML/day	megalitres per day
mm	millimetre
MVA	megavolt-amperes
tpa	tonnes per annum
%	per cent

Appendices

Appendix A. Assessment requirements

Ecology-related assessment requirements and cross reference to where these are addressed in this document.

Environmental attribute	Reference	Assessment requirement	Cross-reference
Biosecurity	BE1	Identify the potential for increased distribution and abundance of existing exotic, pest or nuisance plant and animal species, disease and pathogens, and the associated implications for native species, habitat, agricultural land and other environmental values.	Section 2.2.8, 4.3.3.2
Biosecurity	BE1	Propose measures to remove, control and limit the introduction or spread of exotic, pest or nuisance plants and animals, diseases and pathogens on the development site and any areas under the proponent's control (e.g. decontamination of vehicles, mobile plant, equipment and materials), having regard to the effectiveness of such mitigation measures in the past. This includes declared plants and animals under relevant State and Commonwealth legislation.	Section 4.3.5, 4.4
Terrestrial flora and fauna	BE3	Flora and Native Vegetation: Describe the location, extent, condition and significance of native vegetation, including listed threatened flora species and ecological communities in the development's environs, and identify those that may need to be cleared or disturbed during construction and / or maintenance.	Section 2.2
Terrestrial flora and fauna	BE3	Flora and Native Vegetation: Describe the development activities with the potential to impact on native vegetation and fauna (especially listed species under the *National Parks and Wildlife Act 1972)* and provide an assessment of how those impacts will be avoided, mitigated or offset.	Section 4.3.5

Appendix B. SRE Project Ecological Baseline

Olympic Dam Smelter and Refinery Expansion Project

Ecology Baseline Assessment

LATHWIDA ENVIRONMENTAL

BHP



May 2026

Final

Document status

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This report should be read in full, and no excerpts are to be taken as representative of the findings. No responsibility is accepted by Lathwida for use of any part of this report in any other context.

The sole purpose of this report and the associated services performed by Lathwida is to report on ecological related matters associated with the Smelter and Refinery Expansion (SRE) Project. This document and associated data will support the development of primary approval documentation required for the SRE project in the far north of South Australia. The report is based on a desktop review of available data and reports and survey findings within the survey area and buffers and the activities proposed for the SRE Project as provided by BHP. The scope of services, as described in this report, was developed with the Client.

In preparing this report, Lathwida has relied upon, and presumed accurate, any information (or confirmation of the absence thereof) provided by the Client and/or from other sources. Except as otherwise stated in the report, Lathwida has not attempted to verify the accuracy or completeness of any such information. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change.

Lathwida collected and reviewed data and information available in the public domain at the time or times outlined in this report. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Lathwida has prepared this report in accordance with the usual care and thoroughness of the consulting profession, for the sole purpose described above and by reference to applicable standards, guidelines, procedures and practices at the date of issue of this report. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this report, to the extent permitted by law.

Note on currency

Where possible, information contained in this Document is up to date as at December 2024. This was not possible for supporting appendices, and information based on those appendices, which were prepared by third parties (as discussed in the second paragraph in the Disclaimer above) prior to the Document being finalised.

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Executive summary

ES1 Project background

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion (SRE) Project, located at the existing Olympic Dam (OD) mining operations, located in the far north of South Australia (SA), approximately 580 km north-north-west of Adelaide, on the Native Title lands of the Kokatha People.

The objective of the SRE Project is to expand BHP's smelter and refinery capacity, enabling the Copper SA growth plan by:

- increasing copper production capacity up to 650,000 tonnes per annum (tpa) of total copper (plus associated products) from the current average output of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet that enables the Olympic Dam copper growth pathway
- delivering reliable and predictable production outcomes to realise regional opportunities.

The SRE Project will comprise of two stage smelting, and expanded refining facilities to produce cathode, copper, gold and silver. The SRE Project components are outlined in the August 2024 South Australian Government Gazettal (No. 61, page 3117). Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable production of up to 650,000 tpa copper plus associated products (gold, silver, uranium and acid)
- the introduction of two-stage smelting (TSS) involving the installation of a new primary Flash Smelting Furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing DBF to a flash converting furnace, that will process the matte into blister
- additional acid plants of similar nature and scale to the existing acid plant
- expanded electro-refinery and precious metals recovery facilities to produce cathode copper and gold, and silver ingot.

Associated with the change in smelter configuration and additional refinery and acid plant infrastructure, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the existing Olympic Dam Special Mining Lease (SML).

In addition to the above SRE Project components, changes to the electricity power transmission requirements through the existing 275 kilovolt (kV) line from Davenport substation (near Port Augusta) to Olympic Dam mine within Clause 28 land[1] will require isolated areas of vegetation clearance to maintain the regulatory safe distances between the 275 kV line and the ground surface.

[1] Clause 28 land as defined under the *Roxby Downs (Indenture Ratification) Act 1982* (SA)

ES2 Baseline ecology summary

The SRE Project areas within the existing SML include sand dunes with Umbrella Bush, Bullock Bush and or White Cypress-pine and swales of chenopod shrubland with tall shrubs including Mulga. The broad vegetation communities of the SML included:

- loamy swales with chenopod low open shrubland and emergent Mulga (*Acacia aneura/aptaneura*)
- sand dunes with Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius*) tall shrubland over mixed shrubs/tussock grasses
- sand dunes with White Cypress-pine (*Callitris glaucophylla*) open woodland over mixed tall shrubs/tussock grasses
- sandy swales with mixed Acacia tall shrubland and tussock grasses
- run-on depression with River Red Gum (*Eucalyptus camaldulensis*)/Willow Wattle (*Acacia salicina*) open woodland (one small area).

The vegetation communities of the Electricity Infrastructure Ground Re-profiling Areas included:

- low open chenopod shrubland
- stony plains with low open chenopod shrubland and minor shallow gilgai formations with or without and shallow drainage lines with Cotton-bush (*Maireana aphylla*)
- chenopod low open shrubland and emergent Dead Finish (*Acacia tetragonophylla*)
- sand dunes with mixed Acacia tall shrubland and tussock grasses.

The condition of the vegetation within the SML varies from degraded to medium/high quality, with few weeds, but impacts from rabbits are evident and there are areas with dead stands of Mulga and reduced recruitment of the taller shrubs, particularly the native pines. The Project Area is also adjacent the existing Olympic Dam mine and includes areas of existing disturbance (e.g. tracks, pilot plant, transmission line). Outside of the SML, the Electricity Infrastructure Ground Re-profiling Areas are comprised of low chenopod shrubland on stony gibber plains, clay plains or low sand dunes with mixed Acacia tall shrublands. These areas were in moderate condition and occur beneath an existing transmission line with existing access tracks. The Project areas do not include areas with deep cracking clays, there are no permanent aquatic habitats and there are limited ephemeral drainage areas, and none supporting dense vegetation suitable for key threatened species such as Plains Mouse or Thick-billed Grasswren.

With regards to threatened species and ecological communities and migratory species protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), based on surveys undertaken, historic data and habitat availability, the following was found for the SRE Project:

- No EPBC Act-listed Threatened Ecological Communities have been identified or are considered to occur within the SRE Project Area (either within the SML or along the Electricity Infrastructure Ground Re-profiling Areas).
- No EPBC Act-listed threatened flora are considered known, possible or likely to occur in the Project Area.

- Of thirty threatened EPBC Act-listed fauna species identified in the EPBC Protected Matters database, and two additional species from state database records, one is considered known to occur and three are considered as possible occurrences, based on surveys undertaken, historic data and habitat availability within the SRE Project Area:
    - Southern Whiteface (*Aphelocephala leucopsis*) (vulnerable) was considered known to be present with the SRE Project Area. Nine individuals were recorded at five locations within the SRE Project Area during surveys in July 2024. There were also additional observations of the species immediately south of the SRE Project Area during other recent surveys (Lathwida 2024b).
    - Plains Mouse (*Pseudomys australis*) (vulnerable) was considered as a possible occurrence, but only during irruptive years when the species expands into a range of non-critical habitats.
    - Blue-winged Parrot (*Neophema chrysostoma*) (vulnerable) was considered as a possible occurrence during non-breeding winter migration only.
    - Grey Falcon (*Falco hypoleucos*) (vulnerable) was considered as a possible occurrence (foraging only).
    - The remaining 28 fauna species were considered unlikely to occur, or to not occur, in the Project Areas (Table 7.2).
- An additional seven migratory species that are not EPBC-listed as threatened were also assessed. One species has the potential to occur; the Fork-tailed Swift (*Apus pacificus*) was considered possible flyover species (Table 7.2).

In addition to species protected under the EPBC Act, three State-listed (under the *National Parks and Wildlife Act 1972*) flora species are considered as possible occurrences within the SRE Project Area (*Frankenia cupularis, Gratwickia monochaeta, Swainsona oligophylla*) and one species is considered likely to occur; Sandalwood (*Santalum spicatum*) (Table 7.3). There are also three State-listed fauna species which are considered as possible occurrences (Australian Bustard (*Ardeotis australis*), Major Mitchell's Cockatoo (western) (*Lophochroa leadbeateri*) and Scarlet-chested Parrot (*Neophema splendida*) and four species which are considered as likely to occur; Black Falcon (*Falco subniger*), Flock Bronzewing (*Phaps histrionica*), Little Eagle (*Hieraaetus morphnoides*) and Peregrine Falcon (*Falco peregrinus macropus*) (Table 7.3).

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Appendix A. Protected Matters Search Tool Outputs

Appendix B. Flora

Appendix C. Fauna

1 Introduction

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (SRE Project) at the Olympic Dam mining operations, in the far north of South Australia (Figure 1.1).

EMM Consulting Pty Ltd and Lathwida Environmental Pty Ltd (EMM+Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2017* (SA) (PDI Act). A referral under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) is also being submitted for the SRE Project to determine if further assessment is required under the EPBC Act.

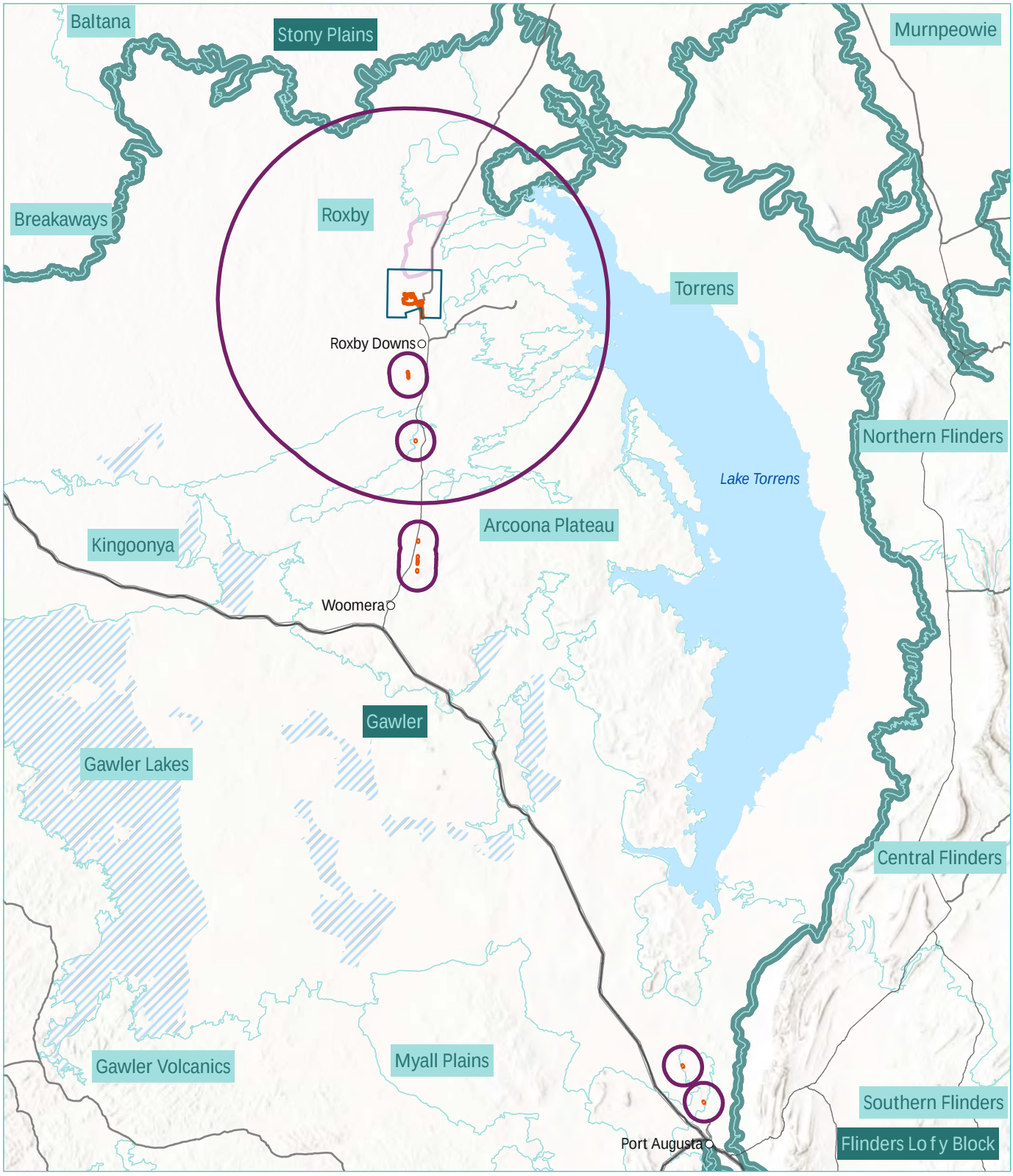
EMM+Lathwida were commissioned by BHP to undertake an environmental assessment of the proposed SRE Project area to confirm baseline conditions. This baseline ecology report is based on field and desktop investigations, and it outlines the ecological conditions within the SRE Project area. The assessment undertaken here has been used to inform the EPBC Act referral and supporting Significant Impact Assessment, which will be submitted to Department of Climate Change, Energy, the Environment and Water (DCCEEW). It will also support the EIS by informing the baseline ecological condition for the EIS ecological impact assessment.

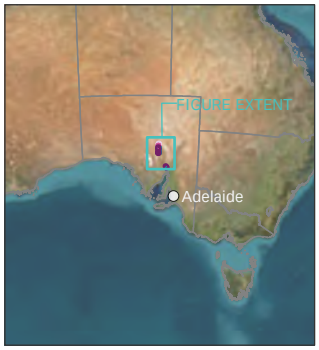
1.1 SRE Project definitions

For the purpose of this assessment, the following terminology has been defined:

- **SRE Project Area (or Project Area):** defined as the boundary around the SRE Project within the Special Mining Lease (SML) for which BHP is seeking approval for under *Planning, Development and Infrastructure Act 2016* (SA)(Figure 1.1 and Figure 1.2), including:
- **Special Mining Lease (SML) Area**, located within the SML, which is further delineated into the following areas:
    - **SRE Area:** the area defined as the extent of the proposed SRE infrastructure required for construction and operation. This includes the existing brownfield plant area; proposed facility relocation(s); proposed plant and laydown areas.
    - **General Infrastructure Area:** defined as the extent of the proposed ancillary infrastructure and ancillary activities required for construction and operation within the SML. This includes the proposed infrastructure laydown areas; proposed stormwater dam location and proposed topsoil/subsoil storage.
    - **Water Infrastructure Area:** the area defined as the extent of the proposed water infrastructure and ancillary activities required for construction and operation within the SML. This includes Northern Water Project connection point, water infrastructure, break tank and proposed topsoil/subsoil storage.

- **Electricity Infrastructure Ground Re-profiling Area (EIGR Area):** the area defined as the extent of the proposed vegetation disturbance required at eleven discrete and isolated locations to maintain regulatory clearance distances between the 275 kV transmission line and the ground surface within Clause 28 land. It is noted that the transmission line and infrastructure are already in place, but additional electricity loads required for the Action will result in increased transmission line temperature and more pronounced line sagging, and therefore changes to existing clearance distances to enable safe operation.
- **Feature Area:** the area boundary upon which the Protected Matters Search Tool (PMST) Reports were run. In this case, the Olympic Dam (OD) SML boundary area and eleven isolated areas along the existing 275 kV transmission line corridor between Davenport Substation and OD mine within Clause 28 land.
- **Study Area/Buffer Area:** a 50 km buffer area applied to the SML feature area boundary and a 5 km buffer applied around each EIGR Area for Clause 28 land (Figure 1.1).





SRE Project Area
Study Area
Arid Recovery Reserve
Wetlands of National Importance
IBRA Regions
IBRA Subregions

N

0 12.5 25 50

Kilometres

GDA2020 MGA Zone 53
A4 1:1,500,000

Figure 1.1: Project Location
SRE Project Baseline Assessment

LATHWIDA

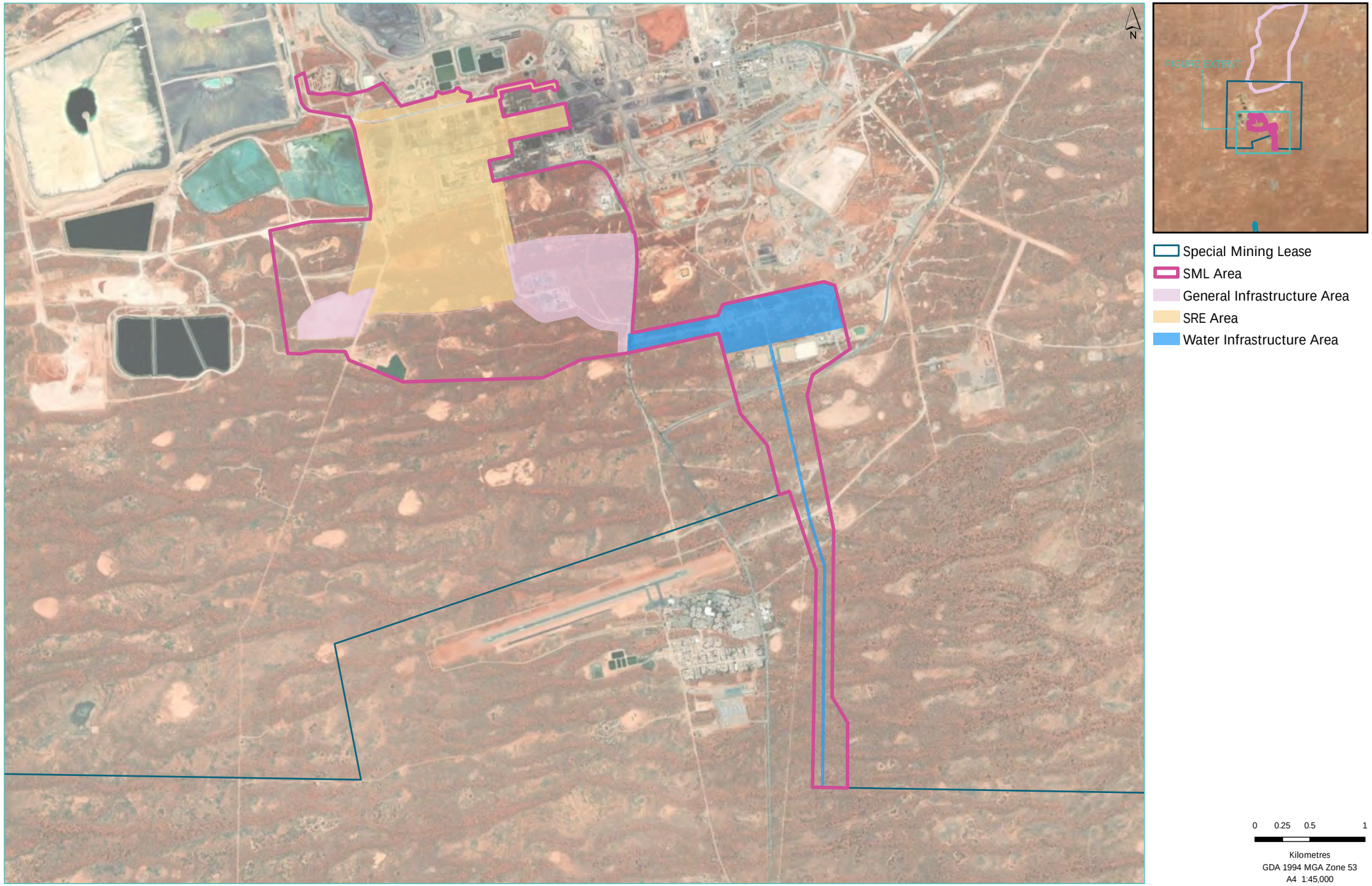


Figure 1.2: Key project components in the SML Area

SRE Project Baseline Assessment

LATHWIDA

1.2 Regulatory context

Legislation relevant to the assessment of ecological values and the planning and delivery of the SRE Project is summarised below.

1.2.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The EPBC Act is the Australian Government's primary environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as Matters of National Environmental Significance (MNES). Under the environmental provisions of the EPBC Act, actions that are likely to have a significant impact on MNES cannot be undertaken without referral to DCCEEW for consideration and approval under the EPBC Act.

The nine MNES identified in the EPBC Act are:

- world heritage areas
- national heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)
- water resources (that relate to coal seam gas development and large coal mining development).

The EPBC Act also legislates for other planning-related matters (e.g. actions proposed on Commonwealth Land) which are not relevant to the SRE Project.

1.2.2 Planning Development and Infrastructure Act 2016 (SA)

Development approval is required for the Action under the PDI Act. The SRE Project was declared an Impact Assessed development pursuant to section 108(1)(c) and 108(7) of the PDI Act in August 2024. The declaration subjects the SRE Project to an EIS process requiring detailed environmental, social and economic assessment.

A scoping application has been prepared by BHP to inform the development of EIS Assessment Requirements by the State Planning Commission (SPC). The EIS assessment requirements issued by the SPC will summarise all potential issues needing to be addressed by BHP and may also highlight any further information required by the Minister to enable a proper assessment of the proposed SRE Project.

1.2.3 Native Vegetation Act 1991 (SA) and Native Vegetation Regulations 2017 (SA)

The *Native Vegetation Act 1991* (SA) (NV Act) and the associated Native Vegetation Regulations 2017 (SA) (the Regulations) outline incentives, education measures, and assistance to landowners in relation to the preservation and enhancement of native vegetation and acts to control the clearance of native vegetation. Under the NV Act, legal clearance of native vegetation may be permissible through one of two mechanisms, either:

- clearance under the Regulations which requires no application fee but must achieve consent from the Native Vegetation Council (NVC) and an offset
- clearance under the NV Act by an application to the NVC, requiring an application fee, approval from the NVC and an offset.

Vegetation clearance applications must meet requirements of the Native Vegetation Regulations 2017 (NVC 2024a). There are associated guidelines related to assessment and offset for approved vegetation clearance (NVC 2024a, 2024c, 2024d).

The Native Vegetation Regulations require consideration of the mitigation hierarchy for applications to clear native vegetation, specifically:

- avoidance—measures must be taken to avoid clearance of native vegetation
- minimisation—if clearance of native vegetation cannot be avoided, measures must be taken to minimise the duration, intensity and extent of impacts of the clearance on biological diversity to the fullest possible extent (whether the impact is direct, indirect or cumulative)
- rehabilitation or restoration—measures should be taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been destroyed, by impacts of clearance of native vegetation that cannot be avoided or further minimised
- offset—where required under these regulations, any adverse impact on native vegetation or ecosystems that cannot be avoided or minimised must be offset by the achievement of a significant environmental benefit (SEB) that outweighs that impact (NVC 2024c, 2024d).

The SRE Project will require some clearance of remnant native vegetation. Approval to clear native vegetation in South Australia is required under the NV Act or the Regulations depending on the activity and approval pathway. Native vegetation clearance approval will occur concurrently with the EIS process under the PDI Act.

1.2.4 National Parks and Wildlife Act 1972 (SA)

The *National Parks and Wildlife Act 1972* (SA) (NPW Act) allows for the protection of habitat and wildlife through the establishment of parks and reserves (both on land and in State waters) and provides for the use of wildlife through a system of permits allowing certain actions, i.e. keeping, selling, trading, harvesting, farming, hunting and the destruction of native species. The NPW Act assigns flora and fauna species to State conservation categories (i.e. assigning the species as a threatened species); Endangered (Schedule 7), Vulnerable (Schedule 8), and Rare (Schedule 9).

Potential impacts to State-listed species are considered within vegetation clearance approvals and offset calculations. Presence of State-listed species contributes to condition scores of vegetation (e.g. Unit Biodiversity Scores) (NVC 2024b) and ultimately influences the environmental offset required for any clearance. Regional stakeholders may also have an interest in State-listed species.

1.2.5 Landscape South Australia Act 2019 (SA)

The *Landscape South Australia Act 2019* (SA) (LSA Act) is the key framework promoting the sustainable and integrated management of the State's natural resources (land, water, biodiversity) and for the management of pest plants and animals.

Under the LSA Act, South Australia is divided into eight regional Landscape Boards managed by the Government of South Australia. Each board develops its own Regional Plan designed to meet the needs of the local regions and contribute to State-level planning.

The SRE Project falls within the South Australian Arid Lands (SAAL) Region, with the LSA Act providing guidance for biodiversity management including management of pests, exotic flora and fauna, and plant diseases if relevant. The location of the SRE Project also influences the type of vegetation assessments required for any proposed impacts to native vegetation and associated approvals.

1.3 Project description

The objective of the SRE Project is to expand BHP's smelter and refinery capacity, enabling the Copper SA growth plan by:

- increasing copper production capacity up to 650,000 tpa of total copper (plus associated products) from the current average output of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet that enables the Olympic Dam copper growth pathway
- delivering reliable and predictable production outcomes to realise regional opportunities.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable production of up to 650,000 tpa copper plus associated products (gold, silver, uranium and acid)
- the introduction of two-stage smelting (TSS) involving the installation of a new primary Flash Smelting Furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing DBF to a flash converting furnace, that will process the matte into blister
- additional acid plants of similar nature and scale to the existing acid plant
- expanded electro-refinery and precious metals recovery facilities to produce cathode copper and gold, and silver.

Associated with the change in smelter configuration and additional refinery and acid plant infrastructure, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the existing Olympic Dam Special Mining Lease (SML).

In addition to the above SRE Project components, changes to the electricity power transmission requirements through the existing 275 kilovolt (kV) line from Davenport substation (near Port Augusta) to Olympic Dam mine within Clause 28 land will require isolated areas of land disturbance and associated vegetation clearance to maintain the regulatory safe distances between the 275 kV line and the ground surface.

The SRE Project would be constructed and operated in a staged manner..

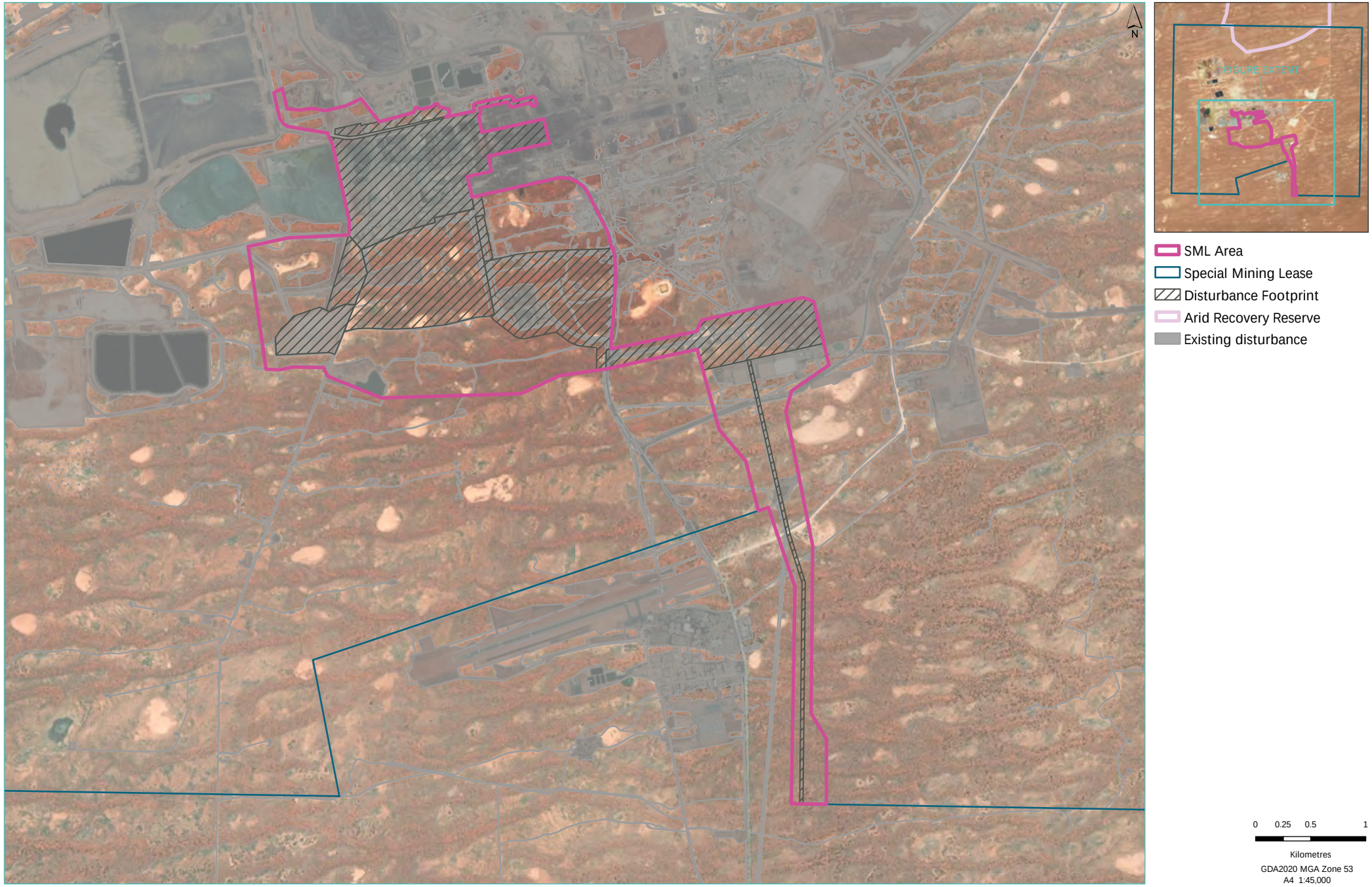


Figure 1.3: Project disturbance in the SML Area

SRE Project Baseline Assessment

LATHWIDA

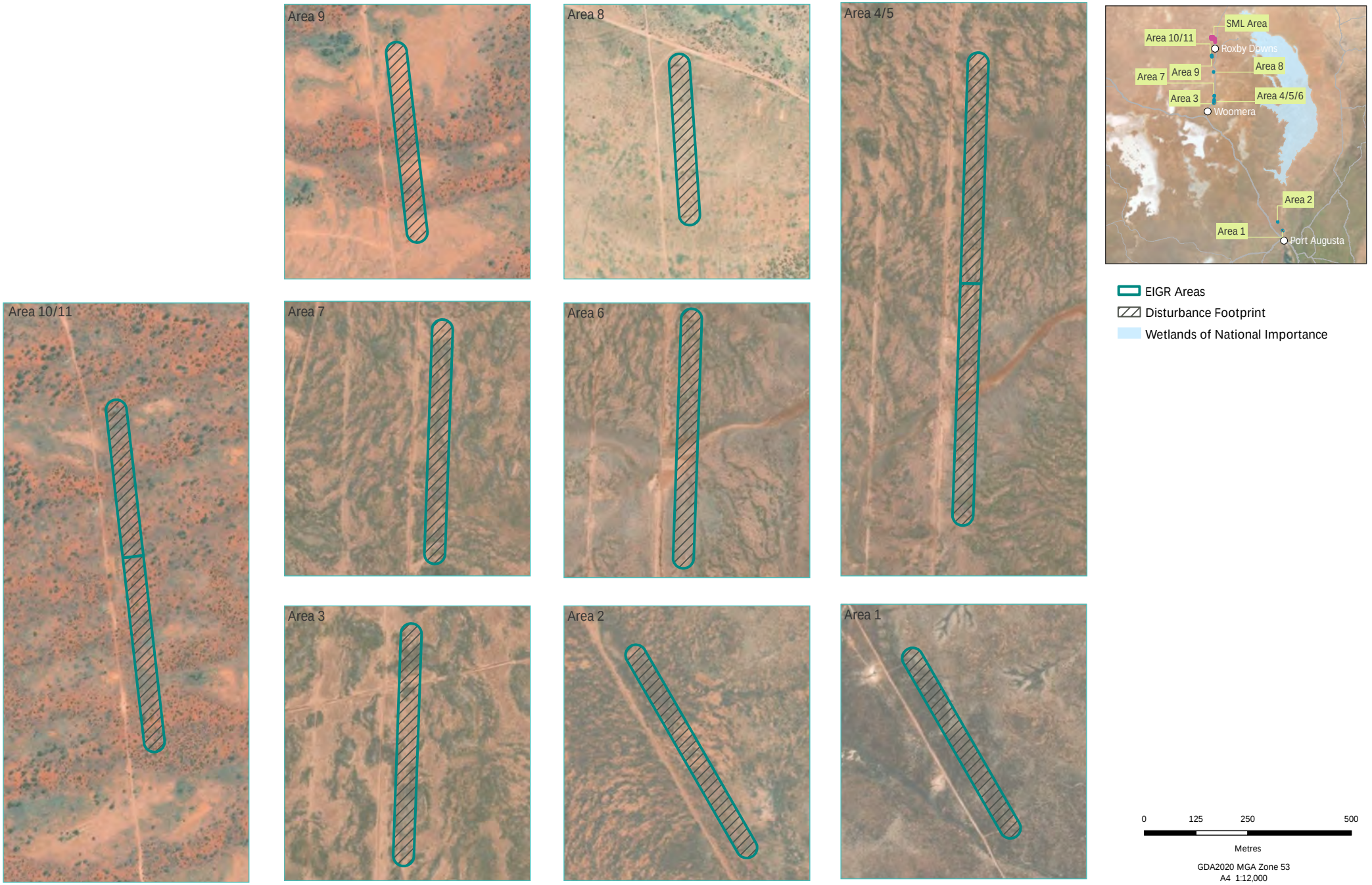


Figure 1.4: Project disturbance in the EIGR Areas
SRE Project Baseline Assessment

LATHWIDA

2 Baseline condition assessment

2.1 Purpose of report

In order to quantify the potential effects of the SRE Project on ecological values and the subsequent impacts to receptors, it is necessary to first understand the existing baseline environment, and specifically:

- to classify and describe the existing ecological environment prior to the development of the SRE Project
- to provide a basis for project activities aimed at describing the likely change in the baseline environment as a result of the development of the SRE Project and quantifying the significance of resultant impacts to receptors; impact assessment.

It should be noted that this current report describes the existing environment, but does not extend to the impact assessment component, which will be covered in a subsequent report in support of the EIS.

2.2 Study area

Definitions relevant to the study area for the assessment of baseline ecological values for the SRE Project are presented in Section 1.1.

The landscape and topographical context for the SRE Project is provided Sections 3.1 and 3.2

This baseline assessment draws upon existing desktop information and field-based data available at the time of preparation, including:

- Protected Matters Search Tool (PMST) Reports (provided in Appendix A) for:
    - the OD SML, applying a 50 km buffer
    - 11 discrete locations along the existing 275 kV transmission line, where vegetation disturbance works are proposed, applying a 5 km buffer to each location.
- Site specific studies and monitoring (outlined in Section 4):
    - OD Expansion Draft Environmental Impact Statement (BHP 2009) – Chapter 15 Terrestrial Ecology
    - ongoing compliance monitoring to support the OD Environment Protection and Monitoring Program (EPMP), including sites within the SRE Project Area, broader OD SML and control sites in the Arid Recovery Reserve (ARR) north of mining activities
    - monitoring undertaken by Arid Recovery within and outside the fenced ARR.
- Site visits conducted in July and October 2024 by Lathwida.

This information has been compiled and used to describe the baseline ecological environment of the SRE Project.

3 Environmental context

The broad aspects of the environment that influence the baseline ecological environment within the SRE Project area are described in this section.

3.1 Landscape and land use

The SRE Area is located within the Gawler Interim Biogeographic Regionalisation of Australia (IBRA) Bioregion which spans approximately 123,605 km^2 (Thackway and Cresswell 1995). The Gawler Bioregion is characterised by semi-arid to arid flat to rounded landscapes, rocky hills, plains and salt-encrusted lake beds. Vegetation types across the bioregion include open woodlands of Black Oak (*Casuarina pauper*) and Wattles, open mallee scrub, chenopod shrublands (bluebush/saltbush) and tall Mulga (*Acacia aneura*) shrublands. The native vegetation across the area is generally relatively intact, but highly disturbed in some areas particularly near stock watering points or infrastructure. More specifically, the majority of the SRE Project Area sits within the Roxby IBRA Subregion (Project Area in SML and four northern most EIGR Areas approximately 11.3 ha) which is characterised by low sand dunes with low open woodland and mixed grasses, sandy interdune swales within Acacia low open woodland over Chenopod low open shrubland and interdune swales with clay soils supporting Cane-grass tall grasslands. The remaining seven EIGR Areas occur across the adjacent Arcoona Plateau subregion (~17.7 ha). The location of the SRE Project in the context of the IBRA Bioregion and subregions is shown in Figure 1.1 and IBRA summaries provided in Table 3.1.

The surrounding landscape of the majority of SRE Project Area includes the OD Mine, Airport, and Village, and the nearby township of Roxby Downs which is connected by a network of established roads. Beyond this, there are large areas of native vegetation which are subject to pastoral leasing (with a long history of livestock grazing) and/or other land uses such as the Woomera Prohibited Area (Department of Defence). The closest conservation area is the ARR (20 km north of Roxby Downs, 4.7 km north of the SRE Project Area). Lake Torrens is located approximately 40 km to the east of the SRE Area (a gazetted National Park). There are no vegetation Heritage Agreements located within 50 km of the SRE Project Area or Electrical Infrastructure Areas, with the nearest being HA 1572 west of Island Lagoon (just over 50 km from a discreet Electrical Infrastructure Area).

The ARR spans a total of 12,300 ha across six large enclosures and is Australia's largest feral proof fenced reserve. It is located north of the OD mine and spanning 4.7 to 21 km from the SRE Area.

Table 3.1: IBRA Bioregion/Subregion Summary

IBRA Classification	Key Description	Location
Gawler Bioregion	Characterised by semi-arid to arid flat topped to rounded hills, rocky quartzite hills, sandstone plateaus, depositional plains, gibber plains and salt-encrusted lake beds. Typical vegetation includes open woodlands of Black Oak (*Casuarina pauper*) and Western Myall (*Acacia papyrocarpa*), open mallee scrub, chenopod shrublands (bluebush/saltbush) and tall Mulga (*Acacia spp.*) shrublands. The native vegetation is generally relatively intact, but in some areas, particularly near stock watering points, it is highly disturbed. The region has been influenced by pastoral activities and infrastructure (e.g. sheep and cattle stations) and mining operations, as well as the construction and operation activities of the Woomera Rocket Range. Grazing by livestock and rabbits has led to extensive habitat modification and coupled with the introduction of predators such as foxes and cats, has resulted in the extinction of many small to medium sized mammals. Weeds are present in the region, primarily in disturbed areas.	Whole Project
Roxby Subregion	Characterised by low sand dunes with low open woodland and mixed grasses, sandy interdune swales with Acacia low open woodland over chenopod low open shrubland and interdune swales with clay soils supporting Swamp Cane-grass (*Eragrostis australasica*) tall grassland, which provide suitable habitat for the Nationally Vulnerable Plains Mouse. Swales and drainage lines with good chenopod shrub cover may provide habitat for Nationally Vulnerable Thick-billed Grasswren whilst dune crests and slopes may provide habitat to Nationally Endangered Dusky Hopping Mouse. Dune crest and swale woodlands provide habitat for Nationally Vulnerable Southern Whiteface. Broad vegetation communities found in this subregion include: • Low sand dunes with White Cypress-pine (*Callitris glaucophylla*)/Slender Mulga low open woodland over Sandhill Cane-grass (*Zygochloa paradoxa*) and Loose-flowered Rattlepod (*Crotalaria eremaea*); • Sandy interdune swales with Western Myall and Slender Mulga low open woodland over chenopod low open shrubland or grasses; • Cracking clay interdune swales with Swamp Cane-grass tall grassland (Plains Mouse habitat); • Occasional inland saline depression of Paperbark (*Melaleuca spp.*) and Samphire (*Tecticornia spp.*); and • Occasional drainage lines and swale with tall chenopod shrubs (e.g. with Old Man Saltbush (*Atriplex nummularia*) (Thick-billed Grasswren habitat)). Aligns with the Moondiepitchnie IBRA Vegetation Associations within the Project Area.	SML/four EIGR Areas
Arcoona Plateau Subregion	Dominated by treeless low stony hills with the clay soils supporting chenopod and samphire low open shrubland and creek lines with open woodlands and taller shrublands. Inland saline depressions occur in small patches. Stony low hills and depressions with cracking clays and gilgai formations provide potential habitat for Plains Mouse. Broad vegetation communities include: • Stony low hills with cracking clay soils supporting Bladder Saltbush (*Atriplex vesicaria*)/Samphire (*Tecticornia medullosa*) and Low Bluebush (*Maireana astrotricha*) low open shrubland; • Minor drainage lines with Western Myall and Black Oak woodlands with tall open shrublands of emubush (*Eremophila spp.*) and *Acacias.*; • Major drainage lines with Northern River Red Gum (*Eucalyptus camaldulensis* ssp. *arida*) open woodland; • Run-on clay depressions and deeper gilgais with Swamp Cane-grass tall grassland. Aligns with the Woomera, Hesso and Simmens IBRA Vegetation Associations within the Project Area.	EIGR Area

3.2 Topography

The topography of the SRE Project Area is generally flat. The area around OD is dominated by a landform of low undulating dunes, swales and clay plans. To the north the land is generally flat to undulating and comprised mainly of gibber plains and rises, outwash plains and dunefields. To the south are various table lands, dunefields and alluvial plains, occasionally separated by plateaus and steep escarpments (BHP 2009).

3.3 Existing disturbance

The SRE Project Area located within the SML includes substantial areas of existing disturbance associated clearance for existing OD mine infrastructure including tracks, borrow pits, transmission lines, historical grazing and felling of wooded areas (BHP 2009).

Outside of the SML, the 11 discrete locations that constitute the EIGR Area are also subject to existing disturbance associated with maintenance of clearance distances for safe operation of the existing transmission line.

3.4 Climate

Meteorological monitoring stations are located at Roxby Downs (Olympic Dam Aerodrome), Andamooka and Woomera Aerodrome (BoM 2024). The majority of data presented in the following sections derive from the Roxby Downs station unless otherwise noted.

3.4.1 Temperature

The SRE Project lies in an arid to semi-arid region, subject to hot summers and cool to mild winters. Temperatures are consistently higher in the north, with long-term mean maximum and minimum annual temperature are 27.8°C and 12.7°C respectively (BoM 2021). January is the hottest month (mean maximum 34.6°C) and July the coldest month (mean minimum 5.8°C).

3.4.2 Rainfall and evaporation

Rainfall in the region of the SRE Project is low, with no clear seasonal pattern. Rainfall is unpredictable and sporadic throughout the year, often occurring in intense short bursts. The SRE Project receives approximately 150 mm of annual rainfall.

Evaporation data is not available for Roxby Downs or Andamooka. Data from Woomera Aerodrome indicates evaporation is consistently an order of magnitude higher than rainfall, and peaks in the summer months. Mean daily evaporation at Woomera Aerodrome ranges from 3 mm in June to 14.5 mm in January.

3.4.3 Wind speed and direction

The prevailing winds at Roxby Downs fluctuate between the south-east and the south-west. The annual average wind speed for 9am and 3pm are summarised in Table 3.2.

Table 3.2: Annual average wind speeds and frequency of calm conditions

Time of day	Wind speed	Frequency of calm condition
9am	4.7 m/s (17 kmph)	3%
3pm	5.1 m/s (18.2 kmph)	<0.5%

4 Methods

This section outlines the sources of information used for determining the baseline ecological environment, assesses the adequacy of these sources and provides a description of the baseline ecological environment of the SRE Project Area and broader Study Area.

A number of field studies and reports have been completed for OD which provide valuable data to inform the current understanding of vegetation, habitat and existing ecological values of the SRE Project Area and broader Study Area. The coverage and methods used across the various studies make them suitable for detection of both flora and fauna species across the broader Study Area, including threatened and migratory species protected under the EPBC Act (refer Section 4.2). As such, they provide a historical context over several years and are relevant to informing the description of the baseline ecological environment. This includes targeted threatened species surveys, vegetation and habitat mapping and full biological surveys as part of the ODX EIS (BHP 2009). There is also ongoing annual compliance monitoring as part of EPMP obligations for Olympic Dam, which includes several established monitoring sites within the SRE Area (e.g. 8 bird monitoring sites and three mammal trapping sites). There are also Arid Recovery monitoring inside and outside of the ARR enclosure. A summary of previous and ongoing studies undertaken is provided in Section 4.1.1 to Section 4.2.

These combined recent and historical studies, coupled with publicly available information and two site surveys to validate current site conditions have been used as the basis for describing the baseline ecological environment.

4.1 Survey effort – previous studies

4.1.1 OD Expansion Draft EIS

Chapter 15 of the draft EIS (BHP 2009) provides a summary of the Terrestrial Ecology present within the EIS Study Area applicable to the OD Expansion as of 2009. The document outlines the applicable bioregions, flora and fauna of the existing environment as a result of historical desktop review and fields surveys. Additionally, the document discusses the applicable SEB and supporting impact and risk assessment process and design modification to protect environmental values.

A suite of ecological studies were used as part of the EIS including regional studies about threatened species and migratory birds, flora and fauna records from Western Mining Corporation (WMC 1997), Biological Surveys (Brandle 1998 and Slaytor 1999), BDBSA data, PMST searches and supplementary studies undertaken in 2006 and 2008 (BHP 2009).

Across the region habitat has been extensively modified through grazing, livestock and rabbits, along with the introduction of feral predators (cats and foxes), this has resulted in the extinction of many small to medium-sized mammals (Morton 1990 cited in BHP 2009).

The most significant habitat for mammals in the OD region is in the ARR, which is subject to independent monitoring as outlined in Section 4.1.3.

4.1.2 Ongoing compliance monitoring to support the EPMP

The OD EPMP includes both flora and fauna monitoring programs which set out the measures BHP use to quantify any change in the extent or significance of impacts of its activities on flora and fauna, to assess the performance of control measures employed to limit these impacts, and to meet relevant legal and other requirements.

Ongoing site monitoring occurs around the mine in control and impact areas. Control sites are located within the ARR north of the mine site and impact sites are within the 'controlled active mine area' and adjacent. There are a number of monitoring sites in the SRE Project Area (e.g. EV387, EV393, EV386, EV410, EV404, EV394, EV409, EV430, EV321, EV320 and EV326). The first 8 monitoring sites are bird survey sites and the latter 3 sites are mammal trapping sites.

4.1.3 Arid Recovery

Arid Recovery is an independent body that researches and monitors ecological restoration in Australia's Arid Lands. The ARR north of OD was established in 1997, as an extensive ecosystem restoration initiative. ARR is a collaboration between BHP Billiton, the community group Friends of Arid Recovery, Department for Environment and Water and the University of Adelaide. Arid Recovery monitoring extends 4.7 to 21 km north of the SRE Area.

There are numerous publications and ongoing monitoring at trapping and bird survey sites within and outside the fenced area north of the OD mine. Initially the area was 8,600 ha, but is now expanded to 12,300 ha across 6 large, fenced areas (referred to as exclosures). The area is home to a number of threatened species (MNES), including Kowari, Western Quoll, Plains Mouse, Burrowing Bettong, Greater Bilby and Shark Bay Bandicoot. A number of other native fauna have also re-established within the fenced area.

4.1.4 Other regional surveys

In addition, information gained from other surveys in the region is also used in the current assessment. For example, field and desktop studies being undertaken south of the SML with recent detection of threatened species, such as EPBC listed Southern Whiteface and state-listed species (Lathwida 2024b).

4.2 Survey effort – current vegetation and habitat assessment

4.2.1 Desktop assessment

Desktop assessments were undertaken both prior to field assessments and following field assessments to inform baseline ecological conditions and likelihood of occurrence assessments for threatened and migratory species. Desktop searches of the Protected Matters database via the online PMST for the SRE Project were undertaken in July 2024 (for the SML) and October 2024 (for the EIGR Areas) (Appendix A1 and Appendix A2).

Naming conventions for flora and fauna common names are as per Department for Environment and Water (DEW) BDBSA taxonomy, which is based on the Census of SA Vascular Plants and Vertebrates of SA (DEW 2024b, 2024c).

Following the initial review of the likelihood of occurrence of conservation significant species, a review of relevant guidelines, recovery plans and literature was undertaken to identify suitable assessment methods for key species considered to potentially occur within the Project Area, including the following:

- survey guidelines for Australia's threatened birds (DEWHA 2010)
- survey guidelines of Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act (DSEWPaC 2011)
- conservation advice, including Thick-billed Grasswren (TSSC 2016b), Southern Whiteface (DCCEEW 2023c), and Blue-winged Parrot (DCCEEW 2023h)
- National Recovery Plan for the Plain Mouse (Moseby 2012b)
- identification of critical habitat for the Plains Mouse (Moseby 2012a).

These reviews highlight critical habitat features, optimal surveys times and duration of survey effort required for detection (e.g. during breeding season for Thick-billed Grasswren, with a minimum of 15 hours over three days) as well as types of survey methods suitable for target species (e.g. broadcast/call playback). It is noted that several changes to EPBC species listings have occurred since release of the threatened species guidelines, and hence selection of suitable alternative survey measures are required for some species. For example, Southern Whiteface and Blue-winged Parrot were only listed in 2023, so guidance from other similar small passerine or parrot species, along with conservation advice was applied.

Targeted surveys in accordance with the relevant guidelines were only undertaken if the species preferred habitat was present. As no critical refuge habitat was identified during site assessments and vegetation mapping for Plains Mouse, no targeted survey or trapping was undertaken.

4.2.2 Field surveys

Specific to the SRE Project, a site survey was undertaken between 23 and 26 July 2024 (Survey One). The aim of the survey was to confirm current vegetation type and condition to align with current NVC assessment methods (NVC 2024a, 2024b) and to assess the Project Area for potential MNES habitat values. A follow up on-ground assessment of the isolated disturbance areas associated within the EIGR Areas to assess the suitability of habitat for relevant MNES was undertaken between 23 and 25 October 2024 (Survey Two). The results of the site surveys are documented in this Ecology Baseline Assessment report. Survey One established ten Rangeland Assessment Method (RAM) sites and Survey Two established seven RAM sites. In addition, data was collected at rapid 'Vegetation Check' points to inform mapping across the Project Area (23 for Survey One and four for Survey Two, respectively). Data collected at RAM sites included vegetation composition, species lists, vegetation condition elements (e.g. grazing, recruitment) and four photos (facing north, south, east and west). Data collected at Vegetation Check sites included a single photo and brief description of vegetation type or alignment with relevant RAM number. The locations of these sites are summarised in Table 4.1 and shown on Figure 5.1 and Figure 5.2.

During both surveys, vegetation was also considered in terms of its suitability as habitat for EPBC listed threatened or migratory species that have potential to occur. Following desktop assessments, the key species considered potentially relevant to the Project Area were Southern Whiteface (known to occur), Thick-billed Grasswren (potential to occur) and Plains Mouse (potential to occur). Vegetation within the Project Area was assessed for habitat suitability for the three key species, and if habitat was present, further assessment was undertaken (e.g. targeted bird survey), as summarised in Table 4.2. General surveys and opportunistic records were also collected to add to the baseline understanding of the Project Area.

It is noted that given the lack of suitable habitat for Plains Mouse, no targeted surveys for this species was able to be undertaken, i.e. there was no suitable areas of cracking clays present within the Project Area which represented important habitat for Plains Mouse. In addition, there were only very limited small, isolated areas of taller denser shrublands considered suitable for Thick-billed Grasswren, so opportunities for targeted call-playback were limited during the bird surveys undertaken. Despite the general lack of suitable habitat for Thick-billed Grasswren, all calls of similar species recorded (e.g. high pitched Fairywren contact calls) were investigated further to rule out Thick-billed Grasswren.

Bird Surveys involved conducting roaming area search bird surveys and recording all species detected (individuals, signs of presence). In addition, species were also recorded opportunistically whilst traversing around the site.

As the habitat present was considered most suitable to Southern Whiteface, the targeted surveys undertaken focused mostly on detecting the presence of the Southern Whiteface (EPBC listed as Vulnerable). Surveys for avifauna, including Southern Whiteface, were undertaken utilising the following methods.

Surveys were conducted during active periods (e.g. in the morning until 1100 and between 1500 and 1700 in the afternoon). Ethical birding was undertaken. Brief playing of relevant species calls via a smart phone/bird application were used sparingly to elicit calls to in the event birds present were being cryptic and not showing themselves. Surveys were generally undertaken for 20 to 30 minutes at each site by separate observers (ranging over different areas), immediately before or after vegetation/habitat assessments.

Table 4.1: Vegetation sites Easting and Northings (Zone 53, GDA 2020)

Survey #	Site Code	Site Type	Easting	Northing
1	LERAM01	RAM	680433	6628807
1	LERAM02	RAM	679064	6629246
1	LERAM03	RAM	682152	6625159
1	LERAM04	RAM	682314	6626760
1	LERAM05	RAM	682243	6626893
1	LERAM06	RAM	677642	6630610
1	LERAM07	RAM	677736	6630699
1	LERAM08	RAM	680433	6628807
1	LERAM09	RAM	679064	6629246
1	LERAM10	RAM	682152	6625159
1	LEOP07	Vegetation Check	678762	6628816
1	LEVC01	Vegetation Check	678409	6628992
1	LEVC02	Vegetation Check	678678	6629025
1	LEVC03	Vegetation Check	678902	6629206
1	LEVC05	Vegetation Check	681870	6627942
1	LEVC06	Vegetation Check	681931	6627659
1	LEVC07	Vegetation Check	681981	6627426
1	LEVC08	Vegetation Check	682034	6627171
1	LEVC09	Vegetation Check	682048	6627248
1	LEVC10	Vegetation Check	681872	6627291
1	LEVC11	Vegetation Check	6627148	682047
1	LEVC12	Vegetation Check	681443	6628822
1	LEVC13	Vegetation Check	681688	6628508
1	LEVC14	Vegetation Check	681453	6628290
1	LEVC15	Vegetation Check	678187	6629842
1	LEVC16	Vegetation Check	678071	6630422
1	LEVC17	Vegetation Check	677632	6630611
1	LEVC18	Vegetation Check	677710	6630591
1	LEVC19	Vegetation Check	677765	6630696
1	LEVC20	Vegetation Check	678517	6630603
1	LEVC21	Vegetation Check	678440	6629387
1	LEVC22	Vegetation Check	678136	6629171
1	LEVC23	Vegetation Check	677393	6629295
1	LEVC24	Vegetation Check	677358	6628498
2	SRETRM01	RAM	758213	6412835
2	SRETRM02	RAM	752643	6422590
2	SRETRM03	RAM	680968	6556177
2	SRETRM04	RAM	681042	6555279
2	SRETRM05	Vegetation Check	681063	6558781

Survey #	Site Code	Site Type	Easting	Northing
2	SRETRM06	Vegetation Check	681104	6559862
2	SRETRM07	RAM	681252	6564160
2	SRETRM08	RAM	680554	6591224
2	SRETRM09	Vegetation Check	678593	6608410
2	SRETRM10	Vegetation Check	678485	6609339
	SRETRM11	RAM	678441	6609687

Photos for these sites are provided in Appendix B2. OP = opportunistic, SRETRM = SRE transmission line, RAM as per NVC (2024b).

Table 4.2: Summary of survey type undertaken by habitat types present

Vegetation/Habitat Types	Survey Type	Target Species
Vegetation with tall trees, shrubs (including emergent)	Bird Survey, RAM or Vegetation Check	Call play-back for Southern Whiteface
Bare areas with clay	Vegetation Check	Plains Mouse (Assess for presence of cracks in clay, as per Moseby 2012b)
Vegetation with tall dense chenopods e.g. Old Man Saltbush, Nitrebush, Cotton-bush	Bird Survey, RAM or Vegetation Check	Call play-back for Thick-billed Grasswren
Areas with water (dams, WWTP lagoons)	Bird Survey	All (focus on migratory species, threatened species)

4.2.2.1 Survey limitations

The arid environment of the Project Area is known to be variable in terms of climatic conditions. Given the duration of the surveys, the main focus was vegetation survey and assessment of habitat characteristics which are not influenced by variable climatic conditions. Bird survey conditions were not considered optimal for the full duration of the SML survey, i.e. influenced by wind or high temperatures at times. Bird surveys were undertaken in the am and pm, but also opportunistically and concurrent with vegetation surveys, where applicable.

No specific bird surveys were undertaken during the vegetation and habitat assessments of the EIGR Areas, but common species observed opportunistically were recorded.

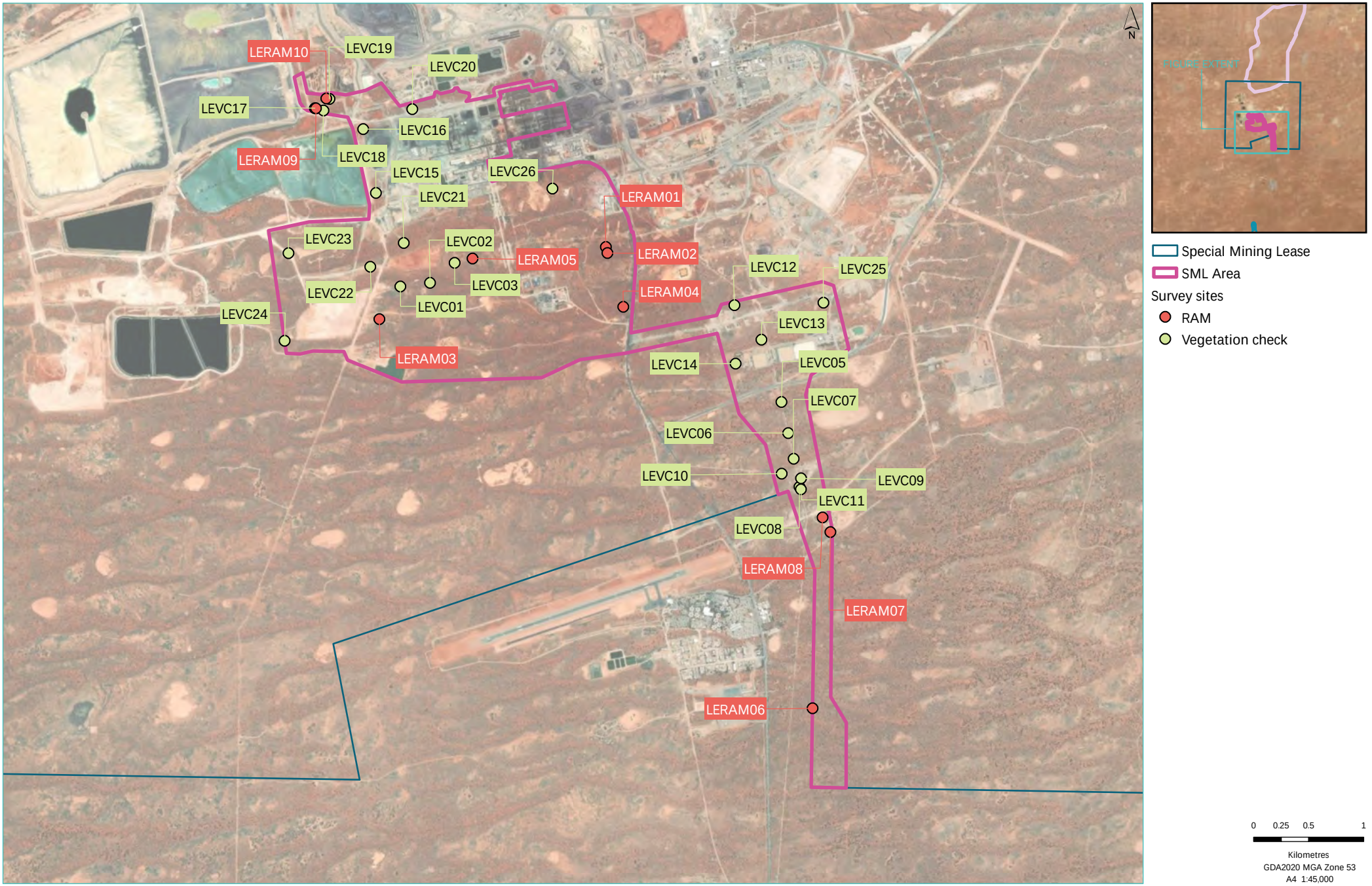


Figure 4.1: Location of vegetation assessment sites in SML Area
SRE Project Baseline Assessment

LATHWIDA

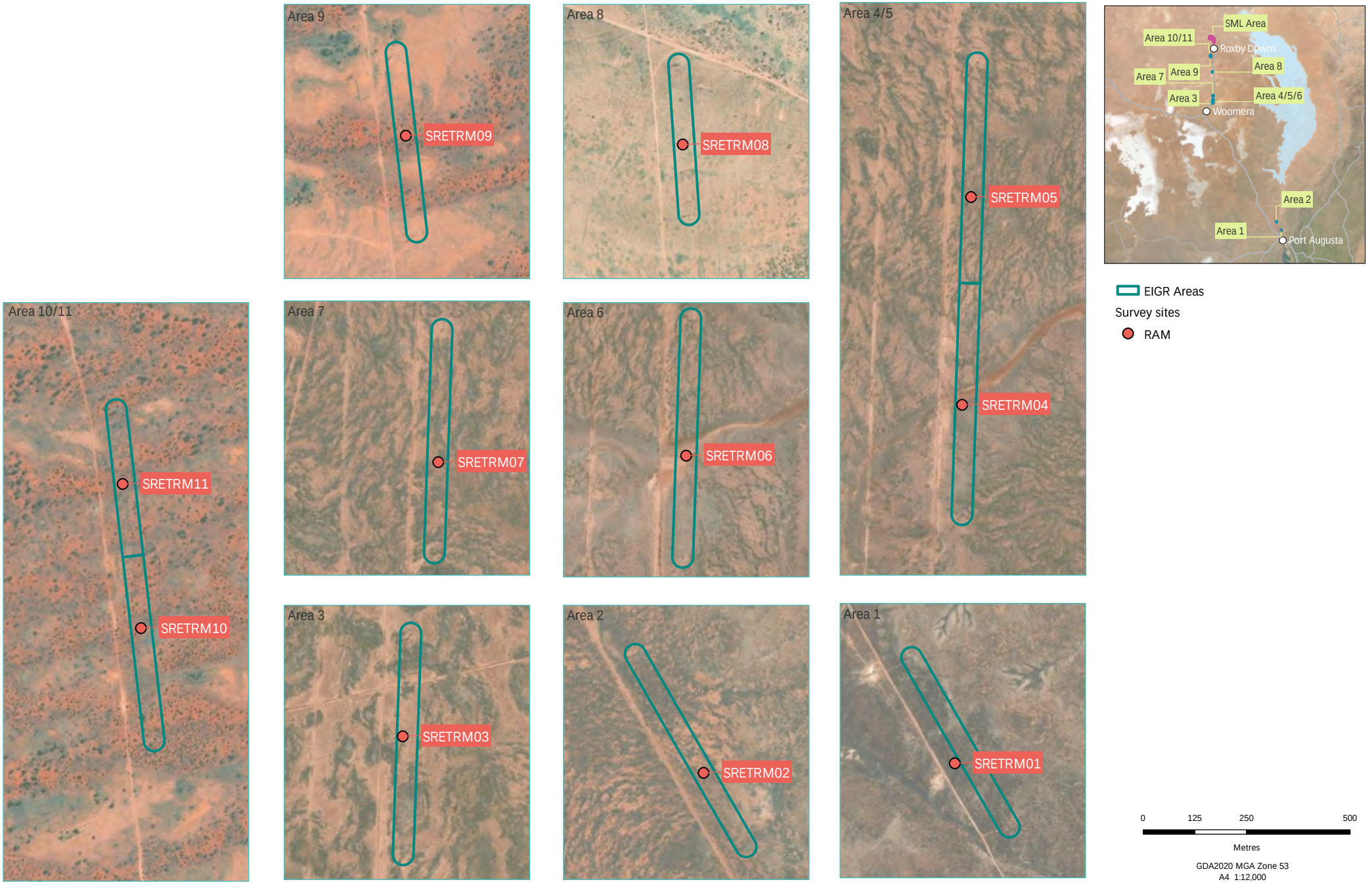


Figure 4.2: Location of vegetation assessment sites in EIGR Areas
SRE Project Baseline Assessment

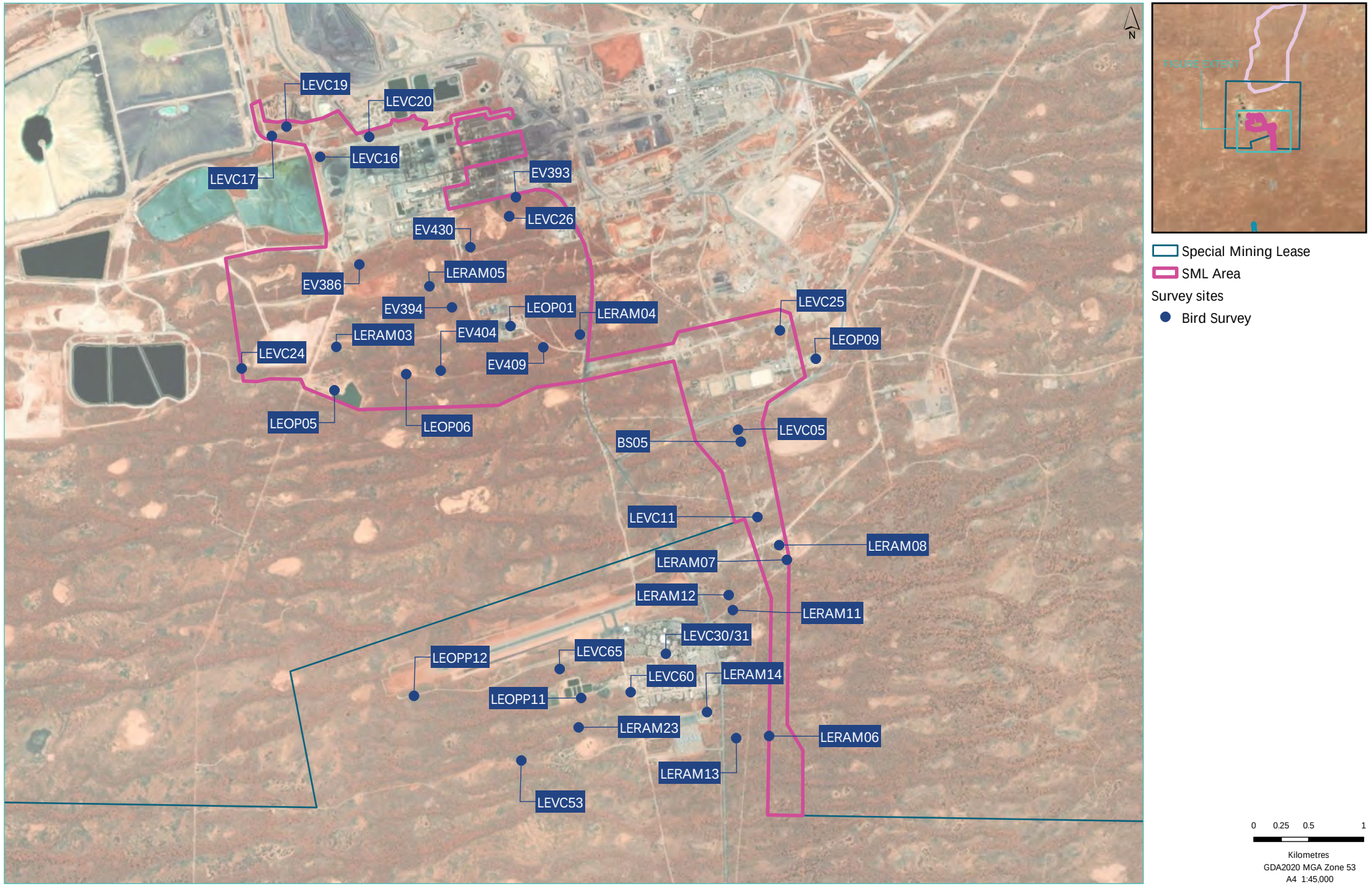


Figure 4.3: Location of Bird Survey sites in SML Area
SRE Project Baseline Assessment

LATHWIDA

4.2.3 Likelihood of occurrence assessment

A likelihood of occurrence assessment was undertaken for the threatened flora and fauna species, ecological communities and migratory species highlighted in the EPBC PMST outputs as potentially occurring within the Study Area. Following this, findings of the desktop assessment (previous records) and any field survey results (e.g. species observations, vegetation/habitat mapping) were used to determine the likelihood of occurrence status (does not occur, unlikely, potential, likely or known) for each of the highlighted species or communities that may occur in the Project Area. With the exception of excluded species (e.g. marine species), refer Section 7.1. The likelihood criteria are provided in Table 4.1.

Table 4.3: Likelihood of occurrence criteria

Likelihood of occurrence	Definition
Does not occur	No recent (1995 or more recent) or historic records (older than 1995) of the species in the Project Area, or in surrounding areas. No suitable habitat for the species within the Project Area. Mapped species distribution does not overlap with the Project Area.
Unlikely	No recent records (1995 or more recent) of the species in the Project Area, or in surrounding areas. No historic records (older than 1995) of the species in the Project Area, but historic records exist within surrounding areas. No suitable habitat for the species in the Project Area, or suitable habitat which is present is highly disturbed or degraded. Project Area is on the fringe of the mapped species distribution and the distribution only potentially overlaps with the Project Area.
Possible	No recent records (1995 or more recent) of the species in the Project Area, or in surrounding areas. No historic records (older than 1995) of the species in the Project Area, but historic records exist within surrounding areas. Suitable habitat for the species exists in the Project Area. Project Area is within the mapped species distribution.
Likely	No recent records (1995 or more recent) of the species in the Project Area, however there are recent records within 20 km of the Project Area. Historic records (older than 1995) may exist in the Project Area and/or in surrounding area. Important habitat for the species (for foraging or breeding) is present in moderate to good condition within the Project Area. Known species distribution overlaps with the Project Area.
Known	Species has been recently (1995 or more recent) recorded in the Project Area. Important habitat for the species (for foraging or breeding) is present within the Project Area. Known species distribution overlaps with the Project Area.

5 Vegetation descriptions

Within the SRE Project area located within the SML, six broad vegetation communities were characterised and mapped as part of the site survey. These broad vegetation communities were represented by ten vegetation associations. Outside of the SML, within the EIGR Areas, five broad vegetation communities were characterised, represented by six vegetation associations. Each vegetation association is defined as being associated with different landforms and soil characteristics, and therefore representing different habitat types which are potentially suitable to support EPBC Act-listed threated and migratory species. Unit Biodiversity Scores were calculated from the RAM data collected, which broadly represent the overall condition of the vegetation association, and therefore the relative habitat values.

The vegetation communities and vegetation associations identified are summarised in Table 5.1 along with preliminary Unit Biodiversity Scores. Vegetation associations are mapped in Figure 5.1 and Figure 5.2.

Table 5.1: Summary of vegetation communities

Broad vegetation community	Vegetation association	Survey site identifier	Unit Biodiversity Score
SRE Project Area, within SML			
Loamy swales with chenopod low open shrubland and emergent Mulga	Bladder Saltbush (*Atriplex vesicaria*)/Low Bluebush (*Maireana astrotricha*) Low Open Shrubland and tussock grasses (interdune swale)	LERAM01 LERAM03	72.73 66.60
	Chenopod Low Open Shrubland (degraded) (interdune swale)	LERAM09	43.09
Sand dunes with Umbrella Bush/Bullock Bush tall shrubland over mixed shrubs/tussock grasses	Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius*) tall open shrubland over Tall Kerosene Grass (*Aristida holathera*) (low dunes)	LERAM02	68.94
	Umbrella Bush tall shrubland (degraded, low dune)	LERAM10	38.87
Sand dunes with White Cypress-pine open woodland over mixed tall shrubs/tussock grasses	White Cypress-pine (*Callitris glaucophylla*) +/- Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius*) tall open shrubland +/- sparse tall shrubs and tussock grasses. (tall dunes)	LERAM04	78.81
	White Cypress-pine open woodland over Umbrella Bush/Bullock Bush tall open shrubland (dunes)	LERAM07	63.95
Sandy swales with mixed Acacia tall shrubland and tussock grasses	Slender Mulga (*Acacia aptaneura*) Low Open Woodland over sparse Chenopods and tussock grasses +/- Umbrella Bush (*Acacia ligulata*) over a patchy mid-storey of woody forb (interdune swales / dune foot slopes)	LERAM05	85.89
	Slender Mulga (*Acacia aptaneura*) low open woodland (sandy interdune swales)	LERAM06	63.95

Broad vegetation community	Vegetation association	Survey site identifier	Unit Biodiversity Score
Run-on depression with River Red Gum/Willow Wattle open woodland	Northern River Red Gum (*Eucalyptus camaldulensis* ssp. *arida*)/Willow Wattle (*Acacia salicina*) +/- River Cooba (*A. stenophylla*) Woodland over tall chenopods (run on depression/drainage line)	LERAM08	63.95
Claypans	Small shallow unvegetated clay-based basins that may hold water for short-periods of time, no cracking clays present, some have small amount of salt crust (interdune swales)	LE VC23 LE OP07	NA
Planted vegetation	Roadside strip of mixed natives (WA Eucalypt species, Native Pine Sheoak)		NA
EIGR Area, outside SML			
Low open chenopod shrubland	Low Bluebush (*Maireana astrotricha*)/Bladder Saltbush (*Atriplex vesicaria*), Low Open Shrubland over Woolly Bluebush (*M. eriantha*) and Bindyi (*Sclerolaena* sp.)	RAM (SRETRM01)	51.63
Stony plains with low open chenopod shrubland and minor shallow gilgai formations	Low Bluebush (*Maireana astrotricha*), Bladder Saltbush (*Atriplex vesicaria*), Samphire (*Tecticornia medullosa*) low shrubland (stony plains)	RAMs (SRETRM02)	50.78
	Bladder Saltbush, Pale-fruit Bluebush (*Maireana apressa*) low open shrubland +/- Barley Mitchell Grass (*Astrebla pectinata*) (stony plains)	RAMs (SRETRM03, SRETRM07)	60.13 55.82
Stony plains with low open chenopod shrubland and minor gilgai formations, and shallow drainage lines with Cotton-bush	Low open chenopod shrubland, minor gilgai formations, and shallow drainage lines +/- Cotton-bush (*Maireana aphylla*) (stony plains)	RAM (SRETRM04) Veg Check (SRETRM05, SRETRM06)	56.35
Chenopod low open shrubland and emergent Dead Finish	Dead Finish (*Acacia tetragonophylla*) / Senna (*Senna artemisioides* ssp. *petiolaris*) over Pearl Bluebush (*Maireana sedifolia*), Tate's Bindyi (*Sclerolaena tatei*), Round Sea-heath (*Frankenia subteres*) and Bristly Love-grass (*Eragrostis setifolia*)	RAM (SRETRM08)	57.74
Sand dunes with mixed Acacia tall shrubland and tussock grasses	Mulga (*Acacia aneura*) and emergent White Cypress-pine (*Callitris glaucophylla*) over Bullock Bush (*Alectryon oleifolius*), Umbrella Bush (*Acacia ligulata*) and Curly Wire-grass (*Aristida contorta*) (low dunes)	RAM (SRETRM11) Veg Check (SRETRM09, SRETRM10)	71.43

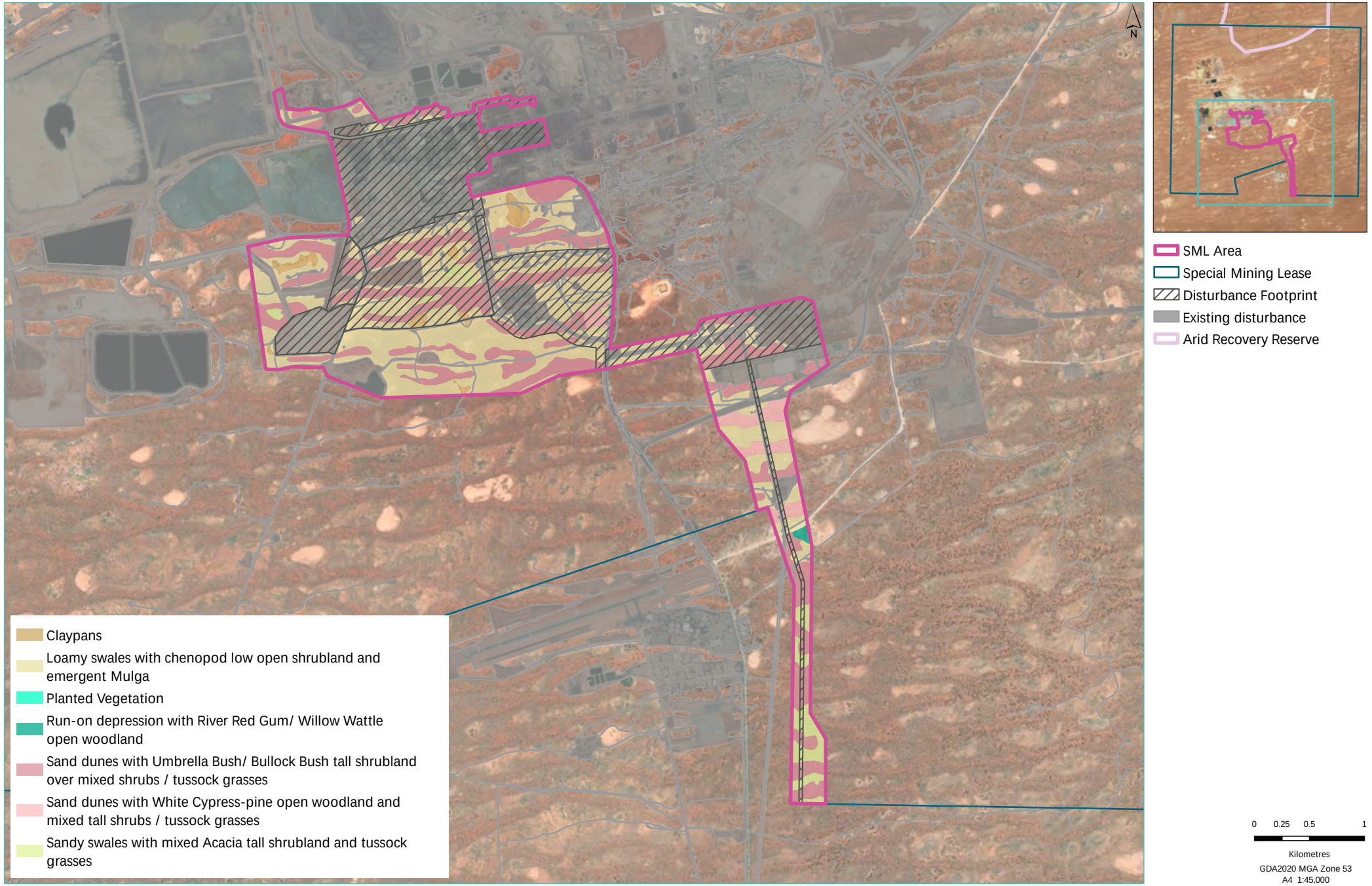


Figure 5.1: Vegetation communities and SRE Project Footprint in SML Area
SRE Project Baseline Assessment

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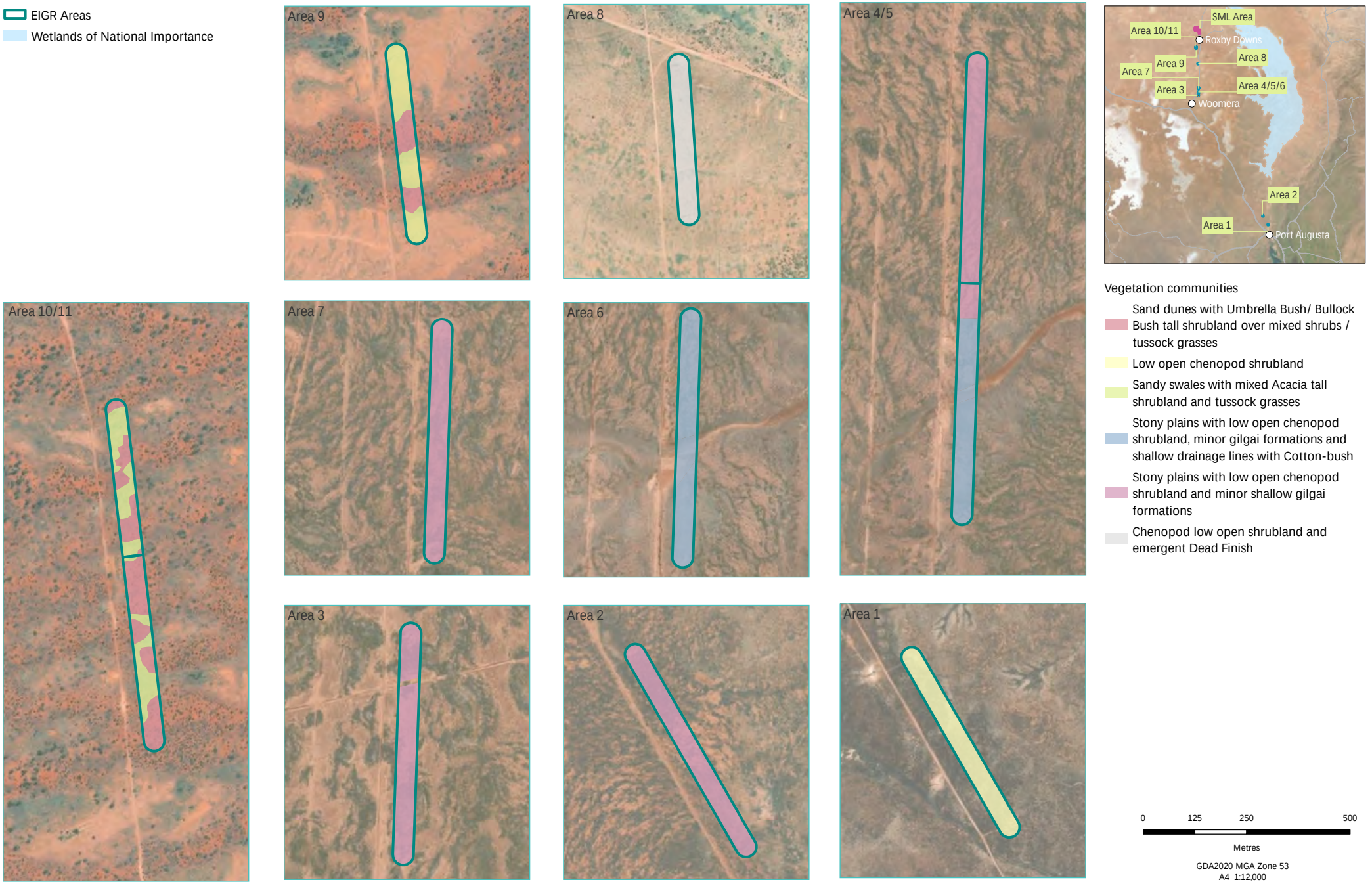


Figure **5.2**: Vegetation communities in the EIGR Areas
SRE Project Baseline Assessment

5.1 Vegetation communities, SRE Project Footprint within SML

Six broad vegetation communities have been delineated in the SRE Project Area located within the SML. These are shown on Figure 5.1 and described below.

5.1.1 Loamy swales with chenopod low open shrubland and emergent Mulga

This community was represented by vegetation associations at RAM sites LERAM01, LERAM03, and LERAM09 (Figure 5.1).

The vegetation is characterised by interdune swales with patchy low open shrubland of Bladder Saltbush (*Atriplex vesicaria*), Low Bluebush (*Maireana astrotricha*) and Sturt's Pigface (*Gunniopsis quadrifida*) often with emergent Sandhill Wattle (*Acacia ligulata*) and Slender Mulga (*Acacia aptaneura*). The ground storey reflects the soil surface with sandier soils supporting more tussock grasses including Common Bottle-washers (*Enneapogon avenaceus*) and Kerosene Grass (*Aristida contorta*) while heavier soils are dominated by Three-spined Bindyi (*Sclerolaena tricuspis*) and Salt Bindyi (*S. ventricosa*) (Plate 5.1). Additional species that were present included Erect Mallee Bluebush (*Maireana pentatropis*), Pin Sida (*Sida fibulifera*), Sand Sida (*Sida ammophila*) Sand Twinleaf (*Roepera aammophila*) Ball Bindyi (*Dissocarpus paradoxus*), Spear-fruit Bindyi (*Sclerolaena patenticuspis*), Pearl Bindyi (*Sclerolaena limbata*) and Grey Bindyi (*Sclerolaena diacantha*). A total of 16 and 25 flora species were detected at site LERAM01 and LERAM03, respectively (Appendix B1). With only 7 flora species detected at site LERAM09, representing a degraded version of the community and located within the TRS area (Plate 5.2).

Very sparse to nil weeds were present. No declared weeds were detected. There was evidence of rabbit activity. The vegetation condition was medium to high for sites LERAM01 and LERAM03 and low to medium for LERAM09, as per electronic RAM sheet scores, shown in Table 5.2.

BHP fauna monitoring sites that align with this community include EV410, EV404 and EV409. Lathwida bird surveys that aligned with this community included LEVC24 and LEVC26. There is no burrowing habitat, no gilgais present (for Plains Mouse), and no suitable dense taller shrub habitat (for Thick-billed Grasswren). This community would provide habitat for common fauna, but provides only limited suitability for the key relevant EPBC listed threatened species. i.e. the vegetation community provides general habitat for Southern Whiteface, which were detected at sites LEVC26 and EV409 during the current survey; it may provide general foraging habitat for Grey Falcon, but not nesting habitat; it may also provide potential foraging habitat for overwintering non-breeding Blue-winged Parrot if present; and it may support Plains Mouse, but only during irruptive periods, given the lack of deep cracking clays and gilgais which represent critical refuge habitat for the species.

Twelve common bird species were detected during the survey at sites EV404, EV409, LEVC24 and LEVC26 (Appendix C).

Table 5.2: RAM summary, loamy swales with chenopod low open shrubland and emergent Mulga

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
LERAM01	1.14	58.00	1	72.73
LERAM03	1.14	53.11	1	66.60
LERAM09	1.14	35.00	1	43.09

[1] Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha



Plate 5.1: Swales with Bladder Saltbush/Low Bluebush low open shrubland and tussock grasses (LREAM01 facing north)



Plate 5.2: Degraded swales with Bladder Saltbush/Low Bluebush low open shrubland (site LERAM09, facing east)

5.1.2 Sand dunes with Umbrella Bush /Bullock Bush tall shrubland over mixed shrubs/tussock grasses

This community was represented by vegetation associations at RAM sites LERAM02 and LERAM10 (Figure 5.1).

The vegetation is characterised by low sand dunes with Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius* ssp. *canescens*) tall open shrubland with scattered Narrow-leaf Hopbush (*Dodonaea viscosa* ssp. *angustissima*) and Sandhill Saltbush (*Atriplex velutinella*) over a sparse Tall Kerosene Grass (*Aristida holathera*) and Bristle-brush Grass (*Paractaenum refractum*) tussock grass understorey. Refer to Plate 5.3. Additional perennial flora species detected included Rosy Bluebush (*Maireana erioclada*), Desert Lantern-bush (*Abutilon otocarpum*), Velvet-leaf Hibiscus (*Hibiscus krichauffianus*), Ruby Saltbush (*Enchylaena tomentosa*), Silver Mulla Mulla (*Ptilotus obovatus*) and Australian Boxthorn (*Lycium australe*). Ten annual flora species were also recorded at the time of the survey. A total of 19 flora species were detected at site LERAM02 (Appendix B1). The vegetation association at site LERAM10 represented a degraded form of the community with only seven flora species detected (Plate 5.4, Appendix B1).

Very sparse to nil weeds were present in this community. No declared weeds were detected. There was evidence of rabbit activity (scats). The vegetation condition was medium to high at site LERAM02 and low to medium at site LERAM10, as per electronic RAM sheet scores, shown in Table 5.3.

BHP fauna monitoring sites that align with this community include EV393, EV394, EV430 and EV386. Lathwida bird surveys that aligned with this community included LEVC05 and LEVC21. There was no burrowing habitat, no gilgais present (representing potential critical refuge habitat for Plains Mouse) and no suitable habitat for Thick-billed Grasswren. This community would provide habitat for common fauna, but only limited habitat suitable for the key relevant EPBC listed threatened species. i.e. the vegetation provides general habitat for Southern Whiteface (detected at site EV394); it may provide general foraging habitat for Grey Falcon, but not nesting habitat; it may provide potential foraging habitat for overwintering Blue-winged Parrot if present; and it may support Plains Mouse, but only during irruptive periods, given the lack of deep cracking clays and gilgais which represent critical refuge habitat for the species.

Ten common bird species were detected during the survey (Appendix C). A pair of EPBC listed Southern Whiteface responded to call play-back (landing in nearby dead Mulga) at site EV394 during the current survey.

Table 5.3: RAM summary, sand dunes with Umbrella Bush/Bullock Bush tall shrubland over mixed shrubs/tussock grasses

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
LERAM02	1.14	54.97	1	68.94
LERAM10	1.14	31.00	1	38.87

[1] Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.3: Low sand dunes with Umbrella Bush/Bullock Bush tall open shrubland (facing north)



Plate 5.4: Degraded low dunes with Umbrella Bush tall shrubland (LERAM10)

5.1.3 Sand dunes with White Cypress-pine open woodland over mixed tall shrubs/tussock grasses

This community was represented by vegetation associations at RAM sites LERAM04 and LERAM07 (Figure 5.1).

Taller sand dunes with Cypress Pine (*Callitris glaucophylla*) open woodland with a sparse cover of tall shrubs including Umbrella Bush (*Acacia ligulata*) and Bullock Bush (*Alectryon oleifolius* ssp. *canescens*) over sparse dwarf shrubs such as Sand Sida (*Sida ammophila*) and Rosy Bluebush (*Maireana erioclada*). Sparse tussock grasses including Tall Kerosene Grass (*Aristida holathera*) and Woollybutt (*Eragrostis eriopoda*) dominate the ground storey. At site LERAM04 at total of 13 flora species were detected, other species included Buckbush (*Salsola australis*), Poached-egg Daisy (*Polycalymma stuartii*) and Clasping Twinleaf (*Roepera howittii*) (Plate 5.5). At site LERAM07 at total of 15 flora species were detected, other species included Narrow-leaf Hopbush (*Dodonaea viscosa* ssp. *angustissima*), Desert Goosefoot (*Chenopodium desertorum* ssp. *desertorum*), Buckbush, Clasping Twinleaf and Sand Twinleaf (*Roepera ammophila*) (Plate 5.6).

Very sparse to nil weeds were present, with Indian Hedge Mustard (*Sisymbrium orientale*) detected at both RAM sites. No declared weeds were detected. There was evidence of rabbit presence (scats and diggings) during the survey. The Vegetation Condition score was medium to high for site LERAM04 and just over medium for site LERAM07, as per electronic RAM sheet scores, shown in Table 5.4.

No BHP fauna monitoring sites aligned with this community, given sparsely present within the Project Area. Lathwida bird surveys that aligned with this community included LEBS05, LERAM07 LEVC11. This community would provide habitat for common fauna, but provides only limited habitat suitability for the key relevant EPBC listed threatened species. i.e. it may provide general foraging habitat for overwintering

non-breeding Blue-winged Parrot if present; it may provide habitat for Plains Mouse and Dusky Hopping Mouse during irruptive periods only when they utilise a broader range of non-critical habitats; and it may provide general foraging, but not nesting, habitat for Grey Falcon (which nest in treed watercourses). The native pines which are present would provide potential nesting and foraging habitat for EPBC listed Southern Whiteface, and a pair were detected at site LECV11.

Ten common bird species were detected in this community during the survey (Appendix C).

Table 5.4: RAM summary, sand dunes with White Cypress-pine open woodland over mixed tall shrubs/tussock grasses

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
LERAM04	1.14	62.85	1	78.81
LERAM07	1.14	51.00	1	63.95

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.5: Sand dunes with White Cypress-pine open woodland (site LERAM04, facing north)



Plate 5.6: Sand dune with White Cypress-pine open woodland over Umbrella Bush/Bullock Bush tall open shrubland (site LERAM07, facing north).

5.1.4 Sandy swales with mixed Acacia tall shrubland and tussock grasses

This community was represented by vegetation associations at RAM sites LERAM05 and LERAM06 Figure 5.1).

The vegetation comprised areas of sandy interdune swales and dune foot slopes with Slender Mulga (*Acacia aptaneura*) low open woodland over sparse Chenopods and tussock grasses. Other areas comprised sandy interdune swales with Slender Mulga (*Acacia aptaneura*) low open woodland with scattered Umbrella Bush (*Acacia ligulata*) over a patchy mid-storey of woody forbs including Ball Bindy (*Dissocarpus paradoxus*), Pin Sida (*Sida fibulifera*) and Three-spined Bindyi (*Sclerolaena tricuspis*). Common Bottle-washer grass (*Enneapogon avenaceus*) is common in the understorey (Plate 5.7). A total of 12 flora species were detected at RAM site LERAM05, other species included Bladder Saltbush (*Atriplex vesicaria*), Ruby Saltbush (*Enchylaena tomentosa*) and Tall Kerosene Grass (*Aristida holathera*). A total of 31 flora species were detected at site LERAM06, additional species included Silver Needlewood (*Hakea leucoptera* ssp. *leucoptera*), Desert Goosefoot (*Chenopodium desertorum* ssp. *desertorum*), Hill Lantern-bush (*Abutilon cryptopetalum* ssp.), Horse Mulga (*Acacia ramulosa* var.), several *Sclerolaena* spp. and several native grasses Plate 5.8. A species list is provided in Appendix B1.

Disturbance levels were typically low with low total grazing pressure. It is noted that most Slender Mulga stands appear to be senescing with a high proportion of dead trees and almost no recruitment evident in recent decades, likely a result of rabbit grazing juvenile plants. The Vegetation Condition score was medium to high for these sites, and higher at LERAM05 than LERAM06, as per electronic RAM sheet scores, shown in Table 5.5. Only one non-declared weed was detected; Indian Hedge Mustard.

No BHP fauna monitoring sites aligned with this community, given sparsely present within the Project Area. Lathwida bird surveys that aligned with this community included LERAM05 and LERAM06. This community would provide habitat for common fauna, but only limited habitat suitability for the key relevant EPBC listed threatened species. i.e. the vegetation community may provide general foraging habitat for overwintering non-breeding Blue-winged Parrot if present; it may provide habitat for Plains Mouse and Dusky Hopping Mouse during irruptive periods only when they utilise a broader range of non-critical habitats; it may provide general foraging, but not nesting, habitat for Grey Falcon (which nest in treed watercourses); and it may provide nesting and foraging habitat for Southern Whiteface.

Four common fauna were detected, Southern Whiteface were not detected (Appendix C).

Table 5.5: RAM summary, sandy swales with mixed Acacia tall shrubland and tussock grasses

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
LERAM05	1.14	68.25	1	85.59
LERAM06	1.14	51.00	1	63.95

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.7: Sandy interdune swales and dune foot slopes with Slender Mulga low open woodland (site LERAM05, facing north)



Plate 5.8: Low sand dune with Umbrella Bush/Slender Mulga/Horse Mulga tall shrubland (site LERAM06, facing north)

5.1.5 Run-on depression with River Red Gum/Willow Wattle open woodland

This community is represented by a vegetation association at RAM site LERAM08 (Figure 5.1).

The vegetation was characterised by a run-on depression/drainage line with River Red Gum (*Eucalyptus camaldulensis* ssp. *arida*)/Willow Wattle (*Acacia salicina*) open woodland with Cooba (*Acacia stenophylla*) over a patchy shrub layer including Old-man Saltbush (*Atriplex nummularia*), Plumbush (*Santalum lanceolatum*) and Inland Paper-bark (*Melaleuca glomerata*). The ground storey is dominated by tussock grasses including Neverfail (*Eragrostis setifolia*), and Umbrella Grass (*Enteropogon acicularis*) (Plate 5.9). A total of 14 species were detected at LERAM08, additional species included Old-man Saltbush (*Atriplex nummularia* ssp. *nummularia*), Climbing Saltbush (*Einadia nutans* ssp.) and Woolly Variable Daisy (*Brachyscome ciliaris* var. *lanuginose*) (Appendix B1).

Disturbance levels were moderate with past earthworks evident. Total grazing pressure was low and no declared weeds present. Vegetation condition at this site was medium to high, as per electronic RAM sheet scores, shown in Table 5.6.

No BHP fauna monitoring sites aligned with this community, given sparsely present and potentially modified habitat adjacent a road within the Project Area. Lathwida Bird surveys that aligned with this community included LERAM08. This community would provide habitat for common fauna, but limited habitat for the key EPBC listed threatened species. i.e. it may provide general foraging habitat only for overwintering non-breeding Blue-winged Parrot if present; it may provide general foraging, but not nesting, habitat for Grey Falcon; and it may provide general nesting and foraging habitat for Southern Whiteface which are widespread across most vegetation communities in the region. Whilst there was some Old Man Saltbush present, the size of the patch was not considered large enough to support Thick-billed Grasswren.

Four common bird species were detected; Black-faced Woodswallow (*Artamus cinereus*), Striated Pardalote (*Pardalotus striatus*), Spiny-cheeked Honeyeater (*Acanthagenys rufogularis*) and Zebra Finch (*Taeniopygia guttata*) (Appendix C).

Table 5.6: RAM summary, run-on depression with River Red Gum/Willow Wattle open woodland

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
LERAM08	1.14	51.00	1	63.95

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.9: Run-on depression/drainage line with River Red Gum/Willow Wattle open woodland (site LERAM08, facing north)

5.1.6 Non-vegetated claypan

Small shallow unvegetated clay-based basins in interdune swales that may hold water for short-periods of time, no cracking clays present, some have small amount of salt crust. No vegetation was present. The areas are unlikely to provide suitable habitat for threatened species (Figure 5.1 and Plate 5.10).



Plate 5.10: Non-vegetated claypan

5.1.7 Planted vegetation

A roadside strip of mixed natives including WA Eucalypt species, Native Pine and Sheoak was noted between RAM04 and the main highway. This very narrow strip is barely a mappable unit and not clearly visible on Figure 5.1

5.2 Vegetation communities, EIGR Areas

5.2.1 Low open chenopod shrubland

This community is represented by RAM site SRETRM01 (Figure 5.2). The site was located north of Port Augusta (Figure 4.2).

The vegetation association comprised Low Bluebush (*Maireana astrotricha*)/Bladder Saltbush (*Atriplex vesicaria*), low open shrubland over Woolly Bluebush *(M. eriantha*) and Bindyi (*Scelerolaena* sp.) on clay plains with sandy veneer. Other species that were present included *Tecticornia medullosa* (Plate 5.11). A total of 11 flora species were detected (Appendix B1).

No declared weed species were detected, only sparse cover of Ward's Weed (*Carrichtera annua*). Vegetation condition at this site was medium to high, as per electronic RAM sheet scores, shown in Table 5.6.

White-winged Fairywrens were opportunistically detected at site SRETRM01. No suitable habitat for EPBC listed species such as Plains Mouse or Thick-billed Grasswren was observed at this location. Southern Whiteface may use the habitat for general foraging if present in nearby areas.

Table 5.7: RAM summary, low open chenopod shrubland

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
SRETRM01	1.12	41.91	1	51.63

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.

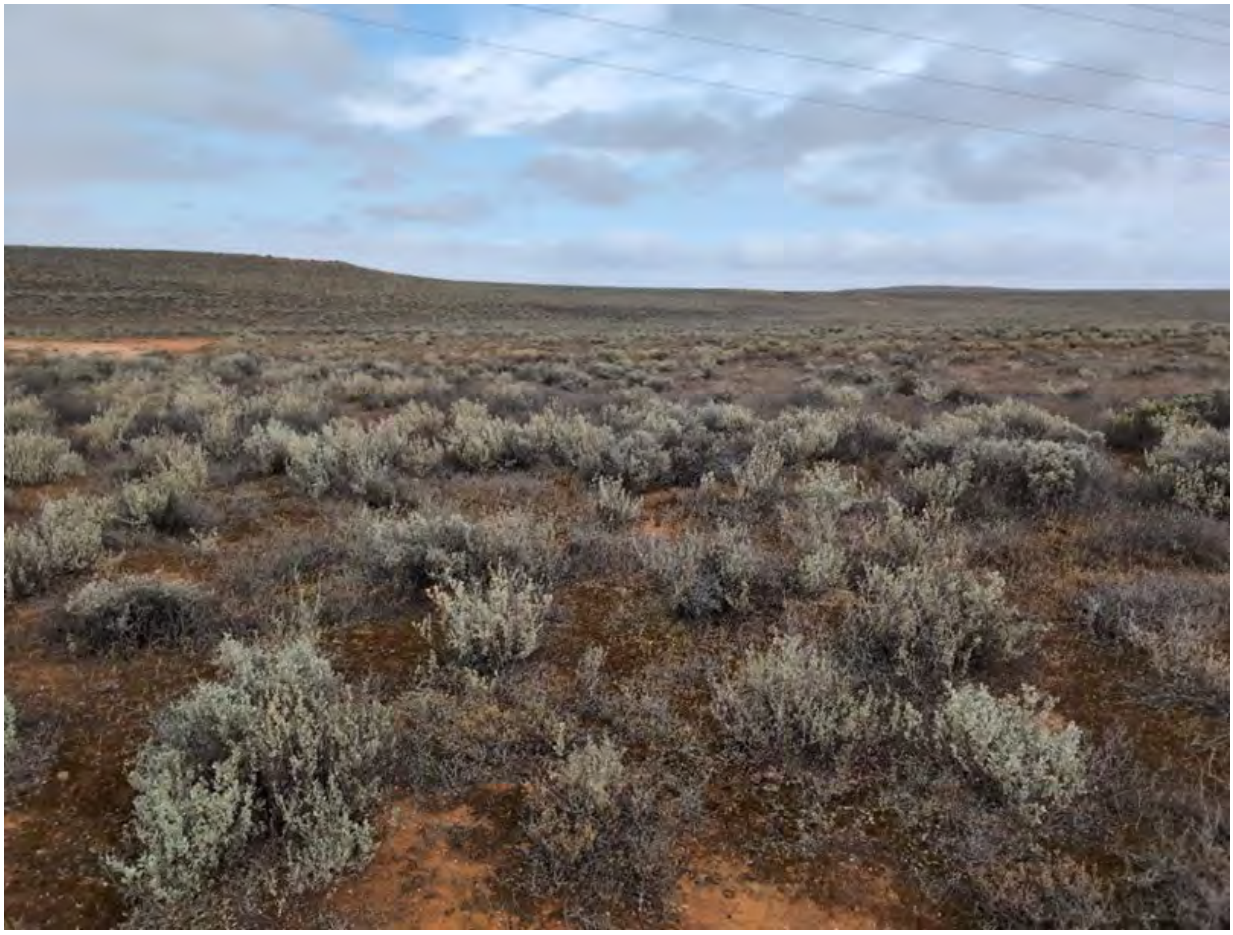


Plate 5.11: Low Bluebush/Bladder Saltbush low open shrubland over Woolly Bluebush and Bindyi (site SRETRM01, facing north)

5.2.2 Stony plains with low open chenopod shrubland and minor shallow gilgai formations

This community is represented by RAM sites SRETRM02, SRETRM03 and SRETRM07 (Figure 5.2).

The vegetation association comprises Low Bluebush (*Maireana astrotricha*), Bladder Saltbush (*Atriplex vesicaria*), Samphire (*Tecticornia medullosa*) low shrubland on undulating stony tablelands at SRETRM02 (Plate 5.12). This site was located north of Woomera, a total of 15 flora species were detected (Appendix B1, Figure 4.2).

At site SRETRM03 the vegetation association comprised Bladder Saltbush over Barley Mitchell-grass (*Astrebla pectinata*), Pale-fruit Bluebush (*Maireana apressa*) low open shrubland, with Plains Lantern-bush and Bush Minuria (daisy) (*Minuria cunninghami*) also present (Plate 5.13). A total of 14 flora species were detected (Appendix B1).

At site SRETRM07 the vegetation association comprised Bladder Saltbush/Pale-fruit Bluebush low open shrubland, with Barley Mitchell-grass and Plains Lantern-bush also present (Plate 5.14). A total of 14 flora species were detected (Appendix B1).

No declared weeds were detected, however there was sparse presence of one exotic flora species; *Bromus lithobius*) at site SRETRM02. The vegetation condition was generally medium for these sites (Table 5.8).

These sites were considered to only provide only opportunistic habitat for Plains Mouse during population irruptions, given the presence of only minor shallow gilgais, rather than larger gilgais containing deep cracking clays. The community would also provide suitable foraging habitat for Southern Whiteface and nesting habitat where taller shrubs were present.

The community would support common fauna. Of note, common fauna opportunistically detected included Rufous Fieldwren at site SRETRM01 and Brown Skylark at SRETRM03.

Table 5.8: RAM summary, stony plains with low open chenopod shrubland and minor shallow gilgai formations

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
SRETRM02	1.12	41.22	1	50.78
SRETRM03	1.12	48.81	1	60.13
SRETRM07	1.12	45.31	1	55.82

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.12: Low Bluebush, Bladder Saltbush, Samphire low shrubland (SRETRM02, facing east)



Plate 5.13: Bladder Saltbush over Mitchell Barley-grass and Pale-fruit Bluebush low open shrubland (SRETRM03, facing south)

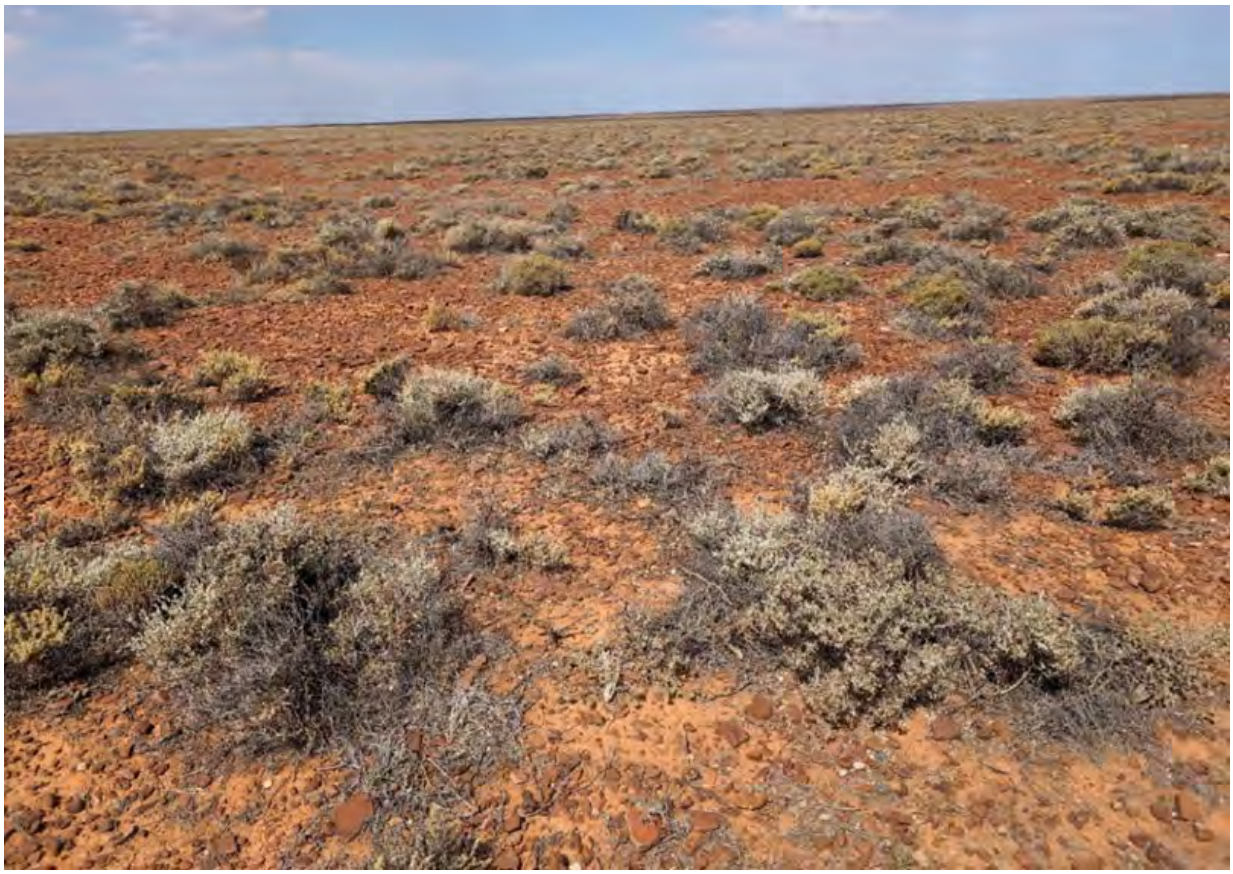


Plate 5.14: Bladder Saltbush/Pale-fruit Bluebush low open shrubland (sit SRETRM07, facing east)

5.2.3 Stony plains with low open chenopod shrubland, minor gilgai formations and shallow drainage lines with Cotton-bush

This community is represented by RAM site SRETRM04 and rapid vegetation check sites SRETRM05 and SRETRM06 (Figure 4.2, Figure 5.2).

The vegetation association comprised Bladder Saltbush (*Atriplex vesicaria*), Samphire (*Tecticornia medullosa*), Woolly Bluebush (*Maireana eriantha*) low open shrubland with sparse cover of Cotton-bush (*Maireana aphylla*) fringing ephemeral drainage line (Plate 5.15). Other species included Plains Lantern-bush, Barley-grass and Thyme Sea-heath. A total of 17 flora species were detected at site SRETRM04 (Appendix B1). No weed species were detected. The vegetation condition of these sites was medium (Table 5.9).

The habitat at these sites were considered marginal (SRETRM04 and SRETRM05) to general foraging (SRETRM06) for Plains Mouse, i.e. not supporting critical refuge habitat, only small and shallow gilgais which may be used by the species during population irruptions. Given the low shrubs present, the habitat was considered to provide general foraging, but limited nesting opportunities for Southern Whiteface. Minor highly ephemeral drainage lines were present with Cotton-bush, but this habitat was considered unsuitable (and too far south) to support Thick-billed Grasswren.

Australian Raven were opportunistically detected at the site.

Table 5.9: RAM summary, minor gilgais and shallow drainage lines with Cotton-bush

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
SRETRM04	1.12	45.74	1	56.35

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.15: Stony plains with low open chenopod shrubland, minor gilgais and shallow drainage lines with Cotton-bush (site SRETRM04, facing east)

5.2.4 Sand dunes with Umbrella Bush/Bullock Bush tall shrubland over mixed shrubs/tussock grasses

This community was represented by RAM site SRETRM11 and vegetation check sites SRETRM09 and SRETRM10 in south of Roxby Downs (Figure 4.2, Figure 5.2).

The vegetation association at SRETRM11 comprised low sand dunes of Mulga (*Acacia aneura*) with emergent White Cypress-pine (*Callitris glaucophylla)* over Bullock Bush (*Alectryon oleifolius*), Umbrella Bush (*Acacia ligulata)*, and Curly Wire-grass (*Aristida contorta*). A total of 19 flora species were detected at this site (Appendix B1). No declared weeds were detected, however there was sparse presence of one exotic species; Wild Turnip (*Brassica tournefortii*) and evidence of rabbit activity. Vegetation condition was medium to high, as per electronic RAM sheet scores, shown in Table 5.10.

The vegetation is considered suitable foraging habitat for Southern Whiteface, with potential nesting opportunities in Acacia and Bullock Bushes which were present. Common fauna observed opportunistically included Blue Bonnet, White-browed Babble and a flock of 12 Zebra Finch.

Table 5.10: RAM summary, sand dunes with Umbrella Bush/Bullock Bush tall shrubland over mixed shrubs/tussock grasses

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
SRETRM11	1.20	56.54	1	71.43

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.16: Mulga with emergent White Cypress-pine over Bullock Bush, Umbrella Bush and Curly Wire-grass (site SRETRM11, facing north)

5.2.5 Chenopod low open shrubland and emergent Dead Finish

This community was represented by RAM site SRETRM08, located between Roxby Downs and Woomera (Figure 4.2, Figure 5.2), The vegetation association comprised an overstorey of Dead Finish (*Acacia tetragonophylla*) and Senna (*Senna artemisioides* ssp. *petiolaris*) over Pearl Bluebush (*Maireana sedifolia*), Tate's Bindyi (*Sclerolaena tatei*), Round Sea-heath (*Frankenia subteres*) and Bristly Love-grass (*Eragrostis setifolia*) (Plate 5.17) on clay loam plains. A total of 19 flora species were detected at this site (Appendix B1). It is noted that *Frankenia subteres* is a State-listed threatened species (rated rare).

No introduced species were detected. Vegetation condition at the site was medium (Table 5.11).

This vegetation is considered to provide potential suitable foraging habitat for Plains Mouse during population irruptions only. The vegetation would also provide suitable Southern Whiteface foraging habitat with potential nesting habitat in the scattered tall Acacias.

Table 5.11: RAM summary, chenopod low open shrubland and emergent Dead Finish

RAM Site	Landscape context score[1]	Vegetation condition score	Conservation significance score	Unit Biodiversity Score (1 ha)[1]
SRETRM08	1.12	45.22	1	57.74

[1]Preliminary landscape context score and UBS, based on conservative RAM 'block' of 600 ha.



Plate 5.17: Dead Finish and Senna over Pearl Bluebush, Tate's Bindyi, Round Sea-heath and Bristly Love-grass (site SRETRM08, facing east)

5.3 Weeds and pests

A search of the BDBSA identified 20 weed species of national and/or state significance that potentially occur in the SRE Project Area, as presented in Table 5.12. Monitoring conducted by BHP during FY23 identified the following pest plant species declared under the LSA Act in the OD area of influence:

- Prickly Pear (*Opuntia* sp.)
- Buffel Grass (*Cenchrus ciliaris*)
- Innocent Weed (*Cenchrus incertus*)
- Fountain Grass (*Cenchrus setaceus*)
- Caltrop (*Tribulus terrestris*)
- Salvation Jane (*Echium plantagineum*)
- Athel Pine (*Tamarix aphylla*).

None of these species were detected during the recent surveys of the Project Areas, but are likely to be present.

Table 5.12: Summary of weeds identified in BDBSA[1]

Common name	Scientific name	Weed status	
		State (LSA Act)	Commonwealth
Khaki Weed	*Alternanthera pungens*	Declared	-
Buffel Grass	*Cenchrus ciliaris*	Declared	-
Spiny Burr-grass	*Cenchrus longispinus*	Declared	-
Fountain Grass	*Cenchrus setaceus*	Declared	-
Boxing Glove Cactus	*Cylindropuntia fulgida* var. *mamillata*	Declared	WoNS
Devil's Rope Pear	*Cylindropuntia imbricata*	Declared	WoNS
Salvation Jane	*Echium plantagineum*	Declared	-
Gazania	*Gazania linearis*	Declared	-
Common Lantana	*Lantana camara*	Declared	-
African Boxthorn	*Lycium ferocissimum*	Declared	WoNS
Horehound	*Marrubium vulgare*	Declared	-
Calomba Daisy	*Oncosiphon suffruticosum*	Declared	-
Riverina Pear	*Opuntia elata*	Declared	WoNS
Red-flower Prickly Pear	*Opuntia elatior*	Declared	WoNS
Grizzly Bear Cactus	*Opuntia polyacantha* var. *hystricina*	Declared	WoNS
Erect Prickly Pear	*Opuntia stricta*	Declared	WoNS
Three-corner Jack	*Rumex hypogaeus*	Declared	-
Athel Pine	*Tamarix aphylla*	Declared	WoNS
Caltrop	*Tribulus terrestris*	Declared	-
Bathurst Burr	*Xanthium spinosum*	Declared	-

1 BHP's FY22–23 Annual Environmental Protection and Management Program Report identified Innocent Weed (*Cenchrus incertus*) as present in the Olympic Dam region (BHP 2023a)

Thirteen introduced vertebrate species have been recorded in the SML area. The main introduced pests are the Red Fox (*Vulpes vulpes*), Cat (*Felis catus.*), House Mouse (*Mus musculus*) and Rabbit (*Oryctolagus*). Monitoring of feral animal populations is undertaken regularly by BHP and control undertaken when required (IMS Element 8 Monitoring Program Fauna, BHP 2023b).

Monitoring of introduced pest species during FY25 showed that kangaroos and rabbits continue to exist in higher densities compared to other introduced species (i.e. foxes, cats and wild dogs). Kangaroo numbers remain relatively high, however rabbit numbers overall have continued to remain below numbers observed before the release of rabbit haemorrhagic disease virus in March 2017 (BHP 2025). Evidence of rabbits was detected during the 2024 baseline survey and lack of recruitment of some palatable overstorey species (e.g. Mulga) also concurs with this. Cat and fox tracks were also observed in sand dune environments during the survey.

6 Fauna survey and habitat assessment

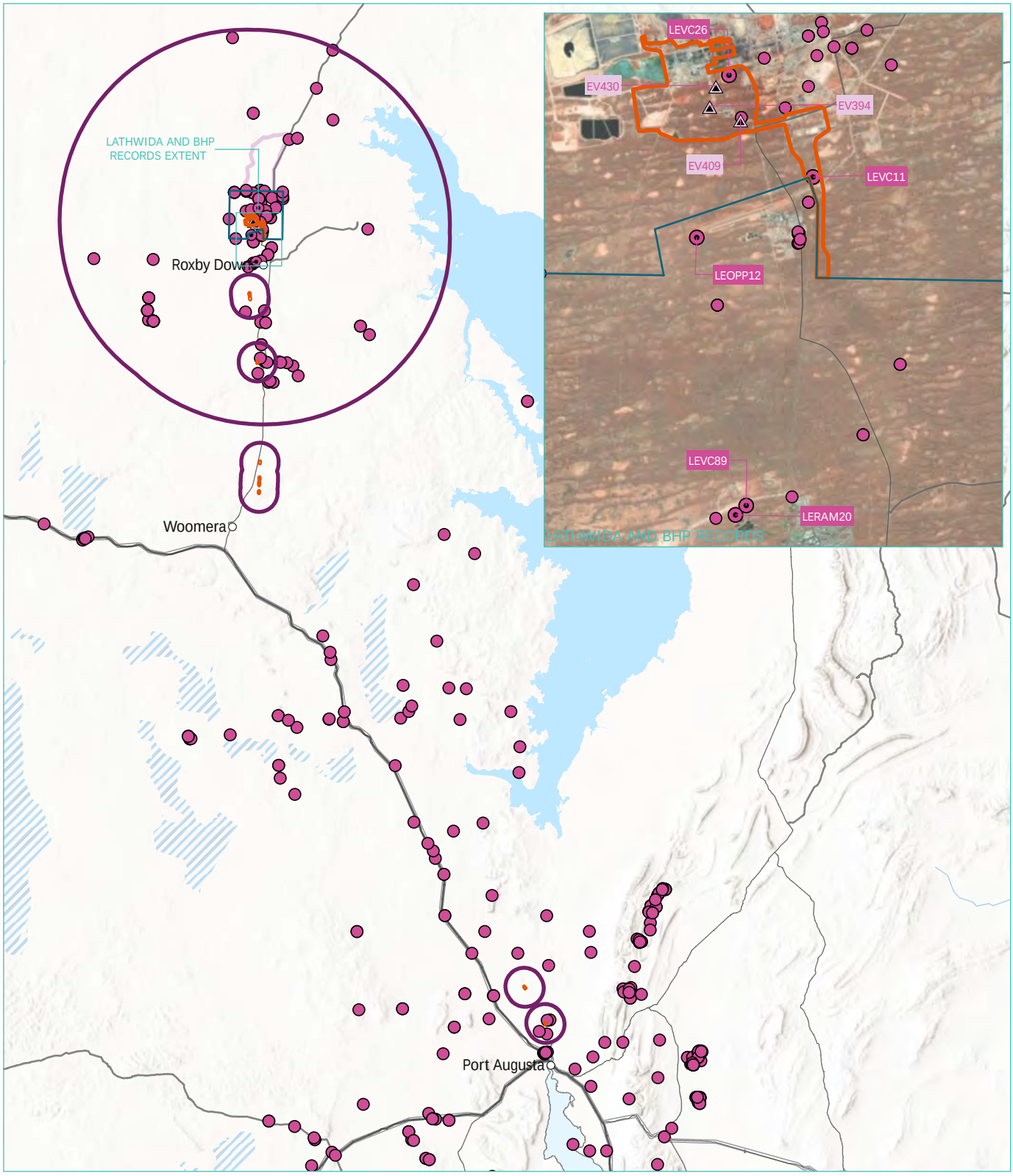
A total of 7.8 hours of Bird Surveys were undertaken in the SRE Project Area in July 2024, and additional surveys (9.7 hours) were also undertaken in adjacent areas in August 2024 as part of another BHP Project (CNPI south of SRE) (Lathwida 2024c). For the SRE Project Area, a total of 32 bird species were detected across 26 sites and opportunistically (Appendix C and Figure 4.3). Notably Southern Whiteface were detected at four sites in the SRE Project Area (nine birds in total) and three sites in adjacent areas (at least eight birds in total), summarised in Table 6.1. The vegetation communities in which Southern Whiteface were detected across both surveys included:

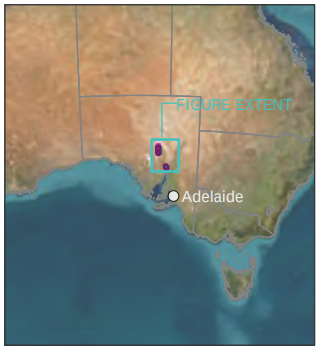
- taller sand dunes with White Cypress-Pine open woodland over mixed tall shrubs/tussock grasses (detected at sites LEVC11, LERAM20/LEVC89)
- loamy swales with Chenopod low open shrubland and emergent Mulga (detected at site EV409)
- sand dunes with Umbrella Bush /Bullock Bush tall shrubland over mixed shrubs/tussock grasses (detected at site EV394.

As per Section 4.2.1 above, vegetation present was assessed for potential MNES habitat, the outcomes of which are summarised in Table 6.2. The Project Area contains limited Plains Mouse habitat (considered to be only potentially suitable during irruption years for the species, with no critical refuge habitat identified), no suitable Thick-billed Grasswren habitat, with the majority of the Project Area considered suitable for Southern Whiteface foraging and/or nesting.

Table 6.1: Summary of 2024 bird survey effort in and adjacent SRE Project Area

Date	Project Location	Site	Observer minutes	Southern Whiteface Detected
23/07/2024	SRE	EV430	20	no
24/07/2024		LERAM03, LERAM04, LERAM05, LERAM06, LERAM07, LERAM08, LEOP01	120	no
25/07/2024		LEVC05, LEVC11, EV430, EV394, LEVC16, LEVC17, LEVC19, LEVC20, EV386, LEVC24	150	Yes (responded to call play-back pairs LEVC11 andEV394)
26/07/2024		LEOP09, BS05, EV404, EV409, LEVC25, LEVC26, EV393	180	Yes (responded to call play-back pair at EV409 and single at LEVC26)
	Total SRE		**470 (7.8 hours)**	**7 individuals at 4 locations**
17/09/2024	CNPI (south of SRE)	LEVC30/31, LERAM11, LERAM12, LERAM13, LERAM14	150	
18/09/2024		LEVC53, LEVC60, LEOP11, LEVC65, LEOPP12, LEOP13	240	One pair opportune sighting at LEOPP12
19/09/2024		LERAM20, LEOPP13, LEVC89, LERAM23	190	Group of 5-10 with juveniles and Zebra Finches at LERAM20; single at LEVC89
	Total CNPI		**580 (9.7 hours)**	**At least 8 across 3 sites**





SRE Project Area
Study Area
Arid Recovery Reserve
Wetlands of National Importance

Southern Whiteface survey records
- Lathwida (2024)
- BHP (1998 - 2014)
- BDBSA (1995 to 2024)

N

0 12.5 25 50

Kilometres

GDA2020 MGA Zone 53
A4 1:1,500,000

Figure 6.1: Records for Southern Whiteface in the Project Area and surrounds

LATHWIDA

Table 6.2: Summary of MNES habitat assessment by vegetation community

Broad Vegetation Community	Broad Vegetation Associations	Survey site[1]	MNES habitat
SML Area			
Loamy swales with chenopod low open shrubland and emergent Mulga/Slender Mulga	Bladder Saltbush (*Atriplex vesicaria*)/Low Bluebush (*Maireana astrotricha*) low open shrubland and tussock grasses (interdune swale) Chenopod low open shrubland (degraded) (interdune swale)	LERAM01, LERAM03, LERAM09	Plains Mouse 'boom' period foraging habitat only (no gilgais present). Southern Whiteface foraging/nesting opportunities in Mulga (low chenopod shrubs with scattered tall Mulga shrubs/trees many dead).
Sand dunes with Umbrella Bush/Bullock Bush tall shrubland over mixed shrubs/tussock grasses	Umbrella Bush/Bullock Bush tall open shrubland over Tall Kerosene Grass (*Aristida holathera*) (low dunes) Umbrella Bush tall shrubland (degraded, low dune)	LERAM02, LERAM10	Plains Mouse 'boom' period foraging habitat only (no gilgais present). Southern Whiteface foraging/nesting opportunities in Bullock Bush/Umbrella Bush.
Sand dunes with White Cypress-pine open woodland and mixed tall shrubs/tussock grasses	White Cypress-pine (*Callitris glaucophylla*) +/- Umbrella Bush (*Acacia ligulata*)/Bullock Bush (*Alectryon oleifolius*) tall open shrubland +/- sparse tall shrubs and tussock grasses. (tall dunes)	LERAM04, LERAM07	Plains Mouse 'boom' period foraging habitat only (no gilgais present). Southern Whiteface foraging/nesting in opportunities in Cypress-pine and tall shrubs.
Sandy swales with mixed Acacia tall shrubland and tussock grasses	Slender Mulga (*Acacia aptaneura*) low open woodland over sparse chenopods and tussock grasses +/- Umbrella Bush (*Acacia ligulata*) over a patchy mid-storey of woody forb (interdune swales / dune foot slopes)	LERAM05, LERAM06	Plains Mouse 'boom' period foraging habitat only (no gilgais present) Southern Whiteface foraging opportunities and nesting in tall shrubs
Run-on depression with River Red Gum /Willow Wattle open woodland	Northern River Red Gum (*Eucalyptus camaldulensis* ssp. *arida*)/Willow Wattle (*Acacia salicina*) +/- River Cooba (*A. stenophylla*) Woodland over tall chenopods (run on depression/drainage line)	LERAM08	Plains Mouse 'boom' period foraging/nesting habitat where cracking clay present, although limited area, potentially artificial drainage adjacent road. Southern Whiteface foraging/nesting opportunities in River Red Gums.

Broad Vegetation Community	Broad Vegetation Associations	Survey site[1]	MNES habitat
Claypans	Small shallow unvegetated clay-based basins in interdune swales that may hold water for short-periods of time, no cracking clays present, some have small amount of salt crust	LEVC23, LEOP07	Too small and lacking vegetation to support MNES. If these areas hold water, many other inland lakes/dams would also be holding water and provide better habitat. Claypans do not have cracking clays, but salt crust, and are not considered suitable for Plains Mouse.
Planted vegetation	Roadside strip of mixed natives	Field polygon	Not suitable or critical for MNES.
EIGR Areas			
Sand dunes with mixed Acacia tall shrubland and tussock grasses	Mulga (*Acacia aneura*) and emergent White Cypress-pine (*Callitris glaucophylla*) over Bullock Bush (*Alectryon oleifolius*), Umbrella Bush (*Acacia ligulata*) and Curly Wire-grass (*Aristida contorta*) (low dunes)	SRETRM09 SRETRM10 SRETRM11	Southern Whiteface foraging habitat. Potential nesting habitat in taller *Acacia* and Bullock Bush (where present). Plains Mouse 'boom' period foraging habitat only (no gilgais present in swales).
Chenopod low open shrubland and emergent Dead Finish	Dead Finish (*Acacia tetragonophylla*) / Senna (*Senna artemisioides* ssp. *petiolaris*) over Pearl Bluebush (*Maireana sedifolia*), Tate's Bindyi (*Sclerolaena tatei*), Round Sea-heath (*Frankenia subteres*) and Bristly Love-grass (*Eragrostis setifolia*)	SRETRM08	Plains Mouse 'boom' period foraging habitat only. Southern Whiteface foraging habitat. Potential nesting habitat in *Acacias*.
Stony plains with low open chenopod shrubland and minor gilgai formations, and shallow drainage lines with Cotton-bush	Low open chenopod shrubland,minor gilgai formations, and shallow drainage lines +/- Cotton-bush (*Maireana aphylla*) (stony plains)	SRETRM04, SRETRM05, SRETRM06	Plains Mouse 'boom' period foraging habitat only (shallow gilgais only). Southern Whiteface foraging habitat, limited suitable nesting habitat (taller shrubs). Minor drainage lines, highly ephemeral. No suitable habitat for Thick-billed Grasswren.
Stony plains with low open chenopod shrubland and minor shallow gilgai formations	Low Bluebush (*Maireana astrotricha*), Bladder Saltbush (*Atriplex vesicaria*), Samphire (*Tecticornia medullosa*) low shrubland (stony plains) Bladder Saltbush, Pale-fruit Bluebush (*Maireana apressa*) low open	SRETRM02 SRETRM03 SRETRM07	Plains Mouse 'boom' period foraging habitat only (shallow gilgais, no deep cracking clay). Southern Whiteface foraging habitat. Limited nesting opportunities. No suitable tall shrubs or trees for nesting habitat.

Broad Vegetation Community	Broad Vegetation Associations	Survey site[1]	MNES habitat
	shrubland +/- Barley Mitchell Grass (*Astrebla pectinata*) (stony plains)		
Low open chenopod shrubland	Low Bluebush (*Maireana astrotricha*)/Bladder Saltbush (*Atriplex vesicaria*), low open shrubland over Woolly Bluebush (*M. eriantha*) and Bindyi (*Sclerolaena* sp.)	SRETRM01	Southern Whiteface foraging habitat. Limited nesting opportunities. No tall shrubs or trees for nesting. No gilgais for Plains Mouse.

7 Likelihood of occurrence results

7.1 EPBC Act-listed species and communities

As per Section 2.2, the PMST output for the SML includes a 50 km buffer area, while the PMST report for the EIGR Area includes a 5 km buffer due to the relatively small size of each discrete parcel forming the EIGR Area. A summary of the number of MNES identified by the PMST searches for both project areas is presented in Table 7.1. It is noted that Listed Marine species are only relevant if the Action is within Commonwealth waters, hence these are not relevant to this SRE Project and are not discussed further.

A summary and likelihood of EPBC Act-listed species identified using the PMST and Biological Database of South Australia (BDBSA) is presented in Table 7.2. MNES species were excluded from the results that were unlikely to occur within the terrestrial Project Areas; i.e. marine dwelling species such as marine mammals, marine turtles, sharks, fishes and birds which utilise oceanic habitats (e.g. albatrosses, petrels, fairy prions and shearwaters). Fifteen threatened and seventeen migratory species were excluded for the EIGR Area. No species were excluded from the SML Area, however species listed as threatened and migratory are only assessed once in the threatened section; Common Greenshank, Curlew Sandpiper, Latham's Snipe, Red Knot and Sharp-tailed Sandpiper.

No Threatened Ecological Communities (TEC) are considered relevant to the SRE Project, and none have been identified onsite. One TEC is considered for the EIGR Area.

Table 7.1: Summary of MNES identified as potential relevant to the SRE Project in PMST Report

MNES	SML Area		EIGR Area	
	In Feature Area only	In Buffer Area only (50 km)	In Feature Area only	In Buffer Area Only (5 km)
Listed Threatened Ecological Communities	0	0	0	1
Listed Threatened Species	18	1	20	21
Listed Migratory Species	10	1	13	17
Wetlands of International Importance (Ramsar)	0	0	0	0
Commonwealth Marine Areas	0	0		
World Heritage Properties	0	0	0	0
National Heritage Places	0	0	0	0
The Great Barrier Reef Marine Park	0	0	0	0

A total of one EPBC TEC, 41 EPBC listed flora and fauna species are considered below (two threatened flora, 32 threatened fauna and 7 migratory fauna that are not also listed as threatened). Note two of the fauna were not highlighted by the PMST. Of these species only one species has previously and currently been detected as part of surveys for the project; Southern Whiteface. An additional, four species have potential to occur; Plains Mouse (potential during irruptive years), Blue-winged Parrot (potential during non-breeding winter migration), Grey Falcon (potential foraging) and Fork-tailed Swift (potential flyover species). The remaining species are considered unlikely or do not occur in the SRE Project Area.

Table 7.2 Summary and likelihood of occurrence EPBC Act -listed species in the Project Areas

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Threatened Ecological Community				
Subtropical and Temperate Coastal Saltmarsh	V		The EIGR Areas PMST output (Appendix A2) suggested that this community is 'likely to occur' in the EIGR Areas buffer area only. The EIGR Areas is inland and not tidally connected in any way. As such, this TEC does not occur in the Project Area	Does not occur
Threatened flora				
Frankenia plicata	EN	V	The SML PMST output (Appendix A1) suggested that this species or species habitat is 'known to occur' within the feature area (SRE Project Area) and 'likely to occur' in the EIGR Area (Appendix A2). The species occurs in a variety of arid environments including small hillside channels where it receives run-off following rain and in a wide range of vegetation communities with good drainage. There are only 7 records just outside the Study Area buffer, all from 1996 and all in the vicinity of Stonewall Dam and Netting Dam; located over 47 km southeast of the Project Area, closer to Lake Torrens (BDBSA 2024).This is a cluster of records north of the Carrapateena mine, which have been confirmed as mis-identified by the SA Herbarium (Jacobs 2021, Helen Vonow pers. comm). Considering this, the next closest record is approximately 78 km south of the SRE Project Area just outside of Woomera in the Woomera Prohibited Area. This record is approximately 10.5 km from the southern-most of a central cluster of EIGR Areas. The species has not been identified by any of the baseline or vegetation surveys undertaken to date within the Study Area, and no suitable habitat is present within the Project Area (BHP 2009, Survey One and Two, this study).	Unlikely
Desert Greenhood (*Pterostylis xerophila*)	VU	V	The PMST outputs (Appendix A1 and Appendix A2) suggested that this species or species habitat 'may occur' within the feature area (both Project Areas). This species is known to occur on the Eyre Peninsula in dry woodland and specifically around rocky outcrops, and in association with Broombush (*Melaleuca uncinata*), Ridge-fruited Mallee (*Eucalyptus incrassate*), Beaked Red Mallee (*E. socialis*) and/or Narrow-leaved Red Mallee (*E. leptophylla*) (Duncan 2010). There are no records within the Study Area (50 km buffer) (BDBSA 2024). The nearest record is approximately 278 km west of the Project Area in Yellabinna Regional Reserve (DEW 2024). This species occurs in association with rocky outcrops and mallee that is not present in the Project Area (BHP 2009, Survey One and Two this study).	Unlikely
Threatened mammals				
Australian Sea-lion (*Neophoca cinerea*)	EN	VU	The EIGR Areas PMST output (Appendix A2) suggested this species or species habitat 'may occur' in the buffer area only. There is no oceanic or beach habitat to support this marine mammal in either of the Project Areas.	Does not occur
Burrowing Bettong (Shark Bay), Boodie (*Bettongia lesueur lesueur*)	VU	-	The SML PMST output (Appendix A1) suggested a translocated population is 'known to occur' within the 'feature area'. While originally widespread over mainland Australia, the Boodie was reduced to only three remnant island subpopulations (Barrow, Dorre and Bernier Island (WA)). Several translocation populations have become established, including introduction to the ARR (20 km north of Roxby Down, 4.7 km north of the Project Area) in SA (DCCEEW 2023b). Populations that are considered important include the remnant and translocated populations (DCCEEW 2023b). Being nocturnal, the species generally occupies borrows during the day in sand dunes but also use calcrete burrows on stony swales. Generally, the species have been recorded in areas of spinifex, claypan, low heath, scrub, saltbush scrub, sandhills, desert, limestone karst, grassy/herbaceous loam flats, mulga, ironwood parks and sand ridge areas (DECCEEW 2023b). There are over 2,895 BDBSA records for this species in the Study Area (BDBSA 2024). These records are primarily in the ARR Main Enclosure. The species has not been recorded outside ARR in the Study Area to date (BDBSA 2024). There is one record in the Project Area (2019, cage trap), but this record appears to be an error given it is from a building within Olympic Dam Village. In SA the only other records are in the Murray Mallee (DEW 2024). There are no records for this species in the OD Small Mammal and Reptile database (BHP 2024b). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2024). Whilst there are sand dunes which may provide suitable habitat within the Project Area, based on the above it is considered unlikely to occur in the Project Area**,** particularly given they are only known from the ARR translocation area, and occur in the Study Area as a result of the ARR.	Unlikely
Chuditch, Western Quoll (*Dasyurus geoffroii*)	VU	E	The PMST outputs (Appendix A1 and Appendix A2) suggested a translocated population is 'known to occur' within the 'feature area' (both Project Areas). This species historically ranged across nearly 70% of the continent, however drastic decline in numbers has occurred since that time. The last report of the species was in the arid zones of SA in the mid-1950s. Free-ranging populations are now restricted to Western Australia in varying densities in Jarrah (*Eucalyptus marginata*) forests and woodlands, and in mallee shrublands and heaths (Arid Recovery 2024b). There are occasional records in drier woodland and mallee shrubland (DEC 2012). All populations are considered important, and key habitat includes adequate hollow logs, burrow and rock crevices (DEC 2012). There are over 299 BDBSA records of this species in the SRE Study Area, and the majority of these are all from the translocated population within ARR (BDBSA 2024). There are no records for this species in the OD Small Mammal and Reptile database (BHP 2024b). There is no suitable mallee habitat in the Project Area, no rock crevices and no hollows of suitable size to support this species (Survey One and Two, this study). There are some records that appear to occur outside the ARR area, these records are all north of OD adjacent the ARR. There is one	Unlikely

[2] EPBC Act Status: Critically Endangered (CE); Endangered (EN); Vulnerable (VU); Migratory Marine (MM); Migratory Terrestrial (MT); Migratory Wetland (MW).
[3] *National Parks and Wildlife Act 1972* (SA) Status: Endangered (E); Rare (R); Vulnerable (V).

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			record in the Project Area (2019, cage trap), but this record appears to be an error given it is from within the Olympic Dam Village. There are records for another population in the Flinders Ranges NP (DEW 2024). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2024). Based on the above it is considered unlikely to occur, particularly given they are only known from the ARR translocation area, and occur in the Study Area as a result of the ARR.	
Dusky Hopping-mouse, Wilkiniti (*Notomys fuscus*)	VU	V	The PMST outputs (Appendix A1 and Appendix A2) suggested that this species or species habitat is 'likely to occur' within the SRE Project Area and 'may occur' in the buffer area of the EIGR Area. The Dusky Hopping-mouse occurs in arid areas of Australia, and prefers continuous soft sandy dunes, hills and ridges with a mixture of shrubs and grasses, with Sandhill Cane-grass (*Zygochloa paradoxa*), Sandhill Wattle (*Acacia ligulata*), Sticky Hopbush (*Dodonaea viscosa*), Nitrebush (*Nitraria billardierei*) and other annual and perennial shrubs forming important habitat (TSSC 2008). In good seasons the species may extend onto gibber plains. In SA, the species is found in areas of continuous sand dune habitat (DCCEEW 2024a). Dense populations are known to occur within the vicinity of major drainage systems. In SA, the species is known to occur in the southern Strzelecki Regional Reserve (RR) and the Cobblers Deserts, Carraweena Montecollina Bore and Quinyambie Station, Lake Eyre NP and Innamincka RR (Menkhorst and Knight 2004, TSSC 2008, DCCEEW 2024a). The majority of the records in SA east and northeast of the Study Area around Maree, Lake Eyre and Lake Frome and across to Innamincka (DEW 2024). There are no records in the SRE Study Area (BDBSA 2024). Note 2 records at Roxby Village and Roxby Town are incorrect are being removed from NatureMaps/BDBSA, DEW pers. com). There are no records in the BHP small mammal and reptile database for this species (BHP 2024b). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2024). Key threats relate to predation by feral cats and foxes. Grazing pressure from stock and competition for food and habitat resources from the European Rabbit (*Oryctolagus cuniculus*) and House Mouse (*Mus musculus*) (TSSC 2008). Subspecies are known to persist in low stable numbers, and other populations may exhibit "boom and bust" lifecycle with numbers rapidly increasing and decreasing rapidly in response to rainfall and resource availability following good conditions (Moseby et al. 2006). The Study Area location is not listed as a known or important population in the Conservation Advice (TSSC 2008) for the species, hence the Project Area is unlikely to support an important population of the species.	Unlikely
Greater Bilby (*Macrotis lagotis*)	VU	E	The SML PMST output (Appendix A1) suggested a translocated population is 'known to occur' within the 'feature area'. The Greater Bilby is a medium sized desert dwelling marsupial. Wild populations persist only in remote parts of the Northern Territory, Queensland and Western Australia (TSSC 2016a). The Greater Bilby is considered extinct in SA, occurring only within the fenced ARR (20 km north of Roxby Downs, 4.7 km northwest of the Project Area), and two other re-introduction sites. The greatest threat to this species is predation by cats and foxes. The remaining populations of the species occupy three main habitats: open tussock grassland on uplands and hills, Mulga (*Acacia aneura*) woodland/shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas (Woinarski et al., 2014). Males range (average of 316 ha) more widely than females (average of 18 ha) from their home burrows, and home ranges can vary considerably in size in different locations. Greater bilbies can use up to 18 burrows concurrently over several months, as well as construct a new burrow on average every 2.5 weeks (Moseby & O'Donnell 2003 in TSSC 2016a). There are also many active and disused burrows within the home range. Whilst no important populations are listed in the species' conservation advice, translocated populations like within the ARR remain important to conservation priorities for the species (TSSC 2016a). There are over 333 BDBSA records in the Study Area, all located within Arid Recovery (main enclosure, main expansion area) (BDBSA 2024). Whilst the sand dune and plains in the SRE Project Area may support the species, the vegetation is generally sparse and Mulga is limited or dead. There are also limited tussock grasslands, and known habitat occurs within the fenced AR translocation area, north of the active mine site. There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2024). Based on the above it is considered unlikely to occur, particularly given they are only known from the ARR translocation area.	Unlikely
Kowari (*Dasyuroides byrnei*)	EN	E	Species not highlighted in PMST. In 2023 status was upgraded from Vulnerable to Endangered. They occur in stony gibber plains with little shrub and ground cover in the Sturt Stony Desert of outback SA and Qld (Arid Recovery 2025a). 62 records (from 2022-2023) in the Study Area all within ARR (BDBSA 2024, DEW 2024).	Unlikely
Numbat (*Myrmecobius fasciatus*)	EN	E	Species not highlighted in PMST. Once occurred across arid southern Australia, now restricted to Powderbark or Jarrah forests in WA and translocated locations (Menkhorst and Knight 2004; DCCEEW 2025); 4 records (2006) in the SML Study Area all within ARR (BDBSA 2024, DEW 2025). The translocation attempts failed and the species no longer occurs in this location.	Unlikely
Plains Rat, Palyoora, Plains Mouse (*Pseudomys australis*)	VU	V	The PMST outputs (Appendix A1 and Appendix A2) suggested that this species or species habitat is 'known to occur' within the SML Area and 'likely to occur' in the EIGR Area. The species is restricted to the Stony Plains Bioregion in SA and the NT and persists where large open gypseous cracking clay depressions occur within stony gibber country. Any large population which persists through drought conditions is considered important, including those of the Arcoona Tablelands in SA and the ARR (Moseby 2012a). There are five broad contiguous areas where Plains Mouse are known to occur; the Arcoona Tableland including Pernatty Station SA (over 100km south of the Action), Southern Lake Eyre region SA (includes Roxby Downs ARR), Moon Plain region around Coober Pedy to Evelyn Downs SA, Oodnadatta region extending from SA into southern NT, and Andado Station and Mac Clark Conservation Reserve NT (Moseby 2012a). The ARR (4.7 km) northwest of the SRE Project Area and separated by the active Olympic Dam mine site) is important because it supports high densities of the species and is protected from predation via fencing (Moseby 2012a).	Possible

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			An overall extent of occurrence for the species is estimated at 100,000 km^2 (10,000,000 ha) which excludes some outlying recent records of the species. An area of occupancy within the extent of occurrence is assumed to be approximately 20,000 km^2 (2,000,000 ha) (Moseby 2012a), though this may be much smaller due to the fragmented nature of populations particularly during drought conditions when numbers retract to critical refuge habitat. There are over 700 BDBSA records of Plains Mouse located within 50 km of the SRE Project Area (BDBSA 2024). The species is known from within and adjacent the ARR since 2005 (BDBSA 2024, BHP pers com., BHP 2024b). There are 51 records in the BHP database for the species, but no records from the three mammal monitoring sites located in the proposed SRE Project Area (sites EV321, EV320, EV326). Of the 51 records, the majority are north of the mine site, Project Area and are within the ARR. However, there are two records from two sites that are adjacent (EV325, from 1998) and south of (EV338A, from 2010) the SRE Project Area, and five records immediately north of the SRE Area within established infrastructure areas, that may not be spatially reliable (2010, 2013, 2017). There are also three records from site EV331A (adjacent the southwest boundary of the ARR) and EV333A (adjacent the eastern boundary of the OD SML) (BHP 2024b). In addition, Moseby (2012) broadly mapped Plains Mouse/Rat habitat in and adjacent the SML. Figure 1 of Moseby (2012) suggests that vegetation within the SML is Bladder Saltbush dominant and that critical refuge habitat occurs north and east of the SML, with two small areas within the eastern portion of the SML. There is no Plains Mouse critical refuge habitat mapped as occurring within the SRE Project Area (Moseby 2012a) or identified within the EIGR Areas during surveys undertaken in October 2024 (Survey One and Two, this study). This aligns with the outcomes of the recent (July 2024) survey and vegetation/habitat classification of the Project Area used to develop Figure 5.1 and Figure 5.2 above (Survey One and Two, this study). Minor areas of potential foraging or habitat during boom periods (i.e. minor gilgai features within stony plains or open chenopod shrublands were identified at 6 of the 11 EIGR Areas, representing a total area of 19.6 ha (Lathwida 2024a). The nature of the historic and recent records is reflective of the irruptive nature of this species, with multiple detections during boom years followed by 'bust' periods where the species is difficult to detect, sometimes for several years. An important distinction for the species related to this irruptive lifecycle, is the difference between critical habitat which represents a refuge for populations during the extended drought periods of the occupied regions, and the broader 'opportunistic' habitat used by the species during favourable conditions and the short population 'booms'. The critical refuge habitat for the species includes discrete areas of deeper cracking clays within natural depressions or along drainage features (e.g. gilgais, Cane-grass Swamps) where the species nests and organic material is accumulated. This species is most commonly associated with large open gypseous cracking clay areas or minor drainage features and in depressions (gilgais, Cane-grass Swamps) of the gibber stony plains, which are common north of the SRE Project Area and existing mine. There is no suitable habitat for the species in the SRE Project Area which comprises low dunes and swales and no cracking clay or drainage features, besides several non-vegetated claypans which do no exhibit deep cracking clay. There are no Cane-grass (*Eragrostis australasica*) swamps present in the Project Areas (Survey One and Two this study). Based on the above, whilst there is a lack of suitable refuge habitat, there are several records of the species during 'boom' periods within proximity to the SRE Project Area, and potential habitat for the species during boom periods was identified in 6 of the EIGR Areas, and therefore the species is considered as a possible occurrence (in irruption years only) in the Project Area.	
Shark Bay (Western Barred) Bandicoot (*Perameles bougainville*)	EN	E	The SML PMST output (Appendix A1) suggested a translocated population is 'known to occur' within the 'feature area'. While originally widespread across western and southern Australia, the only remnant wild populations occur on Bernier and Dorre Island in Shark Bay within the World Heritage Property (WA). Translocated populations have been reintroduced at Heirisson Prong (south of Shark Bay), but the population became extinct in 2008. With more successful translocated populations at Faure Island and Mt Gibson Wildlife Sanctuary (WA), ARR at Roxby Downs (SA), and Sturt National Park, Pilliga State Conservation Area and Mallee Cliffs (NSW) (DCCEEW 2023a). All populations are considered important (wild and translocated) (DCCEEW 2023a). The present range of the wild population species appear to have a broad habitat preference but prefer dense vegetation cover and leaf litter that provides refuge from predators. The vegetation of the nearest translocated population in SA (ARR, 4.7 km northwest of the SRE Project Area, immediately north of the existing mine) is open with a hot and dry climate. The vegetation in the fenced recovery area occupied by the species includes sand dunes with Sandhill Wattle (*Acacia ligulata*) and Sticky Hopbush (*Dodonaea viscosa*), sandplains with Mulga (*A. aneura*)), chenopod swales with Bladder Saltbush (*Atriplex vesicaria*) and *Maireana astrotricha*, ephemeral swamps with Swamp Cane-grass (*Eragrostis australasica*) and creek lines (Moseby 2012 in DCCEEW 2023a). No ephemeral Cane-grass swamps or creek lines are present in the Project Area, but sand dunes with Sandhill Wattle are present. There are over 260 BDBSA records for this species in the Study Area and these are all within the fenced ARR north of the existing mine site (BDBSA 2024). In this location the species is dependent on the predator-proof fence for survival (Arid Recovery 2024a). There are no records for this species in the OD Small Mammal and Reptile database (BHP 2024b). The species has not been recorded outside of the ARR (DEW 2024). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2024).	Unlikely
Wopilkara, Greater Stick-nest Rat (*Leporillus conditor*)	VU	V	The SML PMST output (Appendix A1) suggested a translocated population is 'known to occur' within the 'feature area'. The only natural extant population is found on Franklin Island (SA), while a translocated population was reintroduced to ARR (20 km north of Roxby Downs), however they have been extinct there since 2019. The species inhabits perennial shrublands, especially succulent and semi-succulent plant species (e.g. Bladder Saltbush) (DEWHA 2008a, Arid Recovery 2024c). Key threats are the re-introduction of feral predators into managed reserves (DEWHA 2008a). Whilst no populations are listed as important in the species' conservation advice, the translocated population in ARR is considered key to support ongoing recovery initiatives (DEWHA 2008a). There are 13 records in the Study Area, the majority of records are from the ARR (BDBSA 2024). The most recent record from 2019. There are two records (2003) from the mine pits monitoring site EV329, which is located 4.7 km from the Project Area within the ARR fenced area (BDBSA 2024, BHP 2024b). There are no records south of Roxby Downs to Port Augusta in the vicinity of the EIGR Areas (DEW 2024). Based on the above it is considered unlikely to occur in the Project Area, particularly given they are only known from the ARR translocation area up until 2019 and are now extinct within the ARR.	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Threatened fish				
Blue Warehou (*Seriolella brama*)	CD	-	The EIGR Areas PMST output (Appendix A2) suggested this species or species habitat is 'likely to occur' in the buffer area only. There is no oceanic habitat to support this marine species in either of the Project Areas.	Does not occur
Threatened reptile				
Flinders Ranges Worm-lizard	VU		The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the feature area. The Flinders Ranges Worm-lizard is a small, slender burrowing legless lizard, typically known from the Flinders Ranges of South Australia, extending south to the western slopes and northern and central Mt Lofty Ranges (Cogger et al. 1993). The species has also been recorded in the northern suburbs of Adelaide, with 8 individuals recorded within the Cobbler Creek Recreation Reserve in Salisbury (Cogger et al. 1993 cited in DEWHA 2008b). The species occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates (Cogger et al. 1993), where it prefers stony soils or clay soils with a stony surface. It may also be found sheltering in soil beneath stones and rotting stumps, where it is difficult to observe (Cogger et al. 1993 cited in DEWHA 2008b). There are no records in the SRE Study Area and no records between Olympic Dam and Port Augusta in proximity to the EIGR Areas (DEW 2024). There are no reported important populations of this species, or any listed habitat which is critical to the survival of the species. As all the EIGR Areas are outside of the Flinders Ranges and well removed from the other known locations of this species (i.e. Mount Lofty Ranges), and there are no rocky outcrops, it is considered unlikely that the species occurs in the Project Area.	Unlikely
Threatened birds				
Australian Fairy Tern (*Sternula nereis nereis*)	VU		The EIGR Areas PMST output (Appendix A2) suggests that breeding 'may occur' in the buffer area only. Occurs along coasts and estuaries, and breeds on sandy beaches or spits (Menkhorst et al. 2023, DSEWPC 2011). Along the coast, this sub-species generally nests on sandy beaches and banks above the high tide line and below vegetation. Will roost on jetty structures. The sub-species' distribution extends along the coasts of South Australia, Tasmania, and central Western Australia, and there are a number of breeding sites along the EP, some near Coffin Bay, Port Lincoln and across the Gulf at the base of Yorke Peninsula (ALA 2024, DEW 2024). The closet records to the Project Area are in the Whyalla Saltfields or Yatala Harbour, both well over 60 and 50 km (respectively) from the nearest Electrical Infrastructure area. As there is no wetland or coastal habitat which is preferred by this species within any of the EIGR Areas, it is considered unlikely that the species occurs in the Project Area.	Unlikely
Australian Painted Snipe (*Rostratula australis*)	EN		The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the feature area. The Australian Painted Snipe a medium shorebird, endemic to Australia, widespread, but rarely observed. This species prefers inland swamps and temporary water regimes, marshes with moderate cover, and can be nomadic, appearing in response to rainfall (Geering et al. 2008). The species is most often observed in well vegetated margins and shallow water and shorelines of wetlands, nesting in temporary freshwater wetlands, particularly in the Murray -Darling Basin (Geering et al. 2008, Menkhorst et al. 2023), which are not present in the Project Area. Records of the species in South Australia are predominantly surrounding the Adelaide region, Fleurieu Peninsula or South East. There are no records of this species occurring within the Eyre Peninsula or between Port Augusta and Olympic Dam (DEW 2024, ALA 2024). Therefore, this species is considered unlikely to occur within the Project Area.	Unlikely
Blue-winged Parrot (*Neophema chrysostoma*)	VU	V	The PMST outputs (Appendix A) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both Project Areas). Blue-winged Parrots breed on mainland Australia south of the Great Dividing Range in southern VIC and sometimes in the far south-east of SA (DCCEEW 2023h). During non-breeding periods (from Autumn to early Spring), they occur from northern Victoria, eastern SA, South-western QLD and western NSW (Higgins, 1999). They inhabit a range of coastal, sub-coastal and inland areas through to semi-arid zones, favouring grassy woodlands and areas near wetlands. Critical habitats include foraging and staging habitats in coastal, sub-coastal and inland areas, through to semi-arid zones (e.g. grasslands, grassy woodlands and semi-arid chenopod shrubland with native and introduced grasses, herbs and shrubs), coastal and semi-arid wetlands used for staging and foraging, eucalypt forests and woodlands (including live and dead trees, suitable size hollows) for breeding (in Tasmania, southern Victoria and southeastern SA) (DCCEEW 2023h). Whilst no important populations are listed as such in the species' conservation advice, the Tasmanian and Victorian breeding subpopulations (DCCEEW 2023h) would be considered important. The Area of Occupancy of the species is considered to be 1,100,000 ha (Holdsworth et al. 2021 cited in DCCEEW 2023h). There are no BDBSA records of the species within the Study Area (BDBSA 2024, DEW 2024). There are three birdlife records (1998-2004) of the species within the Study Area near Olympic Dam village (1998, 1999) and between Andamooka and Lake Torrens (2004) (BDBSA 2024). There are numerous records in inland SA in the broader region (e.g. Woomera, Carrapateena Mine, near Lake Eyre). There are no records in the BHP Birds Database (BHP 2024a). There are suitable occasional foraging habitats in the Project Area that would support the species if present during winter migration, such as Sandhill Wattle low shrubland on dunes and low chenopod shrubland on swales. These habitats are extensive in the region. No breeding habitat is present (Survey One and Two this study), and the species does not breed in SA (DCCEEW 2023h). Based on the above this species is considered possible during winter migration (foraging only).	possible during winter migration (foraging only)

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Common Greenshank, Greenshank (*Tringa nebularia*)	EN, MW	-	The PMST outputs (Appendix A) suggested that this species or species habitat is 'likely to occur' within the 'feature area' (both Project Areas). Common Greenshank have extensive breeding grounds. They extend from the northern British Isles, Scandinavia, east Estonia and north-east Belarus, through Russia. Outside of this breeding range, the species is widespread being found in Europe, Africa, Asia, Melanesia and Australasia (DCCEEW 2024b) Within Australia, the species is widespread in coastal regions, occurring in all types of wetlands, and has one of the widest distributions of any shorebird in Australia. The species is found throughout most of eastern SA (DCCEEW 2024b). The species forages at the edge of wetlands, in soft mud on mudflats, in channels or within shallows around the edge of waterbodies. They roost both on the coast and inland, in estuaries and mudflats, mangrove swamps and lagoons, and in billabongs, swamps, sewage farms and flooded crops (DCCEEW 2024b). Habitat critical to the survival of this species includes a mosaic of feeding and roosting habitat such as a variety of freshwater, marine, and artificial wetlands, swamps, open muddy or rocky shores of lakes and large rivers, sewage farms, saltworks, inundated rice-fields, ponds, reservoirs, flooded grasslands, saltmarshes, sandy or muddy coastal flats, mangroves, estuaries, lagoons, pools on tidal reefs or in areas of exposed coral (DCCEEW 2024b).The estimated Australian population is over 23,700 mature individuals (Garnet and Baker 2021). No critical habitat to support the species is known from the Project Area. Whilst the species may be a transient visitor if there are areas of temporary low-lying water, this is not considered critical habitat that would sustain individuals or the species. It is expected that if the small shallow ephemeral clay pans within the Project Area are holding water, there would be more significant water features regionally. There are 14 BDBSA records (1991-1993) of the species within 50 km of the Project Area (BDBSA 2024). These records are from Coorlay Lagoon and Lake Mary; which are over 25 km south of the Project Area. There are also 8 Birdlife records (1998-2006), these records are from Coorlay Lagoon and artificial habitats in the Olympic Dam Village, and Roxby sewage treatment dams. The small claypans that occur in and adjacent the Project Area would not provide suitable habitat, and if water is present in these very small shallow pans, more suitable habitat would be present in inland lakes and dams of the Study Area. Given the lack of suitable habitat within the Project Area and limited recent records within the Study Area, the species is considered unlikely in the Project Area.	Unlikely
Curlew Sandpiper (*Calidris ferruginea*)	CE, MW	E	The PMST outputs (Appendix A) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both Project Areas). The Curlew Sandpiper is a migratory wader which breeds outside of Australia (Menkhorst et al. 2017). The species mostly occur on intertidal mudflats in sheltered coastal areas such as estuaries, bays, inlets and lagoons, and around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (Geering et al. 2008). They have also been recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand (DCCEEW 2023g). They can occur in both fresh and brackish waters. There are four BDBSA records within the Study Area from 1993-1994. These records are from Lakes Echo, Coorlay, Campbell and Mary (BDBSA 2024). There is one Birdlife record from a Cane-grass Swamp on Borefield Rd in 2000 (BDBSA 2024). There are no suitable core shorebird habitats (e.g. inland lakes, ephemeral drainage lines, Cane-grass Swamp) in the SRE Project Area. The small claypans that occur in and adjacent the Project Area would not provide suitable habitat, and if water is present in these very small shallow pans, more suitable habitat would be present in inland lakes and dams of the Study Area. No ephemeral lakes or waterbodies are present within the EIGR Areas (Survey One and Two this study). Given the lack of suitable habitat within the Project Area and limited recent records within the Study Area, the species is considered unlikely in the Project Area.	Unlikely
Diamond Firetail (*Stagonopleura guttata*)	VU		The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the buffer area only. The species has a broad distribution across south-eastern Australia from southern Queensland to the Eyre Peninsula in South Australia, but previously extended into north Queensland (inland from Cardwell) (DCCEEW 2023f). Within South Australia the Diamond Firetail appears to have been separated into 3 isolated subpopulations (i.e. Eyre Peninsula, Mt Lofty to Southern Flinders Ranges, and the South East) (Higgins et al. 2007 cited in DCCEEW 2023f). The species occurs in eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats (including farmland and grassland with scattered trees), preferring areas with relatively low tree density, few large logs, and little litter cover but high grass cover (Menkhorst et al. 2017, DCCEEW 2023f). The nearest historic records of this species to the Project Area, closest to the southern-most EIGR Areas within the Flinders Ranges, to the east and north-east of Port Augusta (DEW 2024). The nearest of these records is over 20 km from the Project Area in very different habitat, hence the species is considered unlikely to occur.	Unlikely
Eastern Curlew Far Eastern Curlew (*Numenius madagascariensis*)	CE		The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the feature area. Migratory wader/large shorebird. Breeds in NE Asia, Siberia and is a spring migrant to Australia where it is found in all states. Within Australia, has a primarily coastal distribution, with very few inland records. Its preferred habitat is coastal lakes, inlets, bays and estuaries where it occupies intertidal mudflats, particularly exposed seagrass beds (Geering et al. 2008, Menkhorst et al. 2017, DCCEEW 2023d). Critical habitat includes areas for breeding (which are outside of Australia), foraging, roosting or dispersal. Important habitat in Australia includes those areas listed in the national Directory of Important Migratory Shorebird Habitat (Weller et al. 2020; DCCEEW 2023d). In South Australia areas listed as important habitat in the Shorebird Directory include the Coorong and associated lakes, Gulf St. Vincent (Weller et al. 2020). These important habitat areas are not in the Project Areas. No suitable seagrass habitat in the Project Areas. No BDBSA records within 40 km the closest record is from Yatala Harbour in the USG. Hence this species is considered not to occur in the Project Area.	Does not occur
Grey Falcon (*Falco hypoleucos*)	VU	R	The PMST outputs (Appendix A) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both Project Areas). An elusive species occurring across almost all of Australia, but noted in arid and semi-arid Australia including the Murray-Darling Basin, Eyre Basin, central Australia and WA (Marchant and Higgins, 1993). Preferred habitat includes timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined watercourses, where they like to forage and breed (Garnett and Baker 2021). The species is considered a single monotypic population across Australia with no specific important populations identified (TSSC 2020). The species may forage widely, generally across open plains, if present, and feeds exclusively on other birds such as finches, doves, pigeons and parrots to the size of a Galah (Menkhorst et al. 2017, Garnet and Baker 2021).	Possible (foraging only)

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			Critical habitat and important populations are not defined in the species' conservation advice, given the species occurs at such low densities (TSSC 2020). The area of occupancy is estimated at 1,690,000 km^2 (169,000,000 ha) within an extent of occurrence of 2,500,000 km^2 (250,000,000 ha) (Garnet and Baker 2021). There are no BDBSA records, but one Birdlife record of the species within the Study Area (BDBSA 2024). The species was recorded in 2000 near a Cane-grass Swamp on Borefield Road, over 51 km from the SRE Project Area. There is a single Birds SA record on NatureMaps on the eastern fringes of Port Augusta from 2001 around 13 km to the south-east of the southern-most EIGR Areas (DEW 2024). There are no suitable timbered plains or tree-lined watercourses in the Project Area for breeding and foraging. The Project Area contains sparse dune and swales which may be suitable for foraging only. Based on the above, whilst there are limited records, this rarely encountered species is considered possible (foraging only).	
Latham's Snipe, Japanese Snipe (*Gallinago hardwickii*)	VU, MW		The PMST outputs (Appendix A) suggested that this species or species habitat 'may occur' within the 'feature area' (both Project Areas). This shorebird species breed in Hokkaido and highland areas of Honshu in Japan and islands east of Russia. When not breeding, the species visit south-eastern Australia and is a passage migrant through northern Australia. The species has been recorded along the east coast of Australia from Cape York Peninsula through to south-eastern SA, including the Adelaide plains, Mount Lofty Ranges, and the Eyre Peninsula (DCCEEW 2024c). The omnivorous species feeds of reed and grass seeds and invertebrates in soft mudflats or shallow water typically a night, early morning or evening. The species roost in small wetlands including urban water bodies, saltmarshes, creek edges, crops and pastures (DCCEEW 2024c). Critical habitats for the species include freshwater wetlands with low dense vegetation. They may also occur in saline or brackish water or grasslands, but in proximity to surface water (DCCEEW 2024c). Important habitats include those listed as internationally important or areas that support at least 18 individuals of the species (DCCEEW 2024c). There are two Birdlife records of the species within the Study Area (BDBSA 2024). These records are from Olympic Dam village and Roxby sewage treatment dams. There are no records of the species in the BHP Bird Database (BHP 2024a). There are no suitable vegetated aquatic habitats that would support the food resources required for this species. The shallow ephemeral non-vegetated clay pan areas in the Project Area would not support the species and there are no ephemeral wetlands identified within the EIGR Areas (Survey One and Two this study). Given the lack of suitable vegetated aquatic habitat or records, this species is considered unlikely.	Unlikely
Malleefowl (*Leipoa ocellata*)	VU	V	The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat is 'likely to occur' in the feature area. This species is a large ground-dwelling bird found mostly in mallee-dominated shrublands and low woodlands in the southern half of Australia. Within South Australia, the majority of records of the species are from the Eyre Peninsula and Murray Darling Basin region. Critical habitat needs include a sandy substrate and an abundance of leaf litter within which incubator style nests are built (DCCEEW 2024f). Densities of birds are greatest in areas of higher rainfall and on more fertile soils where shrub diversity is greatest (DCCEEW 2024f). No specific important populations have been defined for the species, however, all populations and areas occupied by Malleefowl are considered of equal importance (DCCEEW 2024f). Records of the species occurrence are typically associated with the mid Eyre Peninsula across to the Nullarbor Plain, with limited records of the species on the lower portion of the Eyre Peninsula and a notable absence of records from the upper north-west Eyre Peninsula, with the exception of 3 recent (2019) records of the species occurring near Point Lowly Road north of Whyalla (possibly the same individual) and an uncertain record within the Whyalla township from 1999 (DEW 2024). As there are no areas of mallee within the Project Area, including all EIGR Areas feature areas, it is considered that the species does not occur in the Project Area.	Does not occur
Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit (*Limosa lapponica baueri*)	EN		The PMST output (Appendix A2) suggested that this species or species habitat 'may occur' within the EIGR Areas feature area. Recent listing status change from Vulnerable to Endangered (Jan 5 2024). Three subspecies occur in Australia; the other two being are *L. l. anadyrensis* and *L l. menzbieri* (DCCEEW 2024h). All of these large migratory shorebirds do not breed in Australia, but rather Siberia and Alaska (DCEEW 2024g). When in Australia, the sub-species mainly occurs along the north and east coasts, in SA it mainly occurs form the coast near Lake Alexandrina (Coorong) to Denial Bay (past Ceduna) (DCCEEW 2024g), distant from the Project Area. They prefer edges of water or water with shallow tidal estuaries, as well as intertidal sandflats and beaches (Geering et al. 2008, DCCEEW 2024g). As there is no wetland or coastal habitat which is preferred by this species within any of the EIGR Areas, it is considered that the species does not occur in the Project Area	Does not occur
Painted Honeyeater (*Grantiella picta*)	VU		The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the feature area. The Painted Honeyeater is nomadic and sparsely distributed from south-eastern Australia to north-western Queensland and eastern Northern Territory and may be a vagrant to South Australia (DotE 2015a). The species occurs in dry open forests and woodlands which contain a high number of mature trees (prefers *Acacia* woodland/*Allocasuarina* woodland) and is strongly associated with the presence of mistletoe. The species may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. Individuals of the species are rare throughout its range (Menkhorst et al. 2017). Key habitats include Boree/Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. Within South Australia, records for the species occurring are extremely sparse, typically associated near several heritage agreements north of Waikerie (DEW 2024). There are no records of the species occurring in proximity to the SML are or the EIGR Areas (DEW 2024). Therefore, this species is considered unlikely to occur within the Project Area.	Unlikely
Plains-wanderer (*Pedionomus torquatus*)	CE	E	The PMST outputs (Appendix A) suggested that this species or species habitat 'may occur' within the 'feature area' (both Project Areas). Plains-wanderer are distributed across north-central VIC, southern NSW, west-central QLD and across eastern SA. The species formerly was found in the south-east of SA, however, is considered to potentially be extinct from these areas (DotE 2015b). The species has core sites within NSW and Victoria but is known to inhabit QLD and SA where more marginal habitat exists (DotE 2015b). The species is rare and elusive, and typically occurs in sparse, treeless and lowland native grasslands with a strong preference to areas that have approximately 50% bare	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
			patches, with most vegetation less than 5 cm in height and widely spaced plants up to 30 cm (DotE 2015b). They inhabit sparse low grasslands where 50% of the bare ground supports cryptogramic crust and cannot persist in an agricultural landscape with introduced grasses and pesticide use (Garnet and Baker 2021). Records for the species within SA are typically sparse. There are no BDBSA or Birdlife records within the Study Area (BDBSA 2024). The closest records (historical) for the species occur near Bon Bon Homestead within the Woomera Prohibited Area approximately 130 km west from the Action (DEW 2024). There is no suitable grassland habitat within the SML Area, or within the EIGR Areas (Survey One and Two, this study). Based on the above, this species is considered unlikely in the Project Area.	
Princess Parrot, Alexandra's Parrot (*Polytelis alexandrae*)	VU	V	The SML PMST output (Appendix A1) suggested that this species or species habitat 'may occur' within the 'buffer area only'. This species irregularly occurs across the arid zone from Oodnadatta (SA) to Coolgardie (WA), with core distribution in the Great Sandy Desert (Menkhorst et al. 2017). The species will spread into non-core areas following good rains, the Project Area is however well outside the species core and occasion ranges (Menkhorst et al. 2017). Princess Parrots are usually recorded from shrubland in swales between sand dunes, with occupied sites typically having a variety of shrubs (including *Grevillea, Hakea, Cassia* and *Eremophila* species) among scattered emergent trees, with ground-cover of spinifex (*Triodia*) species (TSSC 2018). The y also occur in stands of Mulga and Sheoak (Menkhorst et al. 2017). There are no critical habitats listed for the species in the conservation advice (TSSC 2018). The AOO of the species is 10,000 km^2 (1,000,000 ha) (Garnet and Baker 2021). There are no BDBSA or Birdlife records of the species within the Study Area (BDBSA 2024). The nearest records in SA are over 700 km northwest of the Project Area in Mamungari CP (DEW 2024). Whilst the sparsely covered sand dune and swale vegetation in the Project Area may provide transient habitat for the species, key species such as Spinifex are not present (Survey One and Two, this study). Given the lack of core habitat, distance from known clusters of records (over 700km away) and lack of records within the Study Area, this species is considered unlikely.	Unlikely
Red Knot (*Calidiris canutus*)	VU		The EIGR Areas PMST output (Appendix A2) suggested that this species or species habitat is known to occur within the feature Area. A migratory wader that is found across all coastal areas of Australia, but more commonly in the northern and eastern parts of Australia (DCCEEW 2024d). This species does not breed in Australia. Preferred habitat is intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours, and sometimes terrestrial saline wetlands near the coast (Higgins and Davies 1996). They rarely use inland lakes or swamps (Higgins and Davies 1996). There are limited recent and reliable records of the species occurring within South Australia (DEW 2024). The closest records of the species occurring to the Project Area include 2 records (2022, 2023) from Point Lowly north-east of Whyalla, which is over 60 km from the southern-most of the EIGR Areas. As there are no recent records of the species occurring near the Project Area, and it is considered there is no suitable habitat within the Project Area, this species is therefore considered to unlikely to occur within the Project Area.	Unlikely
Sharp-tailed Sandpiper (*Calidris acuminata*)	VU, MW	-	The PMST output (Appendix A)suggested that this species or species habitat is 'known to occur' within the 'feature area' (both Project Areas). This species maintains the migratory wetlands EPBC listing but has also been newly listed as a threatened under the EPBC Act (5 January 2024). BOTH The Sharp-tailed Sandpiper breeds in Siberia and migrates to New Guinea and Australia during the summer months (Geering et al. 2008, DCCEEW 2024e). During the non-breeding season, the Sharp-tailed Sandpiper migrates south to Australia where it occurs within all states, preferencing the south-east of the country in both inland and coastal localities, including freshwater and saline habitats (DCCEEW 2024e), but it prefers non-tidal fresh or brackish wetlands, damp grasslands, and will also utilise farms dams, wastewater irrigation areas, tidal flats, and beaches (Geering et al. 2008, Menkhorst et al. 2017, DCCEEW 2024e). The species is considered widespread across the eastern half of SA, and may be found as far north as Lake Eyre, extending to areas on the eastern margin of the Nullarbor Plain (Higgins and Davies 1996). Critical habitat includes areas for breeding (outside of Australia), foraging, roosting or dispersal. The highest density of this species generally occurs around grassy edges of shallow inland freshwater wetlands, as well as sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches (BirdLife Australia 2021). Important habitat includes those listed in the National Directory of Important Migratory Shorebird Habitat (DCCEEW 2024e). A site is considered a nationally important site if >85 individuals regularly occur (DCCEEW 2024e). No important populations have been identified in the Study Area or Project Area. There are 20 BDBSA records (1991-2020) and 9 Birdlife records (1998-2013) of the species within the Study Area (BDBSA 2024). The majority of records are from Lakes Coorlay, Purple Downs, Campbell, Mary and Shell Lagoon, which are all south of Roxby Downs over 25 km from the Project Area. Some of the records are also from Lake Torrens, Roxby Downs sewage treatment pond and two of the records are south of Olympic Dam Village (1998-1999). Several scattered records exist between Olympic Dam and Port Augusta, within broad proximity to the EIGR Areas, but all are from within inland ephemeral lakes which are not present within the Project Area associated with the EIGR Areas. There are no records in the BHP birds database (to 2014) (BHP 2024a). There are however historical records in the SML (e.g. mortality in the Tailing Retention System (TRS) (BHP 2009). The SRE Project Area does not include inland freshwater wetland habitats. Whilst several small unvegetated claypans temporarily hold water for short periods, these are unlikely to support resources that would attract the species and the species has not been recorded within the SRE Project Area do date. These small clay pans also occur extensively across the region and the species is more likely to be attracted to more permanent water sources in the region when present (e.g. inland lakes, artificial dams, Roxby sewage treatment area). Based on the above, whilst there are some records, given the lack of habitat in the Project Area, this species is considered unlikely.	Unlikely
South-eastern Hooded Robin (*Melanodryas cucullata cucullata*)	EN		The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the feature area. The South-eastern Hooded Robin prefer dry Eucalypt and Acacia woodland and shrublands with open understorey, patches of grassy areas and a complex ground layer for foraging (DCCEEW 2023e). Historic records of the subspecies within South Australia are restricted to the Yorke Peninsula, Mount Lofty Ranges and Fleurieu Peninsula region, the Murraylands and the South East region. There are no records for the threatened subspecies on the Eyre Peninsula or arid northern and central portions of SA in proximity to any of the Project Area. There are only records for the common Hooded Robin subspecies (*Melanodryas cucullata westralensis*) (DEW 2024, Menkhorst et al. 2023). As such, the species is considered unlikely to occur in the Project Area.	Unlikely
Southern Whiteface	VU	-	The PMST outputs (Appendix A) suggested that this species or species habitat is 'known to occur' within the feature area (both Project Areas).	Known

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
(*Aphelocephala leucopsis*)			Southern Whiteface was recently listed under the EPBC Act with conservation advice issued on 31 March 2023. It is distributed across most of mainland Australia south of the tropics (Schodde and Mason, 1999; DCCEEW, 2023c). The species occupies a wide range of open woodlands and shrublands which support an understorey of grasses and/or shrubs, often dominated by Acacias or Eucalypts on ranges, foothills and lowlands, and plains (Higgins and Peter, 2002; DCCEEW 2023c). They forage at ground level preferring areas with low tree densities and patchy litter cover between understorey, feeding on invertebrates and seeds (Higgins and Peter, 2002). The species is considered to be sedentary, occurring in small family groups up to flocks of 20 and often with thornbills (readers Digest 1977, Menkhorst et al. 2017). There are two subspecies; South-west Southern Whiteface (*A. l. castaneiventris*), occurs in central and southern Western Australia and South-east (*A. l. leucopsis*), occurs in eastern WA to southern NT, southern Queensland all of SA and NSW, and northern Victoria (Menkhorst et al. 2017, Garnet and Baker 2021 DCCEEW 2023c). The latter subspecies is considered to have the larger more stable estimated population of the two; 400,000 individuals. The entire species AOO is 7,000,000 ha across an EOO of 419,000,000 ha (DCCEEW 2023c). The AOO estimate for the South-east subspecies is 6,000,000 ha within an EOO of 380,000,000 ha (Garnet and Baker 2021). From a bioregional perspective the Gawler IBRA Bioregion AOO is 375,600 ha (within an EOO of 15,085,800 ha), the Roxby IBRA subregion AOO is 49,200 ha (within an EOO of 1,445,100 ha), Arcoona Plateau AOO is 20,000 ha (within EOO of 1,671,600 ha and Gawler Lakes AOO is 56,000 ha (within an EOO of 2,965,100 ha) (as calculated within ALA spatial portal using IBRA shapefile import, 0.02 degree grid, ALA 2024). No important populations are defined in the Conservation Advice for the species, and the species has no conservation listing in SA. Habitat deemed critical for the survival of the species is defined as areas of relatively undisturbed open woodland and shrublands with an understorey of grasses of shrubs, habitat with low tree densities and an herbaceous understorey with litter cover which provides essential foraging habitat, and living and dead trees with hollows and crevices which are essential for roosting and nesting (DCCEEW 2023c). There are 23 BDBSA records (1990-2017) and 164 Birdlife records (1982-2015) of the species within 50 km of the Project Area (BDBSA 2024). There are also 232 records within the BHP Birds Database, including from 6 regular monitoring sites in/adjacent the SRE Project Area (EV386, EV394, EV398, EV404, EV409, EV41 (BHP 2024a). In addition, the species was detected during targeted surveys of the Project Area in July 2024 (4 sites, 3 pairs and one individual (sites LEVC11 in the WIA, and EV393, EV409, EV394 in the SRE) (Survey One and Two, this study). Based on the above, this species is considered known in the SRE Project Area.	
Thick-billed Grasswren (*Amytornis modestus*)	VU	V	The PMST outputs (Appendix A) suggested that this species or species habitat is 'known to occur' within the 'feature area' (both Project Areas). Thick-billed Grasswren occurs within four discrete populations within SA in the arid and semi-arid zones (Black et al. 2011), TSSC 2016b). One of the populations extends from the far north of SA down to the northern portions of the western margins of Lake Torrens, potentially to within proximity of the Action. The relevant subpopulation to the Project Area is known as Thick-billed Grasswren (north-west) (*Amytornis modestus indulkanna*) (Black et al. 2011, SA Museum 2021). If the species is present, it may be considered to be part of this important population of the species. *A. m indulkanna* prefers Oodnadatta Saltbush (a dwarf form of Old-man Saltbush, (*Atriplex nummularia*) or Cotton-bush (*Marieana aphylla*) north-west and west of Lake Eyre and Lake Torrens. Known landforms utilised by the subspecies include Oodnadatta Saltbush low shrubland on gibber, and atypical habitat includes low dunes near Lake Eyre South in Sandhill Cane-grass (*Zygochloa paradoxa*) (Black and Gower 2017). Black et al. (2011) also suggest that the "North West population" (*A. m. indulkanna*) occur in low shrublands dominated by chenopods, all heights of Oodnadatta Saltbush and less commonly in Cotton-bush or Black Bluebush (*Maireana pyramidata*) low shrubland. Other habitats where the "North West subspecies" were rarely detected included those dominant with Old Man Saltbush (*Atriplex nummularia* ssp. *spathulata*), Nitre Goosefoot (*Chenopodium nitrariaceum*), Nitrebush (*Nitraria billarderii*), Low Bluebush (*Maireana asterotricha*), Pearl Bluebush (*M. sedifolia*), and Spiny Saltbush (*Rhagodia spinescens*) (Black et al. 2011). Denser patches of shrub are often associated with flood out areas, run-on zones, and watercourses (DCCEEW 2024a, TSSC 2016b). Moseby (2012b) also suggests that deeper gilgais within stony tablelands country and run on areas supporting dense Swamp Cane-grass (*Eragrostis australasica*) and Cotton-bush low-lying areas and swales with gilgais and cracking clays provide suitable habitat for Thick-billed Grasswren. There are five BDBSA records (1996-2014) and four Birdlife records (2004-2006) of the species within the Study Area (BDBSA 2024). Three additional BDBSA records are errors from NVC RAM data export (DEW pers. com.). There are no records for the species in the BHP birds database (BHP 2024a). The nearest two BDBSA/Birdlife records are ~18-20 km northwest of the Project Area within and adjacent the eastern and northern boundary of the Arid Recovery Reserve from 2006/2014 and further northeast (27 km from 2008) (BDBSA 2024). There are also two bird life records over 36 km east near Lake Torrens (2004, 2006) (BDBSA 2024). Limited suitable habitat is present in the Project Area. No Oodnadatta Saltbush was present and a small patch of Cotton-bush was only present around a very small artificial low lying area in close proximity to the existing mine site. Whilst very low chenopod shrublands are present on swales within the Project area, the density and cover is very sparse and considered unsuitable for Thick-billed Grasswren. The species was not detected during recent vegetation assessments and bird surveys across the Project Area, and the EIGR Areas are considered to be south of the species' distribution (Survey One and Two, this study). Based on the above, this species is considered unlikely in the Project Area.	Unlikely
Western Graswren (*Amytornis modestus*)	VU	V	The EIGR Areas PMST output (Appendix A2) suggests this species or species habitat 'may occur' in the feature area. The Western Grasswren (*Amytornis textilis myall*) is scattered and widespread in the Myall Creek and Pine Creek drainages of the north-eastern Eyre Peninsula, bounded in the south by Munyaroo Conservation Park, and in the north towards Lake MacFarlane and eastern Lake Gairdner and Lake Gilles Conservation Park (Garnett and Baker 2021). The species prefers low dense chenopod shrublands, mainly comprising Black Bluebush (*Maireana pyramidata*) and Australian Boxthorn (*Lycium australe*) and spiny shrubs, however, it also prefers semi-arid low open woodlands, mostly comprising Western Myall (*Acacia papyrocarpa*) and Senna shrublands (Black et al., 2009, Menkhorst et al. 2017). Preferred habitats are in drainage lines as well as low rocky hills (DotE 2014). Core habitats are known to occur in the Whyalla to Iron Knob corridor (Garnett and Baker 2021). The species' conservation advice suggests all populations of the species are considered to have high conservation value and that the species occurs in severely fragmented isolated subpopulations at 10 locations (DotE 2014). More recently the Action Plan for Australian Birds and International Union for Conservation of Nature (IUCN) assessment data suggests there is one subpopulation of approximately 12,000 individuals and this subpopulation is not severely fragmented (Garnett and Baker 2021). This population is known to extend west to northwest of Whyalla for approximately 170 km. The species does not extend as far north as Port Augusta, as evidenced by historic records, and as the southern-most EIGR Areas is north of Port Augusta, the species is considered unlikely to occur in the Project Area.	Unlikely

Species	EPBC Act[2]	NPW Act[3]	Justification	Likelihood
Migratory species (not considered threatened species above)				
Migratory wetland (functional group – waders)				
Common Sandpiper (*Actitis hypoleucos*) (PMST suggests likely/known)	MW	R	The PMST outputs (Appendix A) suggested that these species or species habitat is 'likely to occur', is 'known to occur' or 'may occur' within the 'feature area'. These species all migrate from the northern hemisphere, and are non-breeding visitors to Australia (Geering et al. 2008; DCCEEW 2024a). Habitats preferences vary from predominantly coastal or near-coastal (Pectoral Sandpiper) to shallow water generalists that range between coastal and inland wetted environments (Common Sandpiper, Oriental Plover) (Geering et al. 2008). There are only records for the Common Sandpiper within the Study Area, predominantly Birdlife records from nearby dams (e.g. OD Village, Roxby sewage treatment dam and farm dam 15 km southeast of Project Area). There are no records in the Project Area in the BHP Birds Database (BHP 2024a). Suitable habitat for these wading species in the Project Area only includes several highly ephemeral non-vegetated clay pans when water is present. These clay pans are unlikely to support suitable food resources for migratory waders. There are no Cane-grass swamps or watercourse and the clay pans, would only hold water for short durations of time. There are no ephemeral water bodies located within any of the EIGR Area (Survey One and Two, this study). Hence suitable habitat for these migratory waders is very limited, extremely localised, and temporary, and these species are considered as only possible occurrences in the SRE Project Area and unlikely in the Project Area.	Unlikely
Pectoral Sandpiper (*Calidris melanotos*) (PMST suggests known/may)	MW	R		
Oriental Plover, Oriental Dotterel (*Charadrius veredus*) (PMST suggests may occur)	MW	-		
Migratory wetland				
Osprey (*Pandion haliaetus*)	MW	-	The SML PMST output (Appendix A1) suggested that this species or species habitat 'known to occur' within the 'Buffer Area only'. Large coastal fish-eating raptor. Species distribution includes all coastal areas of Australia, also occurs around the world. Nests on coastal cliffs in SA, but also known to use artificial substrates, transmission line towers, utility poles, boat masts in marinas (Menkhorst et al. 2017, ALA 2024). Key known breeding areas are largely coastal (cliffs), and in South Australia the species extends from the head of the Bight to Cape Spencer and Kangaroo Island (DCCEEW 2024a) and occurs in small and fragmented locations (Dennis 2007). Records for this species more commonly occur on the west coast and southern portion of EP, over 230 km south-west of the SML Area, and south of the southern-most EIGR Areas (DEW 2024). Critical aquatic habitat does not occur in the Study Area or Project Area. Core populations and breeding areas occur well outside the Study Area, Project Area. No BDBSA or Birdlife records within the SML Study Area (BDBSA 2024). with only a single recent record located over 4 km to the west of Port Augusta, approximately 11.5 km to the south of the southern-most EIGR Areas (BDBSA 2024). No known nests have been detected in the Project Area to date. No suitable aquatic habitat supporting fish as a food resource in the Project Area (Survey One and Two this study). Based on the above, this species is considered unlikely in the Project Area.	Unlikely
Migratory terrestrial (functional group)				
Grey Wagtail (*Motacilla cinerea*)	MT	-	The PMST outputs (Appendix A1 and Appendix A2) suggested that these species or species habitat 'may occur' within the 'feature area' (both Project Areas). The Grey and Yellow Wagtails are terrestrial migratory species, both rarely seen, occasional visitors to Australia in their non-breeding seasons (DCCEEW, 2024d). The Grey Wagtail prefers higher altitudes, near fast-running water, rocky substrates, lakes and marshes (DotE 2015c). The Yellow Wagtail prefers lower altitude, well-watered open grassland, fringes and wetlands, and may roost in Mangroves and other dense vegetation (DotE 2015c). There are no records for either species within the SRE Study Area (BDBSA 2024) or the EIGR Area (DEW 2024). There is no suitable habitat for either species in the Project Areas. Both species are considered unlikely to occur in both Project Areas.	Unlikely
Yellow Wagtail (*Motacilla flava*)	MT	-		
Migratory marine				
Fork-tailed Swift/Pacific Swift (*Apus pacificus*)	MM	R	The PMST output (Appendix A1 and Appendix A2) suggested that this species or species habitat 'is likely to occur' within the 'feature area' (both Project Areas). The Fork-tailed Swift is a non-breeding visitor to Australia and is almost exclusively an aerial species. In SA the species is widespread from the VIC border west to Spencer Gulf, and also across southern Eyre Peninsula and extending north to Flinders Ranges, the Lake Eyre drainage basin, Lake Eyre south and Marree (DCCEEW 2024e). They occur aerially, over mostly dry inland plains, as well as foothills, coastal areas, cliffs and beaches, and populated areas. In SA the species is present from October–May but is most common from December–March (DCCEEW 2024a, Menkhorst et al. 2017). It does not breed in Australia. There are no BDBSA records for the species within the SRE Study Area (BDBSA 2024). There are three Birdlife records (1986, 1999, 2001) for the species within the SRE Study Area (at the OD Airport and the Roxby Downs Sewage Treatment works) (BDBSA 2024). Species was recorded flying over Whyalla in December 2023 (G. Smith pers. comm). There is no suitable habitat in the Project Area (Survey One and Two, this study). If present the species would only occur as a flyover species. Based on the above this species is considered possible as flyover species.	Possible (flyover species)

[1] EPBC Act Status: Critically Endangered (CE), Endangered (EN), Vulnerable (VU), Migratory Marine (MM), Migratory Terrestrial (MT), Migratory Wetland (MW), Conservation Dependent (CD);

[1] *National Parks and Wildlife Act 1972* (SA) Status: Endangered (E), Rare (R), Vulnerable (V).

7.2 State-listed species or habitat

A search of the BDBSA identified 10 NPW Act-listed flora species and 24 NPW Act-listed fauna that may occur within 50 km of the SML Area and 5 km of the EIGR Areas. Of those, four NPW Act listed flora species and seven NPW Act-listed fauna species are considered likely or possible to occur within the SRE Project Area. Details of the likelihood of occurrence are included within Table 7.2. The likelihood of occurrence assessment was informed by vegetation assessments undertaken in July 2024 (SML Area) and October 2024 (EIGR Areas) to characterise the vegetation associations of the SRE Project Area (refer to Section 5).

NPW Act-listed flora species, additional to those that also have an EPBC Act rating, that are considered likely to occur or which may possibly occur within the SRE Project Area are:

- *Frankenia cupularis* (rare, possible to occur)
- *Gratwickia monochaeta* (rare, possible to occur)
- *Santalum spicatum* (vulnerable, likely to occur)
- *Swainsona oligophylla* (rare, possible to occur).

NPW Act-listed fauna species, additional to those that also have an EPBC Act rating, that are considered likely to occur or which may possibly occur within the SRE Project Area are:

- Australian Bustard (*Ardeotis australis*) (vulnerable, possible to occur)
- Black Falcon (*Falco subniger*) (rare, likely to occur)
- Flock Bronzewing (*Phaps histrionica*) (rare, likely to occur)
- Little Eagle (*Hieraaetus morphnoides*) (vulnerable, likely to occur)
- Major Mitchell's Cockatoo (*Lophochroa leadbeateri*) (rare, possible to occur)
- Peregrine Falcon (*Falco peregrinus macropus*) (rare, likely to occur)
- Scarlet-chested Parrot (*Neophema splendida*) (rare, possible to occur).

Impacts to state-listed fauna and flora are considered as part of the vegetation assessment (RAM) and ultimately within offset calculations for impacted areas as per the SEB offset guide and policy (NVC 2024b, 2024c, 2024d).

Table 7.3: Records for NPW Act threatened flora and fauna (from 1995, excluding species already listed under EPBC Act)

Species	EPBC Act[4]	NPW Act[5]	Justification	Likelihood
Threatened Flora				
Abutilon oxycarpum ssp. *Prostrate* (A.A.Mitchell PRP 1266)	-	R	Most recent record 2007. Only 3 records in whole of SA (DEW 2024). Recorded in clay flats between sand dunes. Very distant from Project Area and no records near Project Areas to date.	Unlikely
Acacia pendula (Weeping Myall)	-	V	One record in Study Area from 2023, in Roxby Village.	Unlikely
Atriplex kochiana (Koch's Saltbush)	-	V	Many records. Most recent record 2008. Clusters known from near Lake Torrens and Oodnadatta. No records near Project Area (BDBSA 2024, DEW 2024)	Unlikely
Atriplex morrisii	-	V	One record from 2015. No other records in Study Area (which includes EIGR Areas) (DEW 2024)	Unlikely
Cyperus dactylotes	-	V	One record from 2004. No other records in Study Area (which includes EIGR Areas) (DEW 2024). No suitable aquatic habitat in Project Area	Unlikely
Frankenia cupularis	-	R	One record from 2012 (plants located inside and outside ARR). No other records in Study Area (which includes EIGR Areas).	Possible
Gratwickia monochaeta	-	R	Three records from 1996 near Stonewall Dam. Occurs in sandy swales (BDBSA 2024). Records near Stuart Highway between Pernatty Lagoon and Port Augusta (DEW 2024). Suitable habitat present.	Possible
Orobanche cernua var. *australiana*	-	R	One record from 2004 from White Dam near Andamooka closer to Lake Torrens (BDBSA 2024). One record between Island Lagoon and Stuart Highway.	Unlikely
Santalum spicatum	-	V	Three records from 2024 (BDBSA 2024). One record within the SML or edge of SML Area Few records near EIGR Areas. Not detected in SRE Project Area to date.	Likely
Swainsona oligophylla	-	R	One record from 2007 (BDBSA 2024) north of SRE Project Area in SML where it is locally common. Occurs on red sand, clay pans and plains. Can be dormant, flowers between August and October.	Possible
Threatened birds				
Australasian Darter (*Anhinga novaehollandiae novaehollandiae*)	-	R	3 birdlife records (1998-2000) from OD Village and Roxby WWTP. Also, 5 BDBSA records (1991-1993 from Lake Coorlay), No suitable aquatic habitat in the Project Area	Unlikely
Australasian Shoveler (*Spatula rhynchotis*)	-	R	5 Birdlife records (1999-2002). No suitable aquatic habitat in the Project Area	Unlikely
Australian Bustard (*Ardeotis australis*)	-	V	One Birdlife record (1998) from Olympic Dam Village, may have spatial uncertainty.	Possible
Banded Stilt (*Cladorhynchus leucocephalus*)	-	V	10 BDBSA records (1998-2001, BDBSA 2024). Has been recorded at the Olympic Dam and Roxby WWTPs, and a small dam immediately east of the SML Area (Survey One, this study/Lathwida 2024b, BDBSA 2024). However, given there is no beach/wader habitat in the SRE Project Area species is only an occasional visitor to the nearby areas. No suitable aquatic habitat in the Project Area	Unlikely
Black Falcon (*Falco subniger*)	-	R	3 Birdlife records near SML, within range (1998-2015) (BDBSA 2024).	Likely
Blue-billed Duck (*Oxyura australis*)	-	R	Records in Olympic Dam WWTP and Roxby WWTP (BDBSA 2024) Also ~20 detected in Roxby WWTP during CNPI survey, August 2024) However, no suitable deep water aquatic habitat in the Project Area.	Unlikely
Bluebonnet (Eastern and Naretha) (*Northiella haematogaster (NC) SA:* ssp.)	-	Ssp.	Listing is for Western ssp. *Northiella narethae*. Project Area not within species range.	NA
Common Sandpiper (*Actitis hypoleucos*)	-	R	9 Birdlife records (1998-2000). No suitable aquatic shorebird habitat in the Project Area	Unlikely
Flock Bronzewing (*Phaps histrionica*)	-	R	23 Records in Study Area (2013), one records in SML (tailings ponds (BDBSA 2024). The majority of records for the species are around Roxby and north to northeast SA (DEW 2024).	Likely
Freckled Duck (*Stictonetta naevosa*)	-	V	3 Birdlife records in Study Area from lakes (2002-2009). No records in SML or Project Area. No suitable aquatic habitat in the Project Area.	Unlikely
Glossy Ibis (*Plegadis falcinellus*)	-	R	3 Birdlife record in Study Area from lakes (1999-2009). No records in SML or Project Area. No suitable aquatic habitat in the Project Area.	Unlikely
Great Crested Grebe (*Podiceps cristatus australis*)	-	R	3 Birdlife record in Study Area from lakes (1999-2007). No records in SML or Project Area. No suitable aquatic habitat in the Project Area.	Unlikely
Grey Currawong (*Strepera versicolor*)	-	Ssp. (E)	The rating is for Pied Currawong (south east subspecies, *Strepera graculina ashbyi*) and Grey Currawong (far western subspecies, *Strepera versicolor plumbea*). Record (which is distant from the Project Area) is for a common subspecies likely *S. v. melanoptera*.	NA
Hooded Robin (*Melanodryas cucullata*)	-	Ssp. (R)	The rating is for southeastern *Melanodryas cucullata cucullata*. At this location the record is likely for common western subspecies *M. c. westralensis*	NA
Jacky Winter (*Microeca fascinans*)	-	Ssp. (R)	The rating is for eastern subspecies *Microeca fascinans fascinans*. At this location the record is likely common subspecies *M. f. assimilis*.	NA

[4] EPBC Act Status: Critically Endangered (CE); Endangered (EN); Vulnerable (VU); Migratory Marine (MM); Migratory Terrestrial (MT); Migratory Wetland (MW).
[5] *National Parks and Wildlife Act 1972* (SA) Status: Endangered (E); Rare (R); Vulnerable (V).

Species	EPBC Act[4]	NPW Act[5]	Justification	Likelihood
Little Eagle (*Hieraaetus morphnoides*)	-	V	10 Birdlife records (1998-2001). Solitary raptor, occurs across Australia. Record in the Study Area are from Lake Mary (BDBSA 2024). Likely foraging over study area (for birds and rabbits). Widespread records across SA (DEW 2024).	Likely
Little Egret (*Egretta garzetta nigripes*)	-	R	One Birdlife record in Study Area (from 2001, BDBSA 2024). Prefers fresh or saltwater wetlands, which are not in the Project Area.	Unlikely
Major Mitchell's Cockatoo (*Lophochroa leadbeateri*)	-	R	One record in the SML Study Area (1999), records across the EP. Could occur in EIGR Areas where there are trees. The common subspecies does not have an EPBC rating.	Possible
Musk Duck (*Biziura lobata menziesi*)	-	R	Over 30 Records in Study Area from lakes or nearby WWTPs (BDBDA 2024). No records in SML or Project Area. No suitable aquatic habitat in the Project Area.	Unlikely
Olive-backed Oriole (*Oriolus sagittatus sagittatus*)	-	R	One BDBSA record in the Study Area (2012). Captured in mist net in ARR. Outside of species known range. Prefers mallee and eucalypt forest. No suitable habitat in Project Area.	Unlikely
Peregrine Falcon (*Falco peregrinus macropus*)	-	R	3 Birdlife records in the Study Area (1998-2002). Wide-ranging species. Forages on birds, mammals and reptiles.	Likely
Scarlet-chested Parrot (*Neophema splendida*)	-	R	2 Birdlife records in the Study Area (2001). Prefers eucalypt/sheoak woodland with Mulga, spinifex and saltbush. SRE Project Area is within species occasional range. May occur in denser areas where taller associated shrubs are present.	Possible
Spotless Crake (*Zapornia tabuensis*)	-	R	2 Birdlife records (1998, 2000) (BDBSA 2024). From Olympic Dam Village. Waterbird, forages in shallows around lakes, swamps, saltmarshes and mangroves. Record likely from WWTP> No suitable aquatic habitat in Project Area.	Unlikely
Wood Sandpiper (*Tringa glareola*)	-	R	5 Records in Study Area from lakes or nearby WWTPs (2000-2009). No records in SML or Project Area. No suitable aquatic habitat in the Project Area.	Unlikely

1 EPBC Act status: Critically Endangered (CE); Endangered (EN), Vulnerable (VU); Migratory Marine (MM); Migratory Terrestrial (MT); Migratory Wetland (MW).

2 NPW Act status: Endangered (E); Rare (R); Vulnerable (V).

Only includes records post 1995 and with spatial reliability < 1km as per RAM requirements (NVC 2024b), unless otherwise mentioned.

8 Conclusion

The baseline ecological environment of the SRE Project Area is characterised by typical vegetation communities for the arid zone region. The SML Area includes sand dunes with Umbrella Bush, Bullock Bush and or White Cypress-pine and swales of chenopod shrubland with tall shrubs including Mulga. The condition of the vegetation varies from degraded to medium/high quality, with few weeds, but impacts from rabbits are evident and there are areas with dead stands of Mulga and reduced recruitment of the taller shrubs, particularly the native pines. The Project Area is also immediately adjacent the existing Olympic Dam mine and includes areas of existing disturbance (e.g. tracks, pilot plant, transmission line). Outside of the SML, the EIGR Areas are comprised of low chenopod shrubland on stony gibber plains, clay plains or low sand dunes with mixed Acacia tall shrublands. These areas are in moderate condition occurring beneath an existing transmission line with existing access tracks (refer Section 5).

The SRE Project Area does not include any areas with deep cracking clays which would provide the important potential critical refuge habitat for Plains Mouse, and there are no permanent aquatic habitats which would support migratory waders. There are limited ephemeral drainage areas, and none with dense Cane-grass Swamp vegetation or tall dense Chenopod shrubland suitable for key threatened species such as Plains Mouse or Thick-billed Grasswren. Given the lack of suitable habitat for Plains Mouse, targeted surveys involving trapping or camera deployment were not undertaken, Whilst there were limited opportunities for focused survey involving call-playback for Thick-billed Grasswren due to the lack of suitable habitat, survey for the species did occurred as part of general bird surveys and the targeted survey for Southern Whiteface. This included a focus on any high-pitched calls heard (e.g. those from fairy wrens) to confirm they weren't Thick-billed Grasswren calls.

Based on the surveys undertaken and the habitat availability and suitability for MNES, the following was found for the SRE Project:

- No EPBC Act-listed Threatened Ecological Communities are considered to occur in the Project Area.
- No EPBC Act-listed threatened flora are considered known, likely or possible to occur in the Project Area.
- Of thirty threatened EPBC Act-listed fauna species identified in the Protected Matters database, and two additional species identified from BDBSA historic records, one is considered known to occur and three are considered as possible occurrences, based on surveys to date and habitat availability within the SRE Project Area. These are:
    - Southern Whiteface was considered known to be present with the SRE Project Area. Seven individuals were recorded at four locations within the SRE Project Area and at least eight individuals were recorded on a subsequent survey immediately south of the SML (Survey One, this Study, Lathwida 2024b).
    - Plains Mouse was considered as a possible occurrence, but only during irruptive years when the species expands into a broader range of non-critical habitat types. No crackling clay habitats were present.

  - Blue-winged Parrot was considered as a possible occurrence, during non-breeding winter migration only.
  - Grey Falcon was considered as a possible occurrence (foraging only), no treed watercourses were present for nesting.
  - The remaining 28 fauna species were considered unlikely to occur, or to not occur, in the Project Area (Table 7.2). It is notable that no suitable habitat of drainage areas with Old Man Saltbush or similar tall dense chenopods were identified for the Thick-billed Grasswren within the SRE Project Area, and the species is considered unlikely to occur.
- An additional seven migratory species that are not EPBC-listed as threatened, one has potential to occur:
  - Fork-tailed Swift was considered possible flyover species (Table 7.2).

In addition, three State-listed flora species are considered as 'possible' to occur within the Project Areas (*Frankenia cupularis, Gratwickia monochaeta, Swainsona oligophylla*) and one species is likely to occur; *Santalum spicatum* (Table 7.3). There are also three State-listed fauna species which are considered as 'possible' to occur (Australian Bustard, Major Mitchell's Cockatoo (western) and Scarlet-chested Parrot), and four species are considered likely to occur; Black Falcon, Flock Bronzewing, Little Eagle and Peregrine Falcon (Table 7.3).

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10 Definitions and abbreviations

10.1 Definition of acronyms

Acronym	Expansion
ARR	Arid Recovery Reserve
BHP	BHP Olympic Dam Corporation Pty Ltd
Cth	Commonwealth
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EIGR	Electricity Infrastructure Ground-reprofiling
EIS	Environmental Impact Statement
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPMP	Environment Protection and Monitoring Program
IBRA	Interim Biogeographic Regionalisation of Australia
LSA Act	*Landscape South Australia Act 2019* (SA)
MNES	Matters of National Environmental Significance
NPW Act	*National Parks and Wildlife Act 1972* (SA)
NV Act	*Native Vegetation Act 1991* (SA)
OD	Olympic Dam
PDI Act	*Planning Development and Infrastructure Act 2016* (SA)
PMST	Protected Matters Search Tool
SA	South Australia
SAAL	South Australian Arid Lands
SEB	significant environmental benefit
SML	Special Mining Lease
SPC	State Planning Commission
SRE	Smelter Refinery Expansion

10.2 Units of measure

Abbreviation	Expansion of Unit
a	year (annum)
g	gram
h	hour
ha	hectare
km	kilometre
km^2	square kilometre
kmph	kilometres per hour
kV	kilovolt
m	metre
mm	millimetre
m/s	metres per second
s	second
t	tonne
tpa	tonnes per annum
y	year
%	per cent

Appendices

Appendix A. Protected Matters Search Tool Outputs

Appendix A1. SRE Project Area (50 km buffer July 2024)

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 23-Jul-2024

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	19
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	9
Commonwealth Heritage Places:	None
Listed Marine Species:	16
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	14
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Amytornis modestus Thick-billed Grasswren [84121]	Vulnerable	Species or species habitat known to occur within area	In feature area
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat known to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Polytelis alexandrae](#) Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
MAMMAL			
[Bettongia lesueur lesueur](#) Burrowing Bettong (Shark Bay), Boodie [66659]	Vulnerable	Translocated population known to occur within area	In feature area
[Dasyurus geoffroii](#) Chuditch, Western Quoll [330]	Vulnerable	Translocated population known to occur within area	In feature area
[Leporillus conditor](#) Wopilkara, Greater Stick-nest Rat [137]	Vulnerable	Translocated population known to occur within area	In feature area
[Macrotis lagotis](#) Greater Bilby [282]	Vulnerable	Translocated population known to occur within area	In feature area
[Notomys fuscus](#) Dusky Hopping-mouse, Wilkiniti [125]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Perameles bougainville](#) Shark Bay Bandicoot [278]	Endangered	Translocated population known to occur within area	In feature area
[Pseudomys australis](#) Plains Rat, Palyoora, Plains Mouse [108]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
[Frankenia plicata](#) [4225]	Endangered	Species or species habitat known to occur within area	In feature area
[Pterostylis xerophila](#) Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - Range Head (Range E) ; LAUNCHER SITE RANGE - KOOLYMILKA [40022]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40081]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40070]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40086]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40080]	SA	In feature area
Defence - WOOMERA AIR WEAPONS RANGE [40069]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40043]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40059]	SA	In buffer area only
Defence - WOOMERA AIR WEAPONS RANGE [40078]	SA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat known to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Lake Torrens	National Park	SA	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Inland Saline Lakes	SA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
BHP Olympic Dam Corporation Pty Ltd - Evaporation Pond 7 Project	2023/09655		Referral Decision	In feature area
Northern Water Desalination and Pipeline Infrastructure Project, SA	2023/09717		Assessment	In feature area
Oak Dam Underground Access Project, SA	2023/09696		Completed	In buffer area only
Olympic Dam Resource Development Strategy	2019/8570		Completed	In feature area
Controlled action				
Expansion of the Olympic Dam copper, uranium, gold and silver mine, processing plant and	2005/2270	Controlled Action	Post-Approval	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
associated				
National Low Level Radioactive Waste Repository, Central-North SA	2001/151	Controlled Action	Post-Approval	In buffer area only
Prominent Hill Copper-Gold Project	2005/2040	Controlled Action	Post-Approval	In feature area
Not controlled action				
132kV Electricity Transmission Line for the Prominent Hill Copper-Gold Project	2006/3110	Not Controlled Action	Completed	In buffer area only
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Increasing a wall height of the tailings storage facility (TSF4), Olympic Dam, SA	2015/7416	Not Controlled Action	Completed	In feature area
Olympic Dam Evaporation Pond 6	2019/8526	Not Controlled Action	Completed	In feature area
Olympic Dam Operations Tailings Storage Facility Six, SA	2019/8465	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Asteroid sampler re-entry vehicle recovery	2002/544	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only
Olympic Dam Heap Leach Trial, Roxby Downs, SA	2014/7280	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Bioregional Assessments			[Resource Information]
SubRegion	BioRegion	Website	Buffer Status
Arckaringa	Lake Eyre Basin	BA website	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix A2. EIGR Areas (5 km buffer October 2024)

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-Oct-2024

Summary

Details

- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat

Acknowledgements

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	41
Listed Migratory Species:	30

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	9
Commonwealth Heritage Places:	None
Listed Marine Species:	35
Whales and Other Cetaceans:	4
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Amytornis modestus			
Thick-billed Grasswren [84121]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Amytornis textilis myall			
Western Grasswren (Gawler Ranges) [64454]	Vulnerable	Species or species habitat may occur within area	In feature area
Aphelocephala leucopsis			
Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Ardenna grisea			
Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus			
Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat may occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Breeding likely to occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area
FISH			
[Seriolella brama](#) Blue Warehou [69374]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
[Dasyurus geoffroii](#) Chuditch, Western Quoll [330]	Vulnerable	Translocated population known to occur within area	In buffer area only
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
[Notomys fuscus](#) Dusky Hopping-mouse, Wilkiniti [125]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Pseudomys australis](#) Plains Rat, Palyoora, Plains Mouse [108]	Vulnerable	Species or species habitat likely to occur within area	In feature area
PLANT			
[Frankenia plicata](#) [4225]	Endangered	Species or species habitat likely to occur within area	In feature area
[Pterostylis xerophila](#) Desert Greenhood [7997]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
[Aprasia pseudopulchella](#) Flinders Ranges Worm-lizard [1666]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In buffer area only
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Megaptera novaeangliae](#) Humpback Whale [38]		Species or species habitat may occur within area	In buffer area only
Migratory Terrestrial Species			
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Charadrius veredus](#) Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area	In feature area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - WOOMERA AIR WEAPONS RANGE [40069]	SA	In feature area
Defence - WOOMERA AIR WEAPONS RANGE [40080]	SA	In feature area
Defence - WOOMERA AIR WEAPONS RANGE [40070]	SA	In feature area
Transport and Regional Services - Australian National Railways Commission		
Commonwealth Land - Australian National Railways Commission [40739]	SA	In buffer area only
Commonwealth Land - Australian National Railways Commission [40729]	SA	In buffer area only
Commonwealth Land - Australian National Railways Commission [41543]	SA	In buffer area only
Commonwealth Land - Australian National Railways Commission [41544]	SA	In buffer area only
Commonwealth Land - Australian National Railways Commission [41545]	SA	In feature area
Unknown		
Commonwealth Land - [40829]	SA	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area overfly marine area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat may occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In buffer area only
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Mammal			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Neophoca cinerea			
Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat may occur within area	In buffer area only
Reptile			
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area	In buffer area only
Chelonia mydas			
Green Turtle [1765]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Dermochelys coriacea			
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In buffer area only
Caperea marginata			
Pygmy Right Whale [39]		Species or species habitat may occur within area	In buffer area only
Lagenorhynchus obscurus			
Dusky Dolphin [43]		Species or species habitat may occur within area	In buffer area only
Megaptera novaeangliae			
Humpback Whale [38]		Species or species habitat may occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Upper Spencer Gulf	Marine Park	SA	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status

Wetland Name	State	Buffer Status
Upper Spencer Gulf	SA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Northern Water Desalination and Pipeline Infrastructure Project, SA	2023/09717		Assessment	In feature area
Olympic Dam Resource Development Strategy	2019/8570		Completed	In feature area
Controlled action				
Expansion of the Olympic Dam copper, uranium, gold and silver mine, processing plant and associated	2005/2270	Controlled Action	Post-Approval	In feature area
Nava-1 Cable System	2001/510	Controlled Action	Completed	In buffer area only
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix B. Flora

Appendix B1. Summary of flora species per site

Appendix Table B1.1: Flora species detected per site (Survey One and Survey Two, 2024)

Species	Common Name	EPBC STATUS	NPW STATUS	PERRENIAL	WEED	SRETRM01	SRETRM02	SRETRM03	SRETRM04	SRETRM07	SRETRM08	SRETRM11	LE RAM 01	LE RAM 02	LE RAM 03	LE RAM 04	LE RAM 05	LE RAM 06	LE RAM 07	LE RAM 08	LE RAM 09	LE RAM 10
Abutilon cryptopetalum ssp.	Lantern-hill Bush			P														1				
Abutilon halophilum	Plains Lantern-bush			P				1	1	1												
Abutilon otocarpum	Desert Lantern-bush			P										1	1			1			1	
Acacia aneura var.	Mulga			P								1	1				1	1				
Acacia ligulata	Umbrella Bush			P								1		1	1	1	1	1	1	1		1
Acacia pendula	Weeping Myall		V	P																1		
Acacia ramulosa var.	Horse Mulga			P														1				
Acacia salicina	Willow Wattle			P																1		
Acacia stenophylla	River Cooba			P																1		
Acacia tetragonophylla	Dead Finish			P							1											
Alectryon oleifolius ssp. *canescens*	Bullock Bush			P								1		1		1			1			
Aristida contorta	Curly Wire-grass										1	1		1				1				
Aristida holathera var. *holathera*	Tall Kerosene Grass											1		1		1	1	1	1			
Astrebla pectinata	Barley Mitchell-grass			P				1	1	1												
Atriplex holocarpa	Pop Saltbush							1	1			1										
Atriplex nummularia ssp. *nummularia*	Old-man Saltbush			P																1		
Atriplex velutinella	Sandhill Saltbush													1		1						1
Atriplex vesicaria	Bladder Saltbush			P		1	1	1	1	1			1		1		1				1	
Austrostipa sp.	Spear-grass					1	1															
Brachyscome ciliaris var.	Variable Daisy											1										
Brachyscome ciliaris var. *ciliaris*	Woolly Variable Daisy														1							
Brachyscome ciliaris var. *lanuginosa*	Woolly Variable Daisy																			1		
Brassica tournefortii	Wild Turnip				*							1										
Bromus lithobius					*		1															
Callitris glaucophylla	White Cypress-pine											1				1			1			
Carrichtera annua	Ward's Weed				*	1																
Chenopodium desertorum ssp. *desertorum*	Desert Goosefoot			P														1	1			
Crotalaria eremaea ssp. *eremaea*	Downy Loose-flowered Rattle																					1
Dissocarpus paradoxus	Ball Bindyi									1			1		1		1	1				
Dodonaea viscosa ssp. *angustissima*	Narrow-leaf Hop-bush			P								1		1				1	1			1
Einadia nutans ssp.	Climbing Saltbush			P																1		
Enchylaena tomentosa var.	Ruby Saltbush			P							1	1		1		1						
Enchylaena tomentosa var. *tomentosa*	Ruby Saltbush			P											1		1	1	1		1	1

Species	Common Name	EPBC STATUS	NPW STATUS	PERRENIAL	WEED	SRETRM01	SRETRM02	SRETRM03	SRETRM04	SRETRM07	SRETRM08	SRETRM11	LE RAM 01	LE RAM 02	LE RAM 03	LE RAM 04	LE RAM 05	LE RAM 06	LE RAM 07	LE RAM 08	LE RAM 09	LE RAM 10
Enneapogon avenaceus	Common Bottle-washers												1		1		1		1			
Enneapogon polyphyllus	Leafy Bottle-washers										1	1						1				
Enteropogon acicularis	Umbrella Grass																			1		
Eragrostis eriopoda	Woolybutt															1		1	1			
Eragrostis setifolia	Bristly Love-grass										1				1					1	1	
Eriachne helmsii	Woolybutt Wanderrie																	1				
Erodium crinitum	Blue Heron's-bill												1		1		1	1				
Eucalyptus camaldulensis ssp. *arida*	Northern River Red Gum			P																1		
Euphorbia tannensis ssp. *eremophila*	Desert Spurge							1		1					1							
Frankenia serpyllifolia	Thyme Sea-heath								1													
Frankenia subteres	Round Sea-heath		R								1											
Gunniopsis quadrifida	Sturt's Pigface			P									1		1							
Hakea leucoptera ssp. *leucoptera*	Silver Needlewood			P														1				
Hibiscus krichauffianus	Velvet-leaf Bush			P										1				1				
Leiocarpa websteri	Narrow Plover-daisy								1													
Lycium australe	Australian boxthorn			P										1								
Lysiana exocarpi ssp. *exocarpi*	Harlequin Mistletoe																	1				
Maireana aphylla	Cotton-bush			P					1													
Maireana appressa	Pale-fruit Bluebush			P			1	1	1	1												
Maireana astrotricha	Low Bluebush			P		1	1						1		1							
Maireana eriantha	Woolly Bluebush			P		1	1		1													
Maireana erioclada	Rosy Bluebush			P										1	1	1		1	1		1	
Maireana georgei	Satiny Bluebush			P							1	1										
Maireana integra	Entire-wing Bluebush			P											1							
Maireana pentatropis	Erect Mallee Bluebush			P									1									
Maireana pyramidata	Black Bluebush			P											1							
Maireana sedifolia	Bluebush			P			1				1											
Melaleuca glomerata	Inland Paper-bark			P																1		
Minuria cunninghamii	Bush Minuria			P			1	1	1												1	
Monachather paradoxus	Bandicoot Grass																	1				
Osteocarpum acropterum var.	Bonefruit					1	1	1		1												
Panicum decompositum var. *decompositum*	Native Millet																			1		
Paractaenum refractum	Bristle-bush Grass													1								
Plantago sp.	Plantain									1												
Podolepis capillaris	Wiry Podolepis											1										
Polycalymma stuartii	Poached-egg Daisy													1		1						
Pterocaulon sphacelatum	Apple-bush														1							
Ptilotus nobilis	Yellow-tails								1			1										

Species	Common Name	EPBC STATUS	NPW STATUS	PERRENIAL	WEED	SRETRM01	SRETRM02	SRETRM03	SRETRM04	SRETRM07	SRETRM08	SRETRM11	LE RAM 01	LE RAM 02	LE RAM 03	LE RAM 04	LE RAM 05	LE RAM 06	LE RAM 07	LE RAM 08	LE RAM 09	LE RAM 10
Ptilotus obovatus	Silver Mulla Mulla			P										1								
Ptilotus polystachyus	Long-tails																	1				
Rhodanthe stricta	Slender Everlasting											1										
Roepera ammophila	Sand Twinleaf												1					1	1			
Roepera aurantiaca ssp. *aurantiaca*	Shrubby Twinleaf										1	1										
Roepera eremaea															1			1		1		
Roepera howittii	Clasping Twinleaf													1		1			1			
Salsola australis	Buckbush						1	1		1		1		1	1	1		1	1			
Santalum lanceolatum	Plumbush			P																1		
Sclerolaena brachyptera	Short-wing Bindyi					1	1	1	1	1												
Sclerolaena cuneata	Tangled Bindyi											1										
Sclerolaena diacantha	Grey Bindyi						1						1		1		1	1				
Sclerolaena divaricata	Tangled Bindyi					1		1	1	1												
Sclerolaena intricata	Tangled Bindyi					1	1	1	1	1												
Sclerolaena limbata	Pearl Bindyi												1		1							
Sclerolaena patenticuspis	Spear-fruit Bindyi												1		1							
Sclerolaena obliquicuspis	Oblique-spined Bindyi							1			1											
Sclerolaena tatei	Tate's Bindyi			P							1											
Sclerolaena tricuspis	Three-spine Bindyi												1		1		1	1				
Sclerolaena ventricosa	Salt Bindyi					1			1	1			1		1		1	1				
Senna artemisioides ssp. *petiolaris*											1											
Sida ammophila	Sand Sida												1	1	1	1			1			1
Sida corrugata var.	Corrugated Sida											1										
Sida fibulifera	Pin Sida												1		1		1	1			1	
Sida intricata	Twiggy Sida											1										
Sisymbrium orientale	Indian Hedge Mustard															1		1	1			
Solanum quadriloculatum	Plains Nightshade						1					1										
Sporobolus actinocladus	Ray Grass							1	1	1												
Tecticornia medullosa				P		1	1		1													
Trachymene glaucifolia	Blue Parsnip											1		1				1				
Trichodesma zeylanicum var. *zeylanicum*	Camel bush													1								
Zygochloa paradoxa	Sandhill Cane-grass																					1
	Total species					**11**	**15**	**14**	**17**	**14**	**12**	**23**	**16**	**19**	**25**	**13**	**12**	**30**	**15**	**14**	**7**	**7**

Appendix B2. Photolog RAM and Vegetation Check sites



Appendix Figure B.1: RAM site LERAM01, facing north



Appendix Figure B.2: RAM site LERAM01, facing east



Appendix Figure B.3: LERAM01, facing south



Appendix Figure B.4: LERAM01, facing west



Appendix Figure B.5: LERAM02, facing north



Appendix Figure B.6: LERAM02, facing east



Appendix Figure B.7: LERAM02, facing south



Appendix Figure B.8: LERAM02 facing west



Appendix Figure B.9: LERAM03, facing north



Appendix Figure B.10: LERAM03, facing east



Appendix Figure B.11: LERAM03, facing south



Appendix Figure B.12: LERAM03, facing west



Appendix Figure B.13: LERAM04, facing north



Appendix Figure B.14: LERAM04, facing east



Appendix Figure B.15: LERAM04, facing south



Appendix Figure B.16: LERAM04, facing west



Appendix Figure B.17: LERAM05, facing north



Appendix Figure B.18: LERAM05, facing east



Appendix Figure B.19: LERAM05, facing south



Appendix Figure B.20: LERAM05, facing west



Appendix Figure B.21: LERAM06, facing north



Appendix Figure B.22: LERAM06, facing east



Appendix Figure B.23: LERAM06, facing south



Appendix Figure B.24: LERAM06, facing west



Appendix Figure B.25: LERAM07, facing north



Appendix Figure B.26: LERAM07, facing east



Appendix Figure B.27: LERAM07, facing south



Appendix Figure B.28: LERAM07, facing west



Appendix Figure B.29: LERAM08, facing north



Appendix Figure B.30: LERAM08, facing east



Appendix Figure B.31: LERAM08, facing south



Appendix Figure B.32: LERAM08, facing west



Appendix Figure B.33: B LERAM09, facing north



Appendix Figure B.34: LERAM09, facing east



Appendix Figure B.35: LERAM09, facing south



Appendix Figure B.36: LERAM09, facing west



Appendix Figure B.37: LERAM10, facing north



Appendix Figure B.38: LERAM10, facing east



Appendix Figure B.39: LERAM10, facing south



Appendix FigureB.40: LERAM10, facing southwest



Appendix Figure B.41: LEOP07



Appendix Figure B.42: LEVC01



Appendix Figure B.43: LEVC02



Appendix Figure B.44: LEVC03



Appendix Figure B.45: LEVC08



Appendix Figure B.46: LEVC09



Appendix Figure B.47:LEVC10



Appendix Figure B.48: LEVC12



Appendix Figure B.49: LEVC13-1



Appendix Figure B.50: LEVC13-2



Appendix Figure B.51: LEVC14



Appendix Figure B.52: LEVC15



Appendix Figure B.53: LEVC16, facing north



Appendix Figure B.54: LEVC16, facing east



Appendix Figure B.55: LEVC16, facing south



Appendix Figure B.56: LEVC16, facing west



Appendix Figure B.57: LEVC17



Appendix Figure B.58: LEVC18



Appendix Figure B.59: LEVC19



Appendix Figure B.60: LEVC20



Appendix Figure B.61: LEVC21-1



Appendix Figure B.62: LEVC21-2



Appendix Figure B.63: LEVC22



Appendix Figure B.64: LEVC23



Appendix Figure B.65: LEVC24



Appendix Figure B.66: LEVC25



Appendix Figure B.67: LEVC26-1



Appendix Figure B.68: LEVC26-2



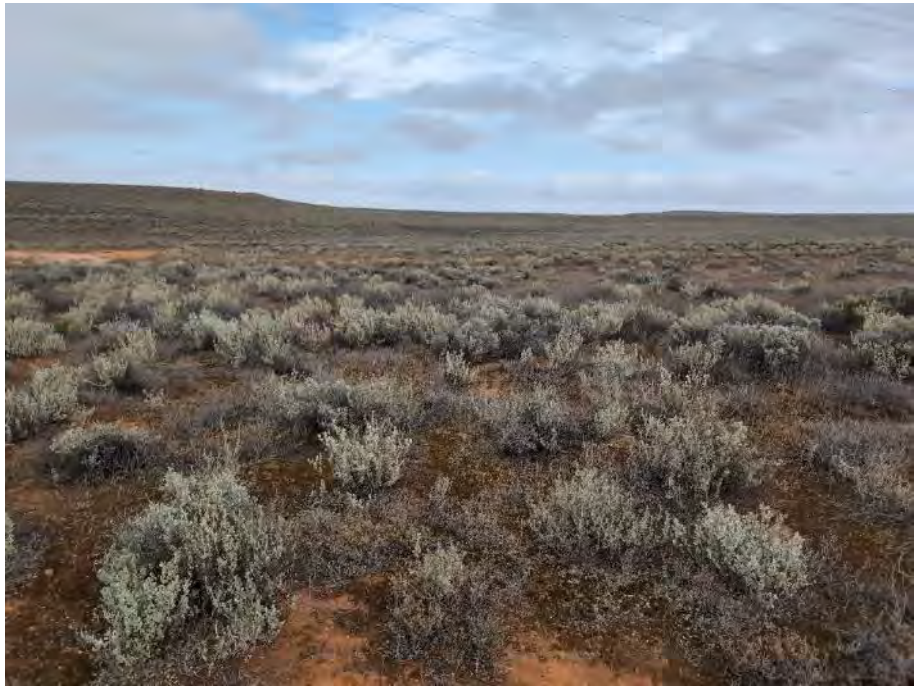
Appendix Figure B.69: SRETRM01 (RAM), facing north



Appendix Figure B.70: SRETRM01 (RAM), facing east



Appendix Figure B.71: SRETRM01 (RAM), facing south



Appendix Figure B.72: SRETRM01 (RAM), facing west



Appendix Figure B.73: SRETRM02 (RAM), facing north



Appendix Figure B.74: SRETRM02 (RAM), facing east



Appendix Figure B.75: SRETRM02 (RAM), facing south



Appendix Figure B.76: SRETRM02 (RAM), facing west



Appendix Figure B.77: SRETRM03 (RAM), facing north



Appendix Figure B.78: SRETRM03 (RAM), facing east



Appendix Figure B.79: SRETRM03 (RAM), facing south



Appendix Figure B.80: SRETRM03 (RAM), facing west



Appendix Figure B.81: SRETRM04 (RAM), facing north



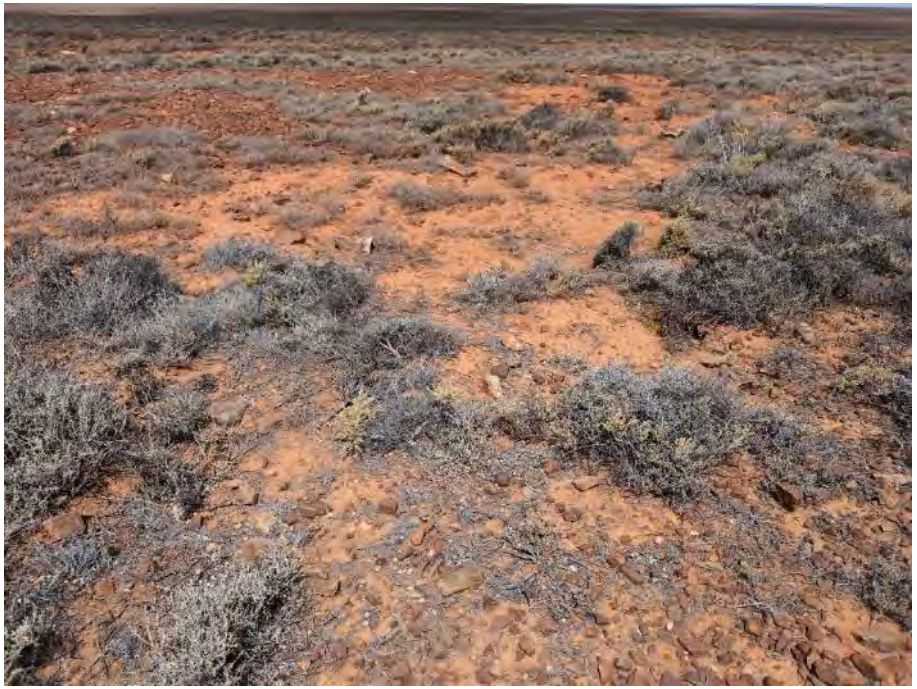
Appendix Figure B.82: SRETRM04 (RAM), facing east



Appendix Figure B.83: SRETRM04 (RAM), facing south



Appendix Figure B.84: SRETRM04 (RAM), facing west



Appendix Figure B.85: SRETRM05 (Vegetation Check, shallow gilgai)



Appendix Figure B.86: SRETRM05 (facing north)



Appendix Figure B.87: SRETRM06 (Vegetation Check, ephemeral drainage)



Appendix Figure B.88: SRETRM06 (facing north)



Appendix Figure B.89: SRETRM07 (RAM), facing north



Appendix Figure B.90: SRETRM07 (RAM), facing east



Appendix Figure B.91: SRETRM07 (RAM), facing south



Appendix Figure B.92: SRETRM07 (RAM), facing west



Appendix Figure B.93: LEVC20 SRETRM08 (RAM), facing north



Appendix Figure B.94: SRETRM08 (RAM), facing east



Appendix Figure B.95: SRETRM08 (RAM), facing south



Appendix Figure B.96: SRETRM08 (RAM), facing west



Appendix Figure B.97: SRETRM08 (RAM), *Frankenia subteres* (rare, NPW Act)



Appendix Figure B.98: SRETRM09 (Vegetation Check, facing north)



Appendix Figure B.99: SRETRM09 (Vegetation Check, facing south)



Appendix Figure B.100: SRETRM10 (Vegetation Check, facing north)



Appendix Figure B.101: SRETRM10 (Vegetation Check, facing south)



Appendix Figure B.102: SRETRM11 (RAM), facing north



Appendix Figure B.103: SRETRM11 (RAM), facing east



Appendix Figure B.104: SRETRM11 (RAM), facing south



Appendix Figure B.105: SRETRM11 (RAM), facing west

Appendix C. Fauna

Appendix C1. Summary of fauna species per site

Appendix Table C1.1: Fauna species detected per site Survey One (2024)

	SPECIES	Common Name	EPBC Status	NPW Status	Opportunistic	Survey type	LERAM03	LERAM04	LERAM05	LERAM06	LERAM07	LERAM08	LEVC05	LEVC11	LEVC16	LEVC17	LEVC19/EV387	LEVC20	LEVC24	LEVC25	LEVC26	EV393	LEOP05/06	LEOP09 (turkey nest)	LEBS05	EV409	EV404	EV386	EV394	LEOP01	EV430	Comments
Bird																																
ARTAMIDAE	*Gymnorhina tibicen*	Australian Magpie			1	Opportunistic																										SRE
MOTACILLIDAE	*Anthus novaeseelandiae*	Australian Pipit			1	Bird Survey														1					1				1			
ARTAMIDAE	*Corvus coronoides*	Australian Raven			1	Bird Survey	1								1	1	1									FO	1			1		
CHARADRIIDAE	*Vanellus tricolor*	Banded Lapwing			1	Opportunistic																		1								
ARTAMIDAE	*Artamus cinereus*	Black-faced Woodswallow			1	Bird Survey			1			1		1	1										1		1			1	1	
RECURVIROSTRIDAE	*Himantopus leucocephalus*	Black-winged Stilt/Pied Stilt			1	Opportunistic																		1								
LOCUSTELLIDAE	*Cincloramphus cruralis*	Brown Songlark			1	Opportunistic																										
CINCLOSOMATIDAE	*Cinclosoma cinnamomeum*	Cinnamon Quailthrush			1	Opportunistic																										near EV393
COLUMBIDAE	*Ocyphaps lophotes*	Crested Pigeon				Bird Survey								1											1		1				1	
PSITTACULIDAE	*Northiella haematogaster haematogaster*	Eastern Bluebonnet			1	Bird Survey								1											1							pairs/small flocks
CASUARIIFORMES	*Dromaius novaehollandiae*	Emu			1	Opportunistic																										
CACATUIDAE	*Eolophus roseicapilla*	Galah			1	Opportunistic																										
ARTAMIDAE	*Cracticus torquatus leucopterus*	Grey Butcherbird				Bird Survey																			1				1			
ANATIDAE	*Anas gracilis gracilis*	Grey Teal			1	Opportunistic																		1								
MONARCHIDAE	*Grallina cyanoleuca*	Magpielark			1	Bird Survey																									1	
FALCONIDAE	*Falco cenchroides*	Nankeen Kestrel			1	Opportunistic				1																					1	FO
ANATIDAE	*Anas superciliosa*	Pacific Black Duck			1	Opportunistic																		1								

	SPECIES	Common Name	EPBC Status	NPW Status	Opportunistic	Survey type	LERAM03	LERAM04	LERAM05	LERAM06	LERAM07	LERAM08	LEVC05	LEVC11	LEVC16	LEVC17	LEVC19/EV387	LEVC20	LEVC24	LEVC25	LEVC26	EV393	LEOP05/06	LEOP09 (turkey nest)	LEBS05	EV409	EV404	EV386	EV394	LEOP01	EV430	Comments
MALURIDAE	*Malurus assimilis assimilis*	Purple-backed (Variegated) Fairywren				Bird Survey															1	1				1			1			
Recurvirostridae	*Recurvirostra novaehollandiae*	Red-necked Avocet			1	Opportunistic																		1								
MELIPHAGIDAE	*Gavicalis virescens*	Singing Honeyeater			1	Bird Survey/Opportunistic			1		1														1		1		1		1	
LARIDAE	*Chroicocephalus novaehollandiae*	Silver Gull			1													1			1	1						FO				Fly Over
ACANTHIZIDAE	*Aphelocephala leucopsis leucopsis*	Southern Whiteface	VU			Bird Survey								pair	no		no		no		1	no			no	pair	no	no	pair		no	3 pairs, 1 single
MELIPHAGIDAE	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater				Bird Survey								1																		
PARDALOTIDAE	*Pardalotus striatus*	Striated Pardalote			1	Bird Survey						1																				
ACCIPITRIDAE	*Aquila audax audax*	Wedge-tailed Eagle			1	Bird Survey/Opportunistic	FO														FO	FO								pair FO		pair
ACCIPITRIDAE	*Haliastur sphenurus*	Whistling Kite			1	Opportunistic																						FO				FO EV320
HIRUNDINIDAE	*Cheramoeca leucosterna*	White-backed Swallow			1	Opportunistic																										LEVC12
POMATOSTOMIDAE	*Pomatostomus superciliosus*	White-browed Babbler				Bird Survey																			1							
MELIPHAGIDAE	*Ptilotula penicillata*	White-plumed Honeyeater				Bird Survey						1																				
MALURIDAE	*Malurus leucopterus leuconotus*	White-winged Fairywren			1	Bird Survey									1				1		1	1	1			1		1			1	both sexes seen/heard
MELIPHAGIDAE	*Manorina flavigula*	Yellow-throated Miner			1	Bird Survey							1								1	1		1	1		1		1		1	
ESTRILDIDAE	*Taeniopygia guttata*	Zebra Finch			1	Bird Survey			1			1		1					1		1	1	1				1				1	
Mammal																																
MACROPODIDAE	*Macropus (Osphranter) rufus*	Red Kangaroo			>15	Opportunistic																										
MACROPODIDAE	*Macropus (Osphranter) robustus*	Euro			1	Opportunistic											1															
LEPORIDAE	*Oryctolagus cuniculus*	European Rabbit				Opportunistic		D/S												1								D/S			D/S	D/S= digs/scats

	SPECIES	Common Name	EPBC Status	NPW Status	Opportunistic	Survey type	LERAM03	LERAM04	LERAM05	LERAM06	LERAM07	LERAM08	LEVC05	LEVC11	LEVC16	LEVC17	LEVC19/EV387	LEVC20	LEVC24	LEVC25	LEVC26	EV393	LEOP05/06	LEOP09 (turkey nest)	LEBS05	EV409	EV404	EV386	EV394	LEOP01	EV430	Comments
FELIDAE	*Felis catus*	Feral Cat				Opportunistic																									prin ts	carcasses
Reptile																																
SCINCIDAE	*Tiliqua rugosa*	Sleepy Lizard			1	Opportunistic																										carcass

No= no response to call play-back



BHP

Appendix D2.
Social

Social Impact Assessment

Smelter and Refinery Expansion Project

Prepared for BHP Olympic Dam Corporation Pty Ltd

September 2026

Social Impact Assessment

Smelter and Refinery Expansion Project

BHP Olympic Dam Corporation Pty Ltd

September 2026

Approved by

Paul Gibbons
Director, Major Projects & Approvals
28 September 2026

Level 2 95 North Quay Brisbane QLD 4000
ABN: 28 141 736 558

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Executive summary

ES1 Introduction

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (SRE Project) at the Olympic Dam mining operations, in the far north of South Australia (SA) (Figure 1.1).

EMM Consulting Pty Ltd (EMM) and Lathwida Environmental Pty Ltd (Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2016* (PDI Act) (SA).

EMM was commissioned by BHP to undertake a Social Impact Assessment (SIA) of the SRE Project activities to:

- Determine if the activities have the potential to result in changes to the baseline social environment (baseline condition assessment in Chapter 5 of this report).
- Determine the likely magnitude of the change to baseline social values as a result of the SRE Project (effects assessment in Chapter 7 of this report).
- Quantify the likely impacts resulting from the predicted change to baseline social values on identified receptors (impact assessment in Chapter 8 of this report).

The SIA will be submitted to the Government of South Australia's Minister for Energy and Mining, as an Appendix to the EIS.

ES2 Purpose of SIA and methodology

The SIA for the SRE Project identifies and assesses potential social impacts on local and regional communities. This assessment follows best practice guidelines, drawing from State and international standards, including the Department for Energy and Mining's *An introduction to social impact assessment guideline* (DEM 2024) and the International Association for Impact Assessment's Social Impact Assessment Guidance for assessing and managing the social impacts of projects (Vanclay et al 2015). Additionally, BHP's Environmental Impact Assessment Framework (EIAF) has been adopted to ensure alignment with corporate environmental and social assessment processes.

The SIA process follows a structured approach, including scoping, baseline analysis, impact assessment, and the development of management measures, all informed by outcomes of stakeholder engagement. The SIA study area has been defined based on communities and stakeholders likely to experience changes to the social environment, encompassing the nearby local communities of Roxby Downs and Andamooka, as well as the regional communities of Woomera, Pimba, Port Augusta, and Whyalla. At a broader level, the regional study area includes the Unincorporated South Australia Local Government Area (LGA), Roxby Downs LGA, Port Augusta LGA, and Whyalla LGA.

ES3 Baseline condition assessment

The baseline condition assessment examines the key social trends and characteristics of the SIA study area. It provides a benchmark against which potential social impacts can be assessed and comprises the below:

- **Population and demography:** In recent years, Roxby Downs has maintained a relatively stable population, whereas the broader regional study area has experienced ongoing population decline. Over the past decade in nearby communities, there has been population decline in Woomera, Pimba, Andamooka and Whyalla, but there has been negligible population change in Port Augusta and minor population growth in Roxby Downs. Mining regions and industry dependent towns are typically characterised by transient populations and fly-in-fly-out (FIFO) workforces. Subsequently there are very high levels of population mobility in the nearby communities of Roxby Downs and Woomera.

- **Housing and accommodation:** Roxby Downs and Andamooka have a high proportion of unoccupied dwellings. Housing affordability is a key community concern, contributed to by the income disparity between those employed by mining companies and those that are not. Short-term accommodation is available in Roxby Downs, Andamooka, Woomera, and Pimba, with non-resident BHP workers typically housed at Roxby Downs Village or Olympic Dam Village. Rental housing in Roxby Downs and Woomera is largely company and government-owned, reflecting the dominance of mining and RAAF provided housing. Despite this, Roxby Downs' median rent remains below the state median of $300. BHP owns approximately 463 dwellings in Roxby Downs.

- **Community values:** Residents of Roxby Downs, Andamooka, Port Augusta, Whyalla, and Woomera value their tight-knit community networks, local facilities, and natural surroundings, particularly given the remote and sparsely populated landscape surrounding the Project. However, challenges such as a transient fly-in/fly-out (FIFO)/drive-in/drive-out (DIDO) workforce, income disparity, difficulties in attracting non-mining workers, and limited access to mental health and specialist healthcare services impact community cohesion. Declining volunteering rates further highlight the challenges of social connectedness and intergenerational support. No non-Indigenous historic heritage sites have been identified within or near the SRE Project, while the presence of any artefacts or identified Aboriginal cultural heritage values, including landscape features, within the SRE Project will be handled in accordance with legislation and the agreed procedures and protocols for heritage management with the Kokatha Aboriginal Corporation (KAC), Kuyani Yartah Association (KYA) and Barngarla Determination Aboriginal Corporation (BDAC) Indigenous Groups.

- **Health and Wellbeing:** Rising crime and antisocial behaviour have become a growing concern in the region, particularly during shutdown periods and other times when there is an influx of contractors. The population of the Far North region experiences higher rates of mental health issues, driven by isolation, economic pressures, and FIFO work, while the mining industry also presents ongoing workplace hazards. Key vulnerable groups in the regional study area include social housing residents and unemployed individuals, who are more susceptible to economic shifts and mining-related impacts.

- **Social Infrastructure:** Social infrastructure and community facilities are limited in Woomera, Pimba, and Andamooka due to their small populations, with residents often travelling to Roxby Downs or Port Augusta for health and other essential services. Roxby Downs Area School is the largest education facility near the Project Site and also caters for students from Andamooka. Access to tertiary education is also limited, with UniHub Spencer Gulf facilitating an outreach service in Roxby Downs, providing study facilities.

- **Labour Force:** The regional SIA study area recorded lower rates of labour force participation and a higher rate of unemployment compared to South Australia. Particularly high rates of unemployment are recorded in Whyalla and Port Augusta, with relatively high youth unemployment. However, Roxby Downs recorded very low rates of unemployment, indicating a restricted labour supply. Mining is the dominant employer in Roxby Downs, employing approximately half of the labour force. Labour shortages remain a challenge, particularly in teaching, policing, childcare, and retail, as the transient workforce limits worker retention, impacting local businesses and services.

- **Business and industry:** The Far North region's economy is dominated by mining, with BHP's Olympic Dam contributing 69.5% of total output. The Olympic Dam Mine dominates the local economy in Roxby Downs, making the mine the primary employer and key customer for local businesses. In addition to mining, tourism is a growing industry in the Far North Region. While Roxby Downs remains the regional business hub, its economic stability is challenged by workforce transience, limited service diversity, and business closures. Retail diversity is declining in Roxby Downs, with high rents, vacant shops, and increased reliance on online shopping.

- **Transport and connectivity:** Regionally significant road and transport networks near to the SRE Project include Olympic Dam Highway, Andamooka Road and Stuart Highway. Nationally significant rail networks traverse the regional study area, with the rail corridor running through Pimba. The nearest commercial airport to the SRE Project is Olympic Dam Airport. There is limited public transport in Roxby Downs and Andamooka.

ES4 Assessment of effects and impact assessment

The assessment has identified both negative and positive social impacts on local and regional communities. Key negative impacts relate to perceived increased traffic delays and a perceived heightened risk of road incidents, reduced access to emergency services, and diminished community cohesion in Roxby Downs, along with concerns about a potential rise in crime and antisocial behaviour associated with a larger transient workforce. To mitigate the negative effects, measures such as implementation of traffic management strategies, continued collaboration with local emergency service providers to update emergency response plans where required, and the ongoing use of a community grievance mechanism to address concerns as they arise. Of these, two negative impacts were assessed as significant:

- Reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents at Project site and on Olympic Dam Highway.

- Diminished community cohesion and vitality in Roxby Downs, as the increase in FIFO workers may lead to weakened social ties, and declining resident engagement.

Despite these challenges, the SRE Project is expected to generate significant socio-economic benefits, including increased labour force participation, enhanced business opportunities, and strengthened local economic resilience. With proactive engagement and mitigation strategies, the SRE Project can balance potential risks while delivering long-term socio-economic benefits to the region.

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1 Introduction

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- quantify the likely impacts resulting from the predicted change to baseline social values on identified receptors (impact assessment in Chapter 8 of this report).

This report supports the EIS, which will be submitted to the Government of South Australia's Minister for Energy and Mining as the relevant Minister for the SRE Project under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

1.1 Project area definitions

To maintain consistency throughout the EIS and supporting technical assessments, the following terminology related to project infrastructure have been defined for the SRE Project where the **SRE Project Area** is defined at the boundary around the SRE Project for which BHP is seeking approval, including:

- **Special Mining Lease (SML) Area** SML (Figure 1.2), which is further delineated by the following areas:
  - **SRE Area**: the extent of the proposed SRE Project infrastructure required for construction and operation of the SRE Project within the SML. Includes the existing brownfield plant area, proposed facility relocation(s), proposed plant and laydown areas.
  - **General Infrastructure Area**: the extent of the proposed ancillary infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed infrastructure laydown areas, proposed stormwater dam location, proposed topsoil and subsoil storage areas.
  - **Water Infrastructure Area**: the extent of the proposed water infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed water pipeline and water storage dam locations.
- **Electricity Infrastructure Ground Re-Profiling Area (EIGR Area)**: the extent of the isolated proposed vegetation disturbance required to maintain regulatory clearance distances between the 275 kilovolt (kV) transmission line and the ground surface within Clause 28 land. It is noted that the transmission line and infrastructure are already in place, but additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging, and therefore changes to existing clearance distances to enable safe operation (Figure 1.3).

1.2 Regulatory context

The SRE Project was declared an Impact Assessed development pursuant to Section 108(1)(c) and 108(7) of the PDI Act on 29 August 2024. The declaration reflects the nature, scale and significance of the SRE Project to SA.

Impact Assessed Development is the most rigorous level of development assessment prescribed under the PDI Act.

Specifically, the Minister made the following declaration:

> Pursuant to Section 108(1)(c) and Section 108(7) of the Planning Development and Infrastructure Act 2016, having taken into account those principles prescribed under Regulation 27(2) of the Planning, Development and Infrastructure (General) Regulations 2017 (the Regulations) and having given consideration to the matters under Regulation 27(3) of the Regulations, I declare that all development of a kind specified in the Schedule to this Notice, to the extent that it is undertaken on land identified in Clause 28(1) of the Indenture as impact assessed development and that references to "development" include a project.

The majority of the SRE Project activities, with the exception of ground re-profiling within the Electricity Infrastructure Area, would be located wholly within the existing SML but does not include business-as-usual (BAU) operations (operations which enable existing approved production of up to approximately 200,000 tonnes per annum (tpa) total copper production) or activities associated with scheduled campaign maintenance 2027 (SCM27) works. These activities are subject to separate regulation (e.g. Environment Protection Authority (EPA) licensing) and approval. The SRE Project may also be supported by low impact development outside the SML, which could include, for example, minor road works and upgrades to accommodation infrastructure. It is proposed that any approvals required for these activities would be sought on an as-needs basis under applicable legislation and guidelines.

1.2.1 Planning Development and Infrastructure Act 2016

Development approval is required for the Action under the PDI Act which established a new development assessment system in SA to streamline the assessment process. The PDI Act is supported by subordinate regulations, as well as practice directions and guidelines which are issued by the State Planning Commission, the State's independent principal planning body.

A key feature of the new planning system is the Planning and Design Code (the Code) which contains a single set of planning policy, rules and classifications for SA, which is applied spatially via mapping. The Code establishes a performance-based approach to planning and development assessment by including policies that address the scale, form and design of built structures and the contextual setting of the development.

The planning system established by the PDI Act includes five assessment pathways; accepted development, code assessed development (deemed-to-satisfy or performance assessed) and impact assessed development (restricted and impact assessed). As previously stated, impact assessed development is the most rigorous level of development assessment prescribed under the PDI Act.

i Ministerial declaration – impact assessed development

The declaration subjects the SRE Project to an EIS process requiring detailed environmental, social and economic assessment.

A Scoping Application was prepared by BHP to inform the development of EIS Assessment Requirements by the State Planning Commission (SPC). The EIS Assessment Requirements issued by the SPC summarise all potential issues needing to be addressed by BHP and highlight any further information required by the Minister to enable a proper assessment of the proposed SRE Project.

Due to the operation of the *Roxby Downs (Indenture Ratification) Act 1982*, the Minister for Energy and Mining is the relevant Minister for the SRE Project.

Specific Assessment Requirements for the SIA (Annexure D) are as follows:

- Provide a SIA of the development which addresses:
    - identification of the social study area based on the anticipated geographic distribution of social impacts (which may include communities distant from the location of the project)
    - the existing social attributes of communities potentially impacted by the project
    - the potential social impacts (positive and negative) of the project during construction and operation (and decommissioning where relevant), including the temporal, spatial and demographic distribution of impacts
    - proposed measures to avoid or mitigate adverse impacts and capture social benefit opportunities during construction and operation (and decommissioning where relevant)
    - proposed approaches to monitoring or responding to changing social impacts over the life of the project, including potential public reporting on progress or achievements.

Several non-statutory guidelines have also been considered in the development of the SIA, including:

- Detailed Assessment Requirements for SC2: Community Wellbeing/Social Impact Assessment as outlined in the Assessment Requirements Library, Impact Assessed Development (PlanSA 2022)
- Department for Energy and Mining's *An Introduction To Social Impact Assessment* Guideline (Department for Energy and Mining 2024)
- International Association for Impact Assessment's (IAIA) Social Impact Assessment Guidance for assessing and managing the social impacts of projects (Vanclay et al 2015)
- BHP's Environmental Impact Assessment Framework (EIAF) for the SRE Project (Annexure A).

The non-statutory guidelines outline good practice expectations for SIA. Annexure B details how this assessment aligns with the non-statutory SIA Guidance.

1.3 Project description

The objective of the SRE Project is to expand BHP's smelter and refinery capacity, enabling the Copper SA growth plan by:

- increasing copper production capacity up to 650,000 tpa of total copper plus associated products from the current average production of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet
- ensuring the Cu:S ratio is resolved at Olympic Dam for copper concentrate production
- delivering reliable and predictable production outcomes following the 2023 acquisition of OZ Minerals' Carrapateena and Prominent Hill mining operations to realise Copper SA province opportunities.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable total production of up to 650,000 tpa copper plus associated products
- introduction of a two-stage smelting involving the installation of a new primary flash smelting furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing direct-to-blister flash furnace (DBF) to a flash-converting furnace (FCF), which would process the matte into blister
- addition of an acid plant of similar nature and scale to the existing acid plant and subsequent upgrade of the existing acid plant
- expansion of the electrorefinery and precious metals recovery facilities to produce cathode copper, gold, and silver.

Associated with these key elements, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the existing SML Area (Figure 1.2).

External to the SML Area, electricity would be supplied to the SRE Project through the existing 275 kV line from Davenport substation (near Port Augusta) to Olympic Dam mine, located within Clause 28 land[1] (EIGR Areas). Whilst the transmission line and infrastructure are already in place, additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging, reducing the existing electrical clearances that are required to enable safe operation. The maintenance of the required electrical clearances between the 275 kV line and the ground surface would necessitate isolated areas of land disturbance and associated vegetation clearance (Figure 1.3).

The SRE Project would be constructed and operated in a staged manner to enable production capacity up to 650,000 tpa of total copper and associated products, with stages detailed in Table 1.1.

This SIA has been prepared considering the maximum potential negative impacts associated with Stage 2 (i.e. the greatest impact scenario) to ensure that the full extent of all potential impacts are identified and assessed.

The regional context and indicative location of key infrastructure is shown in Figure 1.2 and Figure 1.3, while the key project characteristics are outlined in Table 1.2.

[1] Clause 28 land as defined under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

Table 1.1 Project stages and timing

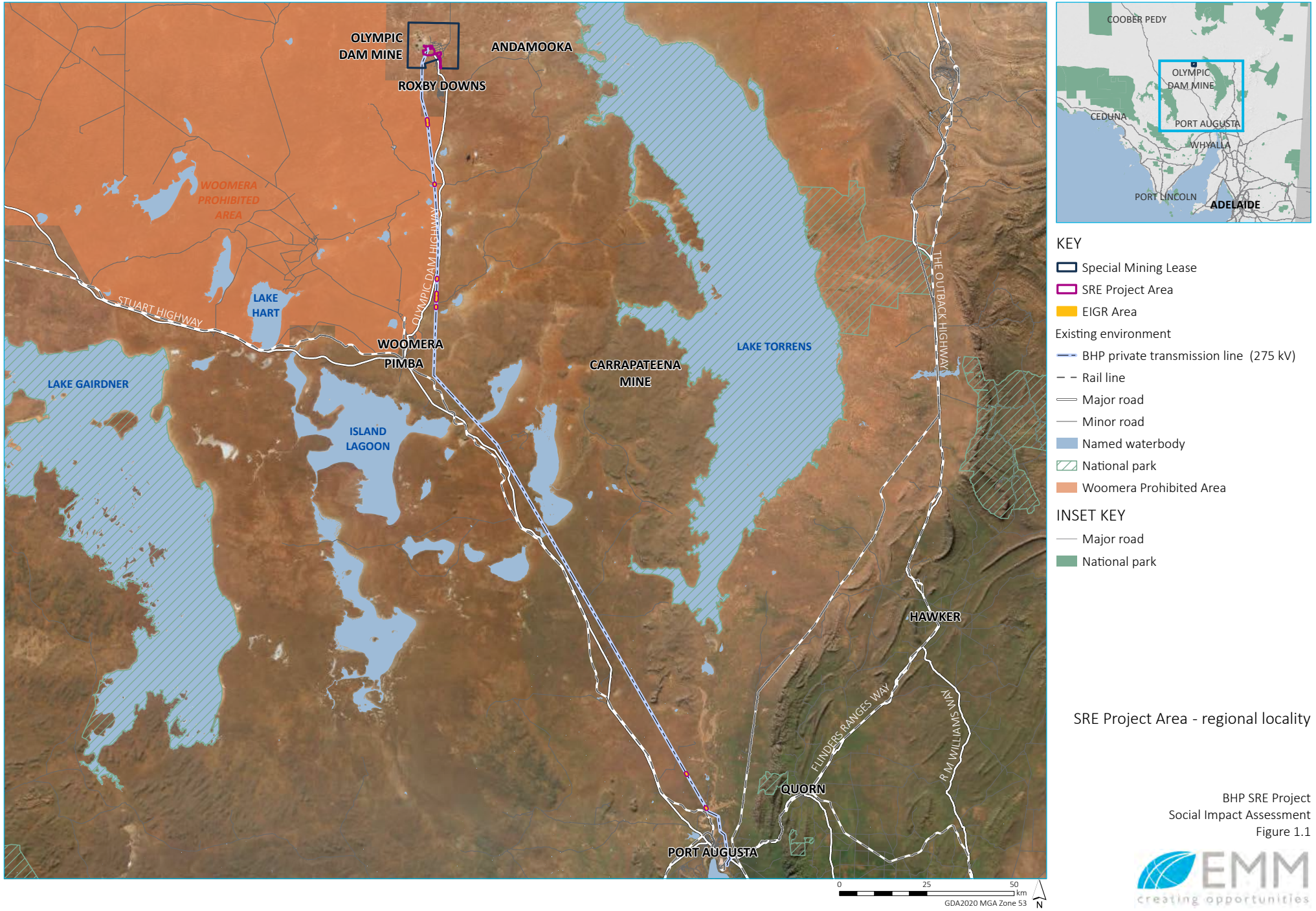
Stage	Smelter concentrate throughput (tpa)	Description	Anticipated timing
Stage 1a	1,100,000	Stage 1a includes: • an increase of smelter throughput to approximately 1,100,000 tpa of concentrate producing an output of approximately 390,000 tpa of total copper • a new regional concentrate receiving, handling and blending facility • upgrade and expansion of the existing smelter feed preparation, including additional concentrate storage, blending and a new steam dryer • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to an FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure and decommissioning of the existing electric slag reduction furnace (EF) if required • expansion of the brownfield slag concentrator supported by FSF slag cooling pits, a new interim slag stockpile and associated environmental management infrastructure • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant, additional acid storage, and an associated acid loading station to allow the export of acid • a new electrorefinery and associated anode preparation infrastructure • a new slimes treatment plant • expansion of the precious-metals refinery (PMR) facility.	2028 to 2032
Stage 1b	1,400,000	Stage 1b includes: • an increase in smelter throughput to approximately 1,400,000 tpa of concentrate producing an output of approximately 500,000 tpa of total copper • installation of additional concentrate leach thickening and filtration infrastructure • development of greenfield slag concentrator and associated stockpile and decommissioning of brownfield slag concentrator • incremental expansion of Stage 1a infrastructure and services, including: – the installation of additional electrorefinery modules – expansion of feed preparation, FCF feed system (including lime addition), off-gas management, acid plant, slimes treatment and PMR capacities.	2032 to 2036
Stage 2	2,000,000	Stage 2 includes: • an increase in smelter throughput to approximately 2,000,000 tpa of concentrate producing an output of approximately 650,000 tpa of total copper. • installation of new concentrate leach circuit for treatment of imported concentrate. • incremental expansion of Stage 1b infrastructure and services, including: – the installation of additional electrorefinery modules. – the installation of an additional anode furnace and associated off-gas management infrastructure. – expansion of feed preparation, FSF and FCF feed systems, off-gas and slag management, acid plant, slimes treatment and PMR capacities.	2038 to closure

Table 1.2 Key characteristics of the SRE Project

Project element	Summary
SRE Project activities and infrastructure	
Smelter and refinery expansion and additions	Expansion of, and additions to, the existing smelter and refinery to enable production of up to 650,000 tpa copper plus associated products (gold, silver, and acid). This would include: • a new concentrate handling and blending facility • additional concentrate leach capacity • upgrade and expansion of the existing smelter feed preparation • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to a FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure • upgrade of the existing slag concentrator circuit and subsequent development of a new slag concentrator circuit • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant and upgrade of the existing acid plants • a new electrorefinery and associated infrastructure • a new slimes treatment plant • expansion of PMR facility • slag stockpile and treatment.
Electricity demand, supply and distribution	An electricity demand of up to 68 mega volt-amperes (MVA) net load increase would be required for the SRE Project. The additional electrical demand due to the SRE Project would be met by capacity from the national grid via the existing 275 kV transmission line (noting potential for below line land disturbance and associated vegetation clearance outside of the SML). Minor augmentation of existing onsite electricity supply infrastructure at Olympic Dam within the SML would be to ensure the additional capacity could be achieved and maintained. New high voltage and low voltage power supply and reticulation infrastructure would be required to all smelter infrastructure.
Water demand	Water demand of between 2 and 16 megalitres per day (ML/day) required for the SRE Project in addition to the existing supply for current operations.
Water supply and distribution	The SRE Project proposes no additional water abstraction from the Great Artesian Basin (GAB) above daily average BAU volumes. Water supply for the SRE Project would nominally be provided from the Department for Infrastructure and Transport (DIT) Northern Water Project (NWP) infrastructure, following commissioning of the initial 90 ML/d capacity of the NWP. This would require new water storage and distribution infrastructure to connect the SRE Project to the NWP connection point at the SML boundary. The NWP water supply may be supplemented or offset by the provision of local groundwater supply (subject to further approvals). This water supply would occur via existing process storage dams, the desalination plant at the Olympic Dam site, and/or through the distribution of the existing water supply within daily average BAU volumes. The additional water supplies are likely to require augmentation of the existing desalination water treatment plant and water distribution network, and a demineralised water plant will be required to support the SRE Project operations.

<table>
<tr><th>Project element</th><th>Summary</th></tr>
<tr><td>Supporting infrastructure</td><td>Supporting infrastructure includes:
civil infrastructure works, such as roads and stormwater infrastructure
new offices and crib rooms
new workshops
new laydown areas
process control system upgrades
concrete batching
other supporting infrastructure as required to facilitate the implementation and operation of the SRE Project.</td></tr>
<tr><td>Waste management</td><td>Development of the SRE Project may require decommissioning of the existing processing plant components including dryers, the electric furnace and the existing concentrate storage and transfer system. Some of the decommissioned infrastructure would be retained in-situ to preserve operational flexibility or for future management under the site Closure Management and Rehabilitation Plan, however some elements may require disposal as a component of the SRE Project.
Waste generated during construction would be managed as follows:
where practicable, demolition materials would be removed from site and recycled
materials not suitable for removal from site would be managed on the SML via existing waste management facilities.
All waste generated from construction of the SRE Project would be managed in accordance with existing site procedures and approved management plans.
Operational wastes associated with the SRE Project consist of processing and non-processing wastes where:
processing wastes are limited to low-copper slags generated from the smelting and slag concentrator operations that are not suitable for reprocessing and effluent streams from various process operations that are directed to tailings, including from the PMR and smelter off-gas systems
non-processing wastes including reagent packaging wastes and operational consumables.</td></tr>
<tr><td>Workforce</td><td>100% fly-in/fly-out (FIFO) workforce is assumed for construction and the SRE Project operational workforce. Estimated peak construction workforce numbers (in full-time equivalents (FTE)) are summarised below.
<table>
<tr><th>Construction stage</th><th>Average FTE</th><th>Peak FTE</th></tr>
<tr><td>Stage 1a</td><td>~708</td><td>~1,313</td></tr>
<tr><td>Stage 1b</td><td>~260</td><td>~515</td></tr>
<tr><td>Stage 2</td><td>~519</td><td>~978</td></tr>
</table>
Following construction, the SRE Project would require the permanent operational workforce summarised below.
<table>
<tr><th>Operational stage</th><th>Additional SRE Project operational workforce</th><th>Total Olympic Dam Smelter and Refinery workforce</th></tr>
<tr><td>Stage 1a</td><td>~207</td><td>766</td></tr>
<tr><td>Stage 1b</td><td>~57 (additional to Stage 1a)</td><td>823</td></tr>
<tr><td>Stage 2</td><td>~244 (additional to Stage 1b)</td><td>1,067</td></tr>
</table>
SRE Project construction and operational workforce is proposed to utilise existing and new accommodation to be established by BHP for SCM27 shutdown, Olympic Dam future campaign maintenance accommodation, and/or greenfield accommodation (subject to separate approvals).</td></tr>
</table>

Project element	Summary
Concentrate import	Import of copper concentrate from Prominent Hill and Carrapateena mining operations, as well as possible future mining operations (e.g. Oak Dam), and maintain the ability to receive copper concentrate from other third-party suppliers. Prominent Hill concentrate may be passed through concentrate leach to remove fluorides prior to smelter feed preparation. Carrapateena concentrate to pass directly to smelter feed preparation. Other, third-party concentrates may be passed through concentrate leach to remove deleterious elements (e.g. fluorides) prior to smelter feed preparation as required.
Production and export	Total production volumes of up to: • ~650,000 tpa of cathode copper • ~893,000 ounces per annum of gold • ~3,950,000 ounces per annum of silver • ~4,900 tpa of uranium oxide concentrate; note that the SRE Project does not materially change existing uranium production, with an increase of approximately 1% expected as a result of the leaching of Prominent Hill concentrate to remove fluoride. No upgrade or modification of uranium production facilities is proposed as a part of the SRE Project • ~1,700,000–1,900,000 tpa of 98% sulphuric acid (H_2SO_4), of which up to approximately 810,000 tpa may be exported from Olympic Dam (i.e. operations become 'net' sulphuric acid producer).



KEY

- Special Mining Lease
- SRE Project Area
- EIGR Area

Existing environment

- BHP private transmission line (275 kV)
- Rail line
- Major road
- Minor road
- Named waterbody
- National park
- Woomera Prohibited Area

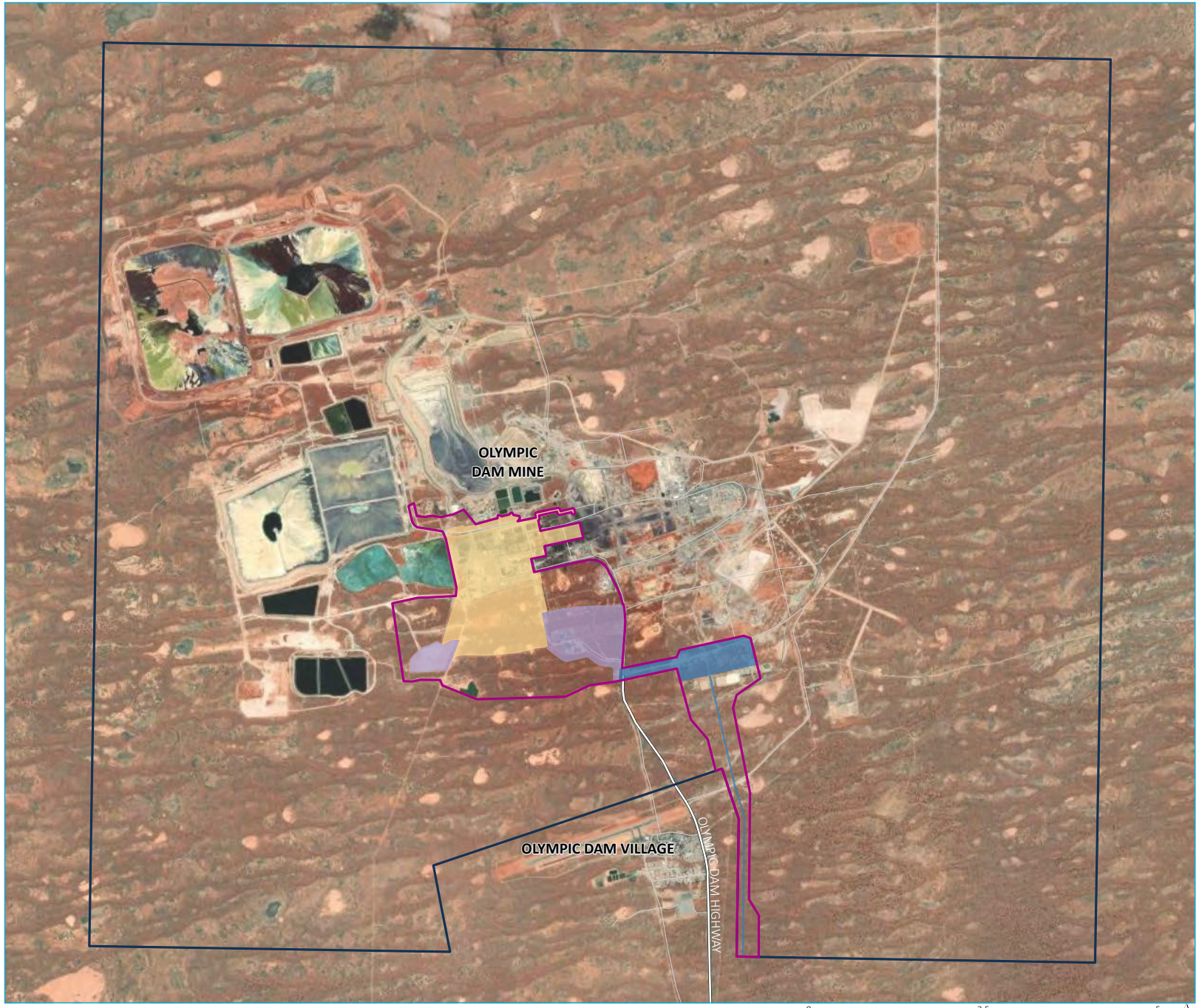
INSET KEY

- Major road
- National park

SRE Project Area - regional locality

BHP SRE Project
Social Impact Assessment
Figure 1.1

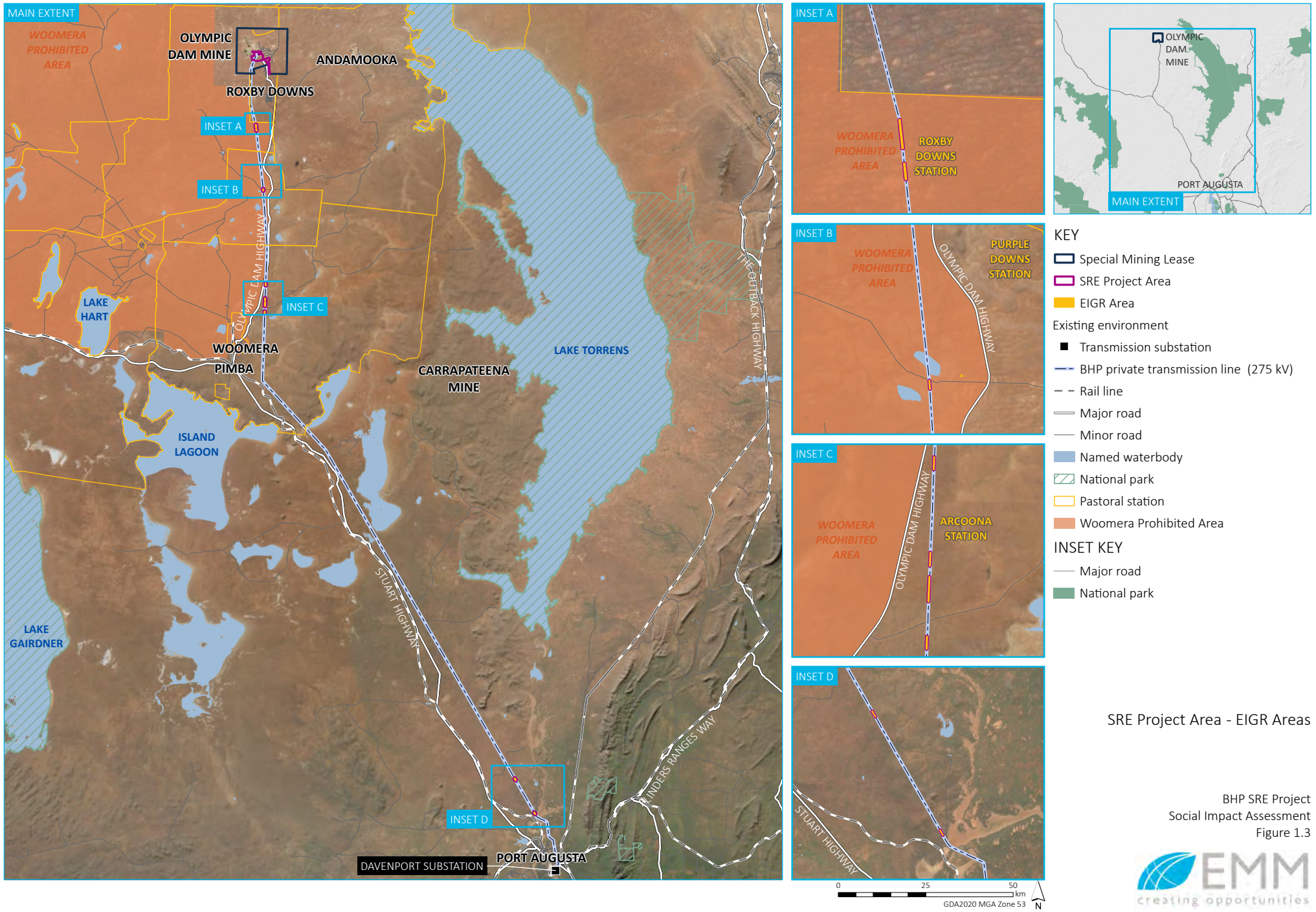
EMM
creating opportunities



SRE Project Area - SML Area

BHP SRE Project
Social Impact Assessment
Figure 1.2

EMM
creating opportunities



SRE Project Area - EIGR Areas

BHP SRE Project
Social Impact Assessment
Figure 1.3

EMM
creating opportunities

1.4 Purpose of the SIA

The purpose of the SIA is to identify and assess the social impacts and benefits which may occur in the local and regional communities as a result of the SRE Project. This includes how such impacts or benefits might be mitigated or enhanced and subsequently monitored to ensure the mitigation is adequate and effective. The Department for Energy and Mining's SIA Guideline (DEM 2024) defines a social impact as *changes to lives, lifestyles and how people make a living*.

SIA involves analysing, managing and monitoring the social consequences of a development such as this project. This includes changes to, or impacts on, communities that are likely to occur throughout the SRE Project's lifecycle.

The International Principles for Social Impact Assessment defines SIA as the process "of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions and any social change processes invoked by those interventions" (Vanclay 2003, pp. 5).

Given the above, the objectives of this SIA are to:

- define the communities potentially affected by the SRE Project
- provide stakeholders with the opportunity to provide inputs into the SIA, including the scope of assessment, identification of the key impacts and benefits that may be experienced in different communities, and how they might be avoided, mitigated or the benefits enhanced
- develop a robust community baseline of the existing social environment against which potential changes (positive and adverse) may be assessed
- provide a detailed assessment of effects, both positive and negative, on the social environment
- undertake an assessment of impacts and benefits to determine their significance
- define mitigation and enhancement measures and outline how they will be monitored.

2 Methodology

This section describes the methodology that has been used to undertake the SIA. The methodology has been specifically tailored to meet the SRE Project Specific Assessment Requirements while also aligning with the Department for Energy and Mining's (DEM) SIA Guideline and BHP's EIAF.

Key steps in the SIA process include scoping, analysing the baseline conditions, assessing the potential effects on social values, evaluating the confirmed social impacts and defining management measures (Figure 2.1). Each step is informed by outcomes of stakeholder engagement.

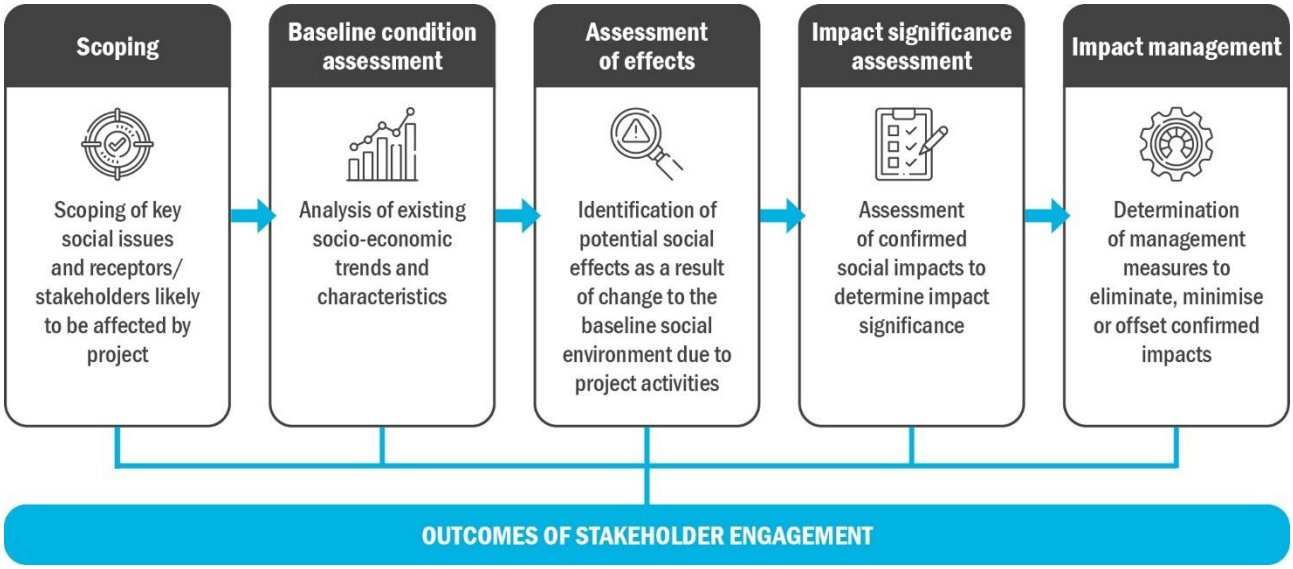


Figure 2.1 Overview of SIA methodology

The key steps in the SIA process, including engagement, are described in the following sections.

2.1 Scoping

Scoping is the first phase of the SIA process and serves to gain an understanding of what the SRE Project entails and how it might interact with the social environment. As outlined in the IAIA SIA Guidance Note, scoping is defined as the process of determining the main issues of concern and the interested and affected parties for a particular planned intervention (Vanclay et al. 2015). It is a preliminary process that produces an interim list of issues to be considered that are later properly assessed. Scoping also ensures that the SIA is appropriately scaled and consistent with regulatory requirements.

The objective of scoping for this SIA was to ensure that proportionate depth and scope is given to the potentially significant impacts of the Project. A number of scoping activities were undertaken to achieve this objective, including:

- understanding the regional context
- outlining the policy and planning context relevant to the SIA
- defining the anticipated SRE Project activities, including project labour and accommodation requirements
- preliminary identification of relevant stakeholder groups and the potential key social changes likely to be invoked by SRE Project activities, including relevant baseline indicators to be collated.

The outcomes of scoping activities informed the definition of the study areas for this SIA, the information to be gathered for the social baseline and the assessment of potential impacts. Outcomes of scoping activities are presented in Chapter 3.

2.2 Baseline condition assessment

The second step in the SIA process is understanding the relevant baseline conditions which constitute the social environment. The baseline condition assessment presents community profiles and a selected set of social indicators for the defined SIA study areas and provides a benchmark against which potential social impacts can be identified, assessed and confirmed.

The objective of baseline condition assessment for this SIA was to concisely document the current state of relevant social, economic and land use characteristics within the defined SIA study areas, providing a benchmark against which direct and indirect impacts can be identified, assessed and managed. The scope and content of the social baseline study was tailored to the specific context and only included indicators and information which was deemed useful and meaningful to the prediction and assessment of impacts. Relevant indicators were defined during the scoping process (Section 3.4) to ensure development of a relevant and concise social baseline analysis.

The baseline condition assessment has drawn on a range of primary and secondary information sources to obtain both qualitative and quantitative data to inform this SIA. Quantitative data sources include:

- Australian Bureau of Statistics (ABS), including for Census and population data
- Government of South Australia's population projection data
- Australian Government's Labour Market Information Portal, including data on unemployment and labour force participation trends, and skills and occupation shortages and projections
- Australian Institute of Health and Welfare, including data on health and wellbeing indicators.

Qualitative data sources include:

- outcomes of targeted stakeholder engagement undertaken for the SRE Project and from BHP commissioned community perception surveys
- review of literature, including from:
    - peer-reviewed academic journal articles
    - industry-commissioned surveys and research reports, including for BHP
    - government policy and other publications
- desktop review of mapping tools, for data on location of social infrastructure and other areas of social interest.

The baseline condition assessment is reported in Chapter 5 of this SIA.

2.3 Assessment of effects

An assessment of effects is undertaken to determine the change in social values resulting from proposed SRE Project activities. The first step in the assessment of effects is impact identification. The International Principles for Social Impact Assessment considers that social impacts include all the issues associated with a planned intervention that affect or concern people, whether directly or indirectly (Vanclay 2003).

Identification of impacts is an exercise requiring subjective judgement to determine what is likely to happen to the social environment as a consequence of the SRE Project and its associated activities. Impacts were identified and described using data triangulation of multiple sources of information, including both primary and secondary data. Primary data included the outcomes of community and stakeholder engagement activities as described in Chapter 4. Secondary data informing impact identification comprised:

- project description information
- demographic, employment, housing and other data available from the ABS, Government agencies and local government
- government-authored strategic policies, plans and documents
- outcomes of other technical assessments undertaken for the SRE Project
- desktop research of websites, databases and grey literature as referenced.

Social impacts were identified from the perspective of the relevant impacted stakeholder groups/s or receptor. Therefore, this SIA recognises that the experience of social impact is subjective; that is, different people experience and perceive changes to the social environment and their impacts on them differently.

Identified social impacts were categorised based on the nature of each impact, being:

- positive impact (benefit): where the impacted stakeholders would be 'better off' or would benefit due to the SRE Project, and/or the quality of life of affected stakeholders is improved
- negative impact: where the impacted stakeholders would be 'worse off' due to the SRE Project and/or the quality of life of affected stakeholders is diminished.

Once the impacts were identified, the sources, pathways and receptors were defined for each identified impact. Sources, pathways and receptors are defined in the EIAF, and for the purpose of this assessment have been applied as follows:

- Source – the potential impact event (e.g. traffic) which, individually or in combination, has the potential to impact a receptor.
- Pathway – the land and/or air pathway, means or route (with consideration of any natural barriers) by which an identified receptor can be exposed to, or may reasonably be expected to be impacted by, the source.
- Receptor – the receptor (e.g. stakeholder) that may be impacted by the source via the pathway.

The identified impacts were predicted based on the social conditions in the SIA study areas at the time when the SIA was undertaken. It is recognised that the predicted social impact and their assessment may change with any alterations to the socio-economic or political context or as stakeholder perceptions change over time as more information about the SRE Project becomes available.

2.4 Impact assessment

The impact assessment facilitated the quantification of the identified negative social impacts resulting from the predicted change to baseline social values (pathway) on identified receptors. It enabled determination of the significance of confirmed negative social impacts. The significance of social impacts was determined by applying BHP's consequence matrix. In determining the impact significance, consideration was given to the:

- type of impact (direct or indirect)
- geographic extent, size and scale
- duration, frequency, reversibility of the potential impact
- whether the potential impacts are from planned or unplanned events
- sensitivity of the receptor and the value of the receptor
- uncertainty associated with the determination of impact significance.

The consequence definitions and significance determination matrix applied in this SIA is presented in Table 2.1.

Table 2.1 Consequence definitions and significance determination for socio-economic pathway

Severity Level	1	2	3	4	5
Significance	**Not Significance**		**Significant**		
Adjoining land and infrastructure (third-party users, indigenous community, social value)	No measurable impact to surrounding land and infrastructure.	Minor repairable damage to land and infrastructure with short-term disruption to use. Minor damage to a conservation area that can be repaired without impacting on conservation values. Suspension of important community services (e.g. transport, telecommunications, energy) for up to one hour.	Damage to land and infrastructure that results in remediation costs and/or loss of income of up to US $1 m. Damage to a conservation area that can be fully remediated within 12 months. Suspension of important community services (e.g. transport, telecommunications, energy) for up to one day.	Damage to land and infrastructure that results in remediation costs and/or loss of income of up to US $10 m. Damage to a conservation area that cannot be remediated within six months and results in the temporary loss of one or more values for which the area was reserved. Suspension of important services to the community (e.g. transport, telecommunications, energy) for more than one week.	Extensive damage to land and infrastructure that results in remediation costs and/or loss of income of over US $10 m. Irreversible damage to a conservation area resulting in permanent loss of one or more of the values for which the area was reserved. Suspension of important services to the community (e.g. transport, telecommunications, energy) for more than a month.
Economic (social value, local community, indigenous community)	No measurable adverse impact on local communities or businesses.	Short-term impacts on local businesses and/or wellbeing of local communities where those affected could be expected to adapt or cope.	Ongoing impacts on the wellbeing of local communities that results in members of the community leaving the area and/or significant mental health issues across the community. Ongoing impacts on local businesses that result in closures and (direct and indirect) loss of employment for up to 20 people.	Ongoing impacts on the wellbeing of local communities that results in a significant proportion of the community leaving the area and/or serious mental health issues across the affected communities. Ongoing impacts to businesses that result in closures and (direct and indirect) loss of employment for up to 100 people.	Ongoing impacts on the wellbeing of communities that leaves towns unable to effectively function. Ongoing impacts to businesses that result in closures and (direct and indirect) loss of employment for more than 100 employees and/or towns in the region becoming unviable.
Public health and safety (human health, indigenous community, local community, social value)	Injury or illness requiring first aid treatment with immediate release	Injury or illness requiring short-term (less than one week) hospitalization with full recovery.	Reversable impairment or serious injuries requiring long-term hospitalisation to one or more members of public.	Single fatality or injury or illness that results in permanent disablement.	Multiple fatalities or serious disabling injuries.

Severity Level	1	2	3	4	5
Significance	**Not Significance**		**Significant**		
Occupational health and safety (human health, social value)	Low level impact resulting in first aid only.	Non-life altering or short-term disabling injury or illness to one or more persons.	Life altering or long term/permanent disabling injury or illness to one or more persons.	One to five fatalities or one to five chronic life-threatening illnesses.	Six or more fatalities or six or more chronic life-threatening illnesses.
Visual amenity (human amenity, indigenous communities, social value)	Introduction of elements in the landscape that may be visible but are consistent with the existing landscape.	Introduction of elements to the landscape that are visible and inconsistent with the local pattern and landform resulting in a reduction in visual amenity that can be remediated.	Introduction of elements to the landscape that are visible and inconsistent with the local pattern and landform resulting in a reduction in visual amenity that cannot be remediated.	Introduction of elements that result in long-term (during operations) substantial changes to the landscape with the total loss or degradation of elements, features or characteristics resulting in an adverse impact for several receptors.	Introduction of elements that result in substantial permanent changes to recognised significant landscapes with the total loss or degradation of elements, features or characteristics.
Historic heritage (heritage values)	No measurable impact to items of historic heritage significance.	Isolated damage to locally significant historic heritage features that is readily rectified.	Damage to State or national listed natural, cultural or historic heritage site that does not alter its heritage significance as stated in the listing.	Permanent damage to State or national listed natural, cultural or historic heritage site that results in a loss of heritage significance as stated in the listing.	Permanent damage to State or national listed natural, cultural or historic heritage site resulting in the site no longer meeting the listing criteria.
Cultural heritage (cultural heritage, indigenous communities)	No measurable impact to items or places of cultural heritage significance.	Isolated damage to item or place of local cultural heritage significance that is readily rectified. Damage to item or place of local cultural heritage significance of low heritage value due to its poor inherent condition.	Damage to an item or place of local cultural heritage significance of low heritage value due to its poor inherent condition.	Loss of multiple items of cultural heritage significance. Damage or loss of a locally significant place.	Permanent loss of a rare place or substantial reduction in cultural heritage values.

2.5 Management and mitigation

Management and mitigation measures were identified for negative social impacts where the impact assessment has determined that the uncontrolled impact is significant (as being level 3 or above), or where such uncertainty exists that a significant impact may occur.

The recommended management measures were developed using adaptive management principles, recognising that impacts may change over time, and that ongoing monitoring of impacts would provide the flexibility to accommodate such changes.

2.6 Limitations and assumptions

The following limitations and assumptions apply to this SIA:

- There has been limited engagement with stakeholders. The subjective and variable nature of social impacts makes it difficult to accurately predict and assess the significance of impacts without stakeholder feedback. Additional stakeholder engagement would enhance the validity of identified social impacts.
- Baseline data is principally sourced from the ABS 2021 Census of Population and Housing. The baseline represents a point in time, noting that social characteristics and trends within communities are fluid and change over time.

3 Scope of SIA

Scoping was undertaken to inform the nature and scale of the SIA, and to align with best practice expectations as outlined in the IAIA SIA Guidance Note (Vanclay et al. 2015) and the DEM's SIA Guideline (DEM 2024).

To understand the nature and scale of the SRE Project, various activities were undertaken during scoping, including:

- Understanding the regional context (Section 3.1).
- Outlining the policy and planning context relevant to the SIA (Section 3.2).
- Defining the anticipated SRE Project activities, including project labour and accommodation requirements (Section 3.3).
- Preliminary identification of relevant stakeholder groups and the potential key social changes likely to be invoked by SRE Project activities, including the relevant baseline indicators to be collated (Section 3.4).

Outcomes of these activities then informed the determination of the study areas for the SIA (Section 3.5). The following sub-sections detail the outcomes of the scoping activities.

3.1 Overview of project location and regional context

The SRE Project is located at the existing Olympic Dam Mine site, which is on the traditional country of the Kokatha People. The SRE Area is situated immediately south of the Olympic Dam Mine Site, and north of Olympic Dam Airport. Access to the SRE Area is via Olympic Dam Highway.

The SRE Project is situated within the State Government defined region of Far North, which spans approximately 800,000 km^2 and has a population of approximately 25,560 people (ABS 2021). The Far North includes the following LGAs:

- Anangu Pitjantjatjara Yankunytjajara
- City of Port Augusta
- District Council of Coober Pedy
- Flingers Ranges Council
- Roxby Downs Council
- Whyalla City Council.

Municipal services to communities outside of the above listed LGAs but within the Far North region are provided directly by the South Australian Government via the Outback Communities Authority which was created to assist with local governance across remote townships in South Australia. The Authority works in partnership with peak community organisations in individual townships to manage facilities and services. The majority of the SRE Project is located wholly within the unincorporated area managed by the Outback Communities Authority, with a small portion of the proposed Electricity Infrastructure Ground Re-Profiling Area located with the City of Port Augusta[2].

Key communities near to the Olympic Dam Mine include Roxby Downs, Andamooka, Woomera, Port Augusta and Whyalla (Figure 3.1).

[2] Electricity Infrastructure Ground Re-Profiling Area (portion) within CT 5439/775.



Figure 3.1 Geographic area and Olympic Dam Mine

The Far North region incorporates two of South Australia's tourism icons – the Flinders Ranges and the Outback. It also contains the majority of South Australia's priority mineral exploration regions and the crossroads of Australia's national land transport network. Mining and pastoralism are the main industries of the Far North, with key growth industries including tourism and energy. Mining has traditionally been the primary economic driver, responsible for over 63% of the Far North's output, and contributing over $1.7 billion in regional value-add (Infrastructure Australia 2022). Port Augusta is the largest community within Far North and acts as a vital service centre for the region's widespread and diverse small communities.

3.2 Policy and planning context

Informing the scope of the SIA is the policy and planning context. Table 3.1 provides an overview of the social and economic policies and strategies relevant to the SRE Project and describes how the SRE Project may contribute to, or support achievement of, community goals, aspirations, actions, or strategies.

Table 3.1 Overview of policy and planning context

Authority	Policy/strategy	Description and relevance to SRE Project
Government of South Australia		
Department of Infrastructure and Transport	State Planning Policies for South Australia 2019 (Department of Infrastructure and Transport 2019)	The State Planning Policies aim to establish a framework that supports the liveability, prosperity and sustainability of South Australia, highlighting support for population growth, infrastructure, service needs, and awareness and attention to community aspirations. Future economic prosperity for regional cities and townships is also a key feature of the State Planning Policies. State Planning Policies relevant to this SIA include: • State Planning Policy 6: Housing Supply and Diversity. • State Planning Policy 7: Cultural Heritage. • State Planning Policy 9: Employment Lands. • State Planning Policy 11: Strategic Transport Infrastructure. The SRE Project has the potential to support economic prosperity in regional townships through employment and business opportunities, which may also translate to support of regional service needs and infrastructure upgrades through increased economic activity in the regions.
Department of Planning and Local Government	Far North Regional Plan 2010-2036 (Department of Planning and Local Government 2010)	The Plan guides future land use and development in the region that sets out how the State Government proposes to balance population and economic growth with the need to preserve the environment and protect the heritage, history, and character of regional communities. The plan highlights the need to focus on population and industry growth in Port Augusta and Roxby Downs, as well as strengthen the tourism industry in the Outback, and expand the mining industries and associated infrastructure (Department of Planning and Local Government 2010). A new Regional Plan for the Far North Region is currently underway, with community consultation completed in 2024. The SRE Project is well aligned to strengthen the identified areas of Roxby Downs and Port Augusta through expansions of resource extraction operations. The SRE Project also has the potential to contribute to the Outback tourism industry through collaboration with Kokatha Aboriginal Corporation (KAC), Kuyani Yartah Association (KYA) and Barngarla Determination Aboriginal Corporation (BDAC) Indigenous Groups to promote the regions cultural significance.
Infrastructure South Australia	20-year State Infrastructure Strategy 2020 (Infrastructure South Australia 2020)	The aim of the Strategy is to make South Australia more productive through identifying areas where investment can best catalyse growth in an economically efficient way. The Strategy must be reviewed at least once every five years. The 2025 Strategy will look at state-wide infrastructure needs to 2045, with a focus on infrastructure planning and investments that drive a growing economy aligned to the State's economic vision of a smart, sustainable and inclusive economy. Community consultation for the 2025 Strategy was completed in 2024, with the final 2025 Strategy to be released in 2025. The SRE Project has the potential to meet the strategies aim of increasing the state's economic output and per-capita Gross Domestic Product through by supporting employment and business opportunities and development of infrastructure that enhance the economy.
Outback Communities Authority	Strategic Management Plan 2020-2025 (Outback Communities Authority 2020)	The Plan illustrates the goals and strategies of the Authority for a five-year period. Building upon three key objectives from previous plans, the 2020-2025 Plan seeks to grow the economy by facilitating new investment in the Outback, grow the community by improving the 'liveability' of the Outback for those that live, work and visit, and lastly, grow influence and presence by better articulating and communicating the needs of Outback people Department of Planning and Local Government 2010. The SRE Project has capacity to provide outcomes relevant to the Strategic Management Plan, particularly economically through increased employment and local service procurement opportunities, and community through collaboration that focuses on improving liveability.

Authority	Policy/strategy	Description and relevance to SRE Project
	Strategic Blueprint for Outback SA - December 2025	The Strategic Blueprint identifies the issues that affect the lives of people who live in Outback SA, and outlines strategies for improved facilities and services for the region over the next 10 years. The Strategic Blueprint is it intended to serve as a guide for advocacy, investment, and partnerships. The SRE Project has capacity to provide outcomes relevant to the Strategic Blueprint, particularly economically through increased employment and local service procurement opportunities, and community through collaboration that focuses on improving liveability.
Regional Development Australia		
Regional Development Australia – Far North South Australia	The Regional Blueprint 2024–2025 – Edition 5 (Regional Development Australia South Australian 2024)	The Regional Blueprint acts as a reference point to coordinate opportunities and investment across the three levels of Government in South Australia to deliver long-term and sustainable outcomes for regional areas. The Regional Blueprint is updated annually. Regional priorities for the Far North region include economic development, strategic infrastructure investment, business capacity building, and population growth. The SRE Project has potential to contribute to the blueprint by enabling employing opportunities and supporting development in the Far North Region.
	Outback Communities Authority Region Economic Growth and Investment Strategy 2019 (Outback Communities Authority 2019)	The Strategy addresses the region's economic development challenges and prospects through a focus on providing opportunities for investment that support the region's long-term growth. The strategy includes four action areas with action area two: Support growth and development of mining and mining services, being most relevant to the SRE Project. The SRE Project supports action area two through the facilitation of resource extraction operations in the region.
	Roxby Downs Region Economic Growth and Investment Strategy 2019 (Regional Development Australia South Australian 2019)	The Strategy focuses on providing opportunities for investment to support the long-term growth of Roxby Downs. The Strategy emphasises three action areas: support development of Roxby Downs as a sustainable community, support growth and development of mining, and support the development of the Roxby Downs region's visitor economy. The SRE Project directly relates to action area 2: support growth and development of mining and mining services.
Local Government		
Roxby Downs Council	Strategic Plan 2021–2025 (Roxby Downs Council 2021)	The Plan communicates Council's aspirations and approach to achieving the best outcomes for the community. The overarching aspiration of the Plan is for Roxby Downs to become *Australia's most highly regarded mining town.* Six community foundations underpin the Plan, with those relevant to the SRE Project including: health and wellbeing; community vibrancy; economic development; infrastructure and essential services; and community services. The SRE Project has the potential to contribute to several strategies outlined in the Plan, such as through supporting local business development by prioritising local purchasing and work with the Council to develop programs that support the community's social and wellbeing needs.

Authority	Policy/strategy	Description and relevance to SRE Project
	Community Development Plan 2020–2022 (Roxby Downs Council 2020)	The Roxby Downs Community Development Plan 2020-2022 was ratified by the Roxby Downs Community Board in September 2019. Six themes underpin the Community Development Plan, including: leadership; health and wellbeing; economic prosperity; youth; community vibrancy; and environment and sustainability. The SRE Project has the potential to enhance community vitality in Roxby Downs by increasing the engagement of the non-resident workforce with local businesses, services, and social infrastructure. The presence of a larger non-resident population may contribute to economic activity, support local businesses, and improve service viability, aligning with key themes of the Community Development Plan. However, ensuring integration and positive community outcomes will depend on effective workforce engagement strategies and local investment initiatives.
Whyalla City Council	Strategic Plan 2021–2030 (Whyalla City Council 2021)	The overarching vision for the City of Whyalla is to be a vibrant and attractive city, offering the community a diverse range of sustainable economic, social, environmental, and cultural opportunities. The SRE Project has the potential to promote a sustainable economy for the City of Whyalla through creation of service prospects and employment opportunities.
	Strategic Plan 2025–2034 (Whyalla City Council 2025)	The overarching vision for the City of Whyalla is to continue creating a vibrant and attractive city encompassing a diversity of sustainable social, economic, environmental and cultural opportunities and actively engage the community with a sense of purpose. The SRE Project has the potential to promote a sustainable, diverse and prosperous economy for the City of Whyalla by harnessing employment opportunities and creating service prospects.
	Economic Development Strategy 2020–2030 (Whyalla City Council 2020)	The principal focus of the Plan is assisting key stakeholders with projects and initiatives that focus on economic development. The aim is to create a more liveable, smart, and environmentally sustainable community that is recognisable on a global stage. The SRE Project would contribute to economic development through generation of employment and business opportunities.
Port Augusta City Council	Strategic Directions Plan 2019–2029 (Port Augusta City Council 2019a)	The Port Augusta City Council's Plan promotes of a vision for the future whereby the city positions itself as the leader in renewable energy in South Australia. The Plan also outlines aspirations for the city to continue growing as a service centre and regional hub to industries of the Outback regions. The SRE Project is well positioned to offer employment and business opportunities that will assist with the Council's aspirations to act as a service regional service hub for resource extraction projects in Outback regions.
	Four Year Priority Action Plan 2019–2022 (Port Augusta City Council 2019b)	The plan outlines the medium-term actions that the council aim to build towards to achieve the longer-term aspirations encapsulated in the Strategic Directions Plan 2019–2029. Broadly the priority plan draws on four themes to focus the Council's strategic aspirations, Community, Economy, Environment, and Infrastructure. The SRE Project has the potential to assist the Council's aspirations to build on history and become a model regional hub through employment and business development opportunities.

3.3 Labour and accommodation requirements

To inform the scope and scale of the SIA, an understanding of SRE Project labour and accommodation requirements is required. The construction personnel profile has a peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025).

All construction personnel are assumed to be residing at the Olympic Dam Village (ODV) and Olympic Dam Village South (ODS) accommodation villages.

Following construction, the SRE Project would require an operational workforce of approximately 508 personnel, which would build upon the existing smelter and refinery operations workforce of approximately 766 personnel.

It is assumed that both the construction and operational workforce for the SRE Project will be predominantly fly-in-fly-out (FIFO). This is due to the specialist skills required and the significant shortage of skilled labour in Roxby Downs. The ODS accommodation facility is being recommissioned and expanded under a separate approval process. Approximately 90% of operational personnel are expected to reside at the ODV, ODS and Roxby Downs Village (RDV) accommodation facilities, while the remaining 10% will reside in Roxby Downs.

The exact source of FIFO workers cannot be predicted with certainty. However, for the purposes of this SIA, it is assumed that 96% of workers will be sourced from within South Australia with the remainder from as anticipated from Queensland and Western Australia.

FIFO arrangements would transfer Adelaide based from Adelaide to Olympic Dam. A bus service would then transfer personnel to their accommodation facility.

3.4 Stakeholder profile and preliminary identification of key social issues and opportunities

An objective of the SIA scoping process was identification of potential social impacts generated by the SRE Project. The preliminary identification of potential social issues and opportunities informs the scope of relevant social indicators which constitutes the baseline analysis. Outcomes of this scoping activity also informed the identification of stakeholders.

The key stakeholder groups relevant to this SIA include:

- Kokatha People, Native Title holder
- KYA and BDAC Indigenous Groups
- local Councils and representatives of townships in unincorporated areas
- State Government
- local and regional communities
- local and regional economic and industry groups
- social infrastructure and community services
- existing BHP workforce.

Table 3.2 outlines the stakeholders who may be affected by the SRE Project, the potential social issues and opportunities relevant to the stakeholder group, and the relevant baseline social indicators required to inform further analysis of the identified preliminary social issues and opportunities.

Table 3.2 Preliminary identification of key social issues and opportunities

Stakeholder group	Stakeholder/receptor	Potential issues with SRE Project	Potential opportunities with SRE Project	Baseline social indicator
Native Title holder	• Kokatha People • Kokatha Aboriginal Corporation	• Perceived loss of intangible cultural heritage values on SRE Project Areas due to changes in the natural and visual landscapes.	• Generation of employment and business opportunities.	• Cultural values • Labour force characteristics • Existing employment arrangements • Amenity values
Indigenous Groups	• KYA • BDAC	• Perceived loss of intangible cultural heritage values on SRE Project Areas due to changes in the natural and visual landscapes.	• Generation of employment and business opportunities.	• Cultural values • Labour force characteristics • Existing employment arrangements • Amenity values
Local Councils and Representatives of unincorporated areas	• Roxby Downs Council • Andamooka Progress and Opal Miners Association • Woomera Board • Port Augusta City Council • City of Whyalla	• Increased demand on local social infrastructure, services and facilities due to increase in non-resident population. • Increased traffic congestion due to vehicle and machinery traffic associated with construction activities. • Increased community tensions due to increase in non-resident workers and perceived “fly-over” effects.	• Increased economic prosperity for local businesses due to increase in non-resident workers engaging in local economy. • Increased community vitality due to increase in non-resident workers participating in community events and initiatives.	• Population trends • Community values • Business and industry characteristics • Traffic counts
State Government	• Outback Communities Authority • Department for Health and Wellbeing • Department for Education • Department for Energy and Mining • Department for Infrastructure and Transport	• Increased demand on social infrastructure, services and facilities due to increase in non-resident population. • Increased traffic congestion due to vehicle and machinery traffic associated with construction activities.	• Increased economic prosperity for local businesses due to increase in non-resident workers engaging in local economy. • Increased community vitality due to increase in non-resident workers participating in community events and initiatives.	• Population trends • Community values • Business and industry characteristics • Traffic counts

Stakeholder group	Stakeholder/receptor	Potential issues with SRE Project	Potential opportunities with SRE Project	Baseline social indicator
Local and regional communities	• Roxby Downs community • Andamooka community • Woomera community • Pimba community • Port Augusta community • Whyalla community	• Increased demand on local social infrastructure, services and facilities due to increase in non-resident population. • Increased regional traffic congestion due to vehicle and machinery traffic associated with construction activities. • Changes in natural and visual landscapes due to expansion infrastructure. • Increased community tensions due to increase in non-resident workers and perceived “fly-over” effects. • Perceived increased risk to health and safety due to exposure to toxic chemicals and materials. • Perceived reduced access to flights for local residents due to increase in non-resident workers. • Perceived increase in crime and anti-social behaviour due to increase in non-resident workers.	• Generation of employment and business opportunities. • Increased economic prosperity for local businesses due to increase in non-resident workers engaging in local economy. • Increased community vitality due to increase in non-resident workers participating in community events and initiatives.	• Population trends • Community values and sentiment • Labour force trends • Business and industry characteristics • Health and wellbeing characteristics • Amenity values • Traffic counts
Local and regional economic and industry groups	• Regional Development Australia – Far North • Roxby Downs Business Forum	• Increased competition for skilled labour due to generation of jobs.	• Generation of employment and business opportunities. • Increased economic prosperity for local businesses due to increase in non-resident workers engaging in local economy.	• Labour force trends • Business and industry indicators

Stakeholder group	Stakeholder/receptor	Potential issues with SRE Project	Potential opportunities with SRE Project	Baseline social indicator
Social infrastructure and community services	• Child and Family Health Service – Roxby Downs • RFDS Roxby Downs Auxiliary • Andamooka RFDS Health Clinic • Country Fire Service Roxby Downs • Police Station – Roxby Downs and Andamooka • Roxby Downs Area School • Roxby Downs Community Youth Centre	• Increased demand on local social infrastructure, services and facilities due to increase in non-resident population. • Increased traffic congestion due to vehicle and machinery traffic associated with construction activities. • Increased demand on emergency services due to risk of on-site incidents and increase in potential hazards from toxic chemicals exposure. • Reduced access and connectivity for emergency services due to increase in heavy vehicles on Olympic Dam Highway. • Perceived increase in crime and anti-social behaviour due to increase in non-resident workers.	• Increased community vitality due to increase in non-resident workers participating in community events and initiatives.	• Capacity of social infrastructure and services • Community values and sentiment • Health and wellbeing indicators

3.5 SIA study area determination

This section details the study area determined for the SIA. The study areas are based on those communities that have potential to experience changes to the social environment due to location of SRE Project infrastructure and activities, or changes to the population profile. Outcomes of scoping activities facilitated the understanding and determination of the SIA study areas. In addition, the following factors informed selection of the SIA study areas:

- Remoteness of the SRE Project site.
- Existing labour and business supply hubs, such as the regional cities of Whyalla and Port Augusta.
- Local and regional transport and connectivity networks.
- FIFO worker source communities.

The SIA study areas also reference areas defined by the ABS Australian Statistical Geography Standard. Table 3.3 describes the SIA study areas.

Table 3.3 SIA study area

Study area	Area and ABS code	Proximity/relevance to site
SRE Project areas	N/A	The majority of the proposed SRE Project activities, with the exception of ground re-profiling within the Electricity Infrastructure Area, is located within BHPs existing Special Mining Lease (SML).
Nearby local communities	Roxby Downs (SA2 406021143)	The nearby local communities study area includes Roxby Downs, located approximately 8 km from Olympic Dam Mine, and Andamooka, situated around 26 km from the mine. These towns serve as key residential and service hubs for the region, supporting both resident and non-resident workforces associated with mining and related industries.
	Andamooka (SAL 40023)	
Nearby regional communities	Woomera (UCL 422061)	The nearby regional communities include Woomera (80 km from Olympic Dam), Port Augusta (240 km), and Whyalla (290 km). These towns have varying levels of interaction with Olympic Dam Mine, primarily through labour supply, business services, and regional economic activity. Port Augusta and Whyalla serve as key hubs for workforce recruitment, specialised services, and supply chain support, while Woomera has a smaller but relevant connection due to its proximity.
	Port Augusta (UCL 413003)	
	Whyalla (UCL 412004)	
Regional study area	Unincorporated SA (LGA49399)	The regional study area includes the SRE Project Areas, the nearby communities, and the LGAs of Unincorporated SA, Roxby Downs, Wommera, Pimba, Port Augusta and Whyalla.
	Roxby Downs (LGA46970)	
	Port Augusta (LGA46090)	
	Whyalla LGA (LGA48540)	
State	South Australia (STE 4)	Used for comparison of social characteristics.

4 Community and stakeholder engagement

<< To be updated as SRE Project stakeholder engagement outcomes become available >>

This SIA is informed by the feedback generated through community and stakeholder engagement.

Community and stakeholder input has an important role in understanding the social context, assessing potential social impacts, and developing management measures. Engaging communities and stakeholders is necessary to understand how they might experience and perceive social impacts. Stakeholder input can also contribute to the design of the SRE Project so that it enhances benefits, mitigates negative impacts, and manages unavoidable residual social impacts.

The objectives of stakeholder engagement are to:

- provide stakeholders with the opportunity to define local values and the characteristics of potentially affected communities
- identify stakeholder concerns and interests and provide stakeholders with the opportunity to identify and assess potential impacts
- ensure the SIA and the SRE Project considers the interests and perspectives of stakeholders who may be affected by proposed SRE Project-related impacts
- verify and supplement the identification and understanding of potential impact pathways, receptors and materiality, and to inform the development of potential outcomes
- meet the expectations of the South Australian Government.

Stakeholders were engaged as part of the broader SRE Project community engagement program, and engagement outcomes directly informed preparation of this SIA.

In December 2024, two community engagement sessions were held in Roxby Downs to introduce the SRE Project to the local community. The sessions were attended by 20 participants, including BHP employees, Roxby Downs Council representatives, Traditional Owners, local businesses, an environmental NGO, and Andamooka residents. Overall, attendees provided generally positive feedback on the SRE Project.

During construction a number of engagement activities are proposed to be established and undertaken including:

- quarterly townhalls in Roxby Downs
- community hub for drop-ins on Roxby Downs main street
- adaptation of BHP's community complaints mechanism for the SRE Project
- regular cadences with local councils, including Port Augusta Regional Council and Roxby Downs Council.

The key outcomes of the stakeholder engagement sessions are summarised in Table 4.1, highlighting the community's perspectives, concerns, and opportunities related to the SRE Project.

Table 4.1 Outcomes of December 2024 community engagement sessions

Theme	Community engagement outcomes
Community benefit	• Community vibrancy and growth: The SRE Project is expected to enhance community vibrancy, but stakeholders want clarity on tangible community benefits. • Challenges in Roxby Downs: The town is perceived as lacking vibrancy compared to 15 years ago, with empty shopfronts and a declining community feel. • Balancing FIFO and residential workforce: BHP should promote the benefits of living in Roxby Downs and support a stable residential workforce while balancing FIFO operations. • Strengthening local engagement: Suggestions included requiring superintendents to be residential for two years to improve community integration and vibrancy. • Roxby Downs as a family-friendly town: Internally, Roxby Downs is recognised as a great place for families, and stakeholders support creating more local job opportunities to sustain its population. • Social investment and local partnerships: A new Social Investment proposal with BHP is in development, including a mural project on a school exterior wall in partnership with Kokatha. • Roxby Business Forum and workforce engagement: The Roxby Business Forum could be a valuable engagement opportunity for addressing hard-to-fill roles, with potential for BHP to support communications and marketing efforts.
Community services and impact	• Road safety and increased traffic: Concerns were raised about the increase in truck traffic due to the SRE Project and how BHP will manage road safety. • Community impact and essential services: Residents worry about strain on essential services, including difficulty accessing doctors, increased pressure on childcare, and limited housing availability. • Social and community dynamics: The shutdown workforce may alter the community dynamic, with concerns about law and order, the need for more policing, and an anticipated rise in crime and antisocial behaviour. • Infrastructure and accessibility: Residents fear reduced access to flights, difficulty securing restaurant bookings, and the lack of a local vet, which presents challenges for pet owners needing emergency treatment. • Workforce onboarding and safety: Questions were raised about onboarding procedures for Carra, PH, and OD, including police clearances and contractor screening for prior sexual assault convictions. • Future infrastructure and development: The Northern Water Project was viewed positively, and there was curiosity about potential future rail projects in the region.
Opportunities for businesses	• Local business capability: Many local businesses across cleaning, staffing logistics, and engineering are available to support the SRE Project. Specific engagement with local businesses would help maximise their involvement. • Contracting and procurement: Stakeholders highlighted the use of C-Res and ICN Gateway for contracting opportunities and expressions of interest, with some businesses working towards obtaining a vendor number. • Supply chain clarity: There is a need for clear communication on procurement processes, particularly regarding direct supply versus third-party supply chains. • Indigenous business involvement: Stakeholders inquired about opportunities for Indigenous-owned businesses and how they could participate in procurement.
Impacts to cultural heritage	• Cultural heritage process and management: Concerns were raised about how BHP will manage cultural heritage impacts, particularly regarding artefact protection and salvage processes. • Indigenous group consensus on salvage: Stakeholders questioned whether all three Indigenous groups must agree to salvage for it to proceed, and what happens if one group does not wish to salvage the artefacts. • Forum for Indigenous engagement: There was interest in whether an established forum exists where Indigenous groups can express concerns and actively participate in heritage management discussions.

5 Local spend and benefits

5.1 Local spend, local employment and supplier benefits.

BHP currently generates significant positive benefits to the local and Indigenous communities in SA. This spend is aligned to the company's priority Social Value, i.e. to support Thriving and Empowered Communities.

BHP's approach to local and Indigenous procurement has and continues to bring lasting economic benefits with enduring partnerships. The results are available in its 2024 Economic Contribution Report[3]. BHP defines local spend at a more granular level than the State of South Australia. Local vendors are defined in partnership with BHP's Community function and by geographic postcodes.

For the smallest operators in the local communities BHP has the Local Buying Program (LBP) available for their registration and use. The program, which provides onboarding and payment support also is a portal where work opportunities can be shared. For example, in FY25 there were 1,608 vendors for Copper SA ,147 local vendors (9.14% of suppliers). A total of 76% of local vendors were engaged through the LBP. The remainder of venders were engaged directly with BHP. Importantly 67 of vendors to Copper SA were Indigenous (4.2% of suppliers to Copper SA)).

When considering total spend in SA in 2025 local spend was A$260M, including A$20M facilitated through the LBP. Local Suppliers totalled 147, including 80 through the LBP with Indigenous Spend of A$109M, including A$3.5M through LBP.

Whether utilising the LBP or engaging through contracts or purchase orders directly payment have been designed to support ease of payments (i.e. for small, local and Indigenous vendors the payment terms are 7 days).

BHP is committed to annual internal targets for its operations, driven by ambitious and interconnected initiatives set out its:

- Elevate Reconciliation Action Plan
- BHP's Local Buying Program, operated by its strategic partner C-Res
- the associated Local Buying Foundation.

BHP's FY26 Major Projects Indigenous Procurement Strategy associated with its Copper SA Growth Program includes employment and procurement targets (see BHP's Elevate Reconciliation Action Plan[4]).

For Copper SA BHP will seek Local and Indigenous business procurement and employment outcomes directly and indirectly through the use of an Engineering Procurement Construction Manager (EPCM). Through partnering with its EPCM and ensuring contractual obligations for social value outcomes BHP will identify opportunities and embed processes to enable Indigenous and Local procurement and employment are a key component of the project. The LBP will also be opened for the EPCM to provide opportunities to the smallest of these businesses.

5.2 Capability and capacity building

Supporting Copper SA growth plans, BHP engages with cross-discipline and culturally appropriate partners to develop its Major Projects Indigenous Procurement Strategy, which in addition to direct contracting opportunities will also see programs associated with education, business development and procurement pathways that build and support capability and capacity programs for Indigenous businesses in SA to provide sustainable outcomes across industries and beyond the growth program.

[3] Economic contribution report 2024 | BHP

[4] 200921_bhpreconciliationactionplan.pdf

6 Baseline condition assessment

To enable the definition of potential effects of the SRE Project on social values, and the subsequent impacts to receptors, it is necessary to understand the existing baseline environment, and specifically to:

- classify and describe existing social values prior to the development of the SRE Project
- provide a basis for subsequent works aimed at describing the likely change in the baseline environment as a result of the development of the SRE Project and quantifying the significance of resultant impacts to receptors.

This section provides the community profiles and baseline condition assessment across the SIA study areas. As detailed in Section 3.5, the SIA study areas entail:

- SRE Project areas
- nearby local communities of Roxby Downs and Andamooka
- nearby regional communities of Woomera, Pimba, Port Augusta and Whyalla
- regional study area, which incorporates the LGAs of Unincorporated SA, Roxby Downs, Whyalla and Port Augusta.

Data for the State of South Australia is also presented where relevant to enable comparison of social trends.

6.1 Community profiles

A community profile is provided for the SRE Project Areas and each of the nearby local communities relevant to the SRE Project. A community profile is a qualitative description of an area or community, including a discussion of key trends and issues (Vanclay et al. 2015). Data supporting development of the community profiles is provided in Annexure C.

6.1.1 SRE Project Areas

The majority of the proposed SRE Project, with the exception of ground re-profiling within the Electricity Infrastructure Area, is proposed to be located within the existing SML.

The SRE Area, General Infrastructure Area and Water Infrastructure Area are located adjacent the existing Olympic Dam Mine and north of the Olympic Dam Airport, with access via Olympic Dam Highway.

The Olympic Dam Mine is on freehold land held by BHP and is subject to a SML granted under the Olympic Dam and Stuart Shelf Indenture and ratified by *the Roxby Downs (Indenture Ratification) Act 1982*. The SML encompasses approximately 17,800 hectares, and the SRE Project will be located within this lease boundary.

The SRE Project Area is entirely within the Native Title determination boundary of the Kokatha People (tribunal file number SCD2014/004), which was formally determined in September 2014.

The SML is bordered by:

- Crown Land to the south and east, managed by the Municipal Council of Roxby Downs
- Roxby Downs Pastoral Station to the west and north
- Andamooka Pastoral Station to the north-east.

Both the Roxby Downs and Andamooka Pastoral Stations are leased by BHP and sub-leased to Kokatha Pastoral Pty Ltd for ongoing pastoral activities. Adjacent to these stations is the Purple Downs Pastoral Lease, also owned by BHP. Collectively, these pastoral leases span over 5,000 km² and are managed by the KAC. The area currently supports approximately 2,000 head of Angus cattle.

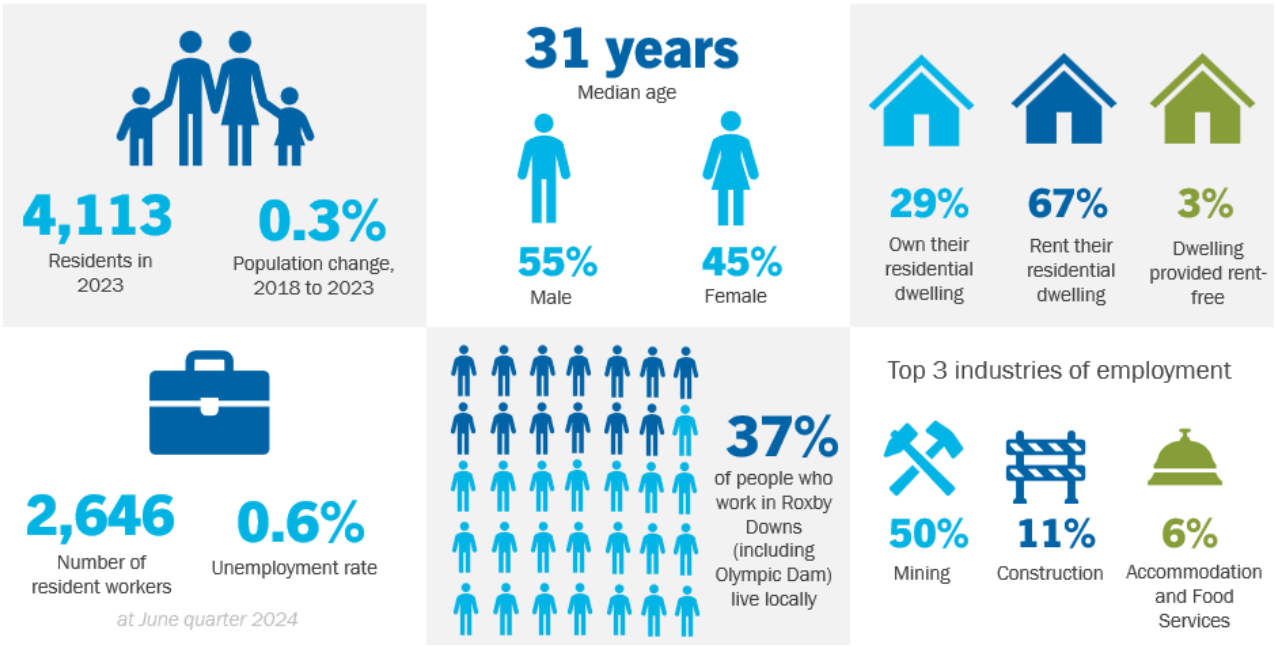
All activities within the Olympic Dam SML, including the proposed SRE Project, are associated with the ongoing Olympic Dam operations, mineral exploration, and infrastructure maintenance.

6.1.2 Roxby Downs

Roxby Downs is in the Far North Region of South Australia, about 570 km north-west of Adelaide. Roxby Downs was established in 1987 to provide accommodation and support services to the Olympic Dam Mine workforce. Prior to the establishment of Roxby Downs township, the workforce resided in a camp at Olympic Dam Mine. Today, Roxby Downs has an estimated residential population of 4,113 people and is a key service centre for the regional area providing a range of social infrastructure, commercial services and recreational facilities (ABS 2024a).

The *Roxby Downs (Indenture Ratification) Act 1982* sets out the structure for the community, and how the community is to be administered (Hales 2008; Roberston et al. 2017). The Act includes special provisions concerning local governance, including the establishment and operation of the Roxby Downs Council. This council operates with all the powers, functions, and duties of a municipal council, as outlined in the Act.

Roxby Downs has the attributes of a mining town, exhibiting demographic characteristics typified in mining towns such as a relatively young population, high degree of population mobility and subsequent low rates of home ownership, high rates of labour force participation and low rates of unemployment, and high proportion of households earning high incomes (ABS 2021). Roxby Down's residential population is supplemented by a FIFO workforce associated with the Olympic Dam Mine. Key population and demographic characteristics of Roxby Downs are depicted in Figure 6.1.



Source: ABS (2021); Jobs and Skills Australia (2024); ABS (2024).

Figure 6.1 Key population characteristics of Roxby Downs (SA2)

Analysis of desktop quantitative and qualitative data identified the following key demographic and social trends in Roxby Downs:

- **Stable population:** The average annual population growth rate over the five years to June 2023 was less than 0.1% (ABS, 2024a). The population is projected to remain relatively stable, increasing by 0.4% to reach 4,129 residents by 2041 (Department of Trade and Investment 2024). Contributing factors to population stability include the longevity of the Olympic Dam Mine, the presence of family-oriented infrastructure, and residency incentives provided by BHP.

- **Relatively young population:** Over a quarter of the population is aged 14 years or younger, reflecting Roxby Downs' family-oriented community and the availability of facilities such as schools and childcare (ABS 2021). In contrast, less than 2% of the population is aged 65 years or older, suggesting that residents typically retire elsewhere to access lifestyle amenities or aged care services (ABS 2021).

- **High levels of economic activity:** The town exhibits a high labour force participation rate (78%) and an exceptionally low unemployment rate of 0.6% as of June quarter 2024 (Jobs and Skills Australia 2024). This indicates limited labour availability within the township.

- **High-income households**: More than half of Roxby Downs households earn over $3,000 per week, compared to less than one-fifth of households across South Australia (ABS 2021). This highlights the community's affluence, driven by high incomes associated with the mining sector.

- **Dominance of mining employment**: Mining is the primary industry of employment, employing nearly half of the resident workforce and supported by a significant FIFO/DIDO workforce (ABS 2021). At the 2021 Census, 6,211 people worked in the Roxby Downs area (including the Olympic Dam Mine), with 59.9% (3,719 workers) directly employed in mining. Among Roxby Downs residents, 2,254 people participated in the labour force, and 49.9% (1,124 workers) worked in the mining industry (ABS 2021).

Roxby Downs provides a range of significant social infrastructure, community services and recreational facilities servicing the town's population, the nearby community of Andamooka and pastoral stations on the town's periphery. It is also home to several community cultural and sporting events, including the annual Roxby Downs Markets. The location of key facilities in Roxby Downs is depicted in Figure 6.2.

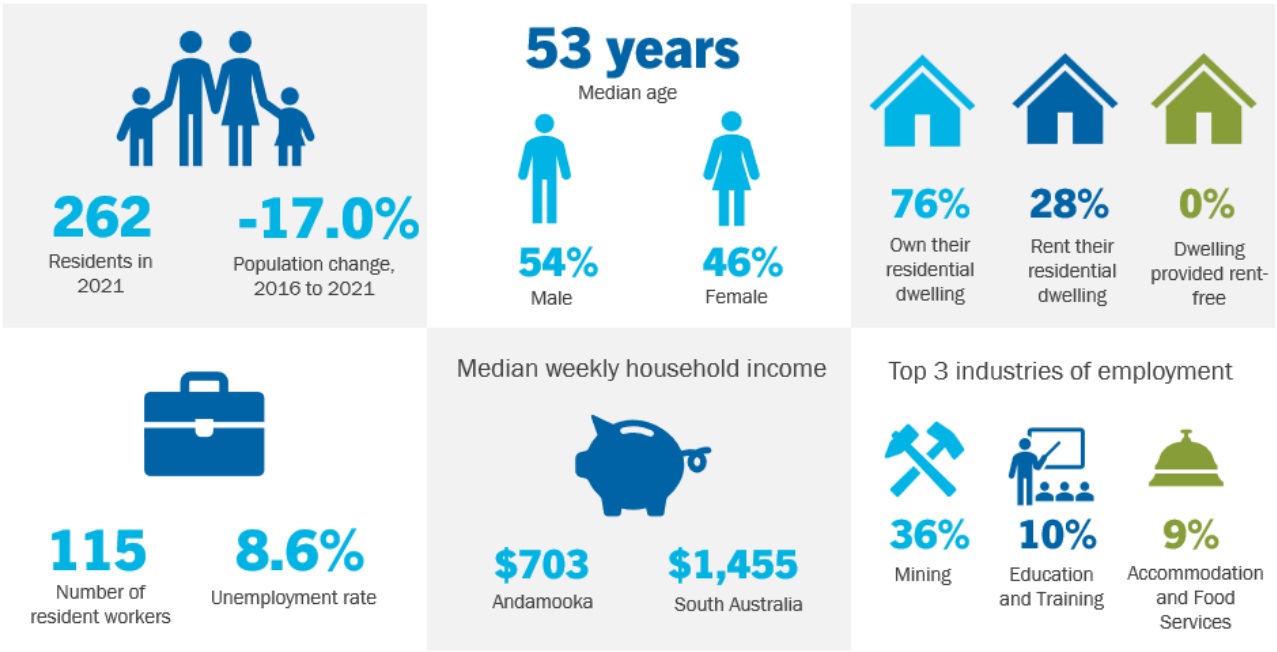


Figure 6.2 Location of key facilities in Roxby Downs

Access to Roxby Downs is via Olympic Dam Highway, which commences at the Stuart Highway. Olympic Dam Airport is serviced by Alliance Airlines, which operates a daily public transport service between Olympic Dam and Adelaide.

6.1.3 Andamooka

Andamooka is a small township located approximately 30 km north-east of Roxby Downs with a population of 262 people (ABS 2021). Access to Andamooka is by Andamooka Road via Roxby Downs. Andamooka is known for its opal mining and fossicking, with opal discovered in the area in 1933. Like most mining towns in the twentieth century, the population of Andamooka fluctuated due to the cyclical nature of the mining industry. Andamooka's population peaked in the 1960s due to an opal boom, with the town recording over 2,000 residents (APOMA n.d.-a). However, the town has experienced significant population decline over the last decade, with the population declining by more than half (55.7%, or a loss of 330 residents) between 2011 and 2021 (ABS 2021; ABS 2011). Key population and demographic characteristics of Andamooka is depicted in Figure 6.3.



Source: ABS (2021).

Figure 6.3 Key population characteristics of Andamooka (SAL)

Analysis of desktop quantitative and qualitative data identified the following key demographic and social trends in Andamooka:

- **Significant population decline:** Between the 2016 and 2021 Census events, Andamooka's population decreased by 54 residents, representing a 17% decline (ABS 2016; ABS 2021). This decline is attributed to a lack of economic diversification, limited amenities and infrastructure, an ageing population, and harsh environmental conditions.
- **Ageing population:** Andamooka has a median age of 57 years, significantly higher than South Australia's median age of 41 years (ABS 2021). Over 30% of residents are aged 65 years or older, highlighting the community's vulnerability to demographic and economic challenges.
- **Economically inactive population:** Less than half of the working-age population participates in the labour force, and the unemployment rate is 8.6%, compared to 5.4% for South Australia (ABS 2021). This low participation in the labour force is likely influenced by the town's older population.
- **Low household incomes:** Nearly half of households earn less than $650 per week, compared to less than one-fifth across South Australia, while only 12% of Andamooka households earn more than $3,000 per week (ABS 2021). This indicates a high prevalence of low-income households in the community.
- **Strong community cohesion and connectedness:** More than one quarter of the population volunteered in in 2021, compared to 17% statewide (ABS 2021). Andamooka benefits from active community groups, including the Country Fire Service, a volunteer ambulance service, a community development program, and a historical society. High levels of volunteering contribute to strong social connectedness and community cohesion (Kragt and Holtrop 2019).

There are limited social infrastructure and services available in Andamooka due to the small size of the town, with residents typically travelling to Roxby Downs to access higher order services and facilities. Town services are managed by the Andamooka Progress and Opal Miners Association, which is funded by the Outback Areas Community Development Trust administered through the Outback Communities Authority. As at January 2023, the association had over 150 members and is run by a committee of nine elected members (APOMA n.d.-b). An objective of the Andamooka Progress and Opal Miners Association is to support development of tourism in Andamooka, building on the town's rich opal mining heritage, emerging astronomy industry and proximity to key nature-based recreation areas such as Lake Torrens.

6.1.4 Nearby regional communities

Other communities that may be impacted by the SRE Project include Woomera, Pimba, Port Augusta, and Whyalla. These communities are likely to experience varying levels of effect depending on their proximity to the SRE Project and the nature of the construction and operational activities.

An overview of each regional community is provided below:

- **Woomera:** Located approximately 83 km south of the SRE Project along the Olympic Dam Highway, Woomera had a population of 132 residents in 2021, reflecting a significant decline over the preceding decade (ABS 2021). Established as a purpose-built township to support classified military operations, Woomera was closed to the public until 1982. Compared to South Australia, its population is characterised by lower proportions of children and youth, a higher prevalence of lone-person households, no low-income households, and higher rates of population mobility (ABS 2021). Most residents are employed in defence-related roles or jobs that sustain the town's management and functions.

- **Pimba:** Situated 90 km from the SRE Project at the junction of the Stuart and Olympic Dam Highways, Pimba had 25 residents in 2021, representing a 30.6% population decline since 2016 (ABS 2016; ABS 2021). Originally established as a construction camp for the Trans-Australian Railway, Pimba is home to *Spud's Roadhouse*, which provides fuel, meals, general store items, and accommodation. The population is older (media age 52 years), with a higher prevalence of residents requiring assistance and no unemployed individuals. All employed residents are employed in the retail trade or accommodation and food services industries.

- **Port Augusta:** Located approximately 240 km south-east of the SRE Project on the Spencer Gulf, Port Augusta had a population of 14,420 residents in 2023 (ABS 2024a). It serves as a critical transport hub, connecting Adelaide, Darwin, and Peth via major highways and rail networks. Port Augusta is a regional base for government services, tourist access to the Flinders Ranges, and industries such as power generation, logistics, manufacturing, and agriculture. Compared to South Australia, Port Augusta has a higher proportion of Indigenous residents, lower labour force participation, high unemployment, and low individual and household incomes. Key industries include healthcare, public administration, and retail trade.

- **Whyalla:** Located 295 km from the SRE Project on the Eyre Peninsula, Whyalla, known as the "Steel City", had 21,902 residents in 2023 (ABS 2024a). It boasts a rich heritage in steelworks and shipbuilding and serves as tourist destination with diverse natural and recreational attractions. Whyalla has a higher proportion of residents aged 65 years or older, a greater prevalence of low-income households (over 25% earning $650 or less per week), a lower rate of population mobility, and a higher concentration of social housing. Key industries include manufacturing, healthcare, and retail trade.

6.1.5 Aboriginal Peoples

The regional study area encompasses the traditional lands of the Kokatha, Kuyani, and Barngarla Peoples, each with strong cultural and historical connections to the landscape. These Aboriginal groups hold distinct Native Title rights, cultural values, and historical traditions, shaping their contemporary identities and relationships with the land.

An overview of the Aboriginal groups is as follows:

- **Kokatha People:** The Kokatha People are the Native Title Determined Group for the SRE Project. Their traditional lands extend for 140,000 km^2 across northern South Australia, stretching north of Port Augusta, from Lake Torrens in the east to the Gawler Ranges in the west. The Kokatha People have long been associated with the lands surrounding Olympic Dam Mine, maintaining a strong cultural and historical presence in the region.

- **Kuyani People:** The Kuyani People have traditional lands west of the Flinders Ranges, encompassing approximately 34,000 km^2, as estimated by anthropologist Norman Tindale. Their territory extents north from Parachilna to the western flank of the Flinders Ranges and Marree. Lake Torrens, known to the Kuyani People as Ngarndamukia ("shower of rain"), is of great cultural and spiritual significance.

- **Barngarla People:** The Barngarla People are the Native Title Determined Group for the area spanning from northern Spencer Gulf to the south of Port Lincoln. Port Augusta services as a cultural hub for the Barngarla People and historically functioned as a traditional trading centre for Aboriginal groups across South Australia.

Key population, labour force and community values characteristics for the Aboriginal population of the regional study area include:

- **Population and demography:** Between the 2016 and 2021 Census, the Aboriginal population in the regional study area grew by 11.9%, increasing from 4,395 to 4,916 people (ABS 2016; 2021). This growth was slower than the 24.5% increase recorded for South Australia's Indigenous population as a whole. Nearly half (47.4%) of the regional study area's Indigenous population was aged 24 years or younger in 2021, aligning closely with the 46.2% recorded for South Australia's Indigenous population (ABS 2021).

- **Labour force:** In 2021, 1,517 Aboriginal people were part of the labour force in the regional study area. Of these, 274 were unemployed, resulting in an unemployment rate of 18.1%, compared to 15.6% statewide. The top industries employing Aboriginal people in the regional study area were copper ore mining, other social assistance services, and supermarkets and grocery stores.

- **Cultural values:** The Kokatha, Kuyani, and Barngarla Peoples maintain deep cultural ties to the landscape, with significant sites of spiritual, historical, and archaeological importance located throughout the region. To ensure the protection and recognition of these cultural values, BHP has undertaken and will continue to undertake identification of Aboriginal cultural heritage values through background research, Aboriginal consultation, archaeological field investigations and anthropological assessments, and cultural heritage surveys in accordance with the Olympic Dam Agreement.

With respect to cultural values, BHP has undertaken, and would continue to undertake:

- identification of Aboriginal cultural heritage values compiled through background research, Aboriginal consultation, archaeological field investigations and anthropological assessments

- cultural heritage surveys in accordance with the Olympic Dam Agreement (ODA).

The presence of any artefacts or identified Aboriginal cultural heritage values, including landscape features, which may be affected by the SRE Project will be handled in accordance with legislation and the agreed procedures and protocols for heritage management with the KAC, KYA and BDAC Indigenous Groups.

6.2 Key social trends and characteristics

An understanding of key social trends and characteristics across the study areas provide a benchmark against which potential social impacts can be assessed. The baseline analysis focuses on socio-economic characteristics relevant to the potential social issues and opportunities caused by SRE Project activities as identified in Section 3.4. Detailed baseline data is provided in Annexure C.

6.2.1 Population and demography

Population decline has been a persistent trend in South Australia's regional areas. Between 2013 and 2023, the regional study area's population decreased by 5.5%, contrasting with South Australia's 10.8% growth (ABS 2024a). Key drivers of regional population decline include structural ageing, job losses, economic shifts, and migration to regional coastal areas (Roberston et al. 2017; Irving et al. 2021). Locally, major events such as the closure of the Port Augusta power stations and Leigh Creek coal mine, alongside the deferred expansion of the Olympic Dam Mine, contributed to population decline, with Roxby Downs experiencing a 23.7% drop between 2011 and 2016 (ABS 2011; 2016). However, between 2016 and 2021, population decline in the regional study area slowed, and Roxby Downs remained relatively stable, with a 0.1% average annual growth rate (ABS 2024a) (Figure 6.4). Future stability is supported by the long-term operations at Olympic Dam, family-oriented infrastructure, and residency incentives from BHP. Housing shortages remain a barrier to population growth, while Andamooka continues to decline due to limited economic opportunities and an ageing population.

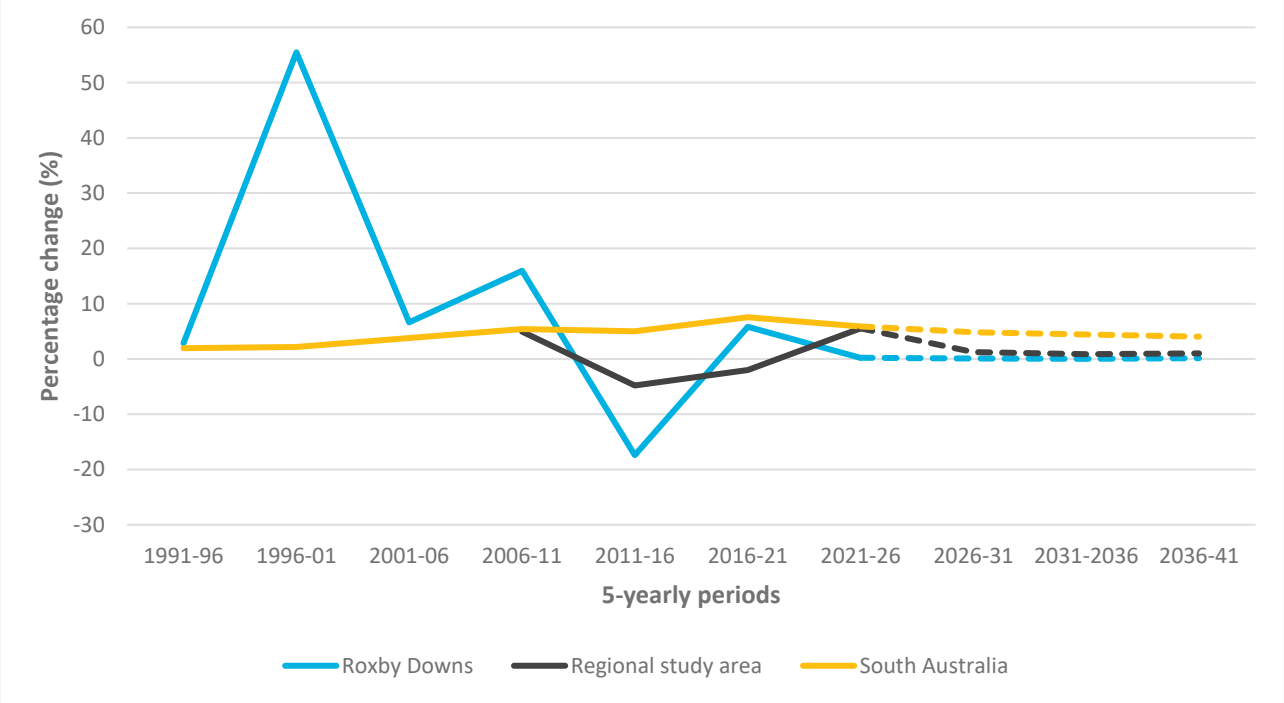


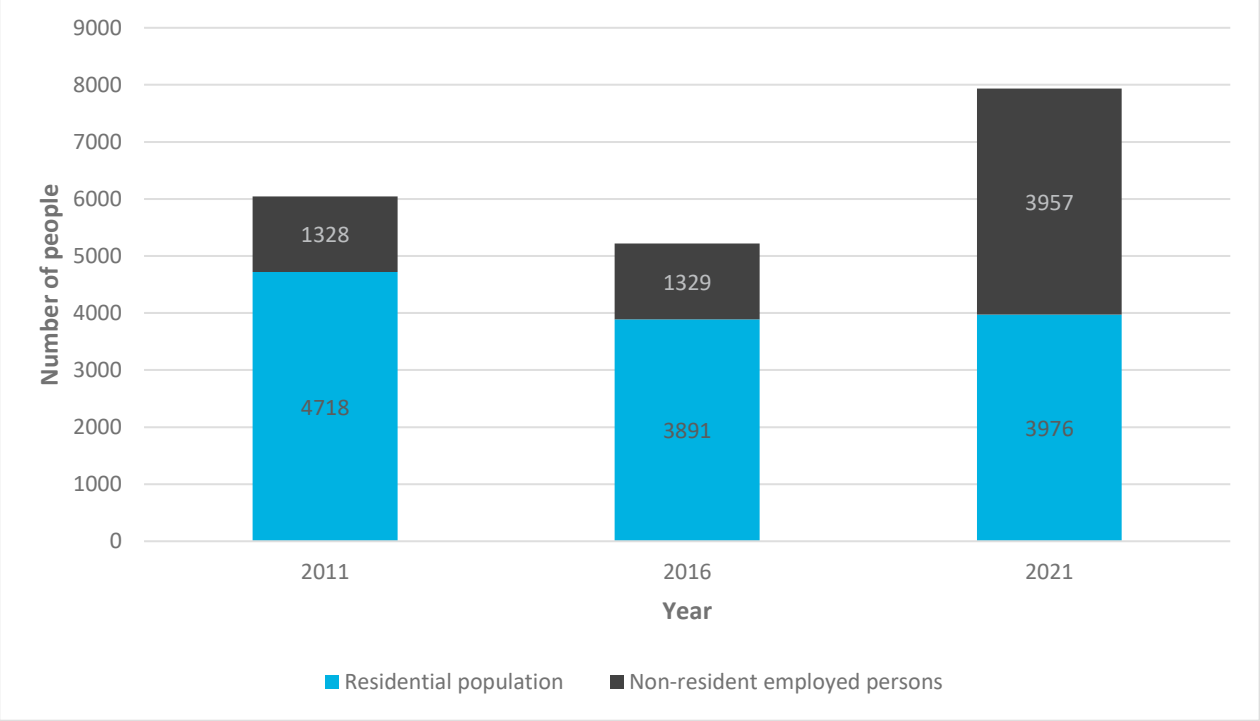
Figure 6.4 Historical and projected population change in Roxby Downs, the regional study area and South Australia, 1991 to 2041

Source: ABS (2024); Department of Trade and Investment (2024).

Over the 20 years to 2041, the regional study area's population is projected to grow by 8.8%, while Roxby Downs is expected to see minimal growth of 0.5%. This contrasts with South Australia's projected growth of 20.6% (Department of Trade and Investment 2024).

Mining and pastoral regions often experience high population turnover, affecting community cohesion, social capital, and resilience (Carson and Carson 2014). Roxby Downs has a highly transient population, with only 64.1% of residents remaining at the same address between 2020 and 2021, compared to 82.4% statewide (ABS 2021). Over five years, this retention rate drops to 30.6%, compared to 57.8% statewide, impacting volunteer availability, community engagement, and the housing market (Municipal Council of Roxby Downs 2021). The cyclical nature of mining operations at Olympic Dam further contributes to workforce mobility, influencing community stability.

Roxby Downs supports a substantial non-resident workforce, with many employees commuting via FIFO/DIDO arrangements. In 2021, only 36.3% of the 6,211 workers in the area, including those at Olympic Dam, reported Roxby Downs as their usual place of residence (ABS 2021). That year, the total residential and non-residential population was 7,933, with only 50.1% being local residents (Figure 6.5). This elevated proportion of non-residents was partly due to a scheduled campaign maintenance program in 2021, which temporarily increased the number of contract and transient workers at Roxby Downs and Olympic Dam.



Source: ABS 2021, Census of Population and Housing: General Community Profile and Working Population Profile.

Figure 6.5 Roxby Downs and Olympic Dam – residential and non-resident populations

Mining towns like Roxby Downs typically have younger populations, higher male proportions, and higher household incomes, while Andamooka is characterised by an ageing population and lower incomes. Woomera and Roxby Downs have few residents aged 65+, likely due to their single-industry economies, which attract working-age individuals and families. The absence of aged care options often leads older residents to migrate to regional centres or coastal areas upon retirement.

The regional study area has low cultural diversity, with fewer residents speaking languages other than English at home compared to South Australia. Port Augusta has the highest Indigenous population, with 20.8% of residents identifying as Indigenous in the 2021 Census (ABS 2021). Income levels vary across towns, with Roxby Downs and Woomera benefiting from mining and government sector wages, while Andamooka has a higher proportion of low-income households (47.5% earning below $650 per week), reflecting its ageing population reliant on government pensions (ABS 2021). Similarly, Port Augusta and Whyalla recorded lower household incomes compared to the state average.

6.2.2 Housing and accommodation

Roxby Downs has a higher proportion of unoccupied dwellings and low homeownership rates compared to South Australia. In 2021, 22.1% of Roxby Downs' 1,778 private dwellings were unoccupied[5], more than double the state average of 10.8% (ABS 2021) (Table 6.1). Nearby communities recorded even higher vacancy rates, with 74.9% of dwellings in Andamooka and 60.7% in Woomera unoccupied (ABS 2021). Population decline, along with mining and government-owned housing reserved for employees, likely contributes to these high rates of unoccupancy. Homeownership in Roxby Downs remains low, with only 28.5% of dwellings owned outright or with a mortgage, compared to 68.4% statewide (ABS 2021). Housing growth has been limited due to barriers to increasing housing stock, leading to a static rate base and constrained capacity to address housing needs (Municipal Council of Roxby Downs 2021).

Table 6.1 Overview of housing characteristics

Characteristic	Roxby Downs	Andamooka	Regional Study Area	South Australia
Number of private dwellings, 2021	1,778	529	17,100	775,134
Proportion of dwellings that are unoccupied, 2021 (%)	22.1%	74.8%	23.2%	10.8%
Dwelling owned outright or with a mortgage, 2021 (%)	28.5%	76.8%	55.2%	68.4%
Dwelling rented, 2021 ($)	67.1%	16.3%	40.5%	27.6%
Median weekly rent ($), 2021	$260	$150	-	$300

Source: ABS 2021, Census of Population and Housing: General Community Profile.

Rental housing in Roxby Downs and Woomera is dominated by company and government-owned housing. In 2021, 47.4% if rented dwellings in Roxby Downs and 78.4% in Woomera were classified as 'other landlord type', reflecting mining and RAAF housing arrangements. Despite having the highest median rent in the region ($260 per week), Roxby Downs remains below the state median of $300 per week (ABS 2021). BHP owns approximately 463 houses in Roxby Downs. The prevalence of company-provided and subsidised housing likely contributes to lower rental costs compared to state averages.

Housing affordability is a key concern in Roxby Downs, where income disparities between mine and non-mine workers are driving up rents and reducing affordability for some groups. FIFO workers are perceived as contributing to housing shortages, increasing demand for temporary housing, and impacting the local tourism industry (BHP 2023). Meanwhile, short-term accommodation remains vital in Roxby Downs, Andamooka, Woomera, and Pimba. In 2019, 59,000 domestic overnight visitors stay in the Roxby Downs LGA, with 78.0% travelling for business, highlighting the importance of short-term rentals in supporting the local economy (Tourism Research Australia 2019).

[5] *BHP's Scheduled Campaign Maintenance 2021 is likely to have influenced Roxby Downs vacancy rates with the Olympic Dam mine production workforce demobilised during the maintenance period.*

Rental vacancy rates in the regional study area fluctuate significantly. A 3% vacancy rate is considered a balance between supply and demand, with rates below 2% indicating high competition and reduced affordability, while rates above 4% suggest excess supply. As of December 2024, Roxby Downs had a 6.0% vacancy rate, while Andamooka's was 30.8%, reflecting its high number of unoccupied dwellings (SQM Research 2024). This suggests that, at present, Roxby Downs has unconstrained housing availability. Supporting this, as of June 2025, Roxby Downs had 102 dwellings for sale and 53 properties available for rent (REA Group 2025), further indicating that the housing market is currently not under pressure. However, Roxby Downs has faced chronic rental shortages in the past, with vacancy rates dropping below 1.5% in 2010, 2011, and again in 2020. Housing affordability remains a challenge, with income disparities between mine and non-mine workers exacerbating economic inequalities, further influencing rental market dynamics in the region.

Workforce Accommodation Villages (WAVs) are the predominant type of accommodation utilised by non-resident workers while on-shift in the regional study area. The regional study area hosts several WAVs to accommodate non-resident workers employed at nearby mines, including for the Olympic Dam Mine and Carrapateena Mine. The WAVs servicing the Olympic Dam Mine workforce include ODV and ODS. Another accommodation village, Roxby Downs Village (RDV), is located within the Roxby Downs township. Currently, approximately 90% of staff reside at ODV and RDV, with 10% living in individual houses in Roxby Downs.

6.2.3 Community and cultural values

This section describes the values held as important to residents of the nearby communities and the broader regional study area for quality of life and wellbeing. They include tangible elements such as access to infrastructure and community groups, and intangible qualitative such as sense of place and community cohesion. Identification of values were informed by engagement undertaken for the SIA and through analysis of literature.

The communities surrounding Olympic Dam, including Roxby Downs, Andamooka, Port Augusta, and Woomera, value both tangible and intangible aspects of quality of life. These include access to infrastructure, strong social networks, a sense of place, and community cohesion. The natural environment is highly valued, with the remote, pastoral landscapes offering unique cultural and recreational significance. Roxby Downs is perceived as a safe and family-friendly town, while Andamooka retains its appeal through its rugged landscape and historical identity. However, there are concerns over the impact of FIFO workforces, which some residents believe contribute to social disengagement and reduce BHP's local investment, although others see potential benefits in economic growth and housing development (Ipsos 2024).

Community connectedness is increasingly challenged by transient workforces, with declining volunteerism highlighting shifts in social capital. In 2021, only 14.0% of Roxby Downs residents engaged in voluntary work, compared to 17.0% statewide, a significant decline from 25.8% in 2016 (ABS 2021). Community surveys consistently identify concerns about workforce transience, limited social services, and difficulties in attracting critical workers (Ipsos 2022; 2024). While BHP-funded programs support community infrastructure, youth apprenticeships, and competitive salaries, there is a growing disconnect between the community's reliance on BHP and perceptions of inadequate local investment (Ipsos 2024).

The perception of mining and BHP's role in the community has shifted over time, with trust in BHP declining from 49% to 30% between 2020 and 2022, and favourability falling from 59% to 39% (Ipsos 2022). Concerns have evolved from FIFO employment to broader issues like declining local businesses, access to healthcare and education, and long-term community viability. A study found that 87% of interview participants did not see Roxby Downs as viable post-mining, reinforcing the town's economic dependency on Olympic Dam (Robertson et al. 2017).

Lake Torrens, a culturally significant site for Kokatha, Barngarla, Adnyamathanha, and Kuyani peoples, is central to both tourism and heritage preservation. BHP continues to undertake Cultural Heritage Assessments in accordance with the ODA and or *Aboriginal Heritage Act 1988*, ensuring Indigenous cultural values are considered in future developments.

BHP regularly commission community surveys associated with Olympic Dam Mine, with the most recent survey completed in August 2024 targeting the communities of Roxby Downs, Andamooka, Port Augusta, Whyalla and Woomera (Ipsos 2024). Table 6.2 summarises the key community values and perceptions identified in the 2024 Community Perception Survey.

Table 6.2 Key community values and perceptions

Theme	Community comments
Strong and tightknit community: many respondents speak highly about the strong sense of community. The town is appreciated for its safe environment, particularly for families.	• It is a safe community with lots of fun things for families.
Amenities and infrastructure: the well-maintained infrastructure, including roads, sporting facilities and library contribute to a good quality of life for the community.	• They have great facilities even though we are in the outer for Regional Area. Talking about the town, it is friendly and convenient for a young family, so we fell in love with this place.
Declining retail options and economic hardship: there's overwhelming concern over the decline of the local economy, evidenced by numerous vacant shops and high commercial rents, making it challenging for small businesses to thrive. This lack of retail diversity forces residents to rely on online shopping or travel long distances for basic goods.	• Community is dead. Shops are barren, only have a few selected options. Sporting events are dying, nothing to do in the town. • Shops are closing down, very limited stock and don't have access to a lot of stuff being remote. National bank has also closed. It will become a ghost town if nothing is done. • The town is reducing, and small businesses are being smothered. • All the empty buildings down the main street with broken windows and old signs.
FIFO erodes community spirit: BHP's perceived shift towards a FIFO model is seen to damage community spirit. Transient workers are not invested in the community and the town's long-term wellbeing and hinder the growth of population and investment into local businesses.	• FIFO has killed the town, there are no shops or services left in the town. • Due to remoteness of the area and the availability of FIFO, it is hard to attract permanent residents. Without permanent residents, there is no town. • FIFO causing families to exit the town.
Lacking the support needed for growth: residents believe that the local council, and BHP as the primary employer in the region, need to do more to address the economic challenges and provide essential services.	• BHP do not support our immediate Roxby community. They have pretty much decimated services, business and sporting clubs due largely to FIFO.

On the other hand, BHP has maintained a long-standing relationship with Roxby Downs and the Upper Spencer Gulf region through implementation of its Social Value Framework. Social value, as defined by BHP, refers to its positive contribution to society – encompassing its people, partners, the economy, the environment, and local communities. Guided by this framework, BHP collaborates with a range of local and regional organisations to deliver targeted social investment and support initiatives that align with community needs and aspirations (Table 6.3).

Table 6.3 Social investment initiatives in Roxby Downs and Upper Spencer Gulf Region

Partner	Description
Books in Homes	Bringing the joy of books three times per year for four Upper Spencer Gulf schools with high levels of student socio-economic disadvantage.
Community Grants Program	Funding to support ad hoc and opportunistic community events and projects. Delivered in fundings rounds per operation.

Partner	Description
Flipside Youth Mental Health Program (Country and Outback Health – Headspace)	Contribution towards operation of youth mental health program, to connect young people with a trained mental health clinician and a youth engagement worker in Roxby Downs.
Foodbank South Australia and Northern Territory	Assisted the establishment of a food hub in Ceduna. The partnership also provides opportunities for our staff to volunteer and BHP also coordinates a food drive at Christmas to assist Foodbank.
Operation Flinders	Contribution towards operation of youth mental health program, to connect young people with a trained mental health clinician and a youth engagement worker in Roxby Downs.
Remote and Isolated Children's Exercise	Funding to support activity and engagement days through the Remote and Isolated Children's Exercise program for isolated children in the Far North of South Australia.
Roxby Childcare support / Thriving Futures Program	Childcare support for the Roxby Downs area. The lack of available childcare in Roxby Downs means that there is a long waitlist at the Roxby Downs Children's Centre. This allocation is to provide professional development, mentoring and governance support, payment and infrastructure upgrades to the Roxby Downs Children's Centre, and upskilling/training support to the broader community, as well as supporting the establishment of Family Day Care centres in town.
Roxby Downs Community Hub	Healthy Environs project manages and facilitates the Community Hub on behalf of BHP Olympic Dam. The Community Hub is about working together to promote the health and wellbeing of people living and working in Roxby Downs and surrounding communities and focusses on three priority pillars; Early Childhood Development, Mental Wellbeing and Physical Health. The Community Hub adopts a model of collaboration and collective impact for community health.
Roxby Downs Innovation Hub	The Innovation Hub is a co-working space which opened in 2023. The hub is a pilot program which will enable residents of Roxby Downs and surrounding communities to work independently or collaboratively in a shared office environment.
Royal Flying Doctors Service	This partnership involves the contribution of funding each year towards the purchase and upgrade of aircraft and facilities. This partnership falls more within the definition of a sponsorship; however, inroads are being made to transform this into a true community partnership.
TACTIC	Sponsorship of the annual conference connecting buyers to suppliers in the Upper Spencer Gulf and local content services agreement to deliver local suppliers tours and engagement activities.
Arid Ranger Program	Project to support existing and new Indigenous Ranger programs in partnership with South Australia Arid Lands. The Project would look to value-add to existing KAC and Arabana Aboriginal Corporation Ranger programs, by providing additional personnel/equipment and facilitating operational collaboration to allow for knowledge sharing and capacity building between the programs.
Arid Recovery	Arid Recovery sits on the Olympic Dam SML, its purpose is to conserve Australia's arid lands and threatened species. They do this using exceptional science at the Arid Recovery Reserve in partnership with industry, traditional owners, government, NGOs and the local community. They foster the next generation of conservation scientists and share their passion for arid environments with the communities around them. BHP has consistently funded Arid Recovery as a founding partner every year over 11 years since 2011.
Biodiversity Conservation Project	Continued focused on existing biodiversity conservation project that focuses on 30x30 social value goal to have 30% of BHP land under conservation, restoration, or regenerative practices.
Clontarf Foundation	Developing pathways to employment and training for indigenous boys in regional South Australia.

6.2.4 Health and community wellbeing

Health and community wellbeing are essential to the quality of life of residents in the regional study area. Key health and wellbeing concerns include mental health issues, safety risks in mining, and community perceptions of crime and antisocial behaviour. Concerns over rising crime and antisocial behaviour have increased, particularly in relation to shutdown periods and contractor influxes. Community Perception Surveys show a rise in reported crime concerns from 1% in 2022 to 8% in 2023 (Ipsos 2024; Consentium 2024).

Mental health challenges are more prevalent in the Far North region than the state average, driven by geographic isolation, economic pressures, environmental adversity, and workforce-related stress (AIHW 2021). The FIFO model has contributed to anxiety, stress, and family disruption, exacerbated by limited service availability and staffing shortages. More broadly, sexual harassment and discrimination in the mining industry more broadly have also been highlighted, with 74% of women and 32% of men reporting workplace harassment in the past five years, disproportionately affecting women in FIFO roles (Verisk Maplecroft 2023). Environmental health concerns may relate to air quality, dust, and noise. According to the BHP Community and Human Rights Impact and Opportunity Assessment, there has been complaints made in relation to air quality and dust regarding demolition materials on roads in 2022 (BHP 2023).

Vulnerability relates to a group's capacity to adapt to, or cope with, changes to their social environment (Cutter et al. 2008). There are certain demographic and social characteristics that make some groups more vulnerable than others. Key vulnerable groups are identified by comparing the proportion of the vulnerable group in the regional study area with the proportion recorded for South Australia as a whole. For example, if the regional study area recorded a significantly higher proportion of unemployed persons compared with South Australia as a whole, it indicates that unemployed persons is a significant vulnerable group in the regional study area. Table 6.4 outlines the vulnerability indicators for the regional study area and South Australia.

Table 6.4 Potentially vulnerable groups, 2021

Indicator	Regional study area	South Australia	Comparison between regional study area and South Australia
Population change, 2016 to 2021 (%)	-2.3	6.3	v
People aged 14 years or under (%)	18.5	17.0	^
People aged 65 years or older (%)	16.5	20.0	v
Youth (15 to 24 years) (%)	11.4	11.7	v
People who do not speak English well or not at all (%)	0.6	2.7	v
People who need assistance (%)	6.3	6.7	v
People who reside in social housing (%)	36.2	20.3	^
Unemployed (%)	6.4	5.4	^
Households earning less than $650 per week (%)	19.5	18.3	^

Source: ABS 2021, Census of Population and Housing: General Community Profile.

The regional study area has higher proportions of people aged 14 years or under, people in social housing, unemployed individuals, and low-income households compared to South Australia overall. These groups in the regional study area are likely to display greater levels of vulnerability and therefore are more likely to have higher sensitivity to changes in their social environment.

6.2.5 Social infrastructure and community services

Social infrastructure, including schools, healthcare, and community services, is essential for supporting residents and sustaining population growth. Roxby Downs provides key social services, including two schools, a hospital, a family medical practice, and a Community Youth Centre, which also serve Andamooka due to its small population. Andamooka Primary School has experienced a decline in enrolments from 26 students in 2019 to 15 in 2024, with many families choosing schools in Roxby Downs (ACARA 2025).

A lack of medical services is a notable concern in Roxby Downs (Ipsos 2024). Healthcare services are limited, with only two medical clinics in Roxby Downs and no healthcare facilities in Andamooka or Woomera, requiring residents to travel to Port Augusta or Adelaide for specialist care. Transport barriers, including high costs and limited flight options, further restrict access (Municipal Council of Roxby Downs 2021). The Royal Flying Doctor Service (RFDS) provides emergency healthcare, with a base in Andamooka and an auxiliary station in Roxby Downs, but no facilities in Woomera or Pimba. Further, health indicators for Roxby Downs show higher rates of cardiovascular disease, high blood pressure, and alcohol consumption compared to Port Augusta and Whyalla, further emphasising the need for improved health services in the region (PHIDU 2023).

Education facilities are concentrated in Roxby Downs, with Roxby Downs Area School catering to 503 students in 2024 (ACARA 2025). Andamooka and Woomera schools have much smaller enrolments (15 and 11 students, respectively). The TAFE campus in Roxby Downs closed in 2019, leaving Port Augusta as the closest option, though CEG Training Partnerships continues to provide some training locally. The University of South Australia campus in Whyalla is the largest in the state but remains geographically distant. UniHub Spencer Gulf operates an outreach service in Roxby Downs located at the Innovation Hub, providing study facilities and services including internet, academic tutors and quiet study spaces.

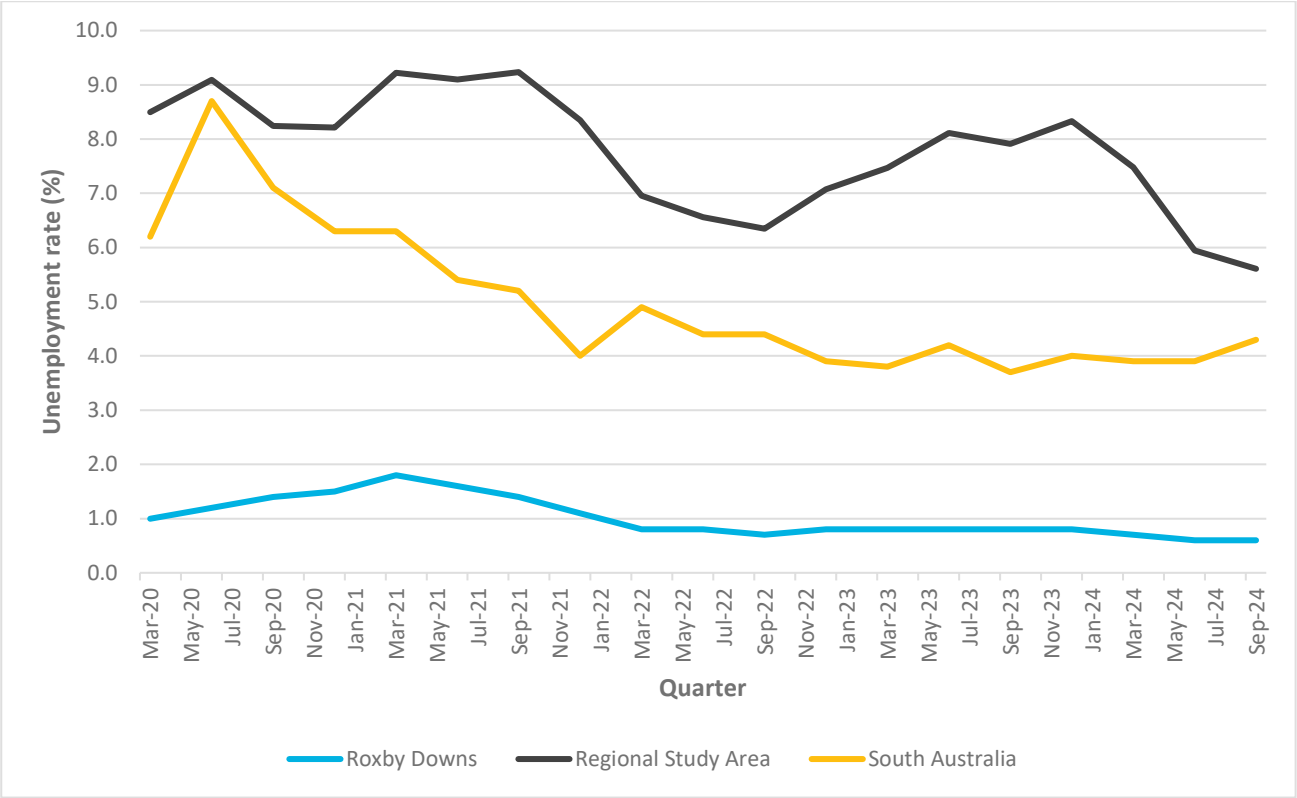
Residents highly value Roxby Downs' well-maintained facilities, including sporting amenities, roads, and the library. However, concerns have been raised about the impact of a transient workforce on service availability, particularly in childcare and education, and a perceived decline in service quality (Ipsos 2024). While Roxby Downs and Woomera have the most varied services, Andamooka and Pimba rely on surrounding towns for essential infrastructure.

6.2.6 Labour force

This section provides an overview of the labour market across the nearby communities and the broader regional study area. It includes detail on labour supply and demand, unemployment trends, and key industries and occupations of employment.

Roxby Downs has a highly active workforce, with a 77.9% labour force participation rate in 2021, significantly higher than South Australia's 60.0% (ABS 2021). The town's unemployment rate was just 2.3%, with only 53 unemployed individuals, making it one of the lowest in the state (ABS 2021). In contrast, Andamooka, with its ageing population, recorded lower workforce participation and higher unemployment, reflecting fewer job opportunities and economic shifts. Woomera, a defence-focused town, also had a high participation rate (76.7%), though its small population limits overall workforce impact (ABS 2021).

Data obtained from Jobs and Skills Australia provides a more accurate estimate of unemployment rates. At September quarter 2024, the unemployment rate for the regional study area was 5.6% (1,197 unemployed persons), which was higher than the unemployment rate recorded for South Australia 4.3% (Jobs and Skills Australia 2024). In the same quarter, Roxby Downs LGA recorded a very low unemployment rate, at 0.6% (15 unemployed persons). Roxby Downs LGA has consistently low unemployment rates, with the unemployment rate having peaked in March 2021 with 1.9% (50 unemployed persons) due to the COVID pandemic (Figure 6.6). Despite the COVID pandemic beginning in March 2020 and subsequently impacting on the Australian labour market, unemployment rates continue to decline across the regional study area.



Source: Jobs and Skills Australia (2024).

Figure 6.6 Unemployment rate, March 2020 to September 2024

Port Augusta and Whyalla both recorded relatively high unemployment rates when compared to South Australia as a whole. At September quarter 2024, Port Augusta and Whyalla recorded unemployment rates of 6.7% (442 persons) and 6.4% (663 persons) respectively.

The mining sector dominates regional employment, accounting for 4,260 jobs (29.0% of total employment) in the Far North region, with 49.9% of Roxby Downs residents working in mining (ABS 2021). The Olympic Dam Mine is the primary employer in Roxby Downs and surrounding areas, while other industries like tourism, health care, and retail contribute to local employment. Mining remains a cornerstone of the regional economy, although job numbers have fluctuated. Between 2016 and 2021, the number of mining jobs declined by 12.2%, while construction jobs grew by 37.1% due to increased infrastructure and maintenance projects (ABS 2021).

Employment in mining and construction is expected to remain strong, with mining jobs projected to grow by 5.9% nationally by 2026 (Labour Market Portal 2023). South Australian mining job advertisements reached a record 1,060 between July and September 2022, with the highest demand in trades, operations, and engineering roles. However, 64% of these jobs were based in Adelaide, and only 20% were in Outback SA, limiting direct employment benefits for local towns like Roxby Downs (RESA 2022).

Despite the strong economic base, labour shortages are a growing issue in the region, particularly for essential service roles such as teachers, police officers, and retail workers. The transient nature of the workforce and housing constraints make it difficult to attract and retain workers in non-mining roles, impacting community services and local businesses. A BHP Community Perception Survey in 2022 found that residents struggle to fill critical jobs, with businesses unable to secure workers for grocery stores, childcare, and cleaning services, affecting overall town functionality (Ipsos 2022).

Attraction and retention of staff in the Far North region is a challenge for local employers (Regional Development Australia 2021). The BHP Community Perception Survey based on Olympic Dam in 2022 noted that communities surrounding Olympic Dam struggle with attracting critical service workers (e.g. teachers, police officers) and everyday roles that keep the community running (e.g. childcare, grocery/chemist retail) (Ipsos 2022). Roxby Downs Council is a key employer in Roxby Downs, employing approximately 85 people in 2022 (Municipal Council of Roxby Downs 2022).

6.2.7 Business and industry

The Far North region's economy is dominated by mining, particularly BHP's Olympic Dam, which generates 70.8% of the region's total economic output and employs 6,041 people (32.9% of total employment (REMPLAN 2025). Over the past decade, Gross Regional Product (GRP) increased by 119%, reaching $6.544 billion in 2024 (REMPLAN 2025). Tourism is a growing industry, contributing $223.497 million in output, primarily from accommodation and food services ($128.578 million). The State Government aims to diversify the economy, promoting technology, defence, and space industries to reduce reliance on mining.

Local businesses in Roxby Downs face significant challenges, including declining retail diversity, rising rents, and limited government support. Many brick-and-mortar stores have closed, replaced by home-based businesses and online shopping. The high number of vacant shops reflects a declining local economy, with residents increasingly relying on online shopping or travelling for goods and services (Ipsos 2024). Despite this, the number of registered businesses in Roxby Downs grew by 18.4% between 2022 and 2024 to 141 registered businesses, though 56.7% are sole traders and no businesses employed over 200 people (ABS 2024b).

In January 2025, 28 Indigenous-owned businesses were registered in the Far North region, spanning construction, environmental services, cultural heritage, traffic management, and retail (Industry Advocate 2025). These businesses contribute to employment and cultural preservation within the region.

Roxby Downs remains the economic hub, but its business landscape is heavily influenced by fluctuations in the mining sector. The town's transient workforce, expensive commercial rents, and limited service diversity are key concerns affecting economic stability and growth (Ipsos 2024). Many essential services, including restaurants, post offices, and healthcare providers, struggle to remain viable, raising concerns about long-term economic sustainability (Ipsos 2024).

The South Australian State Planning Policy (2019) recognises the strategic importance of Roxby Downs as a service hub for the Olympic Dam mining operations and highlights the need for employment land to support both current industry activity and future growth. While Roxby Downs benefits from strong investment linked to the mining sector, including BHP's operations at Olympic Dam, the town faces challenges related to workforce attraction and limited economic diversification.

6.2.8 Transport and connectivity

Roxby Downs and Andamooka rely on key regional road networks, including the Olympic Dam Highway, Olympic Dam Way, Andamooka Road, and Stuart Highway, which provide access to mining operations, pastoral properties, and remote communities. Olympic Dam Way connects Roxby Downs to the mine site, with restrictions in place to divert mine-related vehicles away from the township.

The Olympic Dam Airport, located 10 km from Roxby Downs, facilitates daily flights to Adelaide operated by Alliance Airlines, recording 1,301 aircraft movements and 103,589 passengers in 2023–24, a 5.5% increase in number of passengers from the year prior (BITRE 2025). Public transport options are limited, with only a school bus service between Roxby Downs and Andamooka and a BHP-contracted Greyhound bus route connecting Olympic Dam Village to Adelaide via Port Augusta.

Traffic volumes remain low, with 500 daily vehicle movements on the Olympic Dam Highway and 310 on Andamooka Road in 2018 (Data SA 2023). However, concerns have been raised over increasing truck traffic due to Olympic Dam upgrade works (Consentium 2024). Between 2017 and 2021, there were 13 crashes on the Olympic Dam Highway (including one fatality) and six on Andamooka Road. In 2021, four patients presented to Roxby Downs Hospital due to road incidents, with three drivers and one pedestrian (Data SA 2023).

The Stuart Highway, a major freight and passenger corridor between Adelaide and Darwin, passes through the Woomera Prohibited Area, where access is restricted except for designated routes. Nationally, rail networks such as the Great Southern Railway's Ghan and Indian Pacific services pass through Pimba, providing interstate connections between Adelaide, Darwin, Sydney, and Perth.

Olympic Dam Airport is the nearest commercial airport, primarily serving mining-related travel. In addition to Whyalla Airport, it remains a critical link for regional connectivity, though aircraft movements have declined in recent years due to use of larger airplanes. Limited public transport and remote access constraints continue to present challenges for residents, businesses, and mining operations in the region.

6.2.9 Summary of social baseline

A summary of the key social trends and characteristics is as follows:

- **Population and demography:** In recent years, Roxby Downs has maintained a relatively stable population, whereas the broader regional study area has experienced ongoing population decline. Over the past decade in nearby communities, there has been population decline in Woomera, Pimba, Andamooka and Whyalla, but there has been negligible population change in Port Augusta and minor population growth in Roxby Downs. Mining regions and industry dependent towns are typically characterised by transient populations and FIFO workforces. Subsequently there are very high levels of population mobility in the nearby communities of Roxby Downs and Woomera.

- **Housing and accommodation:** Roxby Downs and Andamooka have a high proportion of unoccupied dwellings. Housing affordability is a key community concern, contributed to by the income disparity between those employed by mining companies and those that are not. Short-term accommodation is available in Roxby Downs, Andamooka, Woomera, and Pimba, with non-resident BHP workers typically housed at Roxby Downs Village or Olympic Dam Village. Rental housing in Roxby Downs and Woomera is largely company and government-owned, reflecting the dominance of mining and RAAF provided housing. Despite this, Roxby Downs' median rent remains below the state median of $300. BHP owns approximately 463 houses in Roxby Downs.

- **Community values:** Residents of Roxby Downs, Andamooka, Port Augusta, Whyalla, and Woomera value their tight-knit community networks, local facilities, and natural surroundings, particularly given the remote and sparsely populated landscape surrounding the region. However, challenges such as a transient FIFO/DIDO workforce, income disparity, difficulties in attracting non-mining workers, and limited access to mental health and specialist healthcare services impact community cohesion. Declining volunteering rates further highlight the challenges of social connectedness and intergenerational support. No non-Indigenous historic heritage sites have been identified within or near the SRE Project, while the presence of any artefacts or identified Aboriginal cultural heritage values, including landscape features, within the SRE Project will be handled in accordance with legislation and the agreed procedures and protocols for heritage management with the KAC, KYA and BDAC Indigenous Groups.

- **Health and Wellbeing:** Rising crime and antisocial behaviour is perceived to have become a growing concern in the region, particularly during shutdown periods and other times when there is an influx of contractors. The population of the Far North region experiences higher rates of mental health issues, likely driven by isolation, economic pressures, and FIFO work, while the mining industry also presents ongoing workplace hazards. Key vulnerable groups in the regional study area include social housing residents and unemployed individuals, who are more susceptible to economic shifts and mining-related impacts.

- **Social Infrastructure:** Social infrastructure and community facilities are limited in Woomera, Pimba, and Andamooka due to their small populations, with residents often travelling to Roxby Downs or Port Augusta for health and other essential services. Roxby Downs Area School is the largest education facility near the SRE Project Areas and also caters for students from Andamooka. Access to tertiary education is also limited, with the Roxby Downs TAFE campus having closed in 2019, leaving Port Augusta as the nearest alternative.

- **Labour Force:** The regional study area recorded lower rates of labour force participation and a higher rate of unemployment compared to South Australia. Particularly high rates of unemployment are recorded in Whyalla and Port Augusta, with relatively high youth unemployment. However, Roxby Downs recorded very low rates of unemployment, indicating a restricted labour supply. Mining is the dominant employer in Roxby Downs, employing approximately half of the labour force. Labour shortages remain a challenge, particularly in teaching, policing, childcare, and retail, as the transient workforce and housing constraints limit worker retention, impacting local businesses and services.

- **Business and industry:** The Far North region's economy is dominated by mining, with BHP's Olympic Dam contributing 69.5% of total output. The Olympic Dam Mine dominates the local economy in Roxby Downs, making the mine the primary employer and key customer for local businesses. In addition to mining, tourism is a growing industry in the Far North Region. While Roxby Downs remains the regional business hub, its economic stability is challenged by workforce transience, limited service diversity, and business closures. Retail diversity is declining in Roxby Downs, with high rents, vacant shops, and increased reliance on online shopping.

- **Transport and connectivity:** Regionally significant road and transport networks near to the SRE Project include Olympic Dam Highway, Andamooka Road and Stuart Highway. Nationally significant rail networks traverse the regional study area, with the rail corridor running through Pimba. The nearest commercial airport to the SRE Project is Olympic Dam Airport. There is limited public transport in Roxby Downs and Andamooka.

The summary of the baseline condition assessment informed the assessment of effects and impact assessment as follows in the next section.

7 Assessment of effects

An assessment of effects analyses the change in social values as a result of proposed SRE Project activities. It identifies the potential negative and positive social impacts which may occur as a result of the SRE Project and defines the sources, pathways and receptors for each identified impact.

The social impacts are identified and discussed under the following broad socio-economic themes which reflect the primary issues raised by stakeholders:

- Labour force and regional economy
- Transport, access and connectivity
- Social infrastructure and utilities
- Housing and accommodation
- Community values, health and wellbeing

The identified positive and negative social impacts across the above social themes are discussed as follows.

7.1 Potential impact events

BHP has identified twenty-five potential impact events associated with likely changes to the baseline social environment as a result of the SRE Project. These events represent scenarios for which there is, or is likely to be, a linkage between SRE Project activities (sources), socio-economic (pathways) and the local community (receptors).

To ensure a consistent approach to impact assessment for the SRE Project, sources, pathways, and receptors (SPR) are defined and applied in this assessment as follows:

- Source – the SRE Project activities (i.e. potential impact event) which, alone or in combination, has the potential to impact a receptor.
- Pathway – the pathway, means or route (with consideration of any natural barriers) by which the receptor can be exposed to, or may reasonably be expected to be impacted by, the source.
- Receptor – the receptor that may be impacted by the source via the pathway (e.g. local community).

The detailed list of potential impact events is provided in the environmental impact assessment tables appendix to the EIS and are summarised for the land pathways in Table 7.1. The scope of this assessment of effects presented herein has considered these identified potential impact events.

Table 7.1 Preliminary SPR assessment – potential impact events

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
SE1	Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, leads to degradation, increasing the risk to public health and safety.	SRE Project – Construction	Infrastructure	Local community (health and safety)	Refer Traffic Impact Assessment
SE2	Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, results in an increase in likelihood of traffic accidents, impacting on the health and safety of the local community.	SRE Project – Construction	Infrastructure	Local community (health and safety)	Refer Traffic Impact Assessment
SE4	During operations, increases in heavy vehicle traffic associated with the movement of operational reagents and concentrates affects road users and impacts on the health and safety of the local community.	SRE Project – Operations	Infrastructure	Local community (health and safety)	Refer Traffic Impact Assessment
SE7	The construction workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community.	SRE Project – Construction	Infrastructure	Local community (social value)	Unconfirmed
SE8	The operational workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
SE9	During construction, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway.	SRE Project – Construction	Infrastructure	Local community (social value)	Unconfirmed
SE10	During operations, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
SE11	The construction workforce demand results in decreased access to accommodation or increases in rental prices, impacting the social value of the local community.	SRE Project – Construction	Infrastructure	Local community (social value)	Unconfirmed
SE12	The operational workforce demand results in decreased access to accommodation or increases in rental prices, impacting the social value of the local community.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
SE13	Increased labour force participation and reduced unemployment during construction, contributes to enhanced socio-economic wellbeing in FIFO source communities, including those within the regional study area.	SRE Project – Construction	Infrastructure	Local community (social value)	Unconfirmed
SE14	Increased labour force participation and reduced unemployment during operations, contributes to enhanced socio-economic wellbeing in FIFO source communities, including those within the regional study area.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
SE15	Construction of the SRE Project results in enhanced economic prosperity for local businesses through increased engagement from non-resident workers in the local economy, alongside new business and supply chain opportunities generated by the SRE Project.	SRE Project – Construction	Infrastructure	State and national (social value)	Refer Economic Impact Assessment
SE16	Operation of the SRE Project results in enhanced economic prosperity for local businesses through increased engagement from non-resident workers in the local economy, alongside new business and supply chain opportunities generated by the SRE Project.	SRE Project – Operations	Infrastructure	State and national (social value)	Refer Economic Impact Assessment
SE17	Construction of the SRE Project results in strengthening of the regional economy through contribution to GRP and to the State, indirectly supporting economic diversification and providing greater resilience to economic downturns.	SRE Project – Construction	Infrastructure	State and national (social value)	Refer Economic Impact Assessment
SE18	Operation of the SRE Project results in strengthening of the regional economy through contribution to GRP and to the State, indirectly supporting economic diversification and providing greater resilience to economic downturns.	SRE Project – Operations	Infrastructure	State and national (social value)	Refer Economic Impact Assessment
SE19	The construction workforce demand reduces the availability of flights due to increased demand driven by SRE Project workforce, indirectly increasing flight fares.	SRE Project – Construction	Infrastructure	Local community (social value)	Unconfirmed
SE20	The operational workforce demand reduces the availability of flights due to increased demand driven by SRE Project workforce, indirectly increasing flight fares.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
SE21	Construction of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers.	SRE Project – Construction	Infrastructure	Local community (social value)	Unconfirmed

SPR ID No.	Potential impact event	Source	Pathway	Receptor	Linkage
SE22	Operation of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
SE23	Construction of the SRE Project results in an increased non-resident workforce resulting increased crime and anti-social behaviour.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
SE24	Operation of the SRE Project results in an increased non-resident workforce resulting increased crime and anti-social behaviour.	SRE Project – Operations	Infrastructure	Local community (social value)	Unconfirmed
A7	Operational activities release emissions of off-gases and fugitive gases from smelting, acid plant and refinery operations affect air quality, resulting in impacts to the amenity of the local community.	SRE Project – Operations	Air Quality	Local community (amenity)	Refer Air Quality Impact Assessment
A19	Project-related operational activities (e.g. stacks or materials handling activities) release emissions of particulate matter that affect air quality, resulting in impacts to the amenity of the local community.	SRE Project – Operations	Air Quality	Local community (amenity)	Refer Air Quality Impact Assessment
A37	Project-related operational activities (e.g. pumps, fans, mobile fleet and including vehicle movement noise) result in the generation of noise that is audible above baseline noise levels and impacts the amenity of the local community.	SRE Project – Operations	Noise	Local community (amenity)	Refer Noise and Vibration Impact Assessment
L12	During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area.	SRE Project – Construction	Land	Local community (amenity)	Refer Visual Impact Assessment

7.2 Labour force and regional economy

This section assesses potential impacts associated with the labour force and regional economy. Potential impacts to the labour force and regional economy due to the SRE Project are:

- increased regional labour force participation.
- enhanced local economic prosperity
- contribution to the regional economy.

These potential impacts are discussed below.

7.2.1 Increased labour force participation

The SRE Project has the potential to increase labour force participation and reduce unemployment, contributing to enhanced socio-economic wellbeing in FIFO source communities, including those within the regional study area. As outlined in Section 6.2.6, the regional study area recorded lower labour force participation (56.6%) and a higher unemployment rate (6.4%) compared to South Australia (60.0% and 5.4%). Unemployment is particularly high in Whyalla and Port Augusta, with youth unemployment a particular concern. Conversely, Roxby Downs has the highest labour force participation rate and the lowest unemployment rate, which is typical of purpose-built towns that support major industries like mining and defence. This indicates a very constrained local labour supply, necessitating a reliance on FIFO workers.

The SRE Project will require a peak construction Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs, while the operation personnel profile has a peak Stage 1a workforce of 207 FTEs, a Stage 1b workforce of 264 FTEs and a Stage 2 peak workforce of 508 FTEs (Hatch Fluor 2025). Given the specialist skills required and the limited local labour pool, the majority of the workforce is expected to be FIFO, sourced from South Australia. While this means limited direct local employment opportunities, the SRE Project will still support indirect employment through supply chains, services, and local businesses, benefiting nearby communities.

More broadly, increasing labour force participation contributes to regional economic growth and prosperity. Higher workforce engagement stimulates local economies through wages spent in communities, increased demand for goods and services, and stronger business activity. Reduced unemployment lowers social welfare dependency, improves financial stability for households, and enhances overall community resilience. In this way, the SRE Project's contribution to employment will extend beyond immediate job creation, fostering broader economic benefits in both the regional study area.

7.2.2 Enhanced local economic prosperity

The SRE Project has the potential to boost economic productivity and prosperity in Roxby Downs, Port Augusta, and Whyalla, the key service centres for the SRE Project. Increased demand for goods and services, combined with the presence of an increased non-resident workforce, is expected to stimulate business activity and workforce expenditure, indirectly creating employment opportunities.

The Olympic Dam Mine dominates the Roxby Downs economy, serving as the primary employer and key customer for local businesses (Verisk Maplecroft 2023). However, stakeholders have consistently raised concerns about business decline, citing rising costs, high rents, and limited retail variety. Community feedback highlighted a lack of business activity, empty shopfronts, and increasing reliance on online shopping or out-of-town purchases. Statements such as "the town is reducing, and small businesses are being smothered" and "rising costs make it harder for businesses to continue servicing the town" illustrate ongoing economic challenges (Ipsos 2024).

As the majority of infrastructure associated with the SRE Project is located within the existing SML, it will not impact designated employment land, thereby avoiding potential land use conflicts and supporting the protection of economic diversity in Roxby Downs and the surrounding region. Despite concerns about the limited availability of industrial land, the SRE Project presents an opportunity to enhance economic diversification by increasing demand for local goods and services, including construction materials, cleaning, staffing logistics, and engineering services. Stakeholder engagement indicated that many local businesses are available to support the SRE Project, and specific engagement with local businesses would help maximise their involvement. There will be opportunities for local and regional businesses to participate in the economic uplift generated by the SRE Project through existing platforms such as the Industry Capability Network (ICN Gateway) and BHP's Local Buying Program (delivered in partnership with C-Res). These programs enable small and regional businesses to competitively tender for the supply of goods and services to BHP as the SRE Project advances. However, the Roxby Downs Council has raised concerns about the lack of industrial land, which may limit business expansion opportunities and constrain the full economic benefits of the SRE Project.

Overall, while the SRE Project is likely to generate additional employment and business opportunities, long-term economic benefits will depend on factors such as local procurement strategies, business engagement efforts, and addressing structural challenges in Roxby Downs' commercial sector.

7.2.3 Contribution to the regional economy

The SRE Project will strengthen the regional economy by contributing to GRP and economic output at both the regional and state levels. In the Far North region of South Australia, GRP has increased by 119% over the past decade, reaching $6.544 billion in 2024 (REMPLAN 2025). The mining industry is the largest economic driver, accounting for 70.8% of total output, with Roxby Downs generating 39.8% of the region's total economic output.

The Olympic Dam Mine remains the dominant economic force in Roxby Downs and the Far North Region, making a significant contribution to both GRP and the broader South Australian economy (Verisk Maplecroft 2023). The SRE Project will further boost regional economic output by creating new employment and business opportunities, as well as through direct financial contributions to the State. This will also support economic diversification and increase resilience to economic downturns, particularly for communities reliant on mining, such as Roxby Downs.

Additionally, the SRE Project will play a critical role in ensuring continuity and efficiency for the growth of the Copper South Australia province, reinforcing South Australia's position as a key player in the global copper market. By providing confidence in the continuation of the mining industry, the SRE Project supports long-term investment, workforce stability, and the expansion of associated industries, ensuring sustained economic growth for the region and the state.

7.3 Transport, access and connectivity

This section assesses potential impacts associated with transport, access and connectivity. The potential impacts to transport, access and connectivity associated with the SRE Project are:

- increased traffic congestion
- increased risk of road incidents
- reduced availability of flights.

These potential impacts are discussed below.

7.3.1 Increased traffic congestion

Traffic congestion has been identified as a key concern among stakeholders engaged for the SRE Project, particularly regarding the perceived increase in truck traffic on Olympic Dam Highway and Olympic Dam Way. The SRE Project may be perceived to generate higher traffic volumes due to the movement of materials, equipment and workers, which could lead to delays and safety risks for road users. Olympic Dam Highway is a critical regional route, connecting the Stuart Highway at Pimba, to Olympic Dam via Woomera and Roxby Downs, and providing access to Andamooka, Woomera, and Roxby Downs from the South. Average annual daily traffic along Olympic Dam Highway between Woomera and Roxby Downs was 500 vehicles in 2018, with heavy vehicles making up 26% of traffic, while Andamooka Road recorded 310 vehicles daily (Data SA 2023). Given the remote location and limited public transport, stakeholders have raised concerns about the increased truck movements and how BHP will manage road safety risks.

According to the Traffic Impact Assessment (EMM 2026), the road network is expected to effectively accommodate traffic generated during both the construction and operational phases of the SRE Project. The assessment concluded that traffic volumes associated with the SRE Project would not significantly affect public health and safety, including the likelihood of traffic accidents, nor would they result in notable increases in travel times.

However, some stakeholders have expressed concerns about increased traffic and may perceive the SRE Project as contributing to congestion, regardless of the projected minimal impact. To help alleviate these perceptions, clear and ongoing communication about any changes to traffic conditions – alongside the implementation of traffic management measures – will be important in maintaining community confidence and minimising concern.

7.3.2 Increased risk of road incidents

The SRE Project has potential to increase the perceived risk of road incidents along Olympic Dam Highway and Olympic Dam Way due to the increased volume of heavy vehicles. This perceived increased risk of road incidents can generate anxiety for road users.

As detailed in Section 6.2.8 of the baseline condition assessment, between 2017 and 2021, there were 13 road crashes on Olympic Dam Highway, of which one resulted in a fatality. There were a further six road crashes on Andamooka Road over the same period. In 2021, four patients presented to Roxby Downs Hospital due to road incidents, of which three were vehicle drivers and one was a pedestrian. The transportation of materials and equipment required for the SRE Project as well as the movement of workers will generate a minor increase in traffic on Olympic Dam Highway and Olympic Dam Way. Stakeholders engaged for the SRE Project expressed concern that an increase in truck movements would affect perceived road safety.

As such, the increase in vehicles on Olympic Dam Highway and Olympic Dam Way has the potential to increase the perceived likelihood of vehicle collision for road users.

7.3.3 Reduced availability of flights

The SRE Project has the potential to reduce the perceived availability of flights at Olympic Dam Airport, as the increased demand from FIFO workers may place pressure on existing services and indirectly drive up flight fares. Olympic Dam Airport, the nearest commercial airport to the SRE Project, is serviced by Alliance Airlines, which operates daily flights to Adelaide in partnership with BHP. To support non-BHP personnel, a portion of available seats are set aside for the broader community. In the 2023–2024 financial year, Olympic Dam Airport recorded 1,301 aircraft movements, reflecting a 37.5% decline over the past five years (BITRE 2025). Factors contributing to decline in aircraft movements include increased use of larger airplanes and the scheduled campaign maintenance in 2021.

The SRE Project workforce will be 100% FIFO for construction and 90% FIFO for operations, with all FIFO workers accommodated at ODV or ODS villages, leading to a further increase in FIFO-related air travel. This higher flight demand may lead to a perceived reduction in accessibility for local residents and increase in flight costs, reinforcing stakeholder concerns about the SRE Project's impact on flight availability. Community members have expressed fears that the SRE Project will limit access to flights, making travel more difficult for non-BHP personnel, local businesses, and residents.

However, the SRE Project is located within an existing mining operation, and towns like Roxby Downs are already characterised by transient FIFO workforces. As of 2021, the Roxby Downs area recorded 3,957 non-resident employed persons, highlighting the town's longstanding reliance on FIFO travel. As such, the region has capacity to adapt to fluctuations in flight availability and pricing, as similar trends are common in mining regions. Furthermore, airlines typically have capacity to schedule additional flights to meet higher levels of demand. In case of the SRE Project, BHP will ensure there is no material impact on the availability of commercial flights for other passengers.

7.4 Social infrastructure and utilities

Social infrastructure, facilities, and services play an important role in supporting the health and wellbeing of communities. Potential impacts to social infrastructure and utilities due to the SRE Project are:

- reduced access for emergency services
- increased burden for health service providers.

These potential impacts are discussed below.

7.4.1 Reduced access for emergency services

The SRE Project may increase demand for emergency services due to an increase in the non-resident population and an increased risk of traffic accidents from workforce traffic and workplace accidents. This could result in perceived reduced access to emergency services for existing residents in Roxby Downs and surrounds.

The nearest emergency services to the SRE Project include Roxby Downs Health Service, Roxby Downs Ambulance Station and Roxby Downs Police Station, located an approximate 10-minute drive from the Olympic Dam Mine. Additionally, Olympic Dam Highway is the major transport link, and limited regional connectivity may further exacerbate concerns about emergency response times. The RFDS also services the region, with a base located in Andamooka and an auxiliary station in Roxby Downs. The minutes from the APOMA 2022 Annual General Meeting report that Andamooka Emergency Services is in danger of closure due to a lack of volunteers, representing a vulnerability in the area.

BHP has an established Olympic Dam Emergency Response Management Plan (ERMP) that outlines procedures for effective incident management across site operations. The ERMP is designed to ensure that potential hazards are appropriately mitigated and managed through clear operational requirements. It provides detailed guidance on the activation of emergency response protocols, the use of emergency equipment, and the roles and responsibilities of key personnel to ensure timely and coordinated responses to incidents. The plan also includes mechanisms for ongoing review and improvement of emergency response capabilities. In addition, the SRE-specific ERMP and supporting procedures will be developed during the next phase of the project to address the unique operational context of the SRE Project. Collectively, these ERMPs will help reduce reliance on local emergency services by ensuring that BHP can manage on-site incidents effectively.

The presence of a large workforce in a remote setting may heighten perceived risks, particularly in relation to traffic and workplace accidents. However, medical and emergency services will be maintained at the existing Olympic Dam Mine and workforce accommodation villages, reducing the need for external emergency support in the event of workplace incidents. This mitigation measure is expected to limit additional pressure on local emergency services, reducing the overall significance of the impact.

7.4.2 Increased burden for health service providers

The SRE Project has the potential to increase demand for medical services in Roxby Downs, placing additional pressure on local health providers and potentially reducing service levels for existing residents. Roxby Downs has two GP clinics and a hospital, serving not only local residents but also those from nearby communities like Woomera and Andamooka, which have no medical centres. As a result, residents in these communities must travel to Roxby Downs for healthcare, further straining existing services. Stakeholders have consistently raised concerns about long wait times and limited specialist availability, while the Roxby Downs Council's Community Development Plan (2020–2022) highlights improving access to physical and mental health services as a key community priority (Municipal Council of Roxby Downs 2020).

While the presence of non-resident workers may be perceived as increasing demand for healthcare services, the actual impact is expected to be minimal. The SRE Project workforce will be fully accommodated at ODV or ODS, providing access to site medics. In addition, FIFO workers are anticipated to access non-urgent, routine and preventative healthcare within their home communities (i.e. see consistent GP or specialist), limiting demand on local medical services and GPs in Roxby Downs (Commonwealth 2013).

7.5 Housing and accommodation

This section assesses potential impacts associated with housing and accommodation. The potential impacts to housing and accommodation due to the SRE Project are:

- reduced housing availability and affordability
- reduced availability of short-term accommodation.

These potential impacts are discussed below.

7.5.1 Reduced housing availability and affordability

The presence of the SRE Project workforce may be perceived to increase demand for housing in Roxby Downs, thus reducing housing availability and affordability. Currently, the Roxby Downs housing landscape is characterised by a high proportion of people who rent, which is reflected in having the highest median rent per week out of the regional study area. Those who do not own their own home are generally more vulnerable to housing stress (AIHW 2021).

Roxby Downs also has a high proportion of rented dwellings with 'other landlord type', which in a mining town often equates to dwellings owned by mining companies with some dwellings owned by Government to provide housing for employees. BHP owns and/or leases approximately 463 dwellings in Roxby Downs. Engagement with Roxby Downs Council noted that a lack of available housing stock and land for residential development was an impediment to attracting people to stay in Roxby Downs. However, data from SQM research demonstrates a growing supply of available rental housing in Roxby Downs and housing available to purchase which would contribute to alleviating any housing stress (see Section 6.2.2).

During construction, despite the SRE Project's peak Stage 1a workforce of 1,313 FTEs, Stage 1b workforce of 515 FTEs and Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025), no direct linkage to housing impacts is expected, as all workers will be accommodated at ODV or ODS while on shift with the long-term impact on housing demand in Roxby Downs is expected to be minimal. During operations, the SRE Project will require an additional peak workforce of 508 workers, with approximately 90% accommodated at ODV, ODS, or RDV. The remaining 10% – around 50 new workers – are expected to reside locally in Roxby Downs. While this may create a perception of increased housing demand and potential pressure on the local housing market, the actual impact is anticipated to be minimal. As of June 2025, Roxby Downs had 102 dwellings for sale and 53 properties available for rent (REA Group, 2025). Given that the SRE Project may increase demand by up to 50 dwellings, the existing housing supply is considered sufficient to meet this demand without significant market disruption.

7.5.2 Reduced availability of short-term accommodation

The demand for short-term accommodation generated by the SRE Project workforce could reduce availability, particularly for visitors. Roxby Downs currently has two short-term accommodation options: the Roxy Downs Motor Inn and Discovery Parks. As at January 2025, Roxby Downs had one Airbnb option, while there were three Airbnb options in Andamooka. There are two short-term accommodation options in Woomera- the Eldo Hotel and the Woomera Traveller's Village and Caravan Park.

Roxby Downs welcomed 59,000 overnight visitors in 2019, of which 78.0% travelled for business purposes. Comparatively, Port Augusta welcomed 178,000 overnight visitors in 2019. Despite a lower number of visitors in comparison to Port Augusta, there are limited short-term accommodation options in Roxby Downs. Tourism in Roxby Downs is not a major industry; however, there are still tourism options in the area such as the seasonal Arid Recovery's Sunset Tours (Municipal Council of Roxby Downs 2021). However, tourism is a growing industry in the Far North region as the State Government is targeting the development of a more diverse economy in South Australia by supporting the emerging technology, defence and space sectors.

The SRE Project has the potential to constrain access to short-term accommodation options for visitors to Roxby Downs, particularly if the accommodation providers are routinely at capacity. While the majority of the workforce will be accommodated at ODV and ODS, there is a possibility that some FIFO workers may choose to stay in Roxby Downs for brief periods before or after their shifts. However, this is expected to be infrequent, and as such, the impact on short-term accommodation availability is anticipated to be negligible.

7.6 Community values, health and wellbeing

This section assesses potential impacts associated with community values, health and wellbeing. The potential impacts to community values, health and wellbeing due to the SRE Project are:

- diminished community cohesion and vitality due to increase in non-resident worker population
- increased risk to health due to perceived exposure to toxic chemicals and materials
- perceived increase in crime and anti-social behaviour due to increase in non-resident workers
- reduced rural and agricultural amenity.

These potential impacts are discussed below.

7.6.1 Diminished community cohesion and vitality

BHP's continued operation of Olympic Dam as a predominantly FIFO workforce – further supported through the SRE Project – has raised concerns among some Roxby Downs residents about the potential impacts on community cohesion and the town's long-term vitality.

Stakeholders perceive BHP's shift toward FIFO as damaging community spirit, with transient workers less invested in the town's future, contributing to population decline, reduced local business investment, and declining community engagement (Ipsos 2024). Some residents have observed that FIFO is causing families to leave the town, weakening intergenerational connections and reducing incentives for permanent settlement.

The transient nature of FIFO workforces has affected community connectedness, as volunteering rates in Roxby Downs have dropped sharply, falling from 25.8% in 2016 to just 14.0% in 2021, well below the statewide average of 17.0% (ABS 2021). Lower participation in civic and social activities reflects a broader erosion of local engagement, as FIFO workers are often perceived as not contributing to the town's social fabric. While some stakeholders are optimistic that operational expansions could bring economic benefits, there remains concern about a lack of BHP's long-term investment in the local community (Ipsos 2024). However, as outlined in Section 5.2, BHP has several long-term community investment and social value initiatives in Roxby Downs and the Upper Spencer Gulf region, which will be maintained throughout the delivery of the SRE Project.

Additionally, the increase in non-resident FIFO workers due to the SRE Project has the potential to deepen social divisions between non-resident workers and the permanent population in Roxby Downs and Andamooka. The clear distinction between the two groups may foster perceptions of inequality, creating an "us versus them" dynamic that weakens social cohesion and trust. Non-resident workers may be viewed as not contributing to the local economy, exacerbating social tensions and disengagement from community life.

7.6.2 Increased risk to health

Residents of Roxby Downs may perceive the SRE Project as increasing the risk of exposure to gamma radiation, from sources of radioactivity within the operations, toxic chemicals and materials. However, given that Roxby Downs township is located approximately 10 km from the Olympic Dam Mine, it has been determined that there is no direct linkage between the SRE Project and potential health impacts with doses to the public and the closest receptor (Olympic Dam Village) being less than 5% of the public dose limit of 1 millisievert per year (mSv/y) (JRHC 2025).

More broadly, mining remains one of Australia's most hazardous industries, exposing both workers and local communities to significant health and safety risks. Previous incidents, including a 2007 smelter shutdown fatality and a 2015 underground rockfall fatality at Olympic Dam, highlight the physical dangers associated with mining operations (Verisk Maplecroft 2023). Workers also face risks such as radiation exposure, musculoskeletal stress, fatigue, and site-related accidents, which require strict safety protocols to mitigate.

Beyond workplace risks, community health and amenity concerns related to air quality, dust, and noise have been consistently raised by residents of host communities. The Noise and Vibration Assessment Impact Assessment conducted by EMM (2025) for the SRE Project determined that there will be no impacts to the health and safety of the local community due to the distance between the SRE Project activities and the nearest local community and residences.

In August 2022, BHP received a complaint regarding demolition materials on roads, underscoring potential health and safety concerns for residents (BHP 2023). While the SRE Project itself is not directly linked to increased health risks for Roxby Downs residents, broader concerns around industrial activities, environmental exposure, and ongoing mine operations remain key considerations for community well-being.

7.6.3 Increased crime and anti-social behaviour

Residents of Roxby Downs highly value their strong, tight-knit community and safe environment, particularly for families (Verisk Maplecroft 2023; Ipsos 2024). However, concerns about rising crime and antisocial behaviour have been growing, particularly in relation to shutdown periods and the influx of FIFO and contractor workforces. The Community Perception Surveys for Olympic Dam revealed an increase in reports of crime and antisocial behaviour as a key concern from 1% in 2022 to 8% in 2023, with drug-related issues and social disturbances identified as key concerns (Ipsos 2024).

The influx of additional FIFO workers has the potential to alter community dynamics, with some stakeholders fearing greater pressure on local policing services (Consentium 2024). Residents have specifically raised concerns that a higher numbers of transient workers may lead to more crime, disorder, and social disengagement, reinforcing a perception of reduced safety in the town. However, BHP's accommodation facilities are designed to include all necessary amenities – such as dining, recreation, and health services – thereby minimising the need for FIFO workers to enter Roxby Downs and reducing potential impacts on the local community.

Further minimising the potential impact is BHP's existing Workforce Code of Conduct, which sets clear expectations for behaviour and ethical standards across its operations. The Code applies to all employees, leaders, and external contractors, and governs conduct both on site and in the broader community, including in Roxby Downs. It provides a framework to promote respectful, responsible behaviour and helps ensures that workforce interactions align with community standards and values.

Stakeholders engaged for the SRE Project also sought clarification on workforce onboarding procedures, including whether FIFO contractors will be required to undergo police clearances and screening for prior sexual assault convictions. Ensuring robust screening and onboarding protocols could help alleviate concerns about worker behaviour and community safety. While no direct link between FIFO workers and increased crime has been established, the perception of increased risk remains significant among residents, highlighting the need for proactive community engagement and security measures to maintain public confidence and social cohesion.

7.6.4 Reduced amenity

The majority of SRE Project infrastructure is located within the SML of the existing Olympic Dam Mine, an area already characterised by industrial infrastructure and activities. However, construction activities may be perceived to temporarily increase noise and dust levels, which may reduce amenity in the immediate area.

The Noise and Vibration Assessment Impact Assessment conducted by EMM (2026) concluded that the SRE Project will not generate impacts on the local community, due to the significant distance between project activities and the nearest residential areas. As a result, no increase in noise or dust levels affected local residents is anticipated.

The Visual Impact Assessment (VIA) conducted by EMM (2026) assessed that visual amenity impacts from the SRE Project as unlikely to be significant for permanent residents as there are no towns or settlements within the visual assessment study area. The only receptors would be travellers along the Borefield Road, who will have restricted views of SRE Project elements and limited time to be impacted by the view.

While the SRE Project is located within an active mining zone, stakeholders may perceive an increase in environmental disturbances during peak construction periods. Given the existing industrial setting, any additional impacts are expected to be localised and temporary, with management measures likely to mitigate any potential disruptions.

7.7 Summary of assessment of effects

A summary of assessment of effects is presented in Table 7.2. It outlines the identified potential social impact, the corresponding baseline condition, and impact's source, pathway and receptor. An assessment of impact linkage to the SRE Project is also provided.

Table 7.2 Assessment of effects – social impacts

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
	Labour force and regional economy							
SE13, SE14	Increased labour force participation and reduced unemployment, contributing to enhanced socio-economic wellbeing in FIFO source communities, including those within the regional study area.	Construction Operations	Positive	The regional study area recorded lower rates of labour force participation (56.5%) and a higher rate of unemployment (6.4%) compared to South Australia (60.0% and 5.4%). Particularly high rates of unemployment are recorded in Whyalla and Port Augusta, with relatively high youth unemployment. Roxby Downs recorded a low unemployment rate, with 2.3% (53 unemployed persons). (See Section 6.2.6).	Construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers.	Socio-economic (workforce)	Local community (social value)	Yes – SRE Project would directly generate demand for labour. Refer Economic Impact Assessment.
SE15, SE16	Construction and operations of the SRE Project results in enhanced economic prosperity for local businesses through increased engagement from non-resident workers in the local economy, alongside new business and supply chain opportunities generated by the SRE Project.	Construction Operations	Positive	Olympic Dam Mine dominates the local economy in Roxby Downs and surrounding towns, with the mine the primary employment and key customer of local businesses. The number of brick-and-mortar shops has declined in Roxby Downs, with retail and businesses spaces closed because of expensive rent. (See Section 6.2.7).	Construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers.	Socio-economic (local economy)	Local community (social value)	Yes – SRE Project would engage with local suppliers and contribute to increased workforce spending. Refer Economic Impact Assessment.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
SE17, SE18	Construction and operations of the SRE Project results in strengthening of the regional economy through contribution to GRP and to the State, indirectly supporting economic diversification and providing greater resilience to economic downturns.	Construction Operations	Positive	The Far North region's economy is dominated by mining, particularly BHP's Olympic Dam, which generates 70.8% of the region's total economic output and employs 6,041 people (32.9% of total employment). Over the past decade, GRP increased by 119%, reaching $6.544 billion in 2024. The area in the Far North Region generating the most output is Roxby Downs, contributing 39.8% of the Far North Region's total output. The mining industry is also the largest employer with 4,260 jobs which represents 29.0% of total employment within the region. (See Section 6.2.7).	Generation of revenue	Socio-economic (state and national economy)	Local community (social value)	Yes – SRE project would enable continuation and expansion of mining activities in the Copper South Australia province, further contributing to GRP and to the State through royalties. Refer Economic Impact Assessment.
	Transport, access and connectivity							
SE1	Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, leads to degradation, increasing the risk to public health and safety.	Construction	Negative	Olympic Dam Highway is a regionally significant road, connecting the Stuart Highway at Pimba to Olympic Dam via Woomera and Roxby Downs. The AADT along Olympic Dam Highway between Woomera and Roxby Downs was an average of 500 vehicles daily, with a 26% heavy vehicle component. (See Section 6.2.8).	SRE Project transport and logistics	Socio-economic (traffic)	Local community (health and safety)	Yes – SRE Project transport and logistics would interact with Olympic Dam Highway and Olympic Dam Way. Refer Traffic Impact Assessment.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
SE2	Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, results in an increase in likelihood of traffic accidents, impacting on the health and safety of the local community.	Construction	Negative	Between 2019 and 2023, there were 21 road crashes on Olympic Dam Highway, of which 0 resulted in a fatality. In 2021, four patients presented to Roxby Downs Hospital due to road incidents, of which three were drivers of the vehicle and one was a pedestrian. (See Section 6.2.8).	SRE Project transport and logistics	Socio-economic (traffic)	Local community (health and safety)	Yes – SRE Project transport and logistics would interact with Olympic Dam Highway. Refer Traffic Impact Assessment.
SE4	During operations, increases in heavy vehicle traffic associated with the movement of operational reagents and concentrates affects road users and impacts on the health and safety of the local community.	Operations	Negative	Between 2019 and 2023, there were 21 road crashes on Olympic Dam Highway, of which 0 resulted in a fatality. In 2021, four patients presented to Roxby Downs Hospital due to road incidents, of which three were drivers of the vehicle and one was a pedestrian. (See Section 6.2.8).	SRE Project transport and logistics	Socio-economic (traffic)	Local community (health and safety)	Yes – SRE Project transport and logistics would interact with Olympic Dam Highway. Refer Traffic Impact Assessment.
SE19, SE20	The construction and operations workforce demand reduces the availability of flights due to increased demand driven by SRE Project workforce, indirectly increasing flight fares.	Construction Operation	Negative	Olympic Dam Airport is the nearest commercial airport to the Project. Alliance Airlines operate a daily public transport service between Olympic Dam and Adelaide. In the 2023-24 financial year, there were a total of 1,301 aircraft movements, which is a decrease of 29.1% in the five years prior. (See Section 6.2.8).	Movement of Project workers	Socio-economic (economy, workforce)	Local community (social value)	No – SRE Project proposes no changes to the availability of flights and will ensure no material impact on the availability of commercial flights for other passengers.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
	Social infrastructure and utilities							
SE9, SE10	During construction and operations, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway.	Construction Operations	Negative	The nearest emergency services to the SRE Project include Roxby Downs Health Service, Roxby Downs Ambulance Station and Roxby Downs Police Station, located approximately a 10 minute drive from the SRE Project. The RFDS also service the region, with a base located in Andamooka and an auxiliary station in Roxby Downs. (See Section 6.2.5).	Project transport and workforce	Socio-economic (traffic, workforce)	Local community (social value)	Yes – SRE Project may necessitate demand for emergency services.
SE7, SE8	The construction and operations workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community.	Construction Operations	Negative	There are two GP clinics and a hospital in Roxby Downs. Residents of Andamooka and Woomera are likely to travel to Roxby Downs to access health services. (See Section 6.2.5).	Construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers.	Socio-economic (workforce)	Local community (social value)	No – SRE Project workforce will be accommodated at permanent accommodation facilities which are equipped with dedicated on-site health services.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
	Housing and accommodation							
SE11, SE12	The construction and operations workforce demand results in decreased access to accommodation or increases in rental prices, impacting the social value of the local community.	Construction Operations	Negative	Housing in Roxby Downs is characterised by a growing supply of available rental housing and housing available for purchase. Approximately 22.1% of private dwellings in Roxby Downs were unoccupied in 2021. However, housing affordability has been raised as a key issue in Roxby Downs, with residents and stakeholders indicating that the disparity in income between miners and non-miners has given rise to housing unaffordability for some population groups. (See Section 6.2.2).	Construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers.	Socio-economic (workforce)	Local community (social value)	No – SRE Project workforce will be accommodated at permanent accommodation facilities.
	Community values, health and wellbeing							
SE21, SE22	Construction and operations of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers.	Construction Operations	Negative	There is ongoing community concern regarding BHP's perceived shift towards a FIFO workforce, which is seen as eroding community spirit and weakening local engagement. Residents feel that transient workers are less invested in the town's long-term wellbeing, contributing to population stagnation and reduced economic investment in local businesses. (See Section 6.2.3).	Construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers.	Socio-economic (workforce)	Local community (social value)	Yes – SRE Project will increase the number of non-resident workers in the region.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
A7	Operational activities release emissions of off-gases and fugitive gases from smelting, acid plant and refinery operations affect air quality, resulting in impacts to the amenity of the local community.	Operations	Negative	Environmental health concerns include air quality which have been raised by local communities as ongoing issues. Complaints related to demolition materials on roads in 2022 highlight potential health and safety risks linked to mining operations. Health indicators for Roxby Downs show higher rates of cardiovascular disease, high blood pressure, and alcohol consumption compared to Port Augusta and Whyalla.	SRE Project operations activities	Air quality	Local community (amenity)	Yes – Emissions are estimated to increase as a result of the SRE Project relative to BAU operations. However, the predicted impacts are below applicable amenity impact assessment criteria at all sensitive receptor location areas. Refer Air Quality Impact Assessment.
A19	Project-related operational activities (e.g. stacks or materials handling activities) release emissions of particulate matter that affect air quality, resulting in impacts to the amenity of the local community.	Operations	Negative	Environmental health concerns include air quality and dust which have been raised by local communities as ongoing issues. Complaints related to demolition materials on roads in 2022 highlight potential health and safety risks linked to mining operations. Health indicators for Roxby Downs show higher rates of cardiovascular disease, high blood pressure, and alcohol consumption compared to Port Augusta and Whyalla.	SRE Project operations activities	Air quality	Local community (amenity)	Yes – Emissions are estimated to increase as a result of the SRE Project relative to BAU operations. However, the predicted impacts are below applicable amenity impact assessment criteria at all sensitive receptor location areas. Refer Air Quality Impact Assessment.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
A37	Project-related operational activities (e.g. pumps, fans, mobile fleet and including vehicle movement noise) result in the generation of noise that is audible above baseline noise levels and impacts the amenity of the local community.	Operations	Negative	Baseline noise monitoring was undertaken at sensitive receivers in Olympic Dam Village and Roxby Downs Village, with results indicating that the baseline noise environment is controlled by human movements, including road traffic and aircraft noise related to flights into and out of Olympic Dam airport. Results from previous studies indicate that there are little vibration sources at sensitive receivers.	SRE Project operations activities	Noise	Local community (amenity)	Yes – The SRE Project will result in an increase in surface infrastructure noise generating activities during operation, increasing predicted noise levels for the local community and sensitive receptors. The operation of the SRE Project will result in an increase in road traffic noise for the local community and sensitive receptors due to an increase in workforce and deliveries. Refer Noise and Vibration Impact Assessment.
SE23, SE24	Construction and operations of the SRE Project results in an increased non-resident workforce resulting increased crime and anti-social behaviour.	Construction Operations	Negative	Concerns over rising crime and anti-social behaviour in Roxby Downs has increased, particularly in relation to shutdown periods and contractor influxes. Community Perception Surveys show a rise in reported crime concerns in Roxby Downs. (See Section 2.4).	Construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers.	Socio-economic (workforce)	Local community (social value)	Yes – SRE Project will increase the number of non-resident workers in the region.

Impact ID	Potential social impact	Phase	Impact type	Baseline condition assessment	Source	Pathway	Receptor	Linkage
L12	During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area.	Construction	Negative	The SRE Project is located within the SML consisting existing Olympic Dam Mine operations. A key mitigating factor includes the lack of sensitive receptors within the visual impact assessment study area. (See Section 6.1.1).	Expansion of surface infrastructure	Socio-economic (amenity)	Local community (amenity)	No – SRE Project elements are not expected to be visible. The only receptors would be travellers along the Borefield Road, who will have restricted views of SRE Project elements and limited time to be impacted by the view. Refer Visual Impact Assessment).

8 Impact assessment

The impact significance of confirmed negative impact events associated with the SRE Project is described in this section. Following the assessment of effects, seven negative socio-economic impact events have been confirmed:

- Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, leads to degradation, increasing the risk to public health and safety.
- Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, results in an increase in likelihood of traffic accidents, impacting on the health and safety of the local community.
- During operations, increases in heavy vehicle traffic associated with the movement of operational reagents and concentrates affects road users and impacts on the health and safety of the local community.
- The construction and operations workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community During construction and operations, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway.
- Construction and operations of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers.
- Construction and operations of the SRE Project results in an increased non-resident workforce resulting increased crime and anti-social behaviour.

To determine impact significance this SIA has applied the potential impact event consequence matrix outlined in BHP's EIAF to the Project (Annexure A). Criteria relevant to the assessment of negative social impact events is outlined in Table 2.1 in Section 2.4. Outcomes of the impact assessment are presented in Table 8.1. The impact assessment also includes an uncertainty assessment.

Table 8.1 Significance assessment of confirmed impact events

Impact ID	Confirmed impact event	Impact significance	Significance justification	Uncertainty	Management measure
	Transport, access and connectivity				
SE1	Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, leads to degradation, increasing the risk to public health and safety.	Level 2 – not significant	Materials and equipment required for the SRE Project will be transported via heavy vehicles, with the primary route being Olympic Dam Highway. Heavy Vehicles will not utilise Olympic Dam Way, thereby bypassing the township of Roxby Downs. Additionally, workers will be transported to and from the SRE Project to Olympic Dam Airport and Roxby Downs via buses, which will increase vehicle movements on Olympic Dam Highway and Olympic Dam Way.	Low – The Traffic Impact Assessment has determined that the SRE Project will generate negligible changes to existing traffic patterns on Olympic Dam Highway and Olympic Dam Way. These negligible changes are unlikely to generate a tangible social impact.	Notify public of changes to traffic conditions due to SRE Project transport and logistics. Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response. Implementation of SRE Project Stakeholder Communication and Engagement Strategy and Plan.
SE2	Increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, results in an increase in likelihood of traffic accidents, impacting on the health and safety of the local community.	Level 2 – not significant	Materials and equipment required for the SRE Project will be transported via heavy vehicles, with the primary route being Olympic Dam Highway. Heavy Vehicles will not utilise Olympic Dam Way, thereby bypassing the township of Roxby Downs. Additionally, workers will be transported to and from the SRE Project to Olympic Dam Airport and Roxby Downs via buses, which will increase vehicle movements on Olympic Dam Highway and Olympic Dam Way. Given the existing intersection design and performance, crash history, and the minor increase in traffic volumes generated by the SRE Project, the probability of vehicle-vehicle incidents on Olympic Dam Highway and Olympic Dam Way will be low.	Low – The Traffic Impact Assessment has determined that the SRE Project will generate negligible changes to existing intersection performance and traffic patterns on Olympic Dam Highway. These negligible changes are unlikely to generate an increase in the likelihood of traffic accidents resulting in a tangible social impact.	Notify public of changes to traffic conditions due to SRE Project transport and logistics. Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response. Implementation of SRE Project Stakeholder Communication and Engagement Strategy and Plan.

Impact ID	Confirmed impact event	Impact significance	Significance justification	Uncertainty	Management measure
SE4	During operations, increases in heavy vehicle traffic associated with the movement of operational reagents and concentrates affects road users and impacts on the health and safety of the local community.	Level 2 – not significant	Materials and equipment required for the SRE Project will be transported via heavy vehicles, with the primary route being Olympic Dam Highway. Heavy Vehicles will not utilise Olympic Dam Way, thereby bypassing the township of Roxby Downs. Given the existing intersection design and performance, crash history, and the minor increase in traffic volumes generated by the SRE Project, the probability of vehicle-vehicle incidents on Olympic Dam Highway and Olympic Dam Way will be low.	Low – The Traffic Impact Assessment has determined that the SRE Project will generate negligible changes to existing intersection performance and traffic patterns on Olympic Dam Highway. These negligible changes are unlikely to generate an increase in the likelihood of traffic accidents resulting in a tangible social impact.	Notify public of changes to traffic conditions due to SRE Project transport and logistics. Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response. Implementation of SRE Project Stakeholder Communication and Engagement Strategy and Plan
	Social infrastructure and utilities				
SE7, SE8	The construction and operations workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community.	Level 3 – Significant	The SRE Project will require a construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers. The presence of a large workforce in a remote setting potentially increasing demand for emergency services due to the heightened risk of workplace accidents at the SRE Project site, ODV and ODS. While on-site first aid facilities will provide immediate medical response, the significant increase in non-resident workers has the potential to place additional demand on public emergency services.	Medium – No consultation has been undertaken with relevant stakeholders at time of development of this report. Engagement with existing emergency services providers would enhance understanding and verify significance of impact.	Project site to continue provision of first aid facility and if necessary, utilise BHP employed paramedics based at Olympic Dam. BHP to collaborate with local emergency services providers (including Police, Ambulance and RFDS) on SRE Project activities and update to the Emergency Response Plan where relevant. Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response.

Impact ID	Confirmed impact event	Impact significance	Significance justification	Uncertainty	Management measure
SE9, SE10	During construction and operations, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway.	Level 3 – Significant	The SRE Project will require a construction peak Stage 1a workforce of 1,313 FTEs, a Stage 1b workforce of 515 FTEs and a Stage 2 peak workforce of 978 FTEs (Hatch Fluor 2025). Additional peak operational workforce requirement of 508 workers. The presence of a large workforce in a remote setting potentially increasing demand for emergency services due to the heightened risk of traffic accidents along Olympic Dam Highway or Olympic Way. While on-site first aid facilities will provide immediate medical response for work related incidents, the significant increase in non-resident workers has the potential to place additional demand on public emergency services.	Medium – No consultation has been undertaken with relevant stakeholders at time of development of this report. Engagement with existing emergency services providers would enhance understanding and verify significance of impact.	Project site to continue provision of first aid facility and if necessary, utilise BHP employed paramedics based at Olympic Dam. BHP to collaborate with local emergency services providers (including Police, Ambulance and RFDS) on SRE Project activities and update to the Emergency Response Plan where relevant. Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response.
	Community values, health and wellbeing				
SE21, SE22	Construction and operations of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers.	Level 3 – Significant	The SRE Project will increase the number of non-resident FIFO workers in the region, potentially exacerbating existing negative community sentiment towards FIFO workforce expansion. Concerns over community disengagement, reduced local investment, and declining population stability have already been raised, and the project may intensify these perceptions. This could lead to a significant impact on Roxby Downs, potentially prompting some community members to leave the area, further weakening local cohesion and economic sustainability.	Medium – The uncertainty of this impact is considered medium, as community perceptions are inherently subjective and may evolve over time. Further engagement with the local community will be essential to better understand concerns, gauge the extent of potential impacts, and identify opportunities for mitigation, helping to increase certainty around the impact of FIFO workforce expansion on Roxby Downs.	Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response. Implementation of the SRE Project Stakeholder Communication and Engagement Strategy and Plan. Continued implementation of BHP Social Investment initiatives in Roxby Downs and the Upper Spencer Gulf Region.

Impact ID	Confirmed impact event	Impact significance	Significance justification	Uncertainty	Management measure
SE23, SE24	Construction and operations of the SRE Project results in an increased non-resident workforce resulting increased crime and anti-social behaviour.	Level 2 – Not significant	The SRE Project will increase the number of non-resident FIFO workers in the region, contributing to existing community concerns that a higher FIFO presence may correlate with increased crime and antisocial behaviour. This perception could negatively impact residents' sense of safety and overall enjoyment of living in Roxby Downs. However, this impact is not expected to be significant due to existing measures such as workforce screening and security protocols.	Medium – The uncertainty of this impact is considered medium, as community perceptions are inherently subjective and may evolve over time. Further engagement with the local community will be essential to better understand concerns, gauge the extent of potential impacts, and identify opportunities for mitigation, helping to increase certainty around the impact of FIFO workforce expansion on Roxby Downs.	Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response. SRE Project workforce to abide by worker code of conduct.
A7	Operational activities release emissions of off-gases and fugitive gases from smelting, acid plant and refinery operations affect air quality, resulting in impacts to the amenity of the local community	Level 1 – Not significant	The assessment of effects showed that no exceedances of ambient air quality impact assessment criteria were predicted at any sensitive receptor area	Low – Moderate – The potential changes to the baseline environment are well-understood. The atmospheric dispersion model used in the assessment is widely used and has been extensively tested and validated. The predicted SRE Project concentrations of air pollutants are well below the corresponding impact assessment criteria at all surrounding sensitive receptor locations. Emissions from future SRE sources are derived from monitoring data collected at comparable existing sources at the site. However, there are some uncertainties: Emissions from Bypass Stacks, while infrequent, have been excluded from the modelling undertaken.	Key mitigation measures incorporated into the SRE Project include the following: • Venturi scrubbers and off-gas capture are in place at the acid plant to convert to sulphuric acid. • Primary processes are operated under negative pressure which contains all process emissions within the primary processing equipment and buildings • Anode furnaces and primary smelting off-gas emissions are scrubbed prior to ventilation to atmosphere. Refer Air Quality Impact Assessment

Impact ID	Confirmed impact event	Impact significance	Significance justification	Uncertainty	Management measure
A19	Project-related operational activities (e.g. stacks or materials handling activities) release emissions of particulate matter that affect air quality, resulting in impacts to the amenity of the local community	Level 1 – Not significant	The assessment of effects showed that no exceedances of dust deposition impact assessment criteria were predicted at any sensitive receptor area	Low – Moderate – Rationale for interpreting uncertainty is consistent with those presented above for human health impacts.	Key fugitive particulate matter emission mitigation measures incorporated into the design of the SRE Project: • All conveyors and conveyor transfer points moving RC will be fitted with a cover and side wall cladding for wind protection. • With the exception of the slag haul road, all SRE Project roads will be sealed. Water spraying will occur along all unsealed and sealed roads. • All other material handling and transfer operations (e.g. silo and day bin loading, bedding plant, slag/revert shed, etc) will occur within full enclosures with dust extraction. Refer Air Quality Impact Assessment
A37	Project-related operational activities (e.g. pumps, fans, mobile fleet and including vehicle movement noise) result in the generation of noise that is audible above baseline noise levels and impacts the amenity of the local community.	Level 1 – not significant	The increase in noise levels associated with surface infrastructure is below the noise limits set out in the *Environment Protection (Commercial and Industrial) Noise Policy 2023.* The increase in noise levels associated with road traffic is below the threshold of perception for the human ear or is below the guidance noise criteria set out in the *Road Noise Policy*, except for two minor exceedances of 1 dB and 3 dB.	Low - Assumptions made in surface infrastructure noise modelling are highly conservative. Measured noise levels are significantly lower than predicted baseline noise levels, confirming that the noise model is conservative. Medium – Traffic volumes have been based on preliminary modelling and have not been confirmed at this stage.	There were no confirmed noise impact events assessed as having the potential for a significant impact requiring management and mitigation measures to be applied. Nevertheless, BHP would implement standard operating procedures to minimise the potential impact from noise and vibration to as low as reasonably achievable (ALARA). Refer Noise and Vibration Impact Assessment

8.1 Management and mitigation

Each confirmed impact event is required to have a description of proposed management and mitigation measures applied, aimed at either breaking the source-pathway-receptor linkage (i.e. avoiding the impact) or otherwise reducing the impact significance to as low as reasonably achievable.

The list of potential management and mitigation measures that may be applied to reduce the significance of social impacts is presented in Table 8.2.

Table 8.2 Management measures for confirmed social impact events

Impact ID	Management measure
SE1, SE2, SE4	Notify public of changes to traffic conditions due to SRE Project transport and logistics.
	Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response.
	Implementation of SRE Project Stakeholder Communication and Engagement Strategy and Plan.
SE7, SE8, SE9, SE10	Project site to continue provision of first aid facility and if necessary, utilise BHP employed paramedics based at Olympic Dam.
	BHP to collaborate with local emergency services providers (including Police, Ambulance and RFDS) on SRE Project activities and update to the Emergency Response Plan where relevant.
	Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response.
SE21, SE22, SE23, SE24	Continued implementation of a community grievance mechanism for the public to raise grievances and receive an appropriate response.
	Implementation of SRE Project Stakeholder Communication and Engagement Strategy and Plan.
	Continued implementation of BHP Social Investment initiatives in Roxby Downs and the Upper Spencer Gulf Region.
	SRE Project workforce to abide by worker code of conduct.
	<< BHP to confirm additional Community Engagement Plan initiatives >>
A7, A19	Key fugitive particulate matter and emission mitigation measures incorporated into the design of the SRE Project: • All conveyors and conveyor transfer points moving RC will be fitted with a cover and side wall cladding for wind protection. • With the exception of the slag haul road, all SRE Project roads will be sealed. Water spraying will occur along all unsealed and sealed roads. • All other material handling and transfer operations (e.g. silo and day bin loading, bedding plant, slag/revert shed, etc) will occur within full enclosures with dust extraction. • Venturi scrubbers and off-gas capture are in place at the acid plant to convert to sulphuric acid. • Primary processes are operated under negative pressure which contains all process emissions within the primary processing equipment and buildings • Anode furnaces and primary smelting off-gas emissions are scrubbed prior to ventilation to atmosphere.
A37	BHP would implement standard operating procedures to minimise the potential impact from noise and vibration to ALARA.

An adaptive approach will be applied to the monitoring and management of social impacts throughout the life of the SRE Project. This approach acknowledges that social conditions and community perceptions may change over time, and that management responses must remain flexible and responsive. As such, social impact management measures will be regularly reviewed and adjusted based on monitoring results, stakeholder feedback, and changes in project activities or external conditions. This includes monitoring indicators related to workforce behaviour, housing availability, local service access, and community wellbeing. Engagement with local stakeholders, including the Roxby Downs Council and community organisations, will inform the interpretation of emerging trends and guide refinements to mitigation strategies where required.

To promote transparency and accountability, BHP will explore opportunities to publicly report on the progress and achievements of social impact management throughout the Project's life cycle. This may include periodic updates published on the Project website or shared through existing community engagement channels, outlining key performance metrics, community investment outcomes, and responses to stakeholder concerns. Public reporting will not only demonstrate BHP's commitment to responsible project delivery, but will also help build trust with the community by highlighting how feedback and monitoring are being used to inform continuous improvement.

9 Conclusion

The SIA for the SRE Project has identified a range of confirmed socio-economic impacts, including both negative and positive effects on local and regional communities. Following a detailed assessment, six confirmed negative socio-economic impact events were identified, primarily relating to transport, emergency services, community cohesion, and workforce dynamics. These include:

- increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, leads to degradation, increasing the risk to public health and safety
- increases in vehicle traffic associated with the movement of construction materials, general travel, including oversized and restricted movements, results in an increase in likelihood of traffic accidents, impacting on the health and safety of the local community
- during operations, increases in heavy vehicle traffic associated with the movement of operational reagents and concentrates affects road users and impacts on the health and safety of the local community
- the construction and operations workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community
- the construction and operations workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community. During construction and operations, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway
- construction and operations of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers
- construction and operations of the SRE Project results in an increased non-resident workforce resulting increased crime and anti-social behaviour.

Of these, two impacts were assessed as significant:

- The construction and operations workforce demand results in decreased access to essential services (e.g. medical), impacting on the social value of the local community During construction and operations, the SRE Project results in reduced access to emergency services for existing residents in nearby communities due to increased demand for emergency services to respond to increased risk of traffic accidents and workplace accidents at Project site and on Olympic Dam Highway.
- Construction and operations of the SRE Project results in diminished community cohesion and vitality in Roxby Downs due to an increase in non-resident workers.

To mitigate these negative socio-economic impacts, the following measures are recommended:

- Public notification of traffic changes to ensure road users are aware of increased transport movements.
- Continued implementation of a community grievance mechanism, providing a structured approach for residents to raise concerns and receive responses.
- Implementation of SRE Project Stakeholder Communication and Engagement Strategy and Plan.

- Continued provision of on-site first aid facilities, with BHP-employed paramedics available at Olympic Dam if required.
- Ongoing collaboration with local emergency service providers, including RFDS, and update the Olympic Dam Emergency Response Plan where relevant.
- Adherence to a worker code of conduct, ensuring workforce behaviour aligns with community expectations and safety standards.

Despite these challenges, the SRE Project is expected to deliver positive socio-economic benefits, particularly in employment, business activity, and regional economic growth. Key benefits include:

- increased labour force participation and reduced unemployment, contributing to improved socio-economic wellbeing in both FIFO source communities and the regional study area
- enhanced economic prosperity for local businesses, driven by greater workforce engagement in the local economy and new business and supply chain opportunities
- strengthening of the regional economy, with contributions to GRP and the State economy, supporting economic diversification and resilience against downturns.

Overall, while some negative socio-economic impacts require mitigation, the SRE Project is expected to provide meaningful socio-economic contributions to the regional study area and beyond. Through proactive engagement, strong mitigation strategies, and community collaboration, the SRE Project can balance potential challenges while maximising long-term benefits.

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Terms and abbreviations

Term	Description
ABS	Australian Bureau of Statistics
ALARA	As Low As Reasonably Achievable
BAU	Business-as-usual
BHP	BHP Olympic Dam Corporation Pty Ltd
Copper SA	Copper South Australia
DIDO	Drive-in/drive-out
EF	Electric slag reduction furnace
EIAF	Environmental Impact Assessment Framework
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
FIFO	Fly-in/fly-out
GAB	Great Artesian Basin
GRP	Gross Regional Product
IAIA	International Association for Impact Assessment
KAC	Kokatha Aboriginal Corporation
kV	Kilovolt
Lathwida	Lathwida Environmental Pty Ltd
LGA	Local Government Area
NWP	Northern Water Project
ODA	Olympic Dam Agreement
ODS	Olympic Dam Village South
ODV	Olympic Dam Village
PDI Act	*Planning, Development and Infrastructure Act 2017* (South Australia)
PMR	Precious metals refinery
RDV	Roxby Downs Village
RFDS	Royal Flying Doctor Service
SCM27	Scheduled Campaign Maintenance 2027
SIA	Social Impact Assessment
SML	Special Mining Lease
SPC	State Planning Commission
SRE Project	Smelter and Refinery Expansion Project
WAV	Workforce Accommodation Village

Annexure A

BHP Environmental Impact Assessment Framework

EMM
creating opportunities

BHP

Olympic Dam Smelter and Refinery Expansion Project

Environmental Impact Assessment Framework

June 2026

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1. Assessment of potential impacts

Relevant to the SRE Project, Section 113(4) of the *Planning, Development and Infrastructure Act 2016* (SA) (PDI Act) requires that an Environmental Impact Statement (EIS) must include a statement of:

- the expected environmental, social and economic effects of the development
- the expected effects of the development on the climate and any proposed measures designed to mitigate or address those effects
- the extent to which the expected effects of the development are consistent with the provisions of any relevant state planning policy, regional plan, the Planning and Design Code, and any matters prescribed by the regulations
- the extent to which the expected effects of the development are consistent with the Environment Protection Act (SA) (EPA Act)
- commitments to avoid, mitigate or satisfactorily manage and control any potentially adverse effects of the development on the environment.

BHP has developed an Environmental Impact Assessment Framework (EIAF) to identify and, wherever possible, quantify, the potential environmental and social impacts associated with the Smelter and Refinery Expansion (SRE) Project in a consistent and repeatable manner. The EIAF is described in the following sections.

1.1 Context

1.1.1 Environmental values

Environmental values are the physical characteristics and qualities of the environment that contribute to biodiversity conservation, and the social, spiritual and economic health of individuals and society.

In designing, constructing and undertaking the SRE Project, BHP will aim to ensure that the overarching environmental objectives described in Table 1.1 are met, and that environmental values are maintained.

The EIAF supports this goal, providing a systematic framework aimed at determining the level of impact of specific activities, and identifying mitigation and management measures to ensure that the environmental objectives are met.

Table 1.1: Environmental values and environmental objectives

Key aspect	Environmental values	Environmental objectives
Air	Air quality	Minimise emissions to air so that associated environmental values are protected
	Greenhouse gas (GHG) emissions	Reduce net GHG emissions to minimise the risk of environmental harm associated with climate change
Groundwater	Groundwater quantity	Minimise groundwater drawdown so that associated environmental values are protected
	Groundwater quality	Maintain groundwater quality so that associated environmental values are protected
Surface water	Surface water quantity	Maintain hydrological regimes so that associated environmental values are protected

Key aspect	Environmental values	Environmental objectives
	Surface water quality	Maintain the surface water quality so that associated environmental values are protected
Land	Terrestrial environmental quality	Maintain the quality of land and soils so that associated environmental values are protected
	Landforms	Manage post-project closure landforms so that they support associated environmental values
	Native flora and vegetation	Protect flora and vegetation so that biological diversity and ecological integrity are maintained
	Native terrestrial fauna	Protect terrestrial fauna so that biological diversity and ecological integrity are maintained
	Subterranean fauna	Protect subterranean fauna so that biological diversity and ecological integrity are maintained
Public and community	Human health	Protect human health from harm
	Social surroundings	Protect social surroundings from harm
	Cultural and spiritual heritage and values	Protect Indigenous cultural and spiritual values from harm
	Visual amenity	Minimise the visual impact of permanent project infrastructure so that prevailing visual amenity is maintained

1.1.2 Environmental impact assessment framework

BHP has developed an EIAF to assess the environmental and social impacts associated with the SRE Project. The EIAF provides a systematic approach to identify and evaluate potential environmental and social impacts associated with the SRE Project through the project life cycle (construction, operations and closure) in a consistent, repeatable and transparent manner. This allows focus on the appropriate avoidance, mitigation and management measures to meet the environmental objectives. The EIAF is used to:

- determine which combinations of sources and pathways are likely to result in impacts to receptors
- make consistent and repeatable determinations of the impact to receptors across multiple pathways
- understand the uncertainties, and resultant sensitivities, associated with the determination of impact
- allow consideration of perspectives that arise from stakeholder consultation about the SRE Project activities and the potential for impacts
- determine where, if any, controls are required to reduce impacts to as low as reasonably practicable (ALARP) in accordance with a mitigation hierarchy.

The EIAF draws on, and generally aligns to the following:

- Government of South Australia and Australian Government regulations
- ISO 14001: 2026 Environmental Management Systems (ISO 2026)
- internationally recognised frameworks, such as those established by the International Finance Corporation of the World Bank Group
- BHP Risk Management Global Standard (BHP 2025).

To ensure the assessment methodology meets the requirements of the PDI Act and the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act), the methodology is compliant with:

- State Planning Commission (SPC) Practice Direction 17 Impact Assessment Development, published by the Government of South Australia (SPC 2023)
- Assessment Requirements as gazetted for the SRE Project (Government of South Australia 2025).

1.1.3 Definitions

To ensure a consistent approach to impact assessment for the SRE Project, it is important to understand the EIAF terminology and definitions. These are described in the following sections.

1.1.3.1 The environment

In determining the pathways and receptors for the EIAF, consideration has been given to defining the environment as including:

- land, air, water (including both surface water, groundwater and sea water), organisms, ecosystems, native fauna and other features or elements of the natural environment
- buildings, structures and other forms of infrastructure, and cultural artefacts
- existing or permissible land use
- public health, safety or amenity
- the geological heritage values of an area
- the aesthetic or cultural values of an area.

Section 3 of the EP Act defines the environment as land, air, water, organisms and ecosystems, and includes:

- human-made or modified structures or areas
- the amenity values of an area.

Section 528 of the EPBC Act defines the environment as including:

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

1.1.3.2 Source, pathway and receptors

Sources, pathways and receptors are defined and are applied in the EIAF as follows:

- Source – a description of the source of the potential impact event which, alone or in combination, has the potential to impact a receptor.
- Pathway – a description of the pathway, means or route (with consideration of any natural barriers) by which an identified receptor can be exposed to, or may reasonably be expected to be impacted by, an identified source.
- Receptor – a description of the receptor that may reasonably be expected to be impacted by the source via the pathway, taking into account the elements of the environment as described in Section 1.1.3.1.

1.1.3.3 Impact events and risk events

For the purposes of this EIAF, the distinction between impact and risk is important.

Broadly, impact events are those events which are predicted to occur as a result of the implementation of the SRE Project ('planned events'). For example, for construction of the smelter furnaces, plant and equipment would require permanent land disturbance activities, which would require removal of existing vegetation, and therefore have an impact on receptors. Whilst there may be some uncertainty (Section 1.2.6) regarding the level and/or nature of the impact, it is certain that proposed project activities would result in some level of impact.

Risk events, by contrast, are not predicted to occur during planned project activities, however there is some potential (or likelihood) that they could occur in some circumstances ('unplanned events'), and should they occur, there may be a subsequent impact to a receptor. For example, a water pipeline may fail (the unplanned event), resulting in the release of saline water to the ground, which may subsequently result in an impact to native vegetation. In an EIAF context, risk events are characterised by the likelihood of a linkage between source and receptor occurring where, under planned situations, no linkage would be present.

Discussion regarding hazards and risks associated with the SRE Project, including the risk management method, framework and the risk register developed for the SRE Project, are described in Chapter 11 of the EIS Main Document. The SRE Project Risk Register identifies, assesses and manages risks associated with the various activities and infrastructure that comprises the SRE Project, including risks to occupational health and safety arising from those activities and the proposed SRE Project infrastructure. The SRE Project Risk Register does not specifically address the potential impacts of unplanned events on off-site receptors. Separately, the EIAF, discussed in this document, has been used to assess unplanned events (risks) to identified non-occupational receptors and off-site infrastructure that are not within the scope of the SRE Project Risk Register. These include:

- surface water (flooding) related risks associated with low probability rainfall events (e.g. 1-in-100-year average recurrence interval (ARI) events)
- soil and groundwater contamination risks associated with a loss of the containment (i.e. spills)
- risk to receptors related to fires that may be started on-site and progress off-site.

1.2 Impact assessment and management

The EIAF is based on a series of repeatable process steps, described in the following sections and illustrated in Figure 1.1.

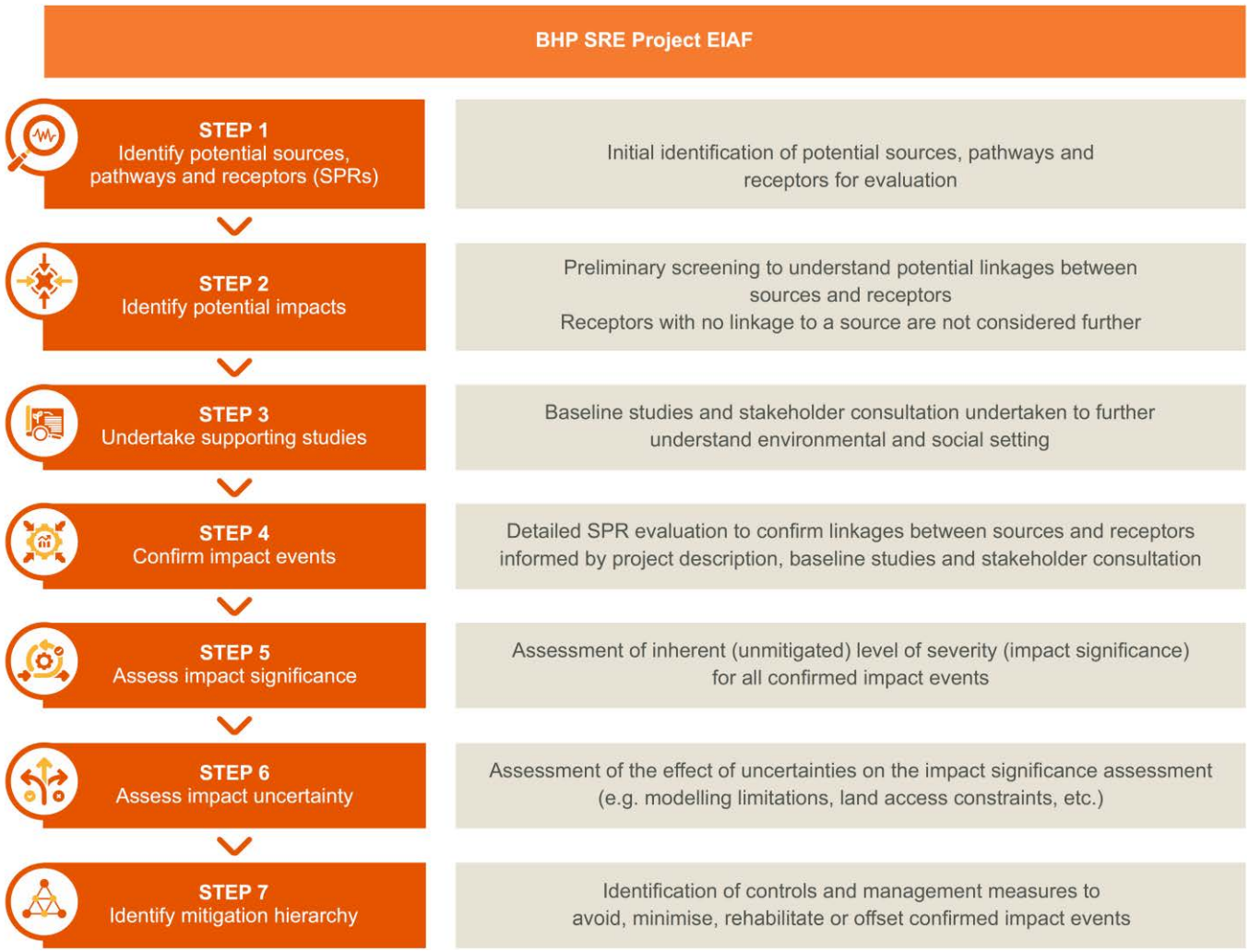


Figure 1.1: Environmental impact assessment framework

1.2.1 Identification of sources, pathways and receptors

Taking into consideration the context provided in Section 1.1, Step 1 describes the identified sources, pathways and receptors for the SRE Project EIAF.

Table 1.2: Sources, Pathways and Receptors under the EIAF

Sources	All proposed SRE Project activities or actions, in whole or in part, and categorised by the timeframe at which the activity or action would be undertaken (i.e. construction, operation, and closure). This includes: • actual and reasonably foreseeable activities under BHP control (i.e. construction, operation, and closure) • associated activities that are essential for the SRE Project, but may not be directly owned, operated or managed by BHP • actual and reasonably foreseeable activities of others that may materially contribute to the severity of the impacts
Pathways	Air – air quality, noise, vibration, light, radiation and greenhouse gases
	Surface water – quality and quantity
	Groundwater – quality and quantity
	Land – quality
	Socio-economic – infrastructure, economy
Receptors	Ecology – terrestrial flora (including vegetation) and fauna (including habitat), aquatic ecology, groundwater dependent ecosystems (GDEs), South Australian listed threatened species, EPBC Act listed threatened species
	Cultural amenity – historic heritage, cultural heritage, Indigenous communities
	Local community – health and safety, amenity, community values
	Third-party users – reduction in resource availability
	Future users – recognises the inherent environmental value of the pathways
	State and Commonwealth matters – economy, climate change

1.2.2 Identification of potential impact events

The PDI Act requires that the EIAF describe potential impact events associated with each phase of the proposed operations (construction, operation, and closure) and relevant to each element of the environment. Noting that, for the purpose of the impact assessment, a potential impact event is the combination of a (planned or unplanned) source, a pathway and a receptor, and is identified in the absence of the implementation of engineering or administrative control measures. Unplanned events, in relation to the distinction between those assessed under the EIAF and those assessed via the BHP Risk Framework and presented in the SRE Project Risk Register, are discussed in Section 1.1.3.3.

The SRE Project's EIAF identifies potential impact events through completion of a preliminary (screening) source-pathway-receptor (SPR) evaluation. This is undertaken to identify linkages between project sources (i.e. proposed activities or project elements), pathways and receptors. This considers potential linkages for the full project life cycle (construction, operation, and closure). This preliminary screening

identifies where potential impacts may occur (Step 2). Receptors with no linkage to a source are not considered further.

At the completion of the screening assessment, potential impact events are determined to either have no linkage, an uncertain or unconfirmed linkage, or a likely or confirmed, as described in Table 1.3.

Table 1.3: Preliminary SPR linkage classifications

Potential impact event assessment	Description
No linkage	It is unlikely that a linkage exists between a source, pathway and receptor. For example: • no community interaction with project ground vibration due to significant separation distances (i.e. inherent control) • no visual amenity impact with project due to topography (i.e. inherent control). The potential impact event is recorded in the Preliminary SPR Register and no further impact assessment is undertaken.
Uncertain or unconfirmed linkage	A potential linkage exists between source and receptor, however significant uncertainties are present in the existing knowledge base and/or significant assumptions have been made. For example, radiation bearing concentrates will be processed and potential public exposure to radon and/or radionuclides requiring air quality/radiation modelling to determine the extent of dispersion of radiation, however significant uncertainties exist in the existing knowledge base. Further supporting studies are required to determine if an SPR linkage is present or absent.
Likely or confirmed linkage	A linkage is considered likely or confirmed to exist between a source and receptor. For example: • SRE Project activities (source) would necessitate ground disturbance (pathway) and direct impacts on native flora and vegetation (receptor). The potential impact event is classified as a confirmed impact event and carried forward to the impact assessment.

In addition to the SPR screening of potential impact events, stakeholder engagement also informs which of the potential impact events are progressed to confirmed impact events, and therefore to the impact assessment stage of the EIAF. In these instances, a potential impact event may have been determined to have no SPR linkage but may be progressed on the basis of the stakeholder's perceived potential for impacts to occur as a result of proposed project activities.

A visual representation of the SPR evaluation process is illustrated in Figure 1.2.

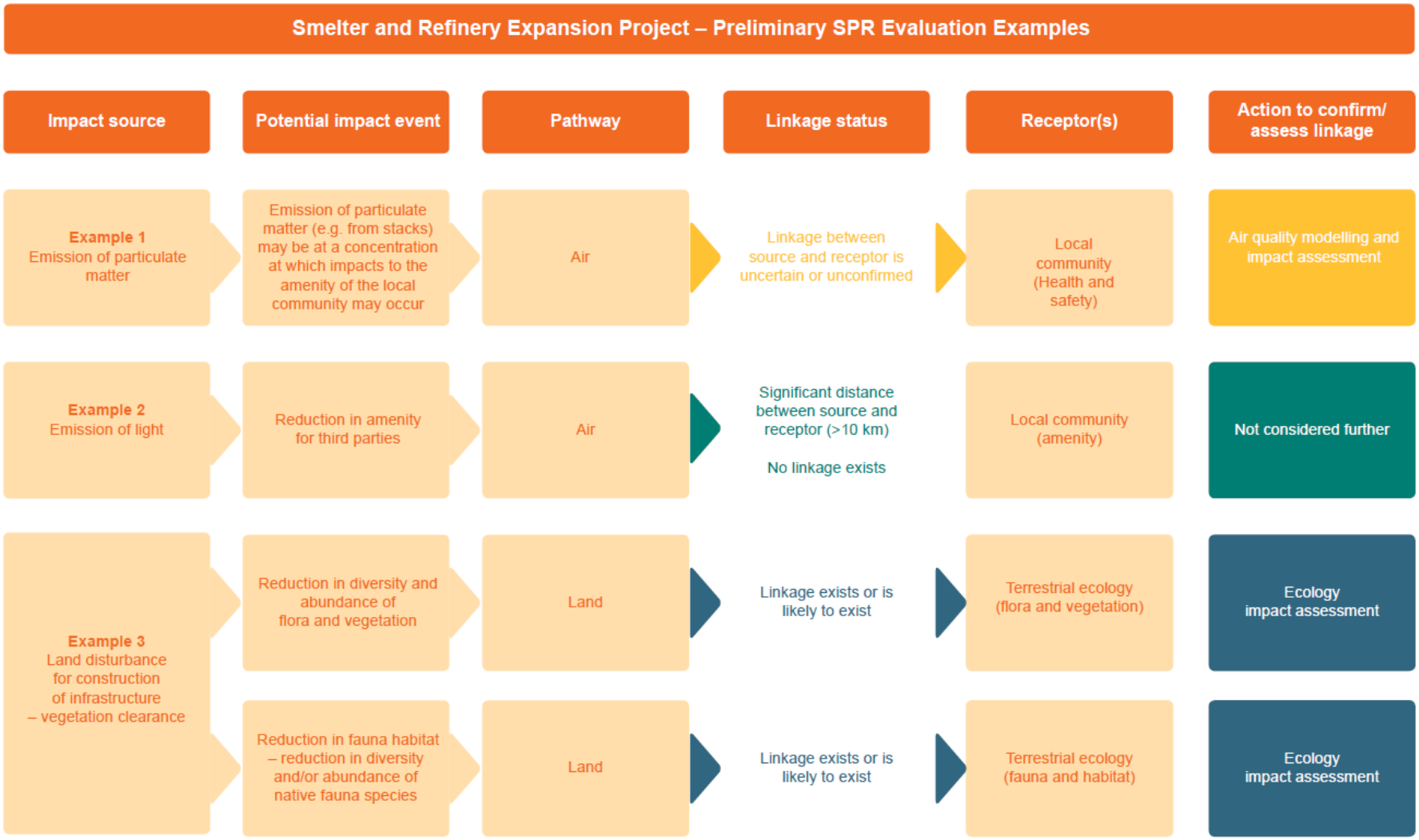


Figure 1.2: Preliminary SPR evaluation examples

1.2.3 Supporting studies

The preliminary SPR outputs are used to inform Step 3 scopes for further technical and supporting studies, which are designed to provide the information necessary to classify uncertain or unconfirmed linkages and to support the impact assessment stage of the EIAF for the confirmed impact events. Examples of supporting studies include:

- engineering studies describing the specifics of proposed site activities, actions and infrastructure (sources)
- baseline social and/or environment studies (pathways and receptors)
- assessment of effects studies, describing and, wherever possible, quantifying the likely change in the pathway values as a result of proposed project activities (e.g. air quality modelling, noise and vibration modelling) (pathways)
- impact assessment studies, describing and, wherever possible, quantifying how the changed pathway values may impact the receptor (e.g. how a change in air quality may result in health or amenity impacts, or how land disturbance may reduce the abundance or diversity of flora, vegetation and/or fauna habitat) (receptors).

1.2.4 Confirm impact events

Outcomes of the supporting studies undertaken on sources and pathways determine potential impact events to either have no linkage, a possible linkage, or a confirmed linkage (Step 4). Potential impact events that remain uncertain or unconfirmed following the completion of supporting studies shall be subject to the precautionary principle and carried forward assuming that a linkage exists.

1.2.5 Impact significance

Confirmed impact events (i.e. those determined to have an SPR linkage and those other events carried forward as a result of the outcomes of stakeholder consultation) are subject to an impact assessment (Step 5) under the EIAF to determine the significance of the impact in the absence of controls.

In determining the impact significance, consideration is given to the:

- type of impact, including direct, indirect, cumulative and/or perceived
- geographic extent, size and scale
- duration, frequency, reversibility of the potential impact
- whether the potential impact is from a planned or unplanned event
- uncertainty associated with the determination of impact significance, and subsequently the sensitivity to change (Section 1.2.6).

BHP applies a standard event consequence matrix across its businesses, and this has been used to inform impact significance under this EIAF (Table 1.4).

Events determined to have an uncontrolled impact consequence of greater than or equal to Severity Level 3, are considered significant and require the application of controls to reduce the consequence severity in keeping with the environmental objectives (Section 1.1.1).

Alternatively, a confirmed impact event may be determined to be significant as an outcome of stakeholder engagement and may also necessitate the application of controls to eliminate or otherwise reduce the impact to ALARP.

Table 1.4: Consequence definitions and significance determination

Severity Level	1	2	3	4	5
Significance	Not significant		Significant		
Air pathway					
Air quality (human health)	No exceedance of ground-level concentrations (GLCs) as per Environment Protection (Air Quality) Policy 2016 (SA)	Localised exceedance of GLCs as per Environment Protection (Air Quality) Policy 2016 (SA) but no effects on off-site sensitive receptors	Ongoing exceedance of GLCs as per Environment Protection (Air Quality) Policy 2016 (SA) that results in complaints or members of the public requiring medical treatment	Major or ongoing exceedance of GLCs as per Environment Protection (Air Quality) Policy 2016 (SA) resulting in persistent complaints and/or hospitalisation of members of the public	Major ongoing exceedance of GLCs as per Environment Protection (Air Quality) Policy 2016 (SA) that results in severely debilitating chronic health impacts or life-threatening hazards
Air quality (environment values)	No or negligible reduction in air quality at the SML boundary or at sensitive receptors (no exceedance of air quality standards)	Localised exceedance of air quality standards (annual dust deposition greater than 4 g/m^2/month) but no effects on threatened species habitat or community viability	Ongoing exceedance of air quality standards (annual dust deposition greater than 4 g/m^2/month) that results in short-term loss of threatened species habitat or community viability	Major or ongoing exceedance of air quality standards (annual dust deposition greater than 4 g/m^2/month) that results in long-term loss of threatened species habitat or community viability	Major ongoing exceedance of air quality standards ((annual dust deposition (total insoluble dust) is greater than 4 g/m^2/month and greater than 2 g/m^2/month above background levels at that location) that result in total extinction of threatened species habitat or community viability
Greenhouse gas (social-economic and environmental values)	Annual Scope 1 greenhouse gas emissions less than 50,000 t defined as CO_2 equivalent (CO_2-e)	Annual Scope 1 greenhouse gas emissions greater than 50,000 t but less than 100,000 t of CO_2-e	Annual Scope 1 greenhouse gas emissions greater than 100,000 t of CO_2-e for a single year	Annual Scope 1 greenhouse gas emissions greater than 100,000 t of CO_2-e and reduced within a two to five-year period	Annual Scope 1 greenhouse gas emissions greater than 100,000 t of CO_2-e and reduced within a five to ten-year period
Noise and vibration (human amenity)	No exceedance of South Australian Environment Protection (Commercial and Industrial Noise) Policy 2023 and relevant vibration standards	Localised exceedance of South Australian Environment Protection (Commercial and Industrial Noise) Policy 2023 and relevant vibration standards which generates complaints, resolved within one week	Ongoing exceedance of South Australian Environment Protection (Commercial and Industrial Noise) Policy 2023 and relevant vibration standards which generates complaints, resolved within three months	Major or ongoing exceedance of South Australian Environment Protection (Commercial and Industrial Noise) Policy 2023 and relevant vibration standards resulting in complaints over an extended period of years with the need to relocate receptors. Repairable damage to buildings due to vibration	Major ongoing exceedance of South Australian Environment Protection (Commercial and Industrial Noise) Policy 2023 and relevant vibration standards resulting in the need to relocate multiple receptors. Major damage from vibration to multiple structures or infrastructure requiring demolition and rebuild
Light (human amenity)	Local (on-site) short-term, infrequent loss of amenity within the SML boundary	Minimal and short-term, but frequent, loss of amenity within the local area which generates complaints, resolved within one week	Medium-term loss of amenity within the local area which generates complaints, resolved within three months	Medium-term and frequent loss of amenity within the local area resulting in ongoing complaints over an extended period of years with the need to relocate receptor(s)	Long-term loss of amenity within the local area resulting in the need to relocate multiple receptors
Radiation (human health)	Public radiation doses less than 0.3 mSv/y	Public radiation doses greater than 0.3 mSv/y but less than 1 mSv/y	Public radiation doses averaging greater than 1 mSv/y but less than 5 mSv over a five-year period	Public radiation doses greater than 5 mSv over a five-year period	Public radiation doses greater than 20 mSv/year in any year
Water pathway					
Groundwater or surface water quantity (GDEs, third-party users, future users)	No or negligible reduction or change in quantity available to current and potential receptors	Local reduction or change in water quantity that can be immediately (within one year) remediated or will attenuate naturally (within one year)	Local major or regional minor reduction or change in water quantity that can be remediated or is reasonably expected to attenuate in the long term	Regional major reduction or change in water quantity available to current and potential receptors that can be remediated or is reasonably expected to attenuate in the long term	Regional major reduction or change in quantity available to current and potential receptors that cannot be remediated and/or is not expected to attenuate
Groundwater or surface water quality (GDEs, third-party users, future users)	No or minimal reduction in water quality, where water quality objectives are maintained	Local reduction in water quality (exceeding water quality objectives) that can be remediated or will attenuate naturally within one year	Local major or regional minor reduction in water quality (exceeding water quality objectives) that can be remediated or is reasonably expected to attenuate in the long term	Regional major reduction in water quality (exceeding water quality objectives) at location of current or potential receptors that can be remediated or is expected to attenuate naturally in the long term	Regional major reduction in water quality at location of current or potential receptors that cannot be remediated during exploration and is not expected to attenuate naturally

Severity Level	1	2	3	4	5
Significance	Not significant		Significant		
Land pathway					
Listed species and ecological communities (threatened and listed species)	Unmeasurable effect	Localised and short-term reduction in threatened species habitat with little or no reduction in species or community viability	Localised and long-term reduction in threatened species habitat resulting in some change to community viability	Regional and long-term reduction in threatened species habitat resulting in significant change to community viability	Regional or total extinction of the threatened species and/or community viability
Other flora and fauna (terrestrial and aquatic species, vegetation and habitat)	Unmeasurable effect	Localised and short-term reduction in species habitat resulting in little or no change to community viability	Localised and long-term reduction in threatened species habitat resulting in some change to community viability	Regional and long-term reduction in threatened species habitat resulting in significant changes to community viability	Regional or total extinction of threatened species habitat and/or community viability
Radiological impacts to non-human biota (terrestrial and aquatic species, vegetation and habitat, threatened and listed species)	Dose rate assessed to be less than natural background or less than the ERICA screening level (10 µGy/y)	Dose rate assessed to be greater than the ERICA screening level (10 µGy/y) but less than 40 µGy/h (level of potential effects on biota reproductive success)	Dose rate assessed to be greater than 40 µGy/h (level of potential effects on biota reproductive success) but less than 400 µGy/h (level of potential effects on biota populations)	Dose rate assessed to exceed 400 µGy/h (level of potential effects on biota populations)	Demonstrated radiological impacts to non-human biota outside the SML boundary
Future land use/closure (third-party users, future users, indigenous community)	Minor repairable damage to land that can be immediately (within days) remediated and that does not compromise the agreed future land use/closure	Damage to land that requires remediation over a period of up to six months and can be sufficiently remediated so that the agreed future land use/closure can be achieved (future land use are not compromised or delayed)	Damage to land that can be sufficiently remediated during operations such that the agreed future land use/closure can be achieved (future land use are not compromised or delayed)	Damage to land to the extent that remediation delays commencement of the agreed future land use/closure	Damage to land to the extent that the agreed future land use/closure is no longer feasible
Socioeconomic pathway					
Adjoining land and infrastructure (third-party users, indigenous community, social value)	No measurable impact to surrounding land and infrastructure	Minor repairable damage to land and infrastructure with short-term disruption to use. Minor damage to a conservation area that can be repaired without impacting on conservation values. Suspension of important community services (e.g. transport, telecommunications, energy) for up to one hour	Damage to land and infrastructure that results in remediation costs and/or loss of income of up to US$1m. Damage to a conservation area that can be fully remediated within 12 months. Suspension of important community services (e.g. transport, telecommunications, energy) for up to one day	Damage to land and infrastructure that results in remediation costs and/or loss of income of up to US$10m. Damage to a conservation area that cannot be remediated within six months and results in the temporary loss of one or more values for which the area was reserved. Suspension of important services to the community (e.g. transport, telecommunications, energy) for more than one week	Extensive damage to land and infrastructure that results in remediation costs and/or loss of income of over US$10m. Irreversible damage to a conservation area resulting in permanent loss of one or more of the values for which the area was reserved. Suspension of important services to the community (e.g. transport, telecommunications, energy) for more than a month
Economic (social value, local community, indigenous community)	No measurable adverse impact on local communities or businesses	Short-term impacts on local businesses and/or wellbeing of local communities where those affected could be expected to adapt or cope	Ongoing impacts on the wellbeing of local communities that results in members of the community leaving the area and/or significant mental health issues across the community. Ongoing impacts on local businesses that result in closures and (direct and indirect) loss of employment for up to 20 people	Ongoing impacts on the wellbeing of local communities that results in a significant proportion of the community leaving the area and/or serious mental health issues across the affected communities. Ongoing impacts to businesses that result in closures and (direct and indirect) loss of employment for up to 100 people	Ongoing impacts on the wellbeing of communities that leads to towns being unable to effectively function. Ongoing impacts to businesses that result in closures and (direct and indirect) loss of employment for more than 100 people and/or towns in the region becoming unviable
Public health and safety (human health, indigenous community, local community, social value)	Injury or illness requiring first aid treatment with immediate release	Injury or illness requiring short-term (less than one week) hospitalisation with full recovery	Reversable impairment or serious injuries requiring long-term hospitalisation to one or more members of public	Single fatality or injury or illness that results in permanent disablement	Multiple fatalities or serious disabling injuries
Occupational health and safety (human health, social value)	Low-level impact resulting in first aid only	Non-life altering or short-term disabling injury or illness to one or more persons	Life-altering or long-term/permanent disabling injury or illness to one or more persons	One to five fatalities or one to five chronic life-threatening illnesses	Six or more fatalities or six or more chronic life-threatening illnesses

Severity Level	1	2	3	4	5
Significance	Not significant		Significant		
Visual amenity (human amenity, indigenous communities, social value)	Introduction of elements in the landscape that may be visible but are consistent with the agreed future landform/closure	Introduction of elements to the landscape that are visible and inconsistent with the agreed future landform/closure resulting in a reduction in visual amenity that will be remediated at closure	Introduction of elements to the landscape that are visible and inconsistent with the the agreed future landform/closure resulting in a reduction in visual amenity that cannot be remediated	Introduction of elements that result in long-term (during operations) substantial changes to the agreed future landform/closure with the total loss or degradation of elements, features or characteristics resulting in an adverse impact for several receptors	Introduction of elements that result in substantial permanent changes to the agreed future landform/ closure with the total loss or degradation of elements, features or characteristics
Historic heritage (heritage values)	No measurable impact to items of historic heritage significance	Isolated damage to locally significant historic heritage features that is readily rectified	Damage to State or national listed natural, cultural or historic heritage site that does not alter its heritage significance as stated in the listing	Permanent damage to State or national listed natural, cultural or historic heritage site that results in a loss of heritage significance as stated in the listing	Permanent damage to State or national listed natural, cultural or historic heritage site resulting in the site no longer meeting the listing criteria
Cultural heritage (cultural heritage, indigenous communities)	No measurable impact to items or places of cultural heritage significance	Isolated damage to item or place of local cultural heritage significance that is readily rectified. Damage to item or place of local cultural heritage significance of low heritage value due to its poor inherent condition	Damage to an item or place of local cultural heritage significance of low heritage value due to its poor inherent condition	Loss of multiple items of cultural heritage significance. Damage or loss of a locally significant place	Permanent loss of a rare place or substantial reduction in cultural heritage values
Nuisance dust (human amenity)	No exceedance of nuisance dust levels (no exceedance of background dust concentrations (g/m^2/month)	Localised exceedance of nuisance dust concentrations but no effects on off-site receptors	Increase in nuisance dust concentrations at receptors, but average annual dust deposition is less than 4 g/m^2/month	Average annual dust deposition (total insoluble dust) at receptors is greater than 4 g/m^2/month. Multiple complaints received	Average annual dust deposition (total insoluble dust) at receptors is greater than 4 g/m^2/month and greater than 2 g/m^2/month above background levels at that location. Multiple complaints

1.2.6 Uncertainty assessment and sensitivity

Uncertainties exist in the determination of impact significance (Step 6) across any proposed project where actual as-built monitoring data does not exist (Table 1.5), and may include:

- source, pathway or receptor knowledge gaps
- assumptions used to inform modelling, assessment of effects or assessment of impacts
- representativeness of baseline data.

An understanding of the level of uncertainty is required for each pathway (effects) and impact assessment in accordance with Table 1.5.

Table 1.5: Uncertainty levels

Level	Description
High	Low level of confidence in the outcomes of the assessment – the potential changes to the baseline environment, the potential impact and impact significance are not well-defined or understood. For example: • scientific evidence and previous experience are lacking or unreliable, with high potential for variability in impacts • no field verification has been undertaken • assessment of effects undertaken using a new method that is not recognised by industry or has been undertaken using an informal approach • several assumptions have been applied for which there is little scientific basis
Moderate	Moderate level of confidence – the potential changes to the baseline environment, the potential impact and impact significance are partially defined and understood. For example: • some scientific evidence is available, with some potential for variability in impact • some field verification has been undertaken • relevant knowledge of somewhat generally similar projects and impacts is available and has been applied • assessment of effects undertaken with an existing method, using a novel application which is not industry recognised • some assumptions have been applied with a reasonable/relevant basis
Low	High level of confidence – the potential changes to the baseline environment, the potential impact and impact significance are well-defined and understood. For example: • extensive scientific evidence is available, with low potential for variability in impact • extensive field verification has been undertaken • relevant knowledge of similar projects and impacts is available and has been applied • assessment of effects undertaken using industry recognised and/or best-practice methodology and/or modelling approach • limited number of assumptions have been applied with a solid scientific basis

Where the impact assessment has a level of uncertainty that changes the impact significance, a conservative (i.e. worst case) and precautionary approach towards the impact is to be taken and the higher impact assessment rating assumed.

The EIAF also assesses the sensitivity of an impact to change of any assumption related to the SPR relationship, using defined levels of sensitivity (Table 1.6). This assessment will determine whether the sensitivity to change in an assumption result in a significant change to the predicted confirmed impact event.

Table 1.6: Sensitivity levels

Level	Description
High	• Predictions highly sensitive to input variations • Sensitivity not studied/known • High potential for variability in impact
Moderate	• Some sensitivity of predictions to input variations • Moderate potential for variability in impact
Low	• Predictions not sensitive to input variation • Low potential for variability in impact

1.2.7 Control and management strategies

Impact assessments are designed to ensure that decisions on projects are made in full knowledge of potential impacts on the environment, public and community. A key step within the EIAF is Step 7, which is the identification of control and management strategies that can be implemented to ensure the potential of adverse impacts is ALARP, that Environmental Outcomes are complied with, and where possible, positive impacts are realised.

The EIAF specifically aims to identify control and management strategies where the impact assessment has determined that the uncontrolled impact is significant, or where such uncertainty exists that a significant impact may occur.

When developing control and management strategies for the SRE Project, the following mitigation hierarchy of controls is considered:

- Avoid: Adjust a project layout or eliminate the effect of the proposed project on the receptor by design. Significant avoidance and minimisation measures have been incorporated into decision making and project design
- Minimise: Measures that minimise or reduce an impact (e.g. reducing speed limits to reduce dust emissions from vehicle travel on unsealed roads)
- Rehabilitate: Measures that rectify, repair, rehabilitate or restore an impact
- Offset: Required if significant residual environmental impacts remain following the application of the above measures.

Control and management strategies should be developed with consideration to any significant uncertainties and assumptions regarding the likely effectiveness of proposed control measures in managing and mitigating impacts and achieving Environmental outcomes for operations and closure.

1.3 Risk assessment and management

As described in Section 1.1.3.3, some potential impacts may only be realised as a result of unplanned events. Examples of these include:

- a source (activity or infrastructure) does not operate as intended, resulting in a fire that impacts native vegetation
- a source (activity or infrastructure) fails resulting in a release of chemicals that contaminates local surface water.

The assessment of these events is described in the following sections.

1.3.1 Identification and assessment

1.3.1.1 Risk and inherent control identification

Risk events with the potential to result in impacts to receptors will be identified through:

- undertaking the initial potential impact event SPR works, as described in Section 1.2.1
- a dedicated environmental and social risk workshop
- stakeholder engagement.

Where a risk event is identified, consideration will be given to measures inherent to the design of operations that would eliminate or substitute a hazard, or source, for the protection of the environment (i.e. the control(s) that prevent an impact from occurring under planned operations).

1.3.1.2 Assessment

Identified risk events will be assessed via the impact assessment process described in Section 1.2, assuming that the inherent control(s) identified in Section 1.3.1.1 have failed (i.e. assuming an unplanned event occurs). This allows for the determination of impact significance were the risk event to occur, and thus provides an indication of the relative importance of the inherent controls in managing the risk.

1.3.2 Inherent controls and management

Depending on the outcomes of the EIAF, risk events may be determined to have a high reliance on controls to prevent a significant impact. In these instances, monitoring commitments may be proposed to ensure that the control measures function as intended.

In addition to inherent controls, there may be further controls identified to reduce the likelihood of a risk event manifesting. These will be documented where identified.

2. Supporting information

2.1 SPR impact assessment summary

The SPR impact assessment summary is provided in Appendix A.

2.2 References

BHP (2025) *Risk Management Global Standard (GRIA-GSTD-00003)*. Version 9.0. 7 July 2025.

Government of South Australia (2025) *Assessment Requirements ENVIRONMENTAL IMPACT STATEMENT. Smelter Refinery Expansion Project, Olympic Dam Operations, Roxby Downs*. September 2025. Published by Department for Housing and Urban Development on 5 November 2025. Accessed at: https://plan.sa.gov.au/development_applications/state_development/impact-assessed-development/majors/major_projects/majors/olympic-dam-smelter-refinery-expansion-project

ISO (2026) *Environmental Management Systems* (International Organization for Standardization Standard No. ISO 14001: 2026).

SPC (State Planning Commission) (2023) Practice Direction 17 Impact Assessed Development. Version 2. Published 14 February 2023. Government of South Australia, PlanSA, State Planning Commission.

2.3 Abbreviations and acronyms

Table 2.1: Abbreviations and acronyms

Abbreviation	Description
ALARP	As Low As Reasonably Practicable
ARI	average recurrence interval
EIAF	Environmental Impact Assessment Framework
ERICA	Environmental Risk from Ionising Contaminants Assessment and Management
GDEs	Groundwater-dependent ecosystems
GHG	Greenhouse gas
GLC	Ground-level concentration
ISO	International Organization for Standardization
SPC	State Planning Commission
SPR	source-pathway-receptor
SRE Project	Smelter and Refinery Expansion Project

2.4 Units of measure

Table 2.2: Units of measure

Unit	Description
%	per cent
US$	United States dollars
g	gram
h	hour
m	metre
mg	milligram
m^2	metre squared
m^3	metre cubed
mSv	millisievert
t	tonne
y	year
µGy	microgray

APPENDIX A SPR IMPACT ASSESSMENT SUMMARY

Potential Impact ID	SPR ID No. (as per final SPR register)	
Potential Impact Description	**Impact description (as per final SPR register)**	
Project phase (when impact will occur)	Construction | Operations | Closure | All	
Source	<< Source >>	**Provide a succinct summary of the source, as it relates to the SPR, to provide context to the reader** - *e.g.: 'clearing of XX ha of land'*
Pathway	<< Pathway >>	**Provide a succinct summary of the pathway/medium, as it relates to the SPR, to provide context to the reader -** *e.g.: 'all disturbance areas will be rehabilitated consistent with the pre-disturbance land uses'*
Receptor	<< Receptor >>	**Provide a succinct summary of the receptor, as it relates to the SPR, to provide context to the reader** - *e.g.: 'the proposed disturbance area is primarily on freehold pastoral land, and wholly within the XXX pastoral lease'.*
Fundamental design controls (Elimination, Substitution or Engineering)	Describe the inherent design controls applied to break a linkage between source and receptor (prevent the impact occurring). *e.g. siting of infrastructure to avoid sensitive areas/receptor. If none apply, reference as 'Not applicable'*	
Preliminary SPR linkage status	No linkage | Uncertain or unconfirmed linkage | Likely or confirmed linkage	
Preliminary SPR linkage justification	**Describe basis for the preliminary SPR linkage classification – e.g.:** • Significant distance exists between source and receptor • A potential linkage exists between source and receptor, however significant uncertainties exist in the knowledge base • Project will necessitate ground disturbance with direct impact(s) on << receptor >> • Significant species identified in existing baseline studies within the proposed disturbance footprint	
Work completed to assess/confirm linkage	**List the key activities undertaken to understand the environmental and social setting and confirm the presence or absence of the SPR linkage – e.g. (stakeholder consultation, baseline environmental assessments, assessment of effects etc).** If the preliminary SPR status is 'no linkage', reference as '*no linkage exists – not considered further*') If the preliminary SPR status is 'unconfirmed' or 'likely/confirmed linkage', make reference to the supporting environmental assessment(s) appended to the EIS, e.g. '*Visual Impact Assessment – Appendix XX to EIS*')	
Legislative Requirements		
Applicable regulatory requirements / agreements	**Identify if mandatory regulatory controls or compliance limits apply to the SPR, irrespective of the application of the EIAF and assessment of impact significance – e.g.:** • Not applicable • Air quality limits under the 'Air Quality EPP 2016' • Permissible noise levels within the 'EP (Noise) Policy 2007' • Requirement for offsets for vegetation clearance in accordance with the 'NV Act 1991', • etc. Identify if key agreements are in place that permit disturbance to receptors/impacts to receptors, irrespective of the application of the EIAF and assessment of impact significance – e.g.: • LACAs • NTMAs or other • etc.	
Stakeholder Consultation		
Outcomes of consultation under s112 of the *Planning, Development and Infrastructure Act 2016*	**In accordance with Section 112 of the PDI Act, BHP will take reasonable steps to consult the relevant landowner(s). Engagement is necessary so that key stakeholder's views are respected and taken into account in the identification of potential environmental impacts, opportunities for management of those impacts, and the development of environmental outcomes which are mutually acceptable.**	
Impact Assessment		
Confirmed SPR linkage status	**Select the confirmed SPR linkage status, based on the completed environmental assessment - either:** • *Not linkage* • *Confirmed linkage*	
Linkage justification	**Describe basis for the confirmed SPR linkage classification – e.g.:** • *Significant distance between source and receptor* • *Groundwater modelling predicts reduction in groundwater levels at third-party borefield* • *Potential impact of concern identified during stakeholder consultation / raised by << stakeholder >>* • *Project will result in ground disturbance with direct clearing (loss) of native vegetation* • *etc.*	

Potential Impact ID	SPR ID No. (as per final SPR register)
Severity ranking	For SPRs assessed as confirmed impact events (linkage exists), identify the severity level per the EIAF - e.g.: Level 1 | Level 2 | Level 3 | Level 4 | Level 5 For SPRs assessed as 'no linkage', reference as 'N/A - not considered further'.
Impact significance	For SPRs assessed as confirmed impact events (linkage exists), state the impact significance classification - e.g.: Not significant | Significant For SPRs assessed as 'no linkage', reference as 'N/A - not considered further'.
Impact uncertainty (Assessment confidence)	**Select the impact uncertainty level, with regard to the rating levels and definitions in the EIAF - either:** • Low uncertainty (high confidence) • Medium uncertainty (moderate confidence) • High uncertainty (low confidence)
Impact uncertainty – justification	**Provide a succinct summary justifying the assigned impact uncertainty rating, with regard to the uncertainty level definitions in the EIAF - e.g.:** • Extensive ecological baseline survey data available within the proposed disturbance footprint to inform the assessment (high confidence level) • Site-specified air quality model developed for the Oak Dam site, however, utilises proxy data for Olympic Dam as baseline (moderate confidence level) • Site-specific groundwater numerical model developed for the site in accordance with << best-practice guidelines >>. Limited baseline data available for input to model, however model prediction included multiple potential project scenarios and model uncertainty analysis (moderate confidence level)
Impact sensitivity	**Select the impact sensitivity level, with regard to the rating levels and definitions in the EIAF - either:** • Low • Medium • High
Impact sensitivity – justification	**Provide a succinct summary justifying the assigned sensitivity rating, with regard to the sensitivity level definitions in the EIAF - e.g.:** • Groundwater model is highly sensitive to input variations - the limited baseline groundwater modelling data increases the potential for variability in inflow volumes that will actually be encountered during excavation of the decline. Iterative updates to the groundwater model will be required to improve model accuracy and reliability, and thus reduce model uncertainty.
Key control measures	**For confirmed linkage events, list key control and mitigation measures that will be required/implemented to break a linkage (eliminate) or significantly reduce the severity of impact to ALARP (i.e. the controls will be relied upon to eliminate or mitigate impacts to receptors):** • Installation of shielding on fixed light fixtures to minimise lighting amenity impacts during evening hours (engineering control) • Stormwater retention and drainage system to collect and store turbid runoff and other contaminants (engineering control) • Bunding integrity inspections and maintenance program (administrative control) • etc. • For SPRs assessed as 'no linkage', reference as 'N/A - not considered further'.
Control measure uncertainty	**Describe any significant uncertainties and assumptions regarding the likely effectiveness of proposed control measures in managing and mitigating impacts and achieving environmental outcomes for mine operations and post-mine completion. Include any assumptions used in modelling carried out to assess the effectiveness of proposed control strategies - e.g.:** • The ARI event associated with the design of the surface water management infrastructure. • The effectiveness of haul road water in reducing the generation of dusts from an unpaved road.

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Annexure B

SIA Guidance alignment

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B.1 SIA Guidance alignment

Table B.1 Non-statutory SIA guidance alignment

Item	Where addressed in this SIA
SC2: Community Wellbeing/Social Impact Assessment, Detailed Assessment Requirements as outlined in the Assessment Requirements Library (page 89), PlanSA, Department for Housing and Urban Development (2022)	
The SIA should include social baseline information which includes but is not limited to: • A demographic profile of potentially affected communities. • An analysis of community characteristics (e.g. community history and culture, land/property ownership). • An overview of land use, key industries in the region, and relevant local and state government plans. • An overview of the capacity and accessibility of infrastructure, facilities and services, including education, health and emergency services. • An analysis of the existing housing and accommodation market, including availability, capacity and affordability. • A profile of the local and regional labour market, including likely availability of personnel with skills relevant to the project. • Details of other resource, infrastructure and major projects in the area (planning and currently operating).	Chapter 5: Baseline condition assessment
Key matters to be addressed by the SIA (for both construction and operation) are:	-
Workforce management incorporating (where relevant): • A summary workforce profile, including the estimated proportion of FIFO workers.	Chapter 3: Scope of SIA
• An analysis of the local and regional labour market, and an assessment of potential social impacts, including employment opportunities, training and development opportunities and possible labour shortages within local communities due to project demand. Including analysis of impact on labour market of skilled workers changing employment. • An assessment of opportunities for local workers to commute to and from work.	Chapter 5: Baseline condition assessment Chapter 7: Assessment of effects
• Workforce management measures which (may) include: – Measures to enhance potential employment opportunities for local and regional communities, and to mitigate potential negative social impacts. – Provisions to prioritise recruitment of workers from local and regional communities, then workers who will live in regional communities. – Proposed training and development initiatives to improve local and regional skills and capacity including, where relevant, initiatives for traditionally under-represented groups.	Chapter 8: Impact assessment
Housing and accommodation incorporating (where relevant): • Proposed workforce accommodation arrangements including details of any proposed project workforce accommodation facilities or purpose-built housing developments.	Chapter 3: Scope of SIA
• An analysis of the local and regional housing and accommodation market, and an assessment of potential social impacts, including: – Potential impacts to availability and affordability of housing (open market and rental) and other forms of accommodation. – Consequences of project induced housing market changes for local residents. – Potential opportunities for local accommodation providers.	Chapter 5: Baseline condition assessment Chapter 7: Assessment of effects

Item	Where addressed in this SIA
• Workforce housing and accommodation management measures which (may) include: – Measures to enhance potential benefits for project workers and the community, and to mitigate potential negative social impacts. – Policies regarding housing and accommodation support to be provided to project workers and their families who wish to live locally.	Chapter 8: Impact assessment
Local Business and Industry Procurement incorporating (where relevant): • A profile of the skills, services and materials required by the project.	Chapter 3: Scope of SIA
• An analysis of local and regional supplier capability and capacity relevant to the project, and an assessment of potential social impacts, including opportunities to enhance the capacity of local businesses and supply chains and risks associated with monopolisation of goods and services by the project.	Chapter 5: Social baseline Chapter 6: Assessment of effects
• Local business and industry procurement plan for construction and operation which (may) include: – Procurement strategies and initiatives for local and nearby regional suppliers, including Aboriginal and Torres Strait Islander owned businesses, and actions to facilitate participation. – Proposed policies and programs to build local and regional capacity and capability, and reduce barriers to entry. – Processes that embed the local business and industry procurement strategies into the contracting model for the project. – Measures to mitigate any potential negative social impacts on local industries. – Details of any established industry guidelines or codes of practice which the proponent has committed to complying with.	Chapter 8: Impact assessment
Health and community wellbeing incorporating (where relevant): • An analysis of the availability, accessibility and capacity of, and an assessment of potential project impacts on, existing social services, facilities and infrastructure such as healthcare and emergency response, transport and utilities, education and childcare, and community support services.	Chapter 3: Scope of SIA
• An analysis of the health and wellbeing of potentially impacted communities (in particular relevant disadvantaged groups e.g. Aboriginal people, disability, elderly), and an assessment of potential social impacts, including: – Community health, safety and security. – Livelihoods, economic wellbeing and access to resources. – Community lifestyles and cultural practices, amenity value, social character, and community cohesion. – Potential temporary or permanent effects on community recreational facilities, affecting the use of open space and the enjoyment of passive and active recreational opportunities.	Chapter 5: Baseline condition assessment Chapter 7: Assessment of effects
• Health and community wellbeing management measures which (may) include: – Measures to ensure that the level of service provided to the local community by existing social services, facilities and infrastructure is not reduced. – Measures to mitigate potential health and wellbeing impacts on local communities, and enhance potential benefits. – The level of on-site health services to be provided for workers. – Details of any workforce code of conduct to govern worker interactions with local communities. – Emergency response arrangements and management measures agreed with emergency service providers, for incidents both on and off the project site. – Details of any community development programs to be implemented, and the outcomes to be achieved.	Chapter 8: Impact assessment

Item	Where addressed in this SIA
An introduction to social impact assessment guideline, Department for Energy and Mining (2024)	
The SIA report must include:	-
• Statement of assumptions (scenarios used for assessment) and limitations (gaps in data, knowledge and further work that may be needed).	Chapter 3: Scope of SIA
• Qualifications of the SIA team members.	Annexure A
• Project description including all relevant change processes, activities and likely project inputs (labour force, energy, water).	Chapter 1: Introduction Chapter 3: Scope of SIA
• Methodology and standards guiding the research.	Chapter 2: Methodology
• Relevant state and regional policies and context.	Chapter 3: Scope of SIA
• Community and stakeholder engagement approach, issues raised and how they were responded to (this may be a separate report).	Chapter 4: Community and stakeholder engagement
• Community profile: describe the neighbourhood, predominant values, economic activities, land and sea uses, vulnerable population segments, recent history of other projects, relevant baseline data.	Chapter 5: Baseline condition assessment
• Aboriginal groups with connections to the site, land tenure, Native Title, representative bodies.	Chapter 5: Baseline condition assessment
• Prediction and assessment of impacts, likelihood and consequences of change, beneficial or harmful, backed by analysis and evidence.	Chapter 7: Assessment of effects
• Risk and opportunity matrix.	Chapter 8: Impact assessment
• Management or social performance plan, including ongoing engagement.	Chapter 8: Impact assessment
• Commitments and responsibilities.	Chapter 8: Impact assessment
• A matrix showing how the terms of reference have been addressed.	This table
Social Impact Assessment: Guidance for assessing and managing the social impacts of projects, International Association for Impact Assessment (2015)	
Typical contents listing of a Social Impact Assessment report and/or a Social Impact Management Plan:	-
• Introduction: A general introduction to the report making the purpose of the report clear, perhaps including a short general statement about how the document connects to SIA literature/philosophy.	Chapter 1: Introduction
• Project summary: A good description of the project and all ancillary activities so that readers can get a sense of the project. Where project alternatives or options exist, they could be explained here.	Chapter 1: Introduction
• Methodology: A statement about the overall design of the SIA, what methods were used, what community engagement processes were used, and how ethical issues were considered and addressed. Perhaps definitions and/or a discussion of key concepts. Some link to the SIA and social research literature would be expected here. A discussion of the governance arrangements for the conduct of the SIA should be provided. Importantly, the limitations of the applied methodology would also be included, including decisions to narrow or expand the scope over the course of the SIA.	Chapter 2: Methodology

Item	Where addressed in this SIA
• Applicable legal framework and standards: A discussion of the legal framework(s) and applicable legislation, regulations and guidelines that apply to the particular case. This would include not only local legislation/regulation, relevant institutions and their responsibility towards the project, but also mention of international standards, such as the IFC Performance Standards, guidance from international industry organisations, and reference to this SIA guidance document.	Chapter 3: Scope of SIA
• Community Profile and Social Baseline: If an extended community profile and social baseline are to be included as appendices, then at least include a summary of key characteristics and key stakeholder groups here; alternatively include the community profile and baseline data here. Key historical issues should also be discussed. Key aspects of the physical environment that may be relevant to understanding the context should be included too.	Chapter 5: Baseline condition assessment
• Scoping report: A statement of all potential social impacts considered in the assessment phase. The disposition of each impact considered should be made clear. Where this is presented as a separate report, a summary should be provided. Alternatively, this can be an appendix.	Chapter 3: Scope of SIA
• Prioritised listing of key social impacts: This is a listing of the residual impacts with a discussion of how different stakeholders are affected. There should be a particular focus on Indigenous peoples, women and vulnerable groups.	Chapter 7: Assessment of effects
• Resettlement (Summary): If resettlement is required, or if physical or economic displacement will occur, a short description of how the resettlement process will be undertaken, what compensation will be provided and how it will be determined, and what measures will be taken to restore and enhance livelihoods. A fully-developed Resettlement Action Plan will be required as a separate document.	*Not relevant*
• Summary of mitigation and management measures: A list of mitigation and other management measures to address social issues should be provided. There should be a costing and timeframe for implementation for proposed mitigation measures.	Chapter 8: Impact assessment
• Monitoring Plan and Contingency Plan (Adaptive Management): A plan for how monitoring will be undertaken – what will be monitored, how monitored, how often and who is responsible, as well as how the company will respond should an allowance threshold be exceeded – needs to be provided.	Chapter 8: Impact assessment
• Benefit statement: This is a statement of the likely project benefits to the local communities, including of all proposed social investment actions, and local content and local procurement strategies.	Chapter 8: Impact assessment
• Ongoing community engagement strategy and grievance mechanisms: A description of the intended ongoing community engagement processes. Also, a description of what grievance mechanisms will be provided and what processes will be used for managing grievances.	Chapter 8: Impact assessment
• Governance arrangements: A discussion of the governance arrangements that will apply to the ongoing community engagement processes, the grievance mechanisms, the monitoring process, and to ensure the ongoing acceptability of the social investment program.	Chapter 8: Impact assessment
BHP EIAF (2024)	
Step 1: Identify potential source, pathway, receptors (SPRs): • Initial identification of potential sources, pathways and receptors for evaluation.	Chapter 3: Scope of SIA
Step 2: Identify potential impact events: • Preliminary screening to understand potential linkages between sources and receptors. • Receptors with no linkage to a source are not considered further.	Chapter 7: Assessment of effects
Step 3: Undertake supporting studies: • Baseline studies and stakeholder consultation undertaken to further understand environmental and social setting.	Chapter 4: Community and stakeholder engagement Chapter 5: Baseline condition assessment

Item	Where addressed in this SIA
Step 4: Confirm impact events: • Detailed SPR evaluation to confirm linkages between sources and receptors informed by project description, baseline studies and stakeholder consultation.	Chapter 7: Assessment of effects
Step 5: Assess impact significance: • Assessment of inherent (unmitigated) level of severity (impact significance) for all confirmed impact events.	Chapter 8: Impact assessment
Step 6: Assess impact uncertainty: • Assessment of the effect of uncertainties on the impact significance assessment (e.g. modelling limitations, land access constraints, etc).	Chapter 8: Impact assessment
Step 7: Identify mitigation hierarchy: • Identification of controls and management measures to eliminate, minimise or offset confirmed impact events.	Chapter 8: Impact assessment

Annexure C

Detailed social baseline data

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Table C.1 Social baseline data

Indicator	Data source and year	Nearby local community		Regional study area					South Australia
		Roxby Downs SA2	Andamooka SAL	Unincorporated SA LGA	Roxby Downs LGA	Port Augusta LGA	Whyalla (C) LGA	Total regional study area	
Demographic and socio-cultural characteristics									
Population, 2024 (no.)	2024, ABS Regional Population	4,113	-	3,015	4,113	14,420	21,902	43,450	1,852,284
Population projections, 2041 (no.)	2024, PlanSA	4,129	-	3,068	4,129	15,029	23,690	42,848	2,174,497
Population, 2021 (no.)	2021, ABS Census	3,976	262	3,006	3,976	13,829	21,244	42,055	1,781,516
Population, 2016 (no.)	2016, ABS Census	3,888	316	3,524	3,884	13,808	21,828	43,044	1,676,653
Population change, 2016 to 2021 (%)	2016 and 2021, ABS Census	2.3	-17.1	-14.7	2.4	0.2	-2.7	-2.3	6.3
Median age (no.)	2021, ABS Census	31	57	42	31	38	41	-	41
Female (%)	2021, ABS Census	45.5	45.9	42.4	45.5	48.3	49.8	48.4	50.7
Male (%)	2021, ABS Census	54.5	54.1	57.6	54.5	51.7	50.2	51.6	49.3
People aged 14 years or under (%)	2021, ABS Census	25.7	11.5	14.2	25.5	18.4	17.9	18.5	17.0
People aged between 15 and 24 years (%)	2021, ABS Census	11.0	6.5	12.2	11.0	11.1	11.5	11.4	11.7
People aged between 24 and 64 years (%)	2021, ABS Census	61.8	53.8	59.5	61.8	52.8	51.7	53.6	51.3
People aged 65 years or older (%)	2021, ABS Census	1.8	32.8	14.0	1.6	17.7	18.9	16.5	20.0
People who identify as Aboriginal and/or Torres Strait Islander (%)	2021, ABS Census	5.0	4.6	24.4	5.0	20.4	5.5	11.7	2.4
Same address 1 year ago (%)	2021, ABS Census	64.1	82.8	71.2	64.1	75.5	80.6	76.7	82.4
Same address 5 years ago (%)	2021, ABS Census	30.6	67.6	51.9	30.6	56.7	61.5	56.4	57.8
Language other than English spoken at home (%)	2021, ABS Census	8.9	4.6	16.0	8.9	7.4	6.8	7.8	18.0

Indicator	Data source and year	Nearby local community		Regional study area					South Australia
		Roxby Downs SA2	Andamooka SAL	Unincorporated SA LGA	Roxby Downs LGA	Port Augusta LGA	Whyalla (C) LGA	Total regional study area	
Housing and economic characteristics									
Number of private dwellings, 2021	2021, ABS Census	1,778	529	2,771	1,778	6,992	11,230	17,100	775,134
Proportion of dwellings that are unoccupied, 2021 (%)	2021, ABS Census	22.1	74.8	51.3	22.1	17.4	14.2	23.2	10.8
Dwelling owned outright or with a mortgage, 2021 (%)	2021, ABS Census	28.5	76.8	43.9	28.5	59.3	57.6	55.2	68.4
Dwelling rented, 2021 ($)	2021, ABS Census	67.1	16.3	35.2	67.1	37.2	39.5	40.5	27.6
Median weekly rent ($), 2021	2021, ABS Census	$260	$150	$90	$260	$200	$180	-	$300
People who participate in labour force (no.)	2024, September quarter, Jobs and Skills Australia	2,657	-	1,767	2,657	6,584	10,341	21,349	987,800
Unemployed persons (no.)	2024, September quarter, Jobs and Skills Australia	15	-	77	15	442	663	1,197	41,300
Unemployment rate (%)	2024, September quarter, Jobs and Skills Australia	0.6	-	4.4	0.6	6.7	6.4	5.6	4.3
Number of registered businesses (no.)	2024, ABS Counts of Australian Businesses	171	-	294	171	642	680	1,769	164,454
Health and wellbeing characteristics									
Has one or more long-term health conditions	ABS, 2021	16.3	42.4	23.8	16.3	29.9	34.2	30.3	29.8
Has a need for assistance (%)	2021, ABS Census	1.1	9.9	3.2	1.1	6.3	7.8	6.3	6.7
Engaged in voluntary work (%)	2021, ABS Census	14.1	21.3	21.7	14.1	13.7	14.5	14.7	17.0

Annexure D

Assessment requirements

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Social impact related assessment requirements and cross reference to where these are addressed in this report are outlined in Table D.1.

Table D.1 Assessment requirements

Environmental attributes	Reference	Assessment requirements	Cross reference
Community Wellbeing / Social Impact Assessment	SC2	Provide a Social Impact Assessment (SIA) of the development which addresses: • Identification of the social study area based on the anticipated geographic distribution of social impacts (which may include communities distant from the location of the project). • The existing social attributes of communities potentially impacted by the project. • The potential social impacts (positive and negative) of the project during construction and operation (and decommissioning where relevant), including the temporal, spatial and demographic distribution of impacts. • Proposed measures to avoid or mitigate adverse impacts and capture social benefit opportunities during construction and operation (and decommissioning where relevant). • Proposed approaches to monitoring or responding to changing social impacts over the life of the project, including potential public reporting on progress or achievements.	Refer Section 3.5, Section 6.1, Chapter 8 and Section 8.1
Community Wellbeing / Social Impact Assessment	SC2	The SIA should include, but not be limited to, the following baseline information: • A socio-demographic profile of potentially affected communities including an analysis of community characteristics (e.g. history, culture, land/property ownership). • An overview of land uses and key industries in the region, and relevant local and state government plans and/or strategic priorities. • The capacity, demand on and accessibility of social infrastructure, facilities and services, including education, health, recreation, justice and emergency services. • The existing housing and accommodation market, including availability, capacity and affordability. • Existing availability of employment land including availability, capacity and affordability. • A profile of the local and regional labour market, including likely availability of personnel with skills relevant to the project. • Details of other resource, infrastructure and major projects in the area (planned and currently operating) that may contribute to cumulative impacts.	Refer Chapter 6

Environmental attributes	Reference	Assessment requirements	Cross reference
Community Wellbeing / Social Impact Assessment	SC2	Housing and Accommodation incorporating (where relevant): • Proposed workforce accommodation arrangements including details of any proposed project workforce accommodation facilities or purpose-built housing developments. • Consideration of housing demand in Roxby Downs and Port Augusta for workers and/or their families. • An analysis of the local and regional housing and accommodation market, and an assessment of potential social impacts, including: – Potential impacts to availability and affordability of housing (open market and rental) and other forms of accommodation. – Consequences of project induced housing market changes for local residents. – Potential opportunities for local accommodation providers. – Potential displacement of tourists and visitors. • Workforce housing and accommodation management measures which may include: – Measures to enhance potential benefits for project workers and the community, and to mitigate potential negative social impacts. – Policies regarding housing and accommodation support to be provided to project workers and their families who wish to live locally.	Refer Section 7.5
Community Wellbeing / Social Impact Assessment	SC2	Liveability - Health and Community Well-being incorporating (where relevant): • An analysis of the availability, accessibility and capacity of, and an assessment of potential project impacts on, existing social services, facilities and infrastructure such as healthcare and emergency response, justice transport and utilities, education and childcare, and community support services. • An analysis of the health and well-being of potentially impacted communities (including traditionally disadvantaged groups e.g. Aboriginal people, disability, elderly), and an assessment of potential social impacts, including: – Community health, safety and security. – Livelihoods, economic well-being and access to resources. – Community values, cohesion, lifestyles, cultural practices, amenity value and social character. – Potential temporary or permanent effects on community recreational facilities and open space. – Potential temporary or permanent effects on employment lands availability and safety and amenity of employment lands particularly in reference to the Olympic Dam and Roxby Downs industrial estates. • Health and community wellbeing management measures which may include: – Measures to ensure that the level of service provided to the local community by existing social services, facilities and infrastructure is not reduced. – Measures to mitigate potential health and well-being impacts on local communities, and enhance potential benefits. – The level of on-site health services to be provided for workers. – Details of any workforce code of conduct to govern worker interactions with local communities. – Emergency response arrangements and management measures agreed with emergency service providers, for incidents both on and off the project site. – Details of any community development programs to be implemented, and the outcomes to be achieved.	

Environmental attributes	Reference	Assessment requirements	Cross reference
Community Wellbeing / Social Impact Assessment	SC2	Social consequences of technical matters assessed under other Assessment Requirement attributes of the EIS, incorporating (where relevant): • Environmental and/or physical changes, such as air or water quality, exposure to hazards and risks, visual and landscape amenity, impacts on Aboriginal or non-Aboriginal heritage places. • Economic changes, such as workforce and employment changes, impacts on existing businesses, and the cost and availability of goods and services.	

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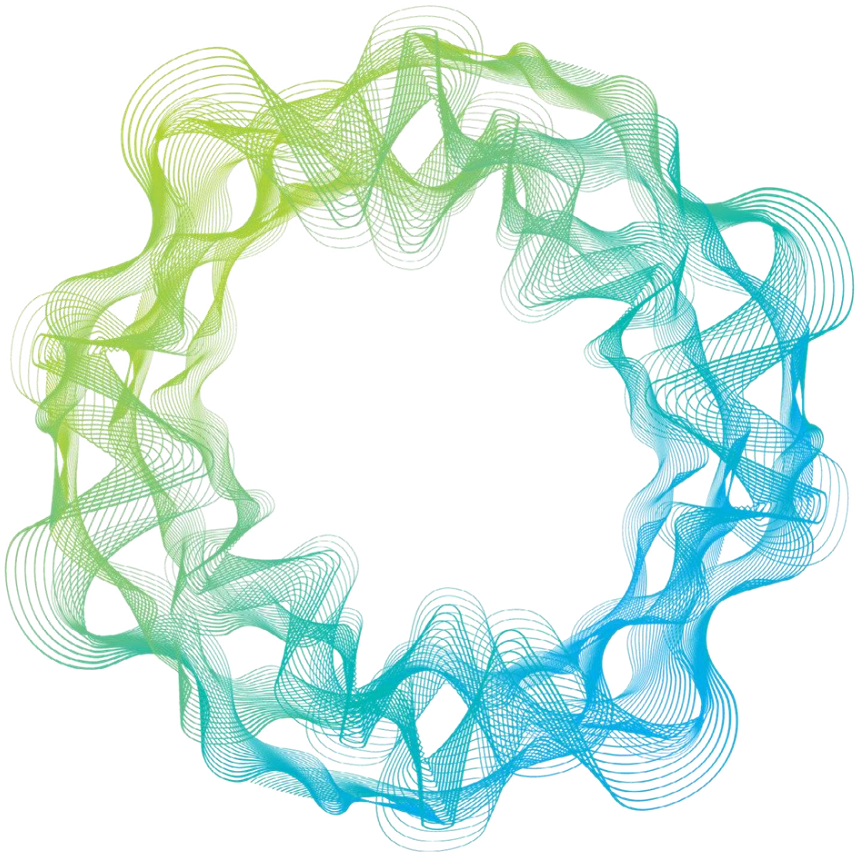
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Appendix D3.
Economic

Deloitte.



Economic Assessment: Olympic Dam Smelter and Refinery Expansion Project

BHP Olympic Dam

July 2026

Deloitte Access Economics

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Executive summary

Background

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (the Project) at the Olympic Dam mining operations, in regional South Australia (SA) (Figure 1.1).

Deloitte Access Economics has been commissioned to undertake an Economic Assessment (EA) of the Project. This assessment forms part of the Environmental Impact Statement (EIS) for the Project, in accordance with EIS assessment requirements of an Impact Assessed Development under the Planning, Development and Infrastructure Act 2016 (SA). Based on the Terms of Reference and relevant guidelines (see Chapter 2.2), this report:

- assesses the Project's net economic benefits to South Australia through a cost–benefit analysis (CBA) at the state level (see Chapter 4 of this report).
- provides additional analysis for Roxby Downs and the South Australia Outback – North and East region, through a local effects analysis (LEA) for the regional economy (see Chapter 5 of this report).

Through these methods this report provides a comprehensive analysis of the net economic benefits of the expansion. Further, through the quantification of environmental and social externalities, it supports the identification of adverse effects, where these are not internalised as part of the project.

Methodology

In addition to the Assessment Requirements, the report was prepared in accordance with the Government of South Australia (2022) *Better Regulation Handbook* (the Guideline). The Guideline provides a detailed consideration for the steps required in the preparation of a CBA. While not directly binding to this assessment, we have also used other guidelines for guidance on specific topics, including valuing certain externalities and best-practice methods for undertaking a LEA. These guidelines include:

- Infrastructure South Australia (2022) *Impact Analysis Guide – Cost-Benefit Analysis*.
- Infrastructure Australia (2021) *Guide to economic appraisal*.
- NSW Government (2015) *Guidelines for the economic assessment of mining and coal seam gas proposals.*

In accordance with these requirements, this report examines impacts on producer surplus, revenue, costs, royalties, taxes, and economic benefits to workers and suppliers. It also addresses environmental, social, and transport externalities, discussing the mitigation and expected costs related to such impacts. Overall, it presents an estimated net economic benefit for the state, in addition to analysis of specific employment, local industry, and externality impacts on the Local Region (defined as the *Outback – North and East* Statistical Area 3).

About the Project

The SRE Project involves the expansion and modernisation of smelting and refining operations at Olympic Dam to support the Copper South Australia growth strategy and enable increased, more reliable production.

The Project is designed to deliver a more productive processing system, increasing copper cathode output from approximately 200 kilotonnes per annum (ktpa) to up to 650 ktpa, while supporting the integration of ore from Carrapateena and Prominent Hill. Key features of the Project include:

- expansion and upgrade of existing smelter and refinery infrastructure to support up to 650 ktpa of copper production, in addition to associated co-products
- introduction of a two-stage smelting process, including installation of a new primary flash smelting furnace to produce copper matte
- conversion of the existing furnace to a flash converting furnace to process matte into blister copper
- addition of a new acid plant and upgrade of the existing acid plant
- expansion of electrorefining and precious metals recovery facilities to produce cathode copper, gold and silver.

Importantly, the majority of the SRE Project activities, except for ground re-profiling within the Electricity Infrastructure Area, would be located wholly within the existing Olympic Dam SML, integrated with Olympic Dam mining operations in addition to Copper South Australia operations more broadly. Nonetheless, the Project will require supporting infrastructure, services and utilities, including upgrades, relocations and removals within the smelter and refinery area, to accommodate the expanded operations.

Net benefit to South Australia

The CBA estimates the net benefits (i.e. economic benefits less costs) of the Project on the South Australia community. The CBA compares the Project Case to a Base Case to estimate the incremental costs and benefits of the Project relative to the Base Case.

The Base Case assumes a continuation of existing smelter and refinery operations at 200 ktpa copper cathode output until FY65, after which the smelter and refinery is decommissioned and surrounding area rehabilitated (over several years, however with most costs incurred in the 10 years post closure). In contrast, the Project Case reflects a 650 ktpa copper cathode output through to FY2103 before decommissioning and rehabilitation.

Incremental costs and benefits are estimated using information provided by BHP and the findings of the other technical assessments within the EIS, alongside relevant additional information. The items considered in the CBA are listed in Table E.1. These items have been developed in compliance with the Guideline that attributes costs and benefits of the Project to the economy of interest; the South Australia community. From these components, the share of the net benefits that accrue to the South Australia community are then aggregated.

Table E.1: Benefit and cost items considered in the CBA

Item	Benefit components	Cost components
Direct producer surplus	Gross production revenue	Operating costs (including local contributions, environmental mitigation, transport management) Capital costs (offset by residual value of capital and residual value of land) Rehabilitation and decommissioning costs Payable taxes (Federal, state & local) and royalties
Royalties	Royalties paid to government due to increase in smelter and refinery production	
Local government rates	Rates paid to local government	
Payroll tax	Increase in BHP's payroll tax paid to SA	
Company income tax	Increase in BHP's income tax paid that is apportioned to SA	
Benefit to workers	Benefits to South Australian workers in wage premium paid above what they could receive elsewhere	
Benefit to suppliers	Benefits to South Australian suppliers in a rate/margin above market rates they would otherwise receive	
Net environmental, social & transport-related costs		Land use, Soils and geochemistry, First Nations and Non-First Nations cultural heritage*, Air quality, Ambient noise and vibration, Biodiversity, Greenhouse gas (GHG) emissions, Surface water and groundwater, Social*, Traffic and transport, Visual amenity*

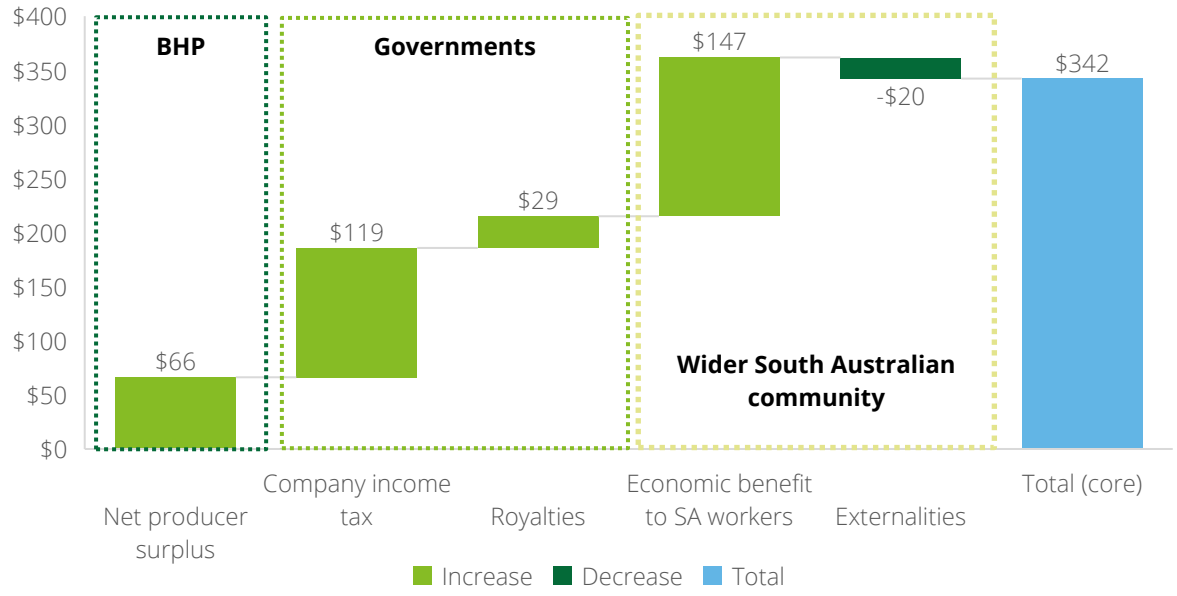
*Item has been considered qualitatively.
Source: Deloitte Access Economics

Assessment of these costs and benefits indicates that the Project is expected to generate a net incremental economic benefit to the South Australia community of approximately $342 million in present value terms (FY26 $AUD) over the 50-year evaluation period (FY27 to FY76) assuming a 6% real discount rate. This net benefit reflects:

- net producer surplus attributable to South Australia of $66 million, reflecting efficiency benefits for both mining and smelting and refining operations at Olympic Dam from resolving the current copper-to-sulphur limitation of the smelter and refinery
- an increase in company income tax attributable to South Australia of $119 million, related to a higher forecast producer surplus from BHP
- an increase in royalties to the Government of South Australia of $29 million, reflecting higher-value output from existing mining activities and a greater recovery rate from the new smelter and refinery
- an expected economic benefit to South Australian workers of $147 million, attributed to a wage premium paid by smelter and refinery operations at Olympic Dam compared to alternatives
- externality costs attributable to South Australia as a result of ambient noise and vibration, air quality, traffic, and greenhouse gas emission changes, valued at $20 million.

An overview of the drivers of this core result is presented in Chart E.1 below.

Chart E.1: Breakdown of core results (NPV, $millions AUD FY26, for FY27-76), 6% real discount rate

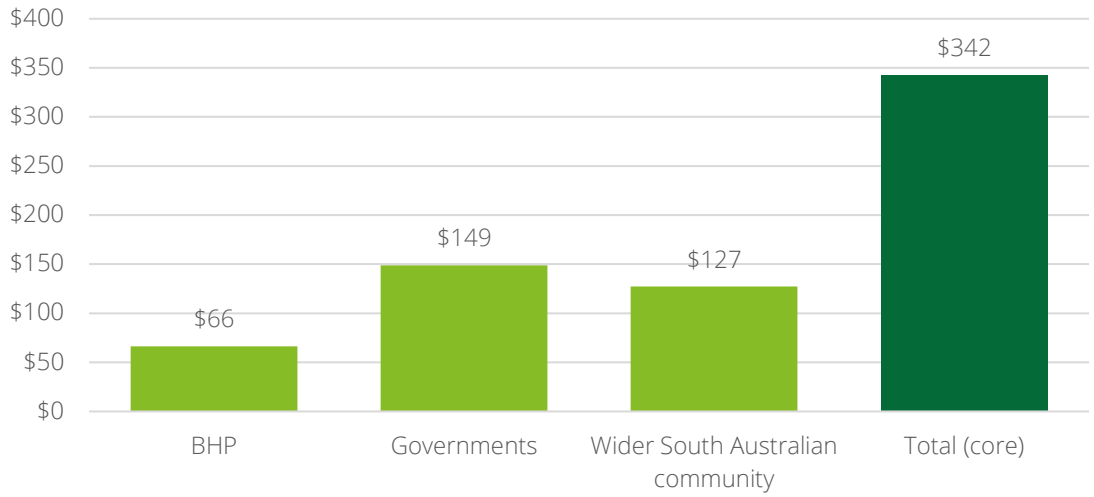


Source: Deloitte Access Economics calculations

A net producer surplus of $66 million (net present value) for BHP reflects productivity and efficiency gains across both mining and smelting and refining operations at Olympic Dam, arising from resolving the current copper-to-sulphur processing constraint. These operational improvements enable higher-value production from existing mining activities and more efficient recovery through the expanded smelter and refinery.

The Project is also expected to deliver net benefits to the South Australian Government and broader community (see Chart E.2 below). Government revenues are forecast to increase through an additional $29 million in mining royalties and $119 million in company income tax attributable to South Australia, reflecting higher-value production and increased producer surplus generated by the Project. The wider South Australian community is expected to benefit from $147 million in wage premiums received by South Australian workers employed by the Project, partially offset by externality costs of $20 million associated with changes in ambient noise and vibration, air quality, traffic and greenhouse gas emissions.

Chart E.2: Distributional breakdown of core results (NPV, $millions AUD FY26, for FY27-76), 6% real discount rate



Source: Deloitte Access Economics calculations

In addition to core results, an indicative below-the-line estimate is also provided for economic benefits to suppliers, which could total $421 million in present value terms. For the purposes of the CBA, it is conservatively assumed that there is no induced production and that local suppliers would earn similar margins relative to what they receive under the Base Case such that there are no additional benefits to suppliers in South Australia.

The $342 million present value net benefit of the Project to South Australia is a result of the state-level disaggregation of results of attribution of national benefits of the Project. More broadly, the Project is projected to generate $963 million in producer surplus to BHP shareholders in Australia in present value terms, $1,730 million in company income tax, and $154 million in labour surplus to Australian workers, offset by $200 million in externalities. Royalties for Australia remain at $29 million in net present value. Overall, the net benefit of the Project to Australia is $3,195 million in present value.

The Project is expected to generate environmental and social effects (both positive and negative), referred to as externalities. These externalities relate to a range of aspects as described in Table E.1. Except for greenhouse gas emissions, traffic, ambient noise and vibration, and air quality, the residual effects associated with the externalities are expected to be immaterial after implementation of mitigation and management measures (included in the capital investment and operating costs) and therefore have not been monetised in the CBA.

The CBA results rely on a number of assumptions and valuations. Consequently, the sensitivity of the results to a number of parameters was analysed, as required by the Guideline (see Table E.2). Parameters tested included variation in the discount rate, capital and operating costs, commodity prices, treatment and refinery charges (TC/RCs), royalties, company income tax, labour surplus for SA workers, and carbon values.

Consistent with the Central CBA finding of a $342 million net benefit in present value terms, the Project is expected to generate positive incremental benefits to South Australia under most individual sensitivity scenarios tested. However, the magnitude of the estimated benefit remains sensitive to changes in key assumptions, with adverse variations capable of materially reducing the net benefit and, in the case of low commodity prices or a high assumed discount rate, resulting in a net cost outcome.

The most influential assumption influencing future results is that of commodity prices. While copper, gold and silver prices are assumed to moderate from current elevated levels under the central case, sustained higher commodity prices would increase the value of recovered products, resulting in higher producer surplus and associated company income tax and royalty benefits to South Australia. Conversely, lower commodity prices would materially reduce the economic value generated by the Project.

Given the key benefit of the Project is improving the efficiency of BHP Olympic Dam operations, the Project is also sensitive to operating and capital costs which reflect upsides or downsides to this efficiency dividend. Overall, 20% higher operating costs, reflecting a reduction in the operating efficiency of the Project, decreases the net benefit of the Project to an estimated $284 million in net present value.

Combining all sensitivities into best- and worst-case scenarios demonstrates the range of potential outcomes, with the NPV of the Project varying from $1.68 billion under the combined best-case scenario to -$1.07 billion under the combined worst-case scenario (using a 6% real discount rate). These outcomes highlight the

importance of key commercial assumptions, particularly commodity prices and treatment and refinery charges, in determining the scale of the Project's economic benefits.

Table E.2: Sensitivity analysis results (NPV, $millions AUD FY26, for FY27-76)

Parameter	Variation in parameter	Net benefits (NPV $m)		
		3% (real)	6% (real)	10% (real)
Central results		**1,252**	**342**	**(5)**
Capital costs of construction	-20%	1,343	406	42
	+20%	1,161	279	(52)
Operational input costs	-20%	1,395	400	18
	+20%	1,109	284	(27)
Commodity prices	-25%	(898)	(692)	(444)
	+25%	3,402	1,376	434
Treatment and refinery charges (TC/RCs)	-50%	912	166	(91)
	+50%	1,819	636	139
Royalty rate	-25%	1,177	335	5
	+25%	1,327	349	(14)
Company income tax	-15pp	1,198	321	(11)
	+15pp	1,306	363	2
Labour surplus for SA workers	-50%	1,102	271	(37)
	-100% (i.e., no benefit)	943	196	(71)
Carbon values	IA Low value (-30%)	1,260	345	(3)
	IA High value (+28%)	1,244	339	(6)
Best/worst case (combination of above sensitivities)	Best case	4,084	1,678	543
	Worst case	(1,712)	(1,074)	(631)

Note: Numbers in the table may not add up due to rounding.
Source: Deloitte Access Economics calculations

Economic impacts on the Local area, Region, and State

The LEA estimates the social and economic impacts of the Project to the communities located near the Project Area, including *Roxby Downs* SA2 (the Local Area) and the *Outback – North and East* SA3 (the Local Region). The results of the LEA are complementary to the CBA and translate effects to South Australia to those relevant to communities located near the Project area.

Table E.3: Estimated average yearly local effects, reported incremental to the Base Case

		Construction phase (average per year, FY28 through FY38)		Operations phase (average per year, FY39 through FY76)	
		Local Region	Outside of the Local Region	Local Region	Outside of the Local Region
Employment					
Average direct increase in full-time equivalent employment	FTE/year	141	500	147	523
Increase in net income (only counted for internal workforce, not contractors)	$m/year	1	3	4	16
Other non-labour expenditure					
Direct expenditure	$m/year	66	680	39	398
Externalities					
Net environmental, social and transport costs	$m/year	0.35	5	0.62	32

Source: Deloitte Access Economics calculations

Local employment and income effects

The Project is estimated to directly support an average of 141 full-time equivalent (FTE) jobs for workers from the Local Region during the construction phase, and 147 FTE jobs during ongoing operations, relative to the Base Case. While the Local Region share of employment has been estimated at around 22%, it is noted that no additional direct employment is forecast to be sourced from Roxby Downs itself; the workforce attributed to the Project is comprised of drive-in drive-out (DIDO) or fly-in fly-out (FIFO) workers, mostly from the rest of South Australia.

The net local employment effect is estimated as the additional employment income from the Project in excess of average wages in the Local Region. This is calculated to be between $1 million to $4 million per year over the life of the Project.

Other local industry effects

Beyond labour effects, the Project will generate ongoing additional expenditure on other non-labour inputs, such as materials and equipment, fuel and utilities, and professional services, a share of which will directly contribute to the local economy. The Local Region is expected to benefit from $66 million a year during the construction phase and $39 million a year during operations phase from ongoing non-labour expenditures.

The Project is likely to have a limited impact on existing land uses, tourism and business travel. While a vast majority of the Project labour force is expected to reside in existing BHP-owned facilities in Olympic Dam, a small minority of additional ongoing operational staff (around 50) are estimated to reside in Roxby Downs, with implications for the local housing and retail industries.

Environmental and social changes in community

With the exception of greenhouse gas emissions, most of the environmental and social impacts evaluated in the CBA will accrue to the Local Region. These include impacts on air quality, ambient noise and vibration, and traffic and transport. The most notable costs for the Local Region are traffic and transport impacts and ambient noise and vibration. Overall, environmental and social costs for the local region are estimated to total $0.62

million per year during the operations period. Externality costs are minimised through the internalisation of environmental and social costs; for instance, through installation of efficient fittings to reduce energy and water demand, and the use of renewable electricity purchase agreements. Further, as the Local Region is dispersed and has a low population, expected environmental impacts on the Local Region are modest.

Flow-on impacts

Input–Output (IO) modelling has been used to estimate the flow-on economic impacts of Project-related expenditure across the South Australian economy. This approach traces how spending by the Project stimulates activity in supplier industries, generating additional output, value-added, employment and income.

The analysis has been undertaken using the Deloitte Access Economics Regional Input Output Model (DAE-RIOM), customised to reflect the structure of the *Outback – North and East* region and the rest of South Australia. IO findings are presented separately from other local effects and separate from the CBA results and should be interpreted as indicative measures of economic activity rather than net economic benefits. Only first round (direct supplier) effects are included when reporting IO results.

The modelling indicates that flow-on impacts are concentrated in the rest of South Australia, reflecting broader supply chain capacity. During construction, indirect value-added is estimated at approximately $17 million per year in the Local Region and $36 million per year in the rest of the state, with associated employment of around 79 and 170 full-time equivalent (FTE) roles, respectively. During operations, these impacts moderate to around $8 million and $25 million per year in value-added, and 37 and 85 FTE roles.

While these results highlight the Project's potential to support Local Region economic activity through supply chains, they are subject to important limitations, including an assumption of fixed production relationships and an absence of resource and labour constraints.

1 Introduction and background

1.1 Introduction

1.1.1 Background

Deloitte Access Economics has been commissioned to undertake an Economic Assessment (EA) of BHP Olympic Dam's (BHP) proposed Olympic Dam Smelter and Refinery Extension (SRE) Project (the Project).

This assessment forms part of the Environmental Impact Statement (EIS) for the project, prepared in accordance with the *Planning, Development and Infrastructure Act 2016*. This assessment has been prepared to satisfy the requirements of the *Assessment Requirements – Environmental Impact Statement – Smelter Refinery Expansion Project, Olympic Dam Operations, Roxby Downs* (ToR), issued by the State Planning Commission in September 2025.

Based on the ToR and relevant impact assessment and cost-benefit analysis guidelines (refer Chapter 2.2), this report estimates the net economic benefits of the Project to the South Australia (SA) community. It also covers costs and benefits to the locality of Roxby Downs and to the local region, defined as the South Australia *Outback – North and East* region. This is done using both cost benefit analysis (CBA) for South Australia and an accompanying regional impact analysis, which has been completed in the form of a local effect analysis (LEA) on the local region. The use of these two distinctly different methods covers the likely effects of the Project on the local, regional, and State economies to ensure adverse economic impacts arising from construction and operation of the development are avoided or mitigated, and net economic benefits to the region and state (i.e. from the perspective of the South Australian community)

The report examines the expected economic costs and benefits of the Project, relative to a Base Case or 'business-as-usual' scenario ("do minimum") where there is no investment in Olympic Dam smelter and refinery expansion. In effect, the 'with project' case is compared with the 'without project' case.

1.1.2 Regulatory Context

The SRE Project was declared an Impact Assessed development pursuant to section108(1)(c) and 108(7) of the PDI Act on 29 August 2024. The declaration reflects the nature, scale and significance of the SRE Project to SA. Impact Assessed Development is the most rigorous level of development assessment prescribed under the PDI Act. Specifically, the Minister made the following declaration: Pursuant to Section 108(1)(c) and Section 108(7) of the Planning Development and Infrastructure Act 2016, having taken into account those principles prescribed under Regulation 27(2) of the Planning, Development and Infrastructure (General) Regulations 2017 (the Regulations) and having given consideration to the matters under Regulation 27(3) of the Regulations, I declare that all development of a kind specified in the Schedule to this Notice, to the extent that it is undertaken on land identified in Clause 28(1) of the Indenture as impact assessed development and that references to "development" include a project.

The majority of the SRE Project activities, with the exception of ground re-profiling within the Electricity Infrastructure Area, would be located wholly within the existing SML but does not include business-as-usual operations (operations which enable existing approved production of up to approximately 200,000 tonnes per annum (tpa) total copper production) or activities associated with scheduled campaign maintenance 2027 (SCM27) works. These activities are subject to separate regulation (e.g. Environment Protection Authority (EPA) licensing) and approval. The SRE Project may also be supported by low impact development outside the SML, which could include, for example, minor road works and upgrades to accommodation infrastructure. It is proposed that any approvals required for these activities would be sought on an as-needs basis under applicable legislation and guidelines.

Planning Development and Infrastructure Act 2016 (SA) Development approval is required for the Project under the PDI Act. The PDI Act established a new development assessment system in SA to streamline the assessment process. The PDI Act is supported by subordinate regulations, as well as practice directions and guidelines which are issued by the State Planning Commission, the state's independent principal planning body. A key feature of the new planning system is the Planning and Design Code (the Code) which contains a single set of planning policy, rules and classifications for SA, which is applied spatially via mapping. The Code establishes a performance-based approach to planning and development assessment by including policies that address the scale, form and design of built structures and the contextual setting of the development. The planning system

established by the PDI Act includes five assessment pathways; accepted development, code assessed development (deemed-to-satisfy or performance assessed) and impact assessed development (restricted and impact assessed). As previously stated, impact assessed development is the most rigorous level of development assessment prescribed under the PDI Act.

1.1.3 Ministerial declaration – impact assessed development

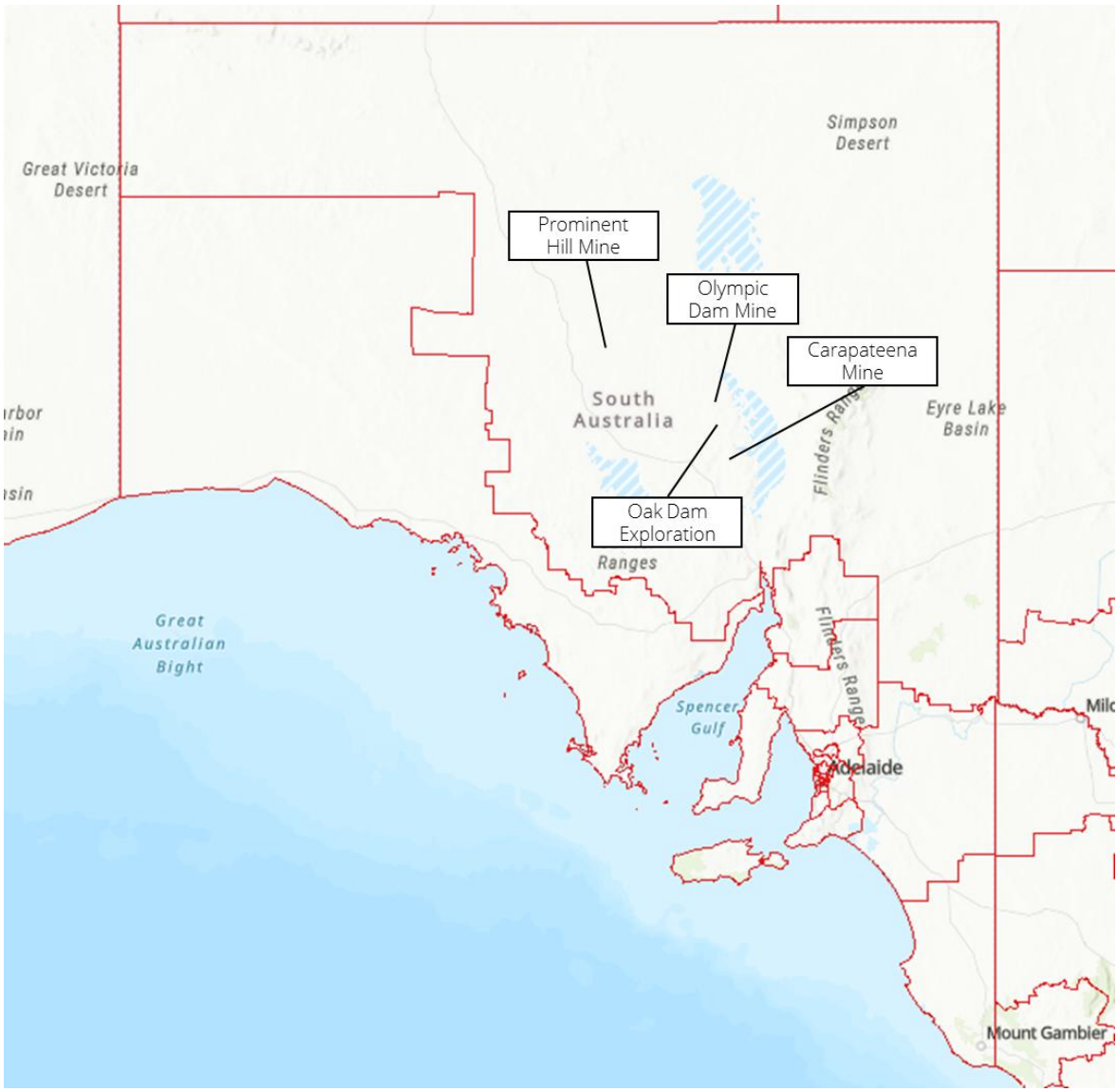
The declaration subjects the SRE Project to an EIS process requiring detailed environmental, social and economic assessment. A Scoping Application was prepared by BHP to inform the development of EIS Assessment Requirements by the State Planning Commission (SPC). The EIS Assessment Requirements issued by the SPC summarise all potential issues needing to be addressed by BHP and highlight any further information required by the Minister to enable a proper assessment of the proposed SRE Project. Due to the operation of the Roxby Downs (Indenture Ratification) Act 1982, the Minister for Energy and Mining is the relevant Minister for the SRE Project.

1.1.4 Existing Copper South Australia operations

The mineral deposit at Olympic Dam was initially discovered in 1975, with underground production beginning at the mine in 1988 and continuing to the present day. BHP took over operations at the Olympic Dam site in 2005 and acquired the Olympic Dam Special Mining Lease. Olympic Dam operations form part of BHP's Copper South Australia operations, and more broadly sits within BHP's Minerals Australia operations. Olympic Dam contains globally significant deposits of copper, gold and uranium, and both underground and surface operations. There is a current smelter and refinery located on-site which processes concentrate from Olympic Dam, although it is capacity-constrained at an average output of 200 ktpa of total copper (in addition to associated silver and gold products).

BHP's Copper South Australia operations include the above Olympic Dam operations, in addition to Prominent Hill and Carrapateena mines, and the Oak Dam deposit (Figure 1.1). The Olympic Dam, Prominent Hill and Carrapateena mines are currently in the operational phase, whilst the Oak Dam deposit is currently in exploration phase.

Figure 1.1: Map of the South Australia with BHP's Copper South Australia operations, including SA3 borders



Source: ABS Maps and Deloitte Access Economics

The SRE Project is located on the Olympic Dam site and existing Special Mining Lease, which is approximately 580 km north-north-west of Adelaide, South Australia (SA). The Special Mining Lease covers approximately 17,800 hectares and is a freehold tenure (CT 5140/575). Olympic Dam and the Project is wholly located in the Roxby Council Local Government Area (LGA), and wider *Outback – North and East* Statistical Area 3 (SA3, provided by red boundaries in Figure 1.1).

1.1.5 The Project

The SRE Project aims to deliver a sustainable, highly productive, and more resilient smelting and refining operation which would enable the Copper SA growth plan and the realisation of regional opportunities. This would be achieved through:

- increasing copper production capacity up to 650,000 tonnes per annum (tpa) of total copper plus associated products from the current average production of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet ensuring the Cu:S ratio is resolved at Olympic Dam for copper concentrate production
- delivering reliable and predictable production outcomes following the 2023 acquisition of OZ Minerals' Carrapateena and Prominent Hill mining operations to realise Copper SA province opportunities.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable total production of up to 650,000 tpa copper plus associated products
- introduction of two-stage smelter involving the installation of a new primary flash-smelting furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing direct-to-blister flash furnace (DBF) to a flash-converting furnace, which would process the matte into blister
- addition of acid plants of similar nature and scale to the existing acid plant
- expansion of the electrorefinery and precious metals recovery facilities to produce cathode copper, gold, and silver.

Associated with these key elements, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the SML Area. The indicative location of key infrastructure is shown in Figure 1.1.

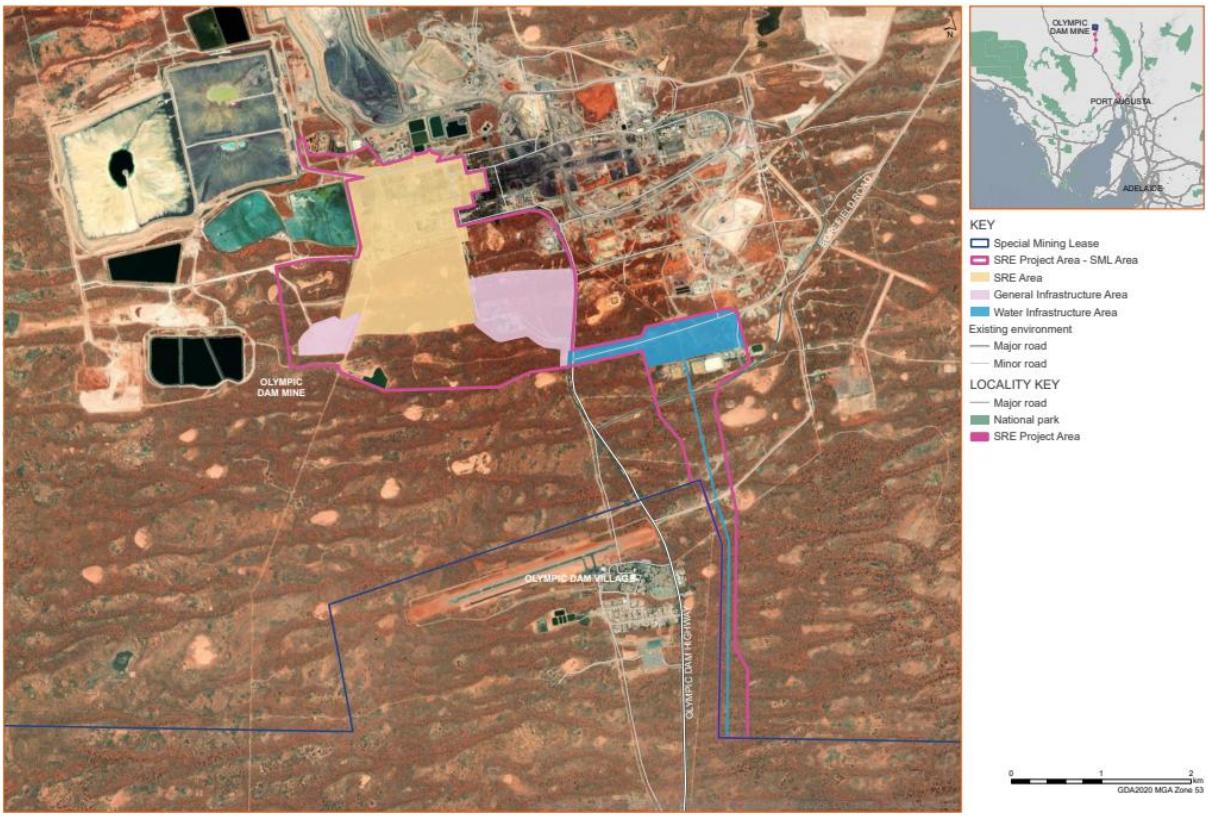
Under the Project, the Olympic Dam smelter and refinery will have a life of approximately 75 years, with capex investment beginning in FY28 and operations of the stage 1 expansion from FY32 onwards. The life of the asset will consist of an operational life of 72 years, from FY32 to FY2103 inclusive, and will employ a maximum of 1,067 full-time equivalent employees (FTEs) during Stage 2 operation (including both BHP-employed and full-time contractors).[1]

In August 2024 BHP requested to have the SRE Project declared an Impact Assessed Development, following the submission of a Scoping application in December 2024, EIS assessment requirements were released in November 2025.

The total SRE Project Area is approximately 887.82 ha, including approximately 640.68 ha within the SRE Area and General Infrastructure Area, approximately 218.57 ha for the Water Infrastructure Area, and approximately 28.57 ha for the Electricity Infrastructure Ground Re-profiling Areas (EIGR Areas) as shown on Figure 1.2 and Figure 1.3. Within the 887.82 ha SRE Project Area, approximately 475.14 ha of ground disturbance is required for the SRE Project, of which 226.89 ha would occur on ground that has been subjected to existing disturbance, and 248.25 ha would require disturbance to vegetation to enable the SRE Project.

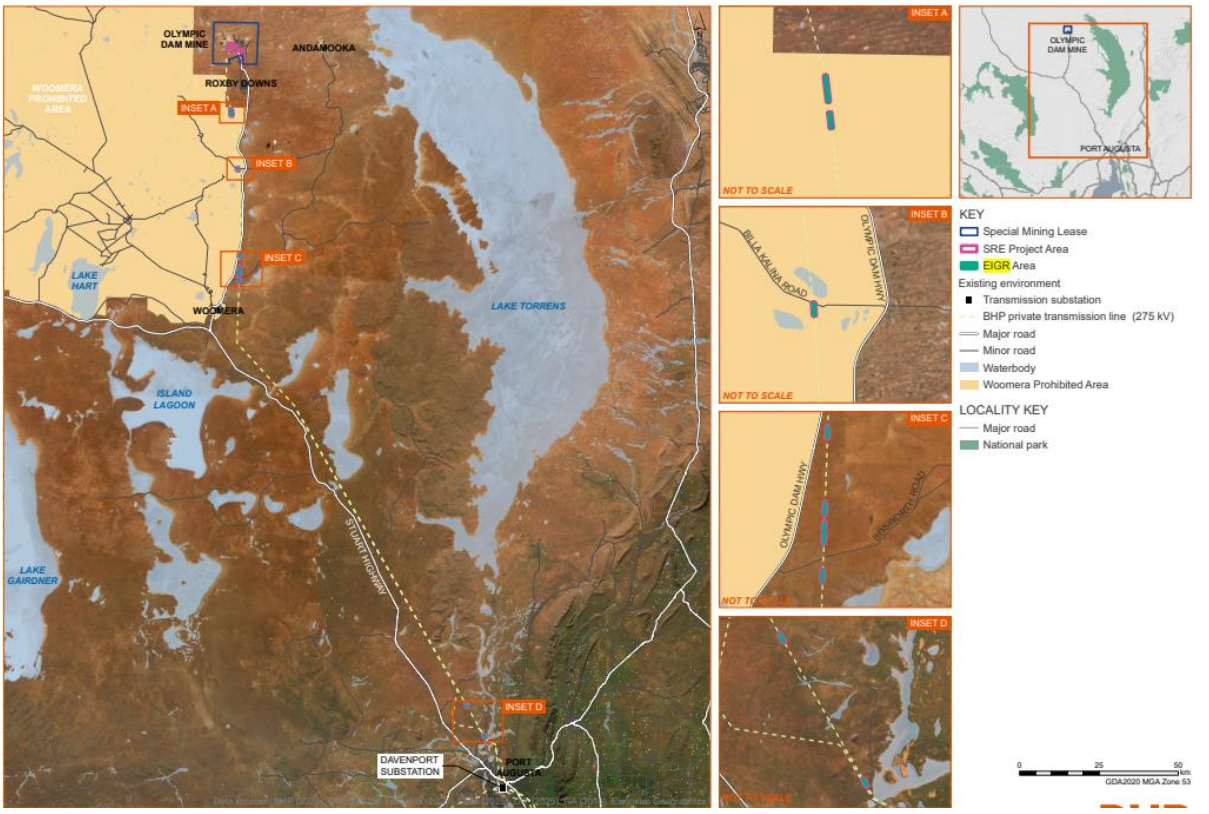
[1] BHP. (2026). *Olympic Dam Smelter and Refinery Expansion Project: Environmental Impact Statement – Updated Project Description.*

Figure 1.2: SRE Project land disturbance – SML Area



Source: BHP Olympic Dam Corporation

Figure 1.3: SRE Project land disturbance – EIGR Areas



Source: BHP Olympic Dam Corporation

As part of this report, the CBA is accompanied by a local effects analysis (LEA) to assess the likely effects of the Project on the local region, defined for the purpose of the analysis as the *Outback – North and East* SA3.

1.2 Project-related regional infrastructure

Current operations rely on the transport of product from the Olympic Dam, Prominent Hill and Carrapateena mine sites to the existing Olympic Dam smelter and refinery facilities. Under past operations, supplies and product in and out of Olympic Dam are primarily transported by road, with the Olympic Way between Pimba and Olympic Dam used to carry standard and oversized loads. However, with BHP's recent logistics agreement with Aurizon, the transport of materials between Pimba and port is expected to be primarily undertaken using rail, facilitated by an intermodal facility at Pimba. Rail transport is also used for the import of materials required and general freights, from interstate locations to Adelaide, in addition to the transport of uranium oxide from BHP's intermediate storage facilities located at Port Adelaide to the Port of Darwin (East Arm) for export.

To transport preassembled modules utilised as part of the Project construction process, the Project assumes oversize and overmass (OSOM) deliveries to be less than 25 metres (m) long, 3.5 m wide and 4.5 m high (i.e. within the Heavy Vehicle National Law and associated regulations). OSOM modules greater than 25 m long, 3.5 m wide and 4.5 m high would be subject to detailed OSOM assessment and approval from the Department for Infrastructure and Transport (DIT) and the National Heavy Vehicle Regulator (NVHR) as part of secondary permitting.

The airport located at the Olympic Dam Village is currently used for the export gold and silver bullion to Perth via dedicated charter flights, for small volumes of general airfreight, and to facilitate public transport flights operated by Alliance Airways. Additionally, it is the primary source of transporting FIFO workers and other personnel in and out of the Olympic Dam. The airstrip is a sealed runway and is suitable for light jet and regional turboprop aircraft.

Olympic Dam currently sources water from the Great Artesian Basin (GAB) near the southern and eastern areas of Lake Eyre, where it pumps water approximately 200km to a desalination plant located within the Olympic Dam mining lease. This water also provides for the Roxby Downs region, which purchases water from BHP at a predetermined price, which is set out in the *Roxby Downs (Indenture Ratification) Act 1982 (SA)*.

Water use is expected to increase under the Project Case. In addition, both the Base Case and Project Case require a transition away from reliance on the Great Artesian Basin (GAB), necessitating connection to a new water source. For the purposes of this assessment, both scenarios are assumed to connect to a right-sized coastal desalination plant, with a larger facility and higher associated connection costs assumed under the Project Case to meet the additional water demand.

This assessment has been undertaken independently of the proposed Northern Water Project. In isolation, the additional water demand associated with the SRE Project would not be sufficient to justify connection to the Northern Water Project, and it would therefore overstate the costs attributable to the Project if a connection was assumed.[2] If, however, water demand at Olympic Dam were to increase further as a result of other future developments, a connection to the Northern Water Project would likely become the more cost-effective long-term water supply solution.

Regardless of water source, the development of infrastructure is required at Olympic Dam to connect upgraded facilities to increased and new water supply, including connection points located at the boundary of the Special Mining Lease and/or local supply wellfield to the Project; these are included in the capital costs of development. Furthermore, the development of additional surface water management infrastructure, including stormwater infrastructure, would occur as part of the Project to accommodate rainfall runoff collected from additional infrastructure. Associated civil works would also occur, which would include the augmentation of the existing desalination water treatment plant and construction of water storage and distribution infrastructure.

To power the current Olympic Dam operations, BHP owns both 275 kV and 132kV power lines, which transmit electricity from the national grid located at Port Augusta. From this a 33kV line services the Roxby Downs region,

[2] This assumption is made to ensure comparable water supply costs between the Base Case and Project Case, enabling the assessment to isolate the incremental impacts of the smelter and refinery expansion. While BHP's broader operational plans indicate that a connection to the Northern Water Project would be the preferred long-term solution, attributing the full cost of that connection to the SRE Project would overstate the costs associated with the expansion alone. Accordingly, this assessment assumes a right-sized desalination plant that reflects the water infrastructure required specifically for the smelter and refinery expansion.

operated by Roxby Power. The Project requires no additional electricity infrastructure, however, does require the isolated clearing of vegetation surrounding the existing 275 kV line from the Davenport substation to Olympic Dam mine in line with Clause 28 of the *Roxby Downs (Indenture Ratification) Act 1982 (SA)*. This will see areas of vegetation cleared to maintain a regulatory safe distance between the 275 kV line and the ground surface.

1.3 Report Structure

The chapters of this report are structured in accordance with the ToR.

The structure of this report is as follows:

- Chapter 2 outlines the methodology employed in this report including how the approach used aligns with the EIS Assessment Requirements.
- Chapter 3 outlines the details of the Base Case and defines the Project Case and the expected scenario under the Project Case.
- Chapter 4 presents the results of the CBA, identifying the net benefits of the Project Case for the South Australia community.
- Chapter 5 presents the results of the LEA, including the economic impacts of the Project to the local, regional, and State economies.

2 Methodology

Deloitte Access Economics has adopted a methodology for undertaking the CBA and LEA for the Project that addresses the ToR and aligns to relevant guidelines. This chapter discusses how the ToR and relevant guidelines have been applied to develop the methodology adopted for this Project.

2.1 Assessment Requirements – Environmental Impact Statement

The Assessment Requirements are requirements for the EIS, including the provision of an economic assessment. The Economic Assessment includes a Cost-Benefit Analysis (CBA) in accordance with the Government of South Australia (2022) *Better Regulation Handbook*, in addition to a Regional Impact Analysis (RIA). In the current report, the RIA has been undertaken in the form of a LEA, which identifies the direct and indirect impacts of the project on local, regional, and state economies during construction and operation.

While the remainder of the requirements in the ToR covers some topics beyond the scope of an economic assessment, there are areas which are potentially relevant to the methodology adopted, including impacts on employment, housing, land, biodiversity, water resources, air quality, greenhouse gases, noise, transport, social, and cultural heritage. These are considered as part of the analysis in Chapters 4 and 5.

2.2 Relevant guidelines

In addition to the Assessment Requirements, the report was prepared in accordance with the Guideline (Government of South Australia (2022) *Better Regulation Handbook*). The Guideline provides a detailed consideration for the steps required in the preparation of a CBA.

While not directly binding to this assessment, we have also assessed other guidelines for guidance on specific topics, including valuing certain externalities and best-practice methods for undertaking a LEA. These guidelines include:

- Infrastructure South Australia (2022) *Impact Analysis Guide – Cost-Benefit Analysis*.
- Infrastructure Australia (2021) *Guide to economic appraisal*.
- NSW Government (2015) *Guidelines for the economic assessment of mining and coal seam gas proposals.*

A full account of the requirements of the ToR and relevant guidelines is given in Appendix A, including relevant requirements cross-referenced against chapters of the report.

2.3 Implications of these guidelines

Cumulatively, the relevant guidelines set out key requirements for this economic assessment. Below a consideration of the qualitative implications of these guidelines is given. It is noted that Appendix A contains a detailed item by item reconciliation of the ToR, the key Guidelines, and the Infrastructure South Australia *Impact Analysis Guide – Cost-Benefit Analysis.*

Implications of the guidelines for cost benefit analysis

Following the guidelines for CBA, the analysis involves:

- Establishing a reasonable base case or 'do-minimum' case by which to assess the Project case against.
- Defining the scope of the Project case options to be considered.
- Identifying and quantifying where possible relevant:
    - Direct revenues and capital, land acquisition, maintenance, replacement and operating costs, separating CAPEX from OPEX and presenting in 'real' terms.
    - Economic benefits to workers and suppliers.
- Potential externalities including air quality, noise, transport, visual amenity, biosecurity, flora and fauna, climate change, greenhouse gases, sustainability, waste, hazards and risks, flooding, groundwater, dangerous substances, land tenure, soils and landforms, Aboriginal heritage, and community impact.
- Estimating monetary value of these impacts, where feasible and material, using market prices where available (and imputed prices or non-market valuation techniques otherwise). Where not monetisable, impacts are otherwise addressed qualitatively.

- Consolidation of values by applying an appropriate real discount rate to measure the Net Present Value (NPV) of the Project's future net benefits. This real discount rate is recommended at 6% per annum in the central case.
- Reporting of results, including unquantified impacts, to include all materials that may be relevant to decision makers.

Implications of the guidelines for local effect analysis

The Guideline provides a requirement of regional impact analysis (RIA) for an impact assessed development, in addition to detailed assessment requirements within. In the current report, the RIA has been undertaken in the form of a LEA. The Guidelines provides assessment requirements for the LEA including:

- Identification of the direct impacts of the Project on local, regional, and state economies, during construction and operation of the Project.
- Describing any potential economic effects locally and regionally, including for employment opportunities and the expected impacts on the local workforce, and direct and flow-on impacts for local businesses.
- Consideration of indirect costs to existing industries of potential changes to worker employment, and conversely secondary economic benefits through opportunities to local industries and supply chains.

Beyond these Guidelines, we refer also to the NSW Government guidelines for LEA including:

- Defining the spatial area and population group to be included and analysed. In accordance with guideline recommendations to adopt the Statistical Area 3 (SA3) that contains the proposed project as the local area, the local area has been defined as the *Outback – North and East* SA3.
- Quantitatively and qualitatively analysing local direct and indirect/flow-on effects relating to:
    - Local employment.
    - Non-labour Project expenditure effects.
    - Other local industries.
    - Externalities relating to the Project, including environmental, social, and transport effects.

3 Copper South Australia – Smelter and Refinery Expansion

The CBA methodology described in Chapter 2 provides a structured approach to assessing whether the Project is likely to result in overall net benefit to the communities of interest. To carry out this assessment, the costs and benefits associated with the Project are compared to those under a Base Case that represents 'business as usual'. This comparison of two options allows for an incremental analysis, to reach a conclusion on the projected net benefits of the Project Case.

This Chapter defines the Base Case and the Project Case in turn.

3.1 Base Case

The current refinery and smelter operations are located on the Olympic Dam Special Mining Lease (SME). These operations allow for an input of around 550 ktpa of copper-rich concentrate fed by Olympic Dam and BHP's other Copper South Australia operations. The smelter and refinery produce an average output of approximately 200 ktpa of refined copper cathode.

As per current production, under the Base Case the refinery and smelter are assumed to process copper-rich concentrate exclusively from Olympic Dam and BHP's other Copper South Australia operations.

Under the Base Case, it is assumed that smelting and refining operations would cease in FY65. The relevant rehabilitation obligations above are expected to commence in FY66, with a majority of works occurring over the next ten years, and ongoing monitoring through the forecast period. Under the Base Case, the works to meet the rehabilitation obligations for the Olympic Dam site (including smelter and refinery) are:

- Decommissioning and removal of all above ground infrastructure, unless agreed with the post mine landholder to retain. This would include demolishing of all structures, buildings, minor infrastructure and concrete footings.
- Disturbed areas to be assessed and rehabilitated consistent with the proposed mine land use.
- Road base and other contaminated material to be removed to a depth of 500 mm.[3]

Under the Base Case, a 'do-minimum' approach would be undertaken, which assumes that BHP would continue the operation of the current smelter and refinery under good management practices. Following this approach, it is assumed that the existing smelter and refinery operations would continue to operate in line with current standards and production outputs. To maintain the current production output, continued maintenance and investment, and sufficient supply of ore is assumed. As part of this, the Scheduled Campaign Maintenance 2027 (SCM27) and any operations intending to maintain the production to the previously approved level of 200 ktpa are included in the Base Case.

For the purposes of this assessment, the Base Case assumes that Olympic Dam transitions away from reliance on the Great Artesian Basin through connection to a right-sized coastal desalination plant. While the proposed Northern Water Project may proceed independently, it is not assumed to service the existing refinery as part of the Base Case, as current water requirements alone would not justify connection.

Under the Base Case, BHP's mining operations are assumed to continue to expand at the Prominent Hill and Carrapateena mines. The total copper concentrate produced by these mines, in addition to the continuation of existing operations at Olympic Dam, will reach up to 1,400 ktpa over the forecast series (from a current average

[3] BHP. (2020). *Closure Management and Rehabilitation Plan Olympic Dam.* https://www.bhp.com/-/media/bhp/regulatory-information-media/copper/olympic-dam/olympic-dam/environment-protection-and-management-program-current-sa-govt/closure-management-and-rehabilitation-plan.pdf

of around 850 ktpa).[4] However, it is noted that almost all concentrate from Prominent Hill and Carrapateena would be sold in an unprocessed form, given the maximum capacity of around 550 ktpa on copper concentrate inputs at the smelter and refinery.

Further, the efficiency of BHP's operations at Olympic Dam will decline over the forecast period. This is due to a natural decline of the copper-to-sulphur ratio in the mined ore in Olympic Dam, which means:

- the existing smelter and refinery (designed for a higher copper-to-sulphur ratio) will decrease in efficiency, requiring more resources for every unit of copper cathode produced
- existing mining operations will be less productive due to the requirement to prioritise the mining of ore with a higher copper-to-sulphur ratio rather than ore which has the highest portion of recoverable minerals or easiest access

The export of copper concentrate for smelting at other locations is not feasible for Olympic Dam given the high uranium content of mined materials, which would require costly specialised safety, transport, and international safeguards protocols for export. As a result, the efficiency of operations at Olympic Dam is contingent on on-site smelting and refining capability.

3.2 Project Case

The Project seeks to maximise production, by right-sizing the scale and timing of the smelter and refinery to align with the available resource base. The Project involves the development of the production capacity of the Olympic Dam smelter and refinery operations located within the Olympic Dam SML. The existing Olympic Dam infrastructure includes a smelter and refinery, electricity transmission infrastructure, water management and other infrastructure. The Project would build on the existing smelter and refinery infrastructure, including the construction and operation of a new concentrate handling and blending facility, expansion of existing smelter feed preparation, new primary smelting furnace, new slag concentrator, new acid plants, and construction of other new infrastructure.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable total production of up to 650,000 tpa copper plus associated products
- introduction of two-stage smelter involving the installation of a new primary FSF to produce copper matte, adding material smelting capacity
- conversion of the existing DBF to a flash-converting furnace, which would process the matte into blister
- addition of acid plants of similar nature and scale to the existing acid plant - expansion of the electrorefinery and precious metals recovery facilities to produce cathode copper, gold, and silver.

Associated with these key elements, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the SML Area.

The Project would further regional development through employing a significant on-site workforce and utilising regional South Australian supply chains, while also providing supply chain security for the local copper mining industry, which is currently reliant on international smelting and refining operations and thus exposed to supply chain risks. Further, through being integrated within the existing Olympic Dam SML, the Project is integrated into existing operations with reduced environmental and social risks compared to greenfield development.

The SCM27 and OD future campaign are considered in the Project Case as they are in the Base Case. The Project does not include any further increase of production over the Base Case at the underground mine at Olympic Dam, nor at other BHP Copper South Australia mines.

The Olympic Dam smelter and refinery and supporting facilities will be used for processing of copper and associated products (gold and silver) derived from BHP's Copper South Australia operations, which includes the Olympic Dam, Prominent Hill, and Carrapateena operations, while maintaining ability to also receive products from third-party suppliers where there is capacity to do so.

[4] Hatch Fluor JV (2026). *SPS Extension EIS Technical Inputs*. Prepared for BHP Olympic Dam Corporation Pty Ltd.

The Project is proposed to produce at capacity an annual copper cathode output of around 650 ktpa, with an input capacity of 2,000 ktpa of copper concentrate. Under the Project Case it is assumed that the necessary input copper-rich concentrate required to meet maximum input capacity can be met, with the refinery not being limited by the availability of inputs. However, noting the capacity of up to 1,400 ktpa of copper concentrate production by BHP mining operations at Olympic Dam, Carrapateena and Prominent Hill,[5] it is assumed that any shortfalls in required copper concentrate input requirements would be met by third parties. These third parties are expected to largely comprise other South Australian copper mines, while interstate and international suppliers would fill any shortfall in inputs required. The Project is expected to increase refinery and smelter output from the current average of 200 ktpa to maximum capacity of 650 ktpa over 12 years (i.e., by FY38), then producing at near-maximum output capacity for a period of 13 years (to FY51), before ramping down to the end of Project life in FY2103. Rehabilitation will be undertaken on an ongoing basis although peaks from FY2104 onwards, with rehabilitation efforts concentrated towards the first ten years following end of Project life.

In addition to the expansion of smelting and refining production, the Project enables greater efficiency of Olympic Dam mining and smelting and refining operations through the design of a smelter and refinery capable of handling ore with a higher copper-to-sulphur ratio. The new smelter and refinery design enables the avoidance of efficiency losses for mining and smelting operations which would otherwise occur under the Base Case (as described in section 3.1).

While copper is the primary output by which production is measured, it is noted that copper-rich concentrate from Copper SA's operations is sourced from iron oxide copper-gold (IOCG) deposits. IOCG deposits are economically significant and include concentrations of several different metals. The combination of copper, uranium oxide, gold and silver provided through the copper-rich ore mined by Copper SA's IOCG deposits means that the Project, through its implications on both mining and smelting and refining productivity, has access to significant revenue streams from uranium oxide, silver and gold, on top of the revenue generated by copper products.

The key elements associated with the Project are summarised in Table 3.1, including key infrastructure required to be developed for the Project.

The economic benefits and costs of the proposed Northern Water Project are not assessed as part of this analysis. While the Northern Water Project may proceed independently, it is treated as external to both the Base Case and the Project Case. For the purposes of this assessment, Olympic Dam is assumed to transition away from reliance on the Great Artesian Basin through connection to a right-sized coastal desalination plant in both scenarios. The Project Case assumes a larger desalination facility and associated connection infrastructure than the Base Case to accommodate the additional water demand resulting from the smelter and refinery expansion. This approach ensures that only the water infrastructure and costs attributable to the SRE Project are included in the assessment.

The smelter and refinery would be operated on a continuous basis – 24 hours per day, seven days per week. The Project would generate employment for an average 508 additional FTE personnel over the Base Case during stage 2 operations. The construction phase would also generate additional employment, peaking at 1,313 FTE personnel in Stage 1a.

[5] Hatch Fluor JV (2026). *SPS Extension EIS Technical Inputs*. Prepared for BHP Olympic Dam Corporation Pty Ltd.

Table 3.1: Summary of key elements of the Project

Proposed project element	Description
Description	Developments to increase BHP's smelter and refinery capacity, in line with their Copper South Australia growth plan. This involved increasing copper production capacity from the existing current average output of approximately 200 ktpa to 650 ktpa (or 2,000 ktpa input).
Project life	Continuation of mine, smelter and refinery until end of FY2103 (compared to FY65 under the Base Case), consisting of: • SRE construction period from FY28 until FY38, including Stage 1 completion in FY36. • Stage 1 operations beginning in FY32, stage 2 operations in FY38.
Project area	Located at the existing Olympic Dam mine in Roxby Downs, in outback South Australia. This includes the Olympic Dam Special Mining Lease freehold tenure (CT 5140/575) and transmission line infrastructure areas (Clause 28 land).
Direct employment	• Construction: average of 500 additional full-time equivalent (FTE) personnel, peaking at 1,313 during Stage 1a. • Operation: 1,067 FTE positions during Stage 2 operations, or 508 additional FTE positions above the current 559 operational workforce.
Interaction with other operations	The Olympic Dam mine houses the smelter and refinery facilities, which service BHP's Copper South Australia projects, including the Olympic Dam, Prominent Hill and Carrapatenna mines and the yet-to-be constructed Oak Dam mine. These mines provide copper-rich concentrate to the smelter and refinery facilities, which then becomes refined copper cathode. Under the Project Case it is expected that there is sufficient input to reach maximum capacity through existing approved mines within South Australia, both owned by BHP and other companies.
Key infrastructure	• A new concentrate handling and blending facility. • Additional concentrate leach capacity. • Expansion and upgrade of existing smelter feed preparation. • A new primary smelting furnace to produce copper matte and conversion of the existing DBF to convert matte to blister, including additional anode furnace and anode casting infrastructure. • A new slag concentrator. • New off-gas management infrastructure, including additional gas and dust handling equipment. • New acid plants. • A new electro-refinery and associated infrastructure. • A new slimes treatment plant and expansion of precious metals refinery facility. • Additional water supply and storage infrastructure, linking water to be delivered from a new desalination faciltiy. • Electricity Infrastructure Ground Re-profiling at identified sites to maintain compliance with regulatory requirements.
Product transport	Product would be transported in and out of the Olympic Dam site primarily via road to Pimba and rail from Pimba to Port of Adelaide or Port Augusta. The Stuart Highway between Port Augusta and Pimba, and Olympic Way between Pimba and Olympic Dam, would be used to carry oversized loads. Rail transport would provide transport of product, including copper cathode, to Adelaide. Rail would also transport of uranium oxide from the Port Adelaide storage facility to the Port of Darwin (East Arm) for export. In addition, charter flights would transport gold and silver bullion to Perth.

Source: BHP Olympic Dam Corporation

3.3 Implications if the project does not proceed

If the Project does not proceed, the Base Case implies eventual closure of these processing assets in FY65, in addition to continuation of lower production capacity at around 200 ktpa of copper cathode production per year until this year. This would mean a long-term constraint on Copper South Australia's processing capability. The smelter and refinery would not keep pace with BHP's expected mining developments at Carrapateena and Prominent Hill. Additional copper concentrate above smelter and refinery capacity would increasingly need to be exported as concentrate, which would reduce value capture within Australia of Copper South Australia operations. There is also a degree of risk associated with the use of global facilities, with the potential for trade barriers or closure of key processors resulting in significant increases in treatment and refining charges faced by BHP and other Australian copper concentrate exporters.

Since the SRE Project is intended to address the declining copper-to-sulphur ratio in Olympic Dam ore, not proceeding with the project would result in a continued deterioration in the efficiency of BHP's existing operations. As the copper-to-sulphur ratio declines over time, the existing smelter and refinery would require increasing levels of labour, energy and other inputs to produce each unit of copper cathode, raising operating costs and reducing productivity. In addition, mining operations would continue to face constraints in ore extraction, as higher priority would need to be given to ore with suitable sulphur content rather than ore that maximises recoverable mineral value or minimises extraction costs. Consequently, failure to proceed with the Project would be expected to result in lower operational efficiency, reduced productivity and higher production costs for Olympic Dam mining and smelting and refining operations relative to a scenario in which the Project is undertaken.

Further, while not quantified in the current analysis due to its contingent nature, an increase in local smelting and refining capacity could also enable the future expansion of other projects. For example, it could enable further production at Olympic Dam, where the uranium content of copper concentrate means that it is not saleable on the market. In the absence of the project, the ability of the South Australian copper mining industry to leverage these opportunities would be constrained.

There are also employment and local industry implications in a case where the project does not proceed. There are an average of 559 full-time equivalent employees within the SRE operational workforce. In absence of the Project, staffing at this level would be expected to continue until closure in FY65, after which operational employment at the smelter and refinery would cease. In addition to an earlier cessation of employment at the smelter and refinery, the level of average operational employment is around 508 FTE employees lower than employment under the Project case. The earlier closure of the smelter and refinery would have significant impacts on the local Roxby Downs area, which is a town purpose-built to service operations at Olympic Dam.

3.4 Consideration of other project options

In addition to clearly defining the Base Case and Project Case, the completion of the CBA would also require a consideration of other project options. This assessment only evaluates the Project Case put forward by BHP. Deloitte Access Economics was not engaged to consider other alternative project options.

Other alternatives for the Project Case were considered by BHP. These considered differences in siting, surface processing solutions and the scale of the proposed smelting and refining facilities. A location study was completed as part of the considerations, which evaluated alternative locations for the expanded smelter and refinery. It considered two locations, the Olympic Dam mine and a South Australian coastal location. Existing onsite options for the use and storage of products and waste management at the Olympic Dam mine meant that certain operational synergies could be realised by expanding the smelter and refinery at this location. The South Australian coastal location, however, was expected to require operational duplications, significant freight movements and have a larger environmental footprint relative to the Olympic Dam mine location.

Furthermore, a study to investigate surface processing solutions to improve throughput and efficiency at Olympic Dam identified that a two-stage smelting flowsheet was favoured, compared to atmospheric hydrometallurgy, atmospheric chloride hydrometallurgy, and heap leach hydrometallurgy processes, given it provided the option to leverage the existing Olympic Dam smelting asset and was the best suited to growth.

Alternatives for the size of the smelter and refinery expansion were also considered, with a staged expansion identified to best align with expected CuSA growth and provided the smallest production interruption. As such, a two-stage smelter starting at a medium input capacity was determined to be the most appropriate size option.

4 Cost Benefit Analysis

Deloitte Access Economics has conducted a CBA, with results presented in this Chapter, which assess the net economic benefits of this Project to the South Australia community. To conduct the CBA, it required identifying, and where possible quantifying incremental costs and benefits of the Project Case relative to the Base Case. The share of the quantified incremental costs and benefit were then apportioned with respect to their attributability to the South Australia community.

All costs and benefits in this analysis are presented in FY26 terms for a 50-year evaluation period (FY27-76), with present values presented using a 6% central real discount rate assumption, in line with the Guideline.

Using this approach, the Project Case is expected to produce a total net economic benefit to the South Australia community of approximately $342 million incremental to the Base Case (in present value terms).

4.1 Scope of the cost benefit analysis

The scope of this CBA is defined by:

- A Base Case – identifying the 'business as usual' scenario ("do minimum) against which to assess the potential economic, social and environmental changes due to the Project.
- A Project Case – full specification of the Project Case with comparisons made relative to the Base Case.
- The community of interest – defining the community for which the benefits and costs of the Project should be assessed.

The definitions for the Base Case and Project Case for this CBA are described in Chapter 3.1 and Chapter 3.2, respectively. In alignment with the guidelines described in Chapter 2.2, the community of interest is the South Australia community.

4.1.1 Limitations of analysis

This cost–benefit analysis is subject to important limitations.

First, the assessment relies in part on financial and operating data provided by BHP. While this information is assumed to be accurate, it has not been independently verified in all instances, which may affect the robustness of some estimates.

Second, the modelling of production scenarios required combining inputs from two different financial models: a 650 ktpa copper cathode output scenario derived from a 2025 model, and a 500 ktpa copper cathode output scenario from an updated 2026 model. An appropriate 650 ktpa scenario incorporating the current scope of works and project design was constructed through extrapolation and reconciliation of these inputs, introducing additional uncertainty due to potential inconsistencies in underlying assumptions, cost structures, and modelling methodologies between the two versions.

Finally, while the Project Case is likely to result in the extension of BHP mining operations beyond FY65, the environmental, social or transport externalities of this mine life extension have not been quantified in this analysis. This is consistent with the scope of the Impact Assessments these externality quantifications are based on, which consider only changes in smelter and refinery activity, and not mining activity, at Olympic Dam. Nonetheless, given the heavy discounting applied to results in FY66 and beyond under the real 6% discount rate assumed in the central case, this limitation is not expected to significantly impact results of the cost-benefit analysis.

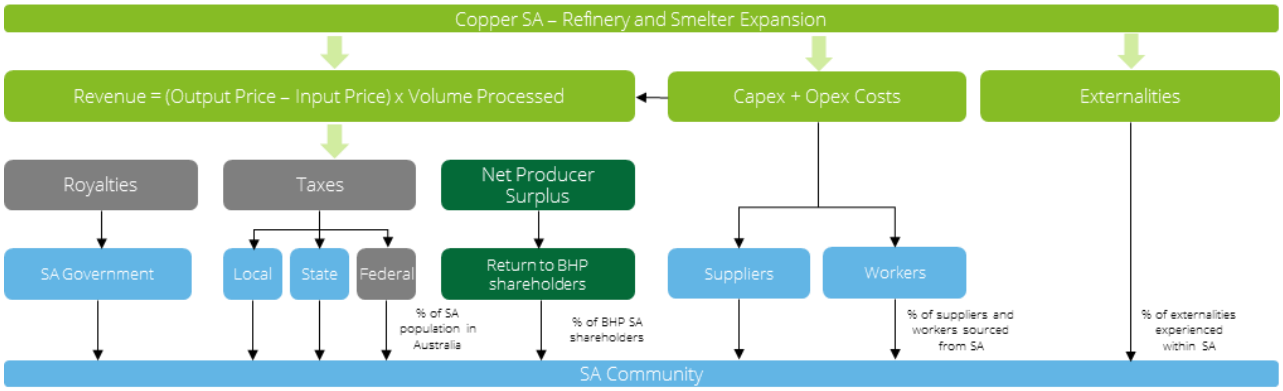
Collectively, these factors may influence the precision of the estimated costs and benefits and should be considered when interpreting the results.

4.2 Identifying costs and benefits

The costs and benefits considered in the CBA are set out in Table 4.1 below. The costs and benefits have been organised into eight categories, in accordance with the parts of the community they accrue to. For instance, the owners of the Olympic Dam smelter and refinery will receive the direct producer surplus resulting from the Project, while royalties and income tax will be paid to the South Australia and Australian governments,

respectively. Other third parties that may be affected by the Project include: local workers, suppliers and residents in the local community and adjacent LGAs. The categorisations are useful in apportioning the share of the net benefits of the Project to the South Australia community (refer below).

Figure 4.1: Contribution of the project to different stakeholders



Source: Deloitte Access Economics

Table 4.1: Benefit and cost items considered in the CBA

Item	Benefit components	Cost components
Direct producer surplus	Gross production revenue	Operating costs Capital costs Offsets - Residual value of capital and residual value of land Rehabilitation costs Decommissioning costs Local contributions Environmental mitigation costs Transport management costs Taxes (Federal, state & local) Royalties
Royalties	Royalties paid to government due to increase in smelter and refinery production	
Local government rates	Rates paid to local government	
Payroll tax	Increase in BHP's payroll tax paid to SA	
Company income tax	Increase in BHP's income tax paid that is apportioned to SA	
Benefit to workers	Benefits to South Australia workers in wage premium paid above what they could accept elsewhere	
Benefit to suppliers	Benefits to South Australia suppliers in a rate/margin above market rates they would otherwise receive	
Net environmental, social & transport-related costs		Land use Soils and geochemistry First Nations cultural heritage* Non-First Nations cultural heritage* Air quality Ambient noise and vibration Biodiversity Greenhouse gas (GHG) emissions Surface water and groundwater Social* Traffic and transport Visual amenity*

*Item has been considered qualitatively.

Chapter 4.3 provides detailed descriptions of the techniques used to value each of these costs and benefit items in Table 4.1, and provides justification for the classification of each item as either a net cost or net benefit. In alignment with the Infrastructure South Australia (2021) *Guide to economic appraisal*, where it is difficult to place a value on a particular item's cost or benefit of the Project a qualitative analysis has been undertaken.

4.3 Costs and Benefits to SA

This chapter details the methods used to value the costs and benefits for each item identified in Table 4.1. In particular, the costs and benefits are quantified, or qualitatively analysed, and apportioned by a share of value to estimate the net benefit to the South Australia community. The share of value is determined by consideration of the level of Australian ownership of the Olympic Dam smelter and refinery, and the population of South Australia.

The quantification of costs and benefits has relied on a range of approaches and data sources, including financial information and technical assessments provided by BHP, as well as government data publications and non-market values published in literature.

In alignment with the Government of South Australia (2022) *Better Regulation Handbook*, a real discount rate of 6% was used to calculate the present value of costs and benefits, with estimates presented in 2025-26 price terms. As part of this report, a sensitivity analysis was undertaken using discount rates of 4% and 10%, with the overall net incremental benefit reported for each sensitivity. This approach is also consistent with the Infrastructure South Australia guideline, which requires sensitivity analysis of a high and low discount rate, at either side of the predicted discount rate. Undiscounted estimates of each cost and benefit are reported in the text in brackets. In most cases, numbers have been rounded to the nearest whole number, so individual numbers may not add up to totals.

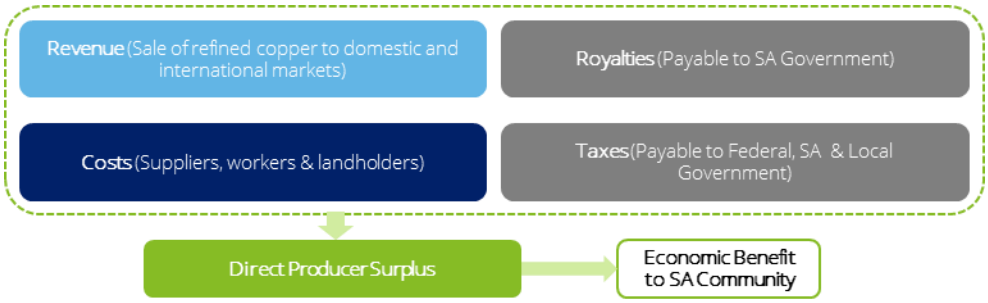
4.3.1 Net producer surplus attributable to SA

The total incremental direct producer surplus of the Project is estimated to be $1,481 million in present value (or $29,283 million in undiscounted terms). Of this, $66 million in present value is net incremental producer surplus for South Australia.

The incremental net producer surplus is the additional value of the Project to BHP, calculated as the total revenue net of all direct costs, royalty payments and taxes, relative to the Base Case. The contribution of direct producer surplus to different stakeholders is provided in Figure 4.2, including the owners of the Project, governments, and suppliers and workers that provide input to the Project Case.

Table 4.2 provides a breakdown of the costs and benefit components used to calculate the direct producer surplus for the Project.

Figure 4.2: Contribution of revenues and costs from the Project to different stakeholders



Source: Deloitte Access Economics

As previously noted, the Project is wholly owned by BHP, an Australian-based publicly listed mining company. On average, RBA research has indicated that foreign ownership is up to around 35% of the Australian stock market, with the remaining 65% being Australian-owned.[6] Given SA's population relative to the total Australian population is approximately 6.9%,[7] the incremental net producer surplus of the Project Case attributed to the South Australia community is 4.5%.

Since the Project is expected to improve the productivity and efficiency of mining, smelting and refining operations at Olympic Dam, producer surplus has been estimated on the basis of all Olympic Dam operations rather than smelting and refining activities in isolation. This reflects the integrated nature of the operation, where ongoing mining activity is contingent on the availability of on-site smelting and refining capability due to the elevated uranium content of Olympic Dam copper concentrate, which limits its feasibility as an export product.

Under both the Base Case and Project Case, Olympic Dam operations are estimated to generate a positive producer surplus (refer Table 4.2), reflecting the value generated across the integrated mining and processing operation. However, producer surplus is higher under the Project Case as a result of improved operational efficiency. As discussed in Section 3.3, a declining average copper-to-sulphur ratio in Olympic Dam ore is

[6] RBA. (2021). *Background on the Australian Listed Equity Market*. https://www.rba.gov.au/publications/submissions/financial-sector/background-on-the-australian-listed-equity-market-2021-09/index.html?utm_source=chatgpt.com
[7] ABS. (2025). *National, state and territory population*. September 2024. https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/latest-release

expected to reduce the efficiency of existing smelting and refining infrastructure and constrain mine planning flexibility over time under the Base Case. The Project mitigates these impacts by enabling the efficient processing of lower copper-to-sulphur ratio ore, reducing processing costs per unit of output and allowing mining operations to prioritise ore based on recoverable mineral value and extraction efficiency rather than sulphur content requirements. This results in higher operating margins and increased producer surplus relative to the Base Case.

Higher producer surplus relating to processed Olympic Dam concentrate is in part offset by concentrate sourced from other mines, including Carrapateena, Prominent Hill and non-BHP owned Australian mines. This concentrate is subject to low smelting and refining margins in the current global market, characterised by a global oversupply of copper smelters; BHP gains only a low margin on processing this concentrate in the Project Case, compared to the revenues it would gain from exporting this concentrate in the Base Case.

The increase in producer surplus contributes to higher company income tax payments and royalty revenues relative to the Base Case. While refined copper products remain subject to a lower South Australian royalty rate than copper concentrate, the Project supports greater production and profitability across the integrated Olympic Dam operation, resulting in a net increase in government revenue.

In addition to these quantified benefits, the Project may generate broader strategic benefits that fall outside the scope of this Economic Impact Assessment.

- First, it enhances supply chain resilience by reducing reliance on overseas smelting and refining facilities. While BHP is currently able to export concentrate and access international processing capacity at competitive cost, this is dependent on continued access to a concentrated global market for smelting and refining services. Potential trade disruptions, geopolitical tensions or reductions in international processing capacity could increase treatment and refining charges and strengthen the value proposition of domestic processing capability.
- Second, the Project preserves and enhances the long-term viability of Olympic Dam operations by maintaining the processing capability required to support ongoing mining activity, thereby facilitating future production growth opportunities that may otherwise be constrained.

The realisation of these strategic benefits is contingent on future scenarios including changes in global economic conditions and future investments and project approvals; as a result, they are not considered in this cost-benefit analysis.

Table 4.2: Calculation of total direct producer surplus attributable to smelting and refining operations (NPV, $millions AUD FY26, for FY27-76)

Item		Base Case (NPV)	Project Case (NPV)	Incremental (NPV)
Revenue attributable to smelting and refining operations				
Gross production revenue	$m	$64,315	$146,675	$82,360
Total	$m	**$64,315**	**$146,675**	**$82,360**
Costs attributable to smelting and refining operations				
Value of copper concentrate sourced from other mines	$m	$260	$67,096	$66,836
Operating costs	$m	$30,159	$35,721	$5,562
Capital costs	$m	$8,827	$15,921	$7,093
Minus residual value of capital	$m	$0	-$207	-$207
Rehabilitation costs	$m	$848	$636	-$211
Total	$m	**$40,094**	**$119,167**	**$79,073**
Royalty costs attributable to smelting and refining operations				
Change in ad valorem refined mineral royalties	$m	$2,238	$2,267	$29
Total	$m	**$2,238**	**$2,267**	**$29**
Taxes attributable to smelting and refining operations				
Company income tax	$m	$7,330	$9,061	$1,730
Payroll tax	$m	$289	$333	$44
Local government rates	$m	$29	$30	$2
Total	$m	**$7,648**	**$9,424**	**$1,776**
Direct producer surplus attributable to smelting and refining operations	$m	**$14,335**	**$15,816**	**$1,481**

Note: Numbers in the table may not add up due to rounding.
Source: Deloitte Access Economics calculations based on data provided by BHP Olympic Dam Corporation.

Table 4.3: Share of the direct producer surplus attributable to the South Australia community (NPV, $millions AUD FY26, for FY27-76)

Item		Base Case (NPV)	Project Case (NPV)	Incremental (NPV)
Direct producer surplus attributable to smelting and refining operations	$m	**$14,335**	**$15,816**	**$1,481**
SA share of project's ownership	%	4.5%	4.5%	4.5%
Value of direct producer surplus attributable to SA	$m	**$642**	**$709**	**$66**

Note: Numbers in the table may not add up due to rounding.
Source: Deloitte Access Economics calculations based on data provided by BHP Olympic Dam Corporation.

The assumptions underlying each component of the total net producer surplus estimate are detailed in Chapters 4.3.2 through 4.3.5 below.

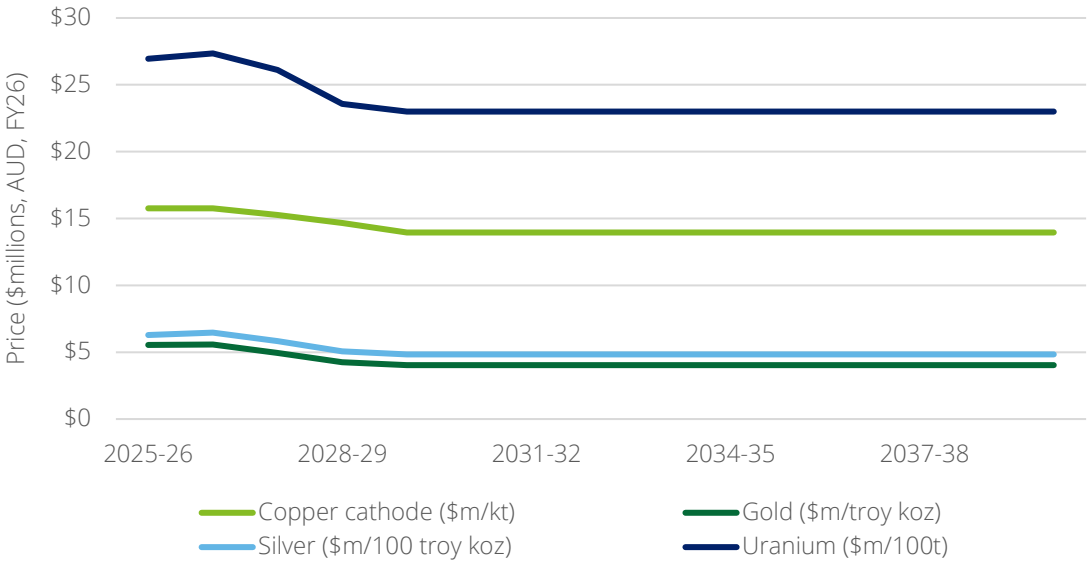
4.3.2 Revenue

Gross production revenue is estimated at $82,360 million in the Project Case incremental to the Base Case in present value terms (or $369,753 million in undiscounted terms). The anticipated revenue from the Project is estimated using production output, measured as volumes of refined metals (copper, gold, and silver) multiplied by the value of these metals, excluding GST. Given the assessment of changes in the revenue and expenses of integrated Olympic Dam operations, including mining as well as smelting and refining operations, sales of uranium oxide are also in-scope revenues insofar as they relate to copper concentrate sourced from Olympic Dam. It is noted that there is a potential for the two-stage smelter and refinery to produce saleable quantities of sulphuric acid (up to 700 ktpa), however given sulphuric acid is not a high-value output and the forecast of its ongoing price is highly uncertain, this is factored as a cost offset to operational expenditures rather than as a separable revenue stream.

Gross production revenue is accrued over the 50-year forecast period between FY27 and FY76, with an uplift in production in the Project Case over the Base Case occurring from FY32 onwards (following completion of the stage 1 expansion). Over the forecast period, the Project Case is expected to result in production of 18,700kt of additional refined copper, 70kt of additional uranium (from more efficient Olympic Dam mining operations), 21,200koz (troy) of gold, and 132,400koz (troy) of silver, compared to the Base Case. In addition to expanded smelting and refining capacity and an increase in efficiency of Olympic Dam mining and smelting operations, this additional production is expected to result from an improved recovery rate under the new two-stage smelter and refinery infrastructure in the Project Case. Indeed, while current recovery rates at the existing smelter and refinery average 96%, 94% and 88% for copper, gold and silver respectively, these recovery rates are expected to increase to 98.5%, 97.0% and 89.0%, respectively, with the opening of the two-stage smelter and refinery under the Project Case.

Copper, gold, uranium and silver price forecasts, reported in FY26 prices, are estimates based on Consensus Economics price forecasts to FY30, adjusted to Australian dollars using the exchange rate. Given Consensus Economics forecasts only extend to FY30, the real price following FY30 is assumed flat in absence of ongoing forecasts. For all three metals, a decrease in prices is expected over the forecast period to FY30, reflecting a softening of recent peaks in global metal prices.

Chart 4.1: Copper, gold, uranium and silver price forecasts ($millions, real AUD FY26)



Source: Consensus Economics forecasts (July 2025).

4.3.3 Costs

The costs to BHP of production include the value of copper concentrate sourced from other mines, operating expenses, rehabilitation and decommissioning costs, capital expenses (offset by residual value of capital), in addition to royalties and taxation. The first four of these costs are detailed in this chapter and detract from BHP's producer surplus benefit. As the final two (royalties and taxes) are transfers from BHP to governments, they both reduce the producer surplus of BHP and simultaneously provide benefits to governments and thus are detailed separately in Chapters 4.3.4 and 4.3.5.

For both the Base Case and the Project Case, the residual value of land is conservatively assumed to be zero, thus is not quantified as a cost offset.

4.3.3.1 Value of copper concentrate sourced from other mines

Copper concentrate for the smelter and refinery is sourced either from within integrated Olympic Dam mining operations, or from other mines (either BHP-owned or third party). In the Base Case, almost all copper concentrate (except for a small amount in FY27) for the smelter and refinery is sourced from Olympic Dam itself. In the Project Case, much of the input copper concentrate is sourced from other mines.

- where input copper concentrate is sourced from Olympic Dam, the costs of procuring this copper concentrate materialises as operating expenses, rehabilitation and decommissioning costs and capital expenses for integrated Olympic Dam operations
- where copper concentrate is sourced from alternative mines (including other BHP-owned mines, which in the absence of the smelter and refinery would export this concentrate), this copper concentrate is treated as 'purchased' by the smelter and refinery at a market value.[8]

As a result, the market value of copper concentrate sourced from other mines is a significant cost under the Project Case, estimated to total $66,836 million in present value terms in the Project Case incremental to the Base Case (or an incremental cost of $273,588 million in undiscounted terms). This value of this copper concentrate is based on historical market sales data from BHP exports of copper concentrate, reflecting the average value of contained metals in concentrate after subtracting average treatment and refinery charges (TC/RC) and average contract payables rates for copper, silver, and gold. Details of each of these three components of input costs are provided below:

[8] For smelter and refinery concentrate input derived from other BHP Copper South Australia mines, the use of copper concentrate is an internal transfer and has no associated market price. Therefore, to consistently estimate only the producer surplus associated with refining and smelting operations, a shadow price is assumed for this input to reflect the incremental producer surplus that can be obtained over export options.

- the forecast value of contained metals in BHP-sourced concentrate is assumed equal to expected metals concentrations (i.e., volumes of gold, silver, and copper per ton), multiplied by the market prices of these metals (as detailed under revenues in Chapter 4.3.2)
- TC/RC charges are estimated based on historical average values from BHP sales contracts from 2022 to 2024, converted from US dollars to Australian dollars using an average exchange rate and to a 2025-26 financial year basis using changes in the consumer price index
- contract payables rates are based on historical data from BHP sales contracts from 2022 to 2024[9]

It is assumed that copper concentrate sourced from other companies (non-BHP input) is purchased at an equivalent cost to BHP-sourced concentrate.

Table 4.4: Input cost assumptions for concentrate sourced from other mines

Assumption	Value	Source/s used
Value of contained metals ($AUD 2025-26)	As per expected metals concentrations and price forecasts detailed in Chapter 4.3.2.	BHP internal estimates (2025). Consensus Economics (2026).
TC/RC charges per ton of concentrate ($AUD 2025-26)	$254.73	BHP historical concentrate sales contracts data (2025).
Contract payables rates	Copper: 97%, Gold: 96.6%, Silver: 80.1%	BHP historical concentrate sales contracts data (2025).

Source: Deloitte Access Economics

4.3.3.2 Operating expenses

Operating expenses accrued because of the Project are estimated to total $5,562 million in present value terms in the Project Case above the Base Case (or $40,018 million in undiscounted terms). Operating expenses include all expenditures associated with operating the mine, smelter and refinery at Olympic Dam other than externally sourced copper concentrate costs (as detailed above). This includes operating costs associated with smelting, refining, mining, concentrator and hydrometallurgical plant activities, engineering, transport to port, exporting, and administrative activities.

Operating expenses include costs associated not only with the use of labour and resources such as increased water and electricity in production processes, but also the transport of finished products to port for loading through truck and rail (utilising the Pimba intermodal terminal),[10] and costs associated with environmental management costs such as the management of pollution, hazards, dangerous substances, and general waste management. The assumed costs of transport and price of external concentrate to the smelter and refinery for processing is based on an assumed intrastate origin, aligning with likely sources of concentrate. Costs may be higher if concentrate is sourced from an interstate or intrastate origin, although the impact of this change on overall operating costs is negligible compared to other operating expenses.

Consistent with increased efficiency of operations but no change to the volume of mining operations at Olympic Dam, operating costs for mining activities at Olympic Dam are for the most part unchanged between the Base Case and the Project Case, with incremental operating expenses accruing as a result of increased smelter and refinery operations.

Further, under the Project Case, the management of hazards and risks and dangerous substances is included within the operating costs of the Project. As part of the risk management framework, the existing radiation management plan would be updated and expanded because of the expansion in operations. Further to this,

[9] An average of three representative years (2022 through 2024) has been used to estimate both TC/RC charges and contract payables rates. Data for 2025 and 2026 was not provided by BHP. While 2025 and 2026 have marked exceptionally low TC/RCs globally, the 2022 to 2024 average is representative of long-term averages over the past 10 years and thus suitable for a forecast that extends 50 years. For the 10-year average global TC/RC series, see IEA. (2026). *Copper prices have hit record highs, but smelters face mounting strategic pressures.* https://www.iea.org/commentaries/copper-prices-have-hit-record-highs-but-smelters-face-mounting-strategic-pressures

[10] It is noted that, in considering the incremental transport costs of smelting and refining expansion, in the Base Case much of BHP's copper concentrate production would need to be transported to port unrefined – and thus have larger costs associated with transport due to higher volumes being transported. In contrast, the expansion of smelting and refining under the Project Case can reduce transport to port expenses, despite the additional processing of non-BHP sourced concentrate.

biosecurity risks, and contamination risks to soil and water sources are expected to be managed through operational control measures which fall in line with Australian Standards and best practice.

Measures to **manage waste and sustainability** produced as a result of the Project are also included in the operating costs of the Project, with additional waste generated from the construction and operation of the Project being managed in line with the existing Olympic Dam waste management procedures. Measures to reduce **broader pollution externalities** are also included in operating costs, including tailings management in line with existing Olympic Dam operations, and the operation of capital selected with efficient fittings to minimise energy and water use.

4.3.3.3 Capital expenses

Capital expenses accrued as a result of the Project are estimated to total $7,093 million in present value terms in the Project Case above the Base Case (or $17,840 million above the Base Case in undiscounted terms). Capital expenses for the Project include not only the construction of two-stage smelter and refinery assets (as described earlier in Table 3.1), but also supporting infrastructure including an additional oxygen plant, increased site security and fencing, new internal roads within the Olympic Dam site, stormwater infrastructure and associated civil works, administration, ablution and cribbing buildings, stores yard, warehouse and laydown areas, and maintenance facilities.

Waste and sustainability measures during construction include, where practical to do so, off site recycling of demolition materials from the decommissioning of the existing metallurgical plant, while materials that cannot be recycled would be managed using existing waste management facilities located at the Olympic Dam mine site.

Capital expenses also include sustaining capital for Olympic Dam mining, smelting and refining operations to replace ageing capital and maintain levels of production over the timeseries. These increase by a low degree for mining operations in the Project Case compared to the Base Case, given the scale of operations is maintained but additional capital is required to maintain higher operating efficiency. Capital expenses increase significantly for the smelter and refinery in the Project Case in line with the increased scale of infrastructure required to sustain increased smelting and refining capacity.

4.3.3.4 Residual value of capital

The residual value of capital accrued as a result of the Project is estimated to total $207 million in present value terms in the Project Case above the Base Case (or $3,804 million above the Base Case in undiscounted terms). Given Olympic Dam facilities are projected to close within the forecast period in the Base Case (FY65), the residual value of capital is zero in the Base Case. In the Project Case, the residual value of capital is calculated as cumulative capital expenditure at Olympic Dam minus estimated depreciation for the Project Case up until the final year of appraisal (FY76).[11]

4.3.3.5 Rehabilitation and decommissioning costs

Rehabilitation and decommissioning costs are estimated to total $211 million in present value terms in the Project Case below the Base Case (or $720 million higher than the Base Case in undiscounted terms).[12] These costs include the management of waste associated with the demolition of mine, smelter and refinery assets at end of Project life, rehabilitation costs towards optimising landform for final use, and ongoing monitoring. While the scale of required rehabilitation is higher under the Project Case, rehabilitation costs decrease in discounted terms due to the later date of closure under the Project Case compared to the Base Case (FY2103 compared to FY65).

4.3.4 Royalties

Royalties payable by BHP to the South Australian Government as a result of the Project are estimated to total $29 million in present value terms in the Project Case above the Base Case (or $1,483 million below the Base Case in undiscounted terms).[13] Royalties for the production and sale of refined copper plus associated smelter and refinery outputs (gold and silver) are estimated by applying the ad valorem mining royalty rate, as determined by the South Australia Government, to the anticipated increase in revenue from processed copper

[11] Depreciation is calculated a straight-line depreciation method across an assumed asset life. The assumed asset life is 17 years for capital investment in smelting and refining and 18 years for mining assets and, in line with the average effective life of iron smelting and steel manufacturing assets and mining assets respectively in the Australian Tax Office *TR 2022/1*.
[12] Decommissioning and rehabilitation costs are lower under the Project Case than the Base Case in present value terms due to occurring later in the forecast period (during the 2103-04 financial year, rather than the 2064-65 financial year).
[13] Much of the royalty benefit is expected to be incurred in early years of the Project, thus while long-term royalties attributed to the Project are lower than the Base Case in undiscounted terms, there is a benefit in discounted terms.

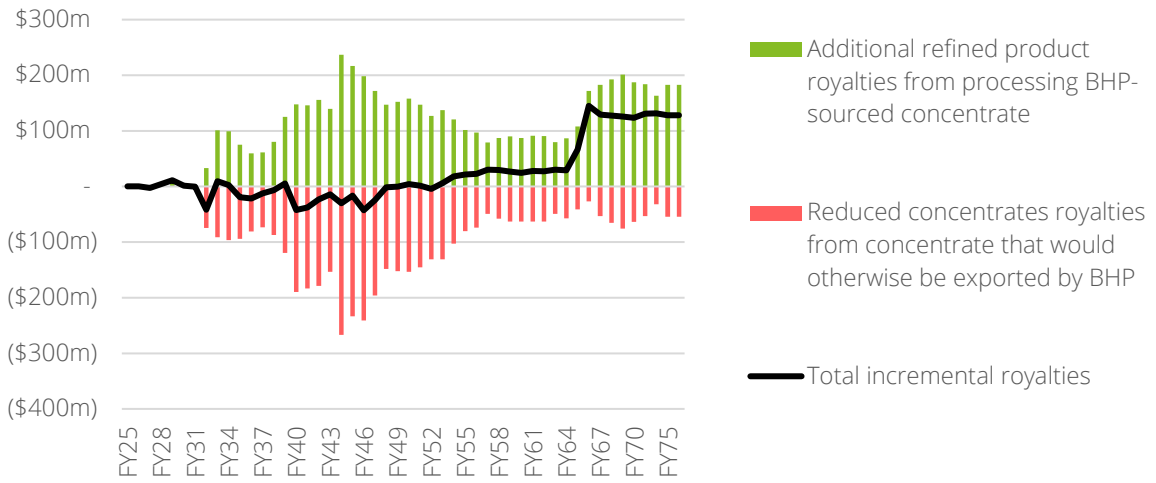
plus associated products above the ore cost for copper plus associated products (excluding goods and services tax [GST]) less freight and insurance costs.

There are two offsetting drivers impacting the incremental royalties associated with smelting and refining in the Project Case (as per Chart 4.1):

- additional refined product royalties attributed to refined BHP-sourced concentrate
- reduced copper concentrate royalties from concentrate from Carrapateena, Prominent Hill and potentially Oak Dam, which would otherwise be exported as concentrate, that is now processed by the smelter and refinery.

The largest driver of incremental royalties in the Project Case is the increased refined product royalties related to a greater volume of refined output from Olympic Dam. However, reduced copper concentrate royalties largely offset any increases in refined product royalties, resulting in little overall changes in royalties under the Project Case. Indeed, due to a lower South Australian royalty rate for refined products (the current royalty rate is 3.5% for refined products compared to 5.0% for raw concentrates), the process of refining concentrate sourced from other BHP mines (thus reducing raw concentrate royalties payable) almost fully offsets the additional royalties gained on refined products.

Chart 4.2: Incremental royalties under the Project Case over the Base Case, by driver



Source: Deloitte Access Economics.

A third potential driver of incremental royalties is that associated with induced production by South Australian mines. Indeed, it is expected that local smelting and refining capacity would incentivise South Australian copper projects which otherwise would not be feasible – and thus not be providing a source of copper concentrate royalties to the South Australian Government – in the Base Case.[14] There is a degree of uncertainty relating to the volume of South Australian copper projects that would be induced by the Project, as induced production may include as-yet unannounced projects, or similarly may not include some currently-announced projects which might not have production induced over the forecast period despite the additional financial incentive provided by local refining and smelting capacity. Desktop research identified six major South Australian copper projects currently seeking financing or in feasibility stage which may be incentivised by the Project. This aligns with non-BHP owned developing copper projects recognised by South Australia Department for Energy and Mining.[15]

Under conservative assumptions including a consideration of only the first stage of each developing mine project (refer Table 4.5) and the commencement of induced production in 2038 following the completion of SRE Stage 2, total royalties from induced production could total a benefit of $316 million in present value for the

[14] Given induced projects are contingent on local smelting and refining capacity, they are likely less profitable than BHP mines and thus no incremental producer surplus benefit assumptions have been made relating to their induced production.
[15] Department for Energy and Mining. (2025). *Copper*. https://www.energymining.sa.gov.au/industry/minerals-and-mining/mineral-commodities/copper. It is noted that Elizabeth Creek Project is further progressed than other developing projects and thus is considered likely in absence of SRE, so is not included in this assumption.

South Australian Government (under a 6% discount rate). Given the uncertain nature of this benefit, however, it has not been considered as an incremental benefit under central estimates.

Table 4.5: Induced mine production estimates

Project	Mine life (years, first stage only)	Annual production		Source
		Copper (kt)	Gold (troy koz)	
Hillside	11	42	30.5	Rex Minerals estimate for Stage 1 Hillside.
Kalkaroo	13	30	72	Havilah Resources estimate.
Mutooroo	13	15	6	Havilah resources estimate.
Other Projects	12	17	13	Estimated for Kapunda, Alford East, and North Portia based on JORC Mineral Resources estimates and average Hillside/Kalkaroo/Mutooroo mine life and extraction rates relative to deposit size.

Source: Deloitte Access Economics, based on Rex Minerals (2024), Havilah Resources (2020, 2024), Thor Energy (2023), EnviroCopper Ltd (2025).

4.3.5 Taxes

Total taxes accrued as a result of the Project are estimated to be $535 million in present value terms under the Project Case below the Base Case (or $1,222 million below the Base Case in undiscounted terms). These estimates include an increase in company income tax payable to the Australia Government, an increase in payroll tax payable to the South Australia Government, and an increase in local government rates payable to local councils.

Company income tax is the largest tax component, estimated to total $1,776 million in present value terms under the Project Case above the Base Case (or $13,036 million in undiscounted terms). This estimate is derived through applying the current full company tax rate of 30% to the estimated taxable income increase attributable to the Project, computed using gross operating revenue less operating costs, rehabilitation and decommissioning costs, royalties and depreciation on capital assets. As the profitability of Olympic Dam operations increases with the Project Case through efficiency benefits, both for mining and smelting activities (see section 3.3), the incremental company income tax payable by BHP increases under the Project Case.

Payroll tax has been estimated to be $44 million in present value terms under the Project Case above the Base Case (or $352 million in undiscounted terms). Payroll tax has been estimated as a function of expected BHP employee wage costs and data on the number of full time equivalent (FTE) staff employed over the course of the Project. The annual payroll tax payable on labour expenditure has been estimated by applying the current 4.95% South Australian payroll tax rate applicable to companies that exceed $1.7 million in Australian wages. Consistent with general guidelines for economic assessment,[16] a majority of payroll tax is expected to be generated without the Project given most of BHP's workforce would have been otherwise employed elsewhere. This tax is recognised as a cost for BHP but separably as an overall benefit of the Project to South Australia.

Local government rates have been estimated to be $2 million in present value under the Project case above the Base Case (or $21 million in undiscounted terms). Local government payments have been estimated based on the share of historical payments made to the Municipal Council of Roxby Downs by BHP Olympic Dam. Local government rates are estimated at $1.9 million per year to the Municipal Council of Roxby Downs under the Base Case. Given the Project Case does not influence land use, it is estimated that there will be no incremental change to council payments until the end of Base Case operations, in FY65, after which it is estimated that BHP will pay an incremental $1.9 million per year under the Project Case which would not otherwise be accrued in the Base Case. As with payroll tax, uncertainty in relation to the additionality of these payments means that they have been conservatively recognised as a cost for BHP but not separably as an overall benefit of the Project.

It is noted that BHP relations with the Municipal Council of Roxby Downs are governed by the *Roxby Downs (Indenture Ratification) Act 1982*, under which the primary responsibilities of BHP in relation to the Council are to

[16] NSW Government. (2015). *Guidelines for the economic assessment of mining and coal seam gas proposals*. https://www.planning.nsw.gov.au/sites/default/files/2023-03/guidelines-for-the-economic-assessment-of-mining-and-coal-seam-gas-proposals.pdf

fund half of the Council's Municipal Deficit (with the other half being paid by the State Government) and to provide power and water at-cost to the Council.[17] As such, BHP is also subject to contributions to Council deficit currently totalling $300,000 per year.[18] This is not estimated to change under the Project Case, where BHP's relation with the Roxby Downs Council will continue. Further, while demand for power and water will likely change in Roxby Downs given additional activity brought on by the Project, BHP is reimbursed for the costs of these utilities and thus will not incur a financial liability. Thus, neither of these financial relations are expected to change in the Project Case.

4.3.6 Economic benefits to workers

One of the primary effects of the Project on the locality is generating employment. This benefit has been calculated only for smelter and refinery operations, given the scale of mining activity at Olympic Dam is assumed to be consistent in both the Base Case and the Project Case.

Overall, additional wages to workers are estimated to total an incremental benefit to South Australia of $147 million in present value terms (or $771 million in undiscounted terms). Employment is expected to peak during the construction period, where the Project is expected to generate up to 1,313 FTE positions in Stage 1a. Further, the project will support a peak of an estimated 1,067 FTE positions during Stage 2 operation, or 508 additional FTE positions above the assumed Base Case 559 operational workforce. Given constraints in the local labour market, all workers employed by the Project, both during construction and operation, are expected to be fly-in fly-out or drive-in drive-out (FIFO or DIDO) positions. Nonetheless, a vast majority of workers FIFO workers are expected to reside in Adelaide. Overall, it is estimated that approximately 96% of workers will be sourced from South Australia, based on historical employment data provided by BHP, with a remainder being sourced from interstate locations. The prioritisation of South Australian employment is expected to be maintained under the Project Case.

The benefit that the Project provides to those it employs is based on their wage above a reservation wage that they would otherwise accept elsewhere in the relevant sector. Since the reservation wage provides a measure of the employment opportunity cost, the skill level required, and the relative disutility of an employment position, the wage premium above this reservation wage thus reflects an economic benefit to workers.

The high-skill requirements of the workers needed to operate the smelter and refinery in the Project Case means that BHP will pay wages at a premium for its internal operational workers, which average 310 FTE positions per year in the Project Case above the Base Case on average over the 50-year forecast period.[19] The contracted workforce, however, is conservatively assumed to receive zero wage premium. Based on estimates provided by BHP, it is expected that internal operational workers will receive an annual income of $114,300 per year, after tax and superannuation. In comparison, the average annual income for a worker in the copper, silver, lead, zinc smelting and refining industry in South Australia is estimated at $74,000, after tax and superannuation. The estimate for the annual average income for the copper, silver, lead and zinc smelting and refining industry in South Australia is based on ABS Census data from 2021, which has been scaled up to December 2025 prices using the South Australia Wage Price Index series.[20] Both estimates of annual income have been discounted for estimated income tax payable using information from the Australian Tax Office.[21]

The difference between the annual income BHP is expected to pay for internal operational workers and the annual average income for the smelting and refining industry in South Australia represents a $40,200 wage premium (Table 4.6). Accounting for each of the 376 internal operational workers and apportioning to represent the 96% of employment that is estimated to come from South Australia, this represents a total incremental benefit to South Australia workers of $147 million in present value terms (or $771 million in undiscounted terms), above the Base Case.

Conservatively, given the absence of data on forecast wages, no wage premium is assumed for contracted workers, including construction and operational workforces. In this case the construction workforce is assumed

[17] Municipal Council of Roxby Downs. (2023). *2022-2023 Annual Report.* https://www.roxbydowns.sa.gov.au/__data/assets/pdf_file/0028/1513639/Annual-Report-2022-2023-FINALWebsite.pdf

[18] Municipal Council of Roxby Downs. (2024). *Long-term Financial Plan: 2025-2034.* https://www.roxbydowns.sa.gov.au/__data/assets/pdf_file/0034/1646926/Long-term-Financial-Plan-2025-34-FINAL-Website.pdf

[19] Consistent with BHP-provided forecast data for smelter and refinery employment, 74% of operational employees are assumed internal, while 26% are contractors.

[20] ABS. (2025). *Wage Price Index, Australia.* https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/wage-price-index-australia/latest-release

[21] ATO. (2025). *Tax rates – Australian resident.* https://www.ato.gov.au/tax-rates-and-codes/tax-rates-australian-residents

to be receive an annual income after tax and superannuation of $59,300, in line with the South Australian industry average. The contracted operational workforce is assumed to receive an annual income after tax and superannuation of $74,000 in line with the South Australian industry average.

Table 4.6: Estimate economic benefit to workers

		BHP Internal Operations Workforce
Average additional workers	FTE/year	310
Project average net income per FTE*	$/year	114,300
SA copper, silver, lead and zinc refining average net income per FTE*	$/year	74,000
Average increase in net income per FTE	$/year	40,200
Total increase in net income per year	$m/year	13
Incremental benefits to South Australia workers (PV, 2027-2076)	$m	147

*Average wage, after tax and superannuation.
Note: Sums may not equal totals due to rounding.
Source: Deloitte Access Economics calculations based on data provided by BHP Olympic Dam Corporation and ABS data.

4.3.7 Economic benefit to suppliers

The economic benefit to suppliers is defined as the rate or margin received by South Australia suppliers above the market rates that they would otherwise receive. It is calculated as the additional producer surplus (or profit) that would be accrued in the Project Case relative to the Base Case.

Under the Project Case, supplier expenditure is expected to total $10,132 million in present value terms above the Base Case (or $30,099 million in undiscounted terms above the Base Case). This is a combination of operational and capital expenditure, excluding labour expenditure.

To apportion the supplier expenditure to SA, both the operating surplus ratios for suppliers and the share of suppliers located in South Australia were considered. Operating surplus ratios from the South Australia input-output table produced by the Deloitte Access Economics Regional Input-Output Model (DAE-RIOM) were utilised to estimate the gross operating surplus to suppliers. This process estimated the gross operating surplus from operational and capital expenditure separately, at 16.0% and 16.3% respectively. Further to this, it is estimated that approximately 29% of the SRE supplier expenditure would go to South Australian suppliers, based on historical supplier data provided by BHP. The Project is expected to undertake consistent local procurement practices to current operations, thus making the use of historical supplier data appropriate.

As such, it is estimated that the economic benefit to South Australian suppliers under the Project Case is $421 million in present value terms above the Base Case (or $1,174 million in undiscounted terms).

Conservatively only the first-round impacts of those businesses that directly supply to BHP are considered. Nonetheless, in this CBA the economic benefit to suppliers is presented below the line, thus not forming part of the core results. This is because there is a degree of uncertainty around the extent of the benefit that is realisable, even for those directly supplying BHP, due to crowding effects in labour and capital markets which are not considered in this CBA.

4.3.8 Net environmental, social and transport costs

This chapter discusses all other environmental and social effects of the Project. These are collectively referred to as 'externalities', since they are borne by the wider society and environment, external to the financial performance of BHP. The human and environmental parties that are impacted by the Project externalities are referred to as 'sensitive receptors.' Effects on land use, First Nations and non-First Nations cultural heritage, air

quality, ambient noise and vibration, biodiversity, greenhouse gas emissions, water resources, social impacts, traffic and transport, and visual amenity were considered.

Externality assessments and quantifications are based on Impact Assessments completed through the SRE EIS process. Consistent with the scope of the underlying Impact Assessments, quantified environmental, social and transport costs relate only to changes in smelter and refinery activity and do not include any incremental externalities associated with mining operations at Olympic Dam. This treatment is not expected to materially affect results to FY65, as the level of mining activity at Olympic Dam is assumed to be the same under both the Base Case and Project Case over this period. However, it may result in some unquantified differences beyond FY65, when mining operations are assumed to cease in the Base Case but continue under the Project Case. As discussed in Section 4.1.1, this limitation is not expected to materially affect the overall cost-benefit analysis results due to the relatively low present value of impacts occurring in the later years of the assessment period.

The externalities that were quantified include air quality, ambient noise and vibration, greenhouse gas emissions, and traffic and transport impacts. It is estimated that the Project will generate costs of $199.5 million in present value terms (or $1,300.5 million in undiscounted terms) attributable to these externalities, relative to the Base Case. For South Australia, these externalities total $19.7 million (or $114.1 million in undiscounted terms). Externality costs are minimised through the internalisation of environmental and social costs; for instance, through installation of efficient fittings to reduce energy and water demand, and the use of renewable electricity purchase agreements. Further, as the Local Region is dispersed and has a low population, expected environmental and social impacts incurred mostly by the local region (e.g., ambient noise and vibration, air quality, and traffic) are minimised.

All other externalities were considered qualitatively. The residual effects associated with these externalities are considered to be immaterial, given the implementation of mitigation and management measure (included in the capital investment and operating costs), and therefore have not been quantified and monetised for inclusion in the CBA. They are instead discussed qualitatively in the following sub-sections.

Table 4.1 Summary of externality impacts (NPV, $millions AUD FY26, for FY27-76)

Externality	Definition	Base Case (NPV)	Project Case (NPV)	Incremental (NPV)	Incremental to South Australia (NPV)
Land use	Opportunity costs of additional land use to alternative land uses (e.g. livestock grazing)	-	-	-	-
Soils and geochemistry	Impacts on soil quality in surrounding areas.	-	-	-	-
First Nations cultural heritage	Potential negative impacts on First Nations cultural values and heritage sites.	-	-	-	-
Non-First Nations cultural heritage	Potential negative impacts on non-First Nations cultural values and heritage sites.	-	-	-	-
Air quality	Air quality impacts from the SRE expansion.	(1.6)	(2.4)	(0.8)	(0.8)
Ambient noise and vibration	Captures noise and vibration impacts on local populations.	(62.7)	(67.7)	(5.1)	(5.1)
Biodiversity	Impacts on biodiversity due to additional land use.	-	-	-	-
Greenhouse gas emissions	Scope 1 and 2 emissions generated by the Project.	(301.5)	(494.7)	(193.2)	(13.3)
Surface water and groundwater	Impacts on water availability and quality in the region.	-	-	-	-

Social	Impacts on the liveability of surrounding regions (e.g. housing).	-	-	-	-
Traffic and transport	Impacts on road service quality due to additional vehicle movements.	(0.4)	(0.9)	(0.4)	(0.4)
Visual amenity	Impacts of the Project on the visual amenity of its local vicinity and nearby communities.	-	-	-	-
Net environmental, social and transport costs		**(366.1)**	**(565.7)**	**(199.5)**	**(19.7)**

Source: Deloitte Access Economics calculations

4.3.8.1 Land use

The land on which the Project is located is zoned as 'Remote Area' and features a diverse range of uses including extensive livestock grazing, energy generation and storage, and First Nations land-use activities. However, all but a very small portion of the Project activities are located within BHP's existing Special Mining Lease (SML) areas(see Figure 4.1), with 28.57 ha of new disturbance footprint associated only with EIGR Areas outside of the SML.[22] Consequently, the potential incremental cost of the Project to other land uses is minimal.

The land use and planning assessment[23] identified three potential land-use related impact events from the Project: two related to Aboriginal heritage sites and cultural values, and one related to changes to the prevailing visual amenity. These potential impacts are discussed further in Chapters 4.3.8.3 and 4.3.8.12 respectively.

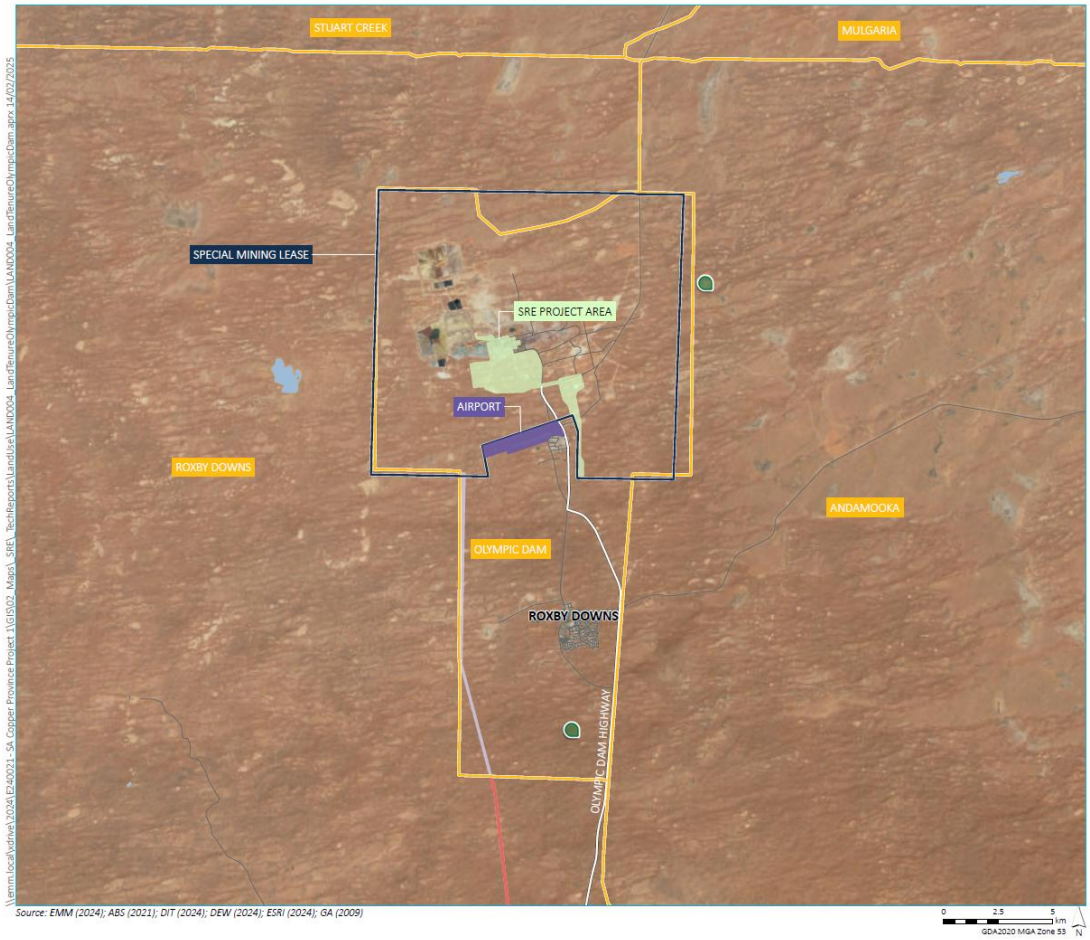
The only assessed impact on land use outside of the SML is ground re-profiling within the Electricity Infrastructure Ground Re-Profiling Area, for which isolated vegetation disturbance would be required to maintain regulatory clearance distances between the existing transmission line and the ground surface to maintain safe operation. No change to existing land tenure or acquisition of land is required.

Overall, the assessment considered the Project to be compatible with the scale, function, character and intensity of the existing land uses and surrounding areas. It would not significantly impact the Base Case land use environment which is characterised by the existing Olympic Dam mine and associated infrastructure.

The costs resulting from changes to land use, and any mitigation efforts such as First Nations cultural heritage surveys which might occur under the Project Case, have been considered in the incremental benefits associated with revenue and operating costs incurred for the Project Case.

[22] EMM Consulting Pty Ltd. (2026). *Land Use and Planning Assessment: Olympic Dam Smelter and Refinery Expansion Project* (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2026).
[23] Ibid.

Figure 4.1 Summary of land tenure



Source: EMM Consulting Land Use and Planning Assessment

4.3.8.2 Soils and geochemistry

A targeted soils and geochemistry sampling program was undertaken to investigate potential soil contamination within the Project area. The results showed that no contaminants of potential concern (CoPC) were identified within the 19 test pits investigated in the Project area. Overall, the assessment found low risks to identified receptors from soil disturbance generated by the Project construction and operation. Potential impacts to surface and ground water from soil disturbance are discussed further in Chapter 4.3.8.9.

The potential contamination risk related to Project construction and operations may be appropriately mitigated and managed in accordance with relevant Australian Standards, construction environmental management, and operational control measures. Control measures include:

- All hydrocarbon and chemical storage locations are bunded (enclosed with an impermeable barrier) to prevent discharge in the event of a spill.
- Development of a site-specific construction environment management plan, which includes an unexpected find protocol, to manage ground disturbance during Project development works.
- Implementation of BHP's existing hydrocarbon and chemical spills procedure.

The costs associated with implementing the above mitigation measures for soil and water impacts are included in the operating and capital investment costs for the Project.

4.3.8.3 First Nations cultural heritage

This externality refers to the potential impact of the Project on sites of First Nations cultural heritage, and cultural values. The Social Impact Assessment (SIA) report identified that the clearing of native vegetation associated with the Project could impact sites of cultural significance, and result in a change in the relationship

between Indigenous peoples and Country.[24] To mitigate the potential impact, BHP has undertaken, and would continue to undertake:

- Identification of Aboriginal cultural heritage values compiled through background research, Aboriginal consultation, archaeological field investigations and anthropological assessments.
- Cultural heritage surveys in accordance with the Olympic Dam Agreement (ODA).

The presence of any artefacts or identified Aboriginal cultural heritage values, including landscape features, within the Project will be handled in accordance with legislation and the agreed procedures and protocols for heritage management with the Kokatha Aboriginal Corporation (KAC), Kuyani Yartah Association (KYA) and Barngarla Determination Aboriginal Corporation (BDAC) Indigenous Groups.

The costs associated with implementing the above mitigation measures for negative First Nations cultural heritage impacts are included in the operating and capital investment costs for the Project.

4.3.8.4 Non-First Nations cultural heritage

A Historic Heritage (non-Indigenous) Impact Assessment (HHIA) undertaken for the Project identified two heritage sites within 30km of the Project site. It was determined that neither archaeological sites would be impacted by the Project.

The HHIA stated that there remains a low to very low potential for subsurface historical archaeological features to be encountered during ground disturbing construction activities. As a mitigating measure, the report proposed a stop works procedure for unexpected historical archaeological finds in the construction environmental management plan.

4.3.8.5 Air quality

Air quality impacts have been estimated to be $0.8 million in present value ($5.4 million in undiscounted terms), incremental to the Base Case, attributable to impacts felt within the Roxby Downs SA2.

The Project's air quality impacts have been quantified in terms of the health costs associate with emissions of fine particulate matter of less than 2.5 micrometres ($PM_{2.5}$) using the damage cost approach outlined in the technical notes supporting the NSW Government Guidelines.[25] The damage cost approach attributes a predetermined dollar-per-tonne cost to emissions and does not consider the separation distance between the emissions sources and the sensitive receptor. The approach draws from the PAEHolmes 2013 report,[26] using the unit damage cost, which has been determined on a significant urban area (SUA) and non-SUA basis. In line with guidance from the PAEHolmes 2013 report, since the SRE area is not considered an SUA, it falls within the non-SUA definition, and so the non-SUA unit damage cost has been applied to $PM_{2.5}$ emissions. The quantification utilises the annual $PM_{2.5}$ emissions total from fugitive and stack sources, which includes primarily emissions from stack sources that are controlled to reduce damage. As a result, it represents a conservative estimate of the impact.

The Air Quality Impact Assessment undertaken by EMM Consulting Pty Ltd reported both the incremental and cumulative impacts to air quality, relative to the existing Olympic Dam operations detailed under the Base Case.[27] To determine this the assessment measured emissions for air pollutants, including particulate matter, sulphur dioxide, sulphur trioxide, oxides of nitrogen, carbon monoxide, hydrogen chloride, fluoride compounds and metals and metalloids. Particulate matter is reported through three metrics: total suspended particulate (TSP), coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$).

A relatively low overall derived value of air quality impacts is consistent with the assessment report, which notes that the Project is expected to cause minor increased air quality impacts relative to the Base Case at neighbouring sensitive receptor locations. Concentrations of sulphur dioxide, copper, manganese and

[24] EMM Consulting Pty Ltd. (2026). *Social impact assessment: Smelter and Refinery Expansion Project* (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2026).
[25] NSW Government (2018). *Technical Notes supporting the Guidelines for the Economic assessment of Mining and Coal Seam Gas Proposals.* https://www.planning.nsw.gov.au/sites/default/files/2023-03/technical-notes-supporting-guidelines-economic-assessment-mining-coal-seam-gas-proposals.pdf
[26] PAEHolmes. (2013). *Methodology for valuing the health impacts of changes in particle emissions – final report.* https://www.epa.nsw.gov.au/sites/default/files/healthpartemiss.pdf
[27] EMM Consulting Pty Ltd. (2026). *Air quality impact assessment: Olympic Dam Smelter and Refinery Expansion Project* (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2026).

particulate matter are expected to see the most significant increase as a result of the Project.[28] The cumulative concentrations, however, are expected to remain below the South Australia Environment Protection assessment criterion at all receptor locations.[29] As such, none of the confirmed air quality impact events were assessed to have a significant impact against BHP's environmental impact assessment framework. The confirmed air quality impact events were also not expected to have a significant impact to the health and safety of the local community.[30]

4.3.8.6 Ambient noise and vibration

Ambient noise impacts caused by the Project incremental to the Base Case have been estimated to be $5.1 million in present value ($19.2 million in undiscounted terms).

The ambient noise and vibration impact assessment focussed on impacts generated from two emissions sources, which are treated separately in the sub-sections below:

- surface infrastructure and
- road traffic.

Vibration from operations and construction is also in-scope. However, since vibration levels will be negligible to the nearest sensitive receivers, it was deemed a minor component of ambient noise and vibration and therefore not quantified in the CBA.[31] Further, aircraft noise is also not expected to change, given no additional flights are assumed to be scheduled over the Base case under the Project.

Noise impacts are borne by ten sensitive receivers in the areas surrounding the study area, including at Olympic Dam Village (ODV) and Roxby Downs Village (RDV). Three of the ten sensitive receivers are BHP-owned accommodation for employees. All receivers are categorised as residential.

Benchmarks for acceptable noise factors are contained in the Environment Protection (Commercial and Industrial Noise) Policy 2023 (Noise Policy), under South Australia's Environment Protection Act 1993 (EPA Act). The Noise Policy applies to privately-owned sensitive receivers, such as residents in the Roxby Downs township. For BHP-owned accommodation at the Olympic Dam site, the Noise Policy criteria is not applicable; here, noise limits were determined in accordance with Australian Standards.

Surface infrastructure noise

Surface infrastructure noise impacts have been estimated to be $4.2 million in present value ($15.6 million in undiscounted terms), incremental to the Base Case, attributable to impacts felt within the Roxby Downs SA2. Surface infrastructure noise relates to noise generated by sources above the ground, such as fixed plant, mobile equipment and vehicles.

The Noise and Vibration Impact Assessment found that, under worst case noise enhancing conditions, the Project complies with the Noise Policy at privately owned noise sensitive receivers, and the Australian Standard at BHP-owned receivers (accommodation at the Olympic Dam site).[32]

The impact of additional noise generated by the Project on the ten identified receivers was quantified in the CBA. This was done by first taking an average of the predicted increase in noise level in decibels (dB) across the ten receivers, which equated to 0.4 dB during construction and 3.4 dB during operation. These factors were multiplied by a fixed unit cost of noise per decibel per household of $83.90,[33] and finally by the number of households in the Roxby Downs Statistical Area 2 (SA2) (1,195).[34] Notably, a stable population is forecast for

[28] Ibid.
[29] Ibid.
[30] Ibid.
[31] EMM Consulting Pty Ltd (2026). *Noise and Vibration Impact Assessment: Olympic Dam Smelter and Refinery Expansion Project* pg. 21 (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2026).
[32] Ibid.
[33] The original value was provided by Navrud (2002) in a report for the European Commission DG Government, in which the reported total cost of noise impact ranges from 2 to 32 euros per dB per household each year. The upper limit was used as a conservative estimate for quantifying the noise impact. For the purposes of modelling, the cost per dB was inflated to FY26 dollars, using consumer price index (CPI) data from the Australian Bureau of Statistics (ABS). Conversion from euros to Australian dollars was previously done by Deloitte Access Economics.
[34] Australian Bureau of Statistics. (2021). *Region Summary: Roxby Downs* (Census 2021).

Roxby Downs through the assessment period, as per South Australia government projections.[35] Consistent with outcomes of the Noise and Vibration Impact Assessment, a low total incremental present value ($4.2 million) was associated with surface infrastructure noise.

Road traffic noise

Road traffic noise impacts have been estimated to be $0.9 million in present value ($3.6 million in undiscounted terms), incremental to the Base Case, attributable to impacts felt within the Roxby Downs SA2.

Road traffic noise impacts from the Project have been quantified in terms of the noise generated by additional vehicle movements during construction and operation. Road impacts are noted in the EIS to be minor, given the rural locality of the mine and the relatively small population proximal to the road network servicing the Olympic Dam mine site.

The impact of additional road traffic noise was quantified in the CBA by multiplying the net increase in vehicle-kilometres travelled (vkt) over the lifetime of the Project by a per-vkt unit cost of noise by vehicle type, as recommended by ATAP Guidelines. Vkt was used as the transport unit of measurement (rather than pkm), since detailed data on traffic movements by vehicle type were made available.

Base Case and Project vkt were calculated using traffic volume data obtained from the Traffic Impact Assessment report.[36] Vkt were distinguished between heavy vehicles transporting mine commodities, and coaches and light vehicles transporting personnel. Total net vkt by vehicle type were multiplied by corresponding unit costs obtained from the ATAP Guidelines.[37] These were $0.13/1000 vkt for a passenger car, $0.89/1000 vkt for a passenger coach, and $1.72/1000 vkt for a heavy vehicle.

4.3.8.7 Biodiversity

The Project's incremental impact on biodiversity is found to be of low significance and as a result has not been quantified in the CBA.

To assess impacts on biodiversity, the Project's Ecological Impact Assessment has focussed on assessing the potential for Base Case ecological environment changes, the magnitude of these changes and the likely impact of these changes on identified ecological receptors.[38] Base Case ecological assessments have been undertaken across the Project area, with a particular focus on State and Nationally threatened species, threatened ecological communities, vegetation and fauna habitat characterisation. A desktop review and Base Case assessments have indicated that several threatened species may occur within the Project area, including three key species (Southern Whiteface, which is known to occur, and the Plains Mouse and Thick-billed Grasswren, which have potential to occur). To determine whether these ecological receptors are at significant risk of being impacted by the Project, an analysis of source, pathways and receptor impact was performed.

It was determined that there would be a total of 18 confirmed grouped impact events on ecological receptors associated with:

- noise and vibration,
- air quality, radiation,
- land and soils,
- groundwater and surface water, and
- traffic.

These events were assessed to quantify the likely significance of the impact against the Project's Environmental Impact Assessment Framework, and all impact events were concluded to not be significant. This is due to disruption to Base Case mostly occurring during the construction phase (e.g. increase in noise impacts, lighting, emissions, land clearing) and resulting in only minor effects on ecological receptors. In addition, the operational disruption is found to be very localised to the Project site and only marginally incremental on the existing

[35] Department for Housing and Urban Development (SA). (2024). *Population Projections for SA*. https://data.sa.gov.au/data/dataset/population-projections-for-sa

[36] Worley Consulting. (2025). *CuSA Smelter & Refinery Expansion Project (SRE): Traffic Volume EIS Data* (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2025).

[37] Department of Infrastructure, Transport, Regional Development and Communications (2024). *Australian Transport Assessment and Planning Guidelines: PV5 Environmental parameter values*. June 2023 cost values were inflated to FY26 using CPI data from the ABS.

[38] Lathwida Environmental. (2025). Olympic Dam Smelter and Refinery Expansion Project (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2025).

disturbance in the area due to small additional land use and the similar nature of industrial operations that will be occurring. As a result, the Project is not expected to have a significant impact on biodiversity, with all assessed potential impact events affecting biodiversity found to have a low significance level.

4.3.8.8 Greenhouse gas emissions

Under the Project Case, the incremental social cost of additional greenhouse gas emissions to Australia are estimated at $193.2 million in present value ($1,274.3 million in undiscounted terms) relative to the Base Case. This social cost is attributed to South Australia based on the population of the state relative to Australia, which provides a proportion of approximately 6.9%, and produces an additional cost to South Australia of $13.3 million in present value ($87.8 million in undiscounted terms).

The incremental change in greenhouse gas emissions occurs relative to the Base Case, which includes existing smelter and refinery operations. The majority of emissions due to the Project relate to diesel and fuel oil combustion, liquefied petroleum gas combustion, and coke coal.[39] Although the Base Case and Project Case both include purchases of electricity from the grid, the associated Scope 2 emissions are expected to be substantially offset through renewable electricity purchase agreements already reflected in BHP's financial forecasts. In this report, the incremental change in greenhouse gas emissions and associated social cost has also been used as an indicator of the impact the Project is expected to have on climate change.

The Greenhouse Gas Assessment undertaken by EMM Consulting Pty Ltd reports two confirmed impact events, which related to construction and operation of the Project, are expected to have a not significant and significant impact, respectively.[40] As such, mitigation practices have been recommended to reduce the impact of these events.

In the assessment, greenhouse gas emissions are categorised into three scopes of emissions for greenhouse gas accounting and reporting purposes. The impacts of greenhouse gas emissions under the Project are estimated using projections of Scope 1 and Scope 2 emissions for each year of operations, which are reported in Appendix C of the Greenhouse Gas Assessment and measured in tonnes of CO_2 emissions.

Scope 1 and scope 2 emissions can be defined as:

- Scope 1 – related to direct emissions from sources within the boundary of the Project and as a result of the Project's activities
- Scope 2 – related to indirect emissions from the purchase of electricity, steam, heat or cooling that the Project will consume, which are physically generated outside of the boundaries of the Project.

In the absence of specific guidelines on GHG treatment from South Australia, treatment is in alignment with the technical notes supporting the NSW Guidelines,[41] whereby the projections of Scope 1 and Scope 2 emissions have been used to account for the impacts of greenhouse gases to the South Australia community, with Scope 3 emissions not included.[42] Consistent with BHP's emissions reduction strategy, no Scope 2 emissions are assumed from FY30 onwards, reflecting the expected procurement of renewable electricity through purchase agreements. The costs associated with these arrangements have been incorporated within the Project's operating expenditure assumptions (see section 4.3.3.2) and are therefore not separately valued as an emissions impact.

BHP has a long-term goal to achieve net zero operational GHG emissions (Scopes 1 and 2 emissions from BHP's operated assets by CY2050. However, while the Project takes measures to ensure that appropriate capital and processes are in place to reduce Scope 1 emissions to as low as reasonably achievable, there remains uncertainty regarding the timing and feasibility of significant emissions reductions from the smelter and refinery, given the technological challenges associated with decarbonising these processes. Further, while BHP may procure offsets (including Australian Carbon Credit Units), there remains uncertainty as to the quantity and

[39] EMM Consulting Pty Ltd. (2026). *Greenhouse gas assessment: Olympic Dam Smelter and Refinery Expansion Project* (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2026).
[40] Ibid.
[41] NSW Government. (2018). *Technical Notes supporting the Guidelines for the Economic assessment of Mining and Coal Seam Gas Proposals.* https://www.planning.nsw.gov.au/sites/default/files/2023-03/technical-notes-supporting-guidelines-economic-assessment-mining-coal-seam-gas-proposals.pdf
[42] Scope 3 emissions relate to all other indirect emissions, which are not included in Scope 2, and which occur outside the boundary of the Project but as a result of actions undertaken during the Project and are generated in the wider economy. Consistent with conventional CBA and relevant guidelines, where the potential direct costs and benefits of an activity are considered together, in the country where the activity takes place, Scope 3 emissions are not considered in the CBA.

value of these that may be purchased. As a result, this assessment conservatively assumes that Scope 1 emissions continue in accordance with the *Greenhouse Gas Assessment* throughout the assessment period. As a result, the Project is estimated to generate an additional 52,700 tonnes of CO_2-e per annum between FY27 and F76, driven by higher Scope 1 emissions associated with greater production capacity.

To monetise the impacts of greenhouse gas emissions, measured as Scope 1 and Scope 2 emissions, national carbon values from Infrastructure Australia's *Guide to assessing greenhouse gas emissions* have been used to value the average cost per tonne of CO_2 emissions.[43] Specifically, Infrastructure Australia has based the carbon values on modelling of the least-cost approach to achieve Australia's legislated emissions reductions targets. Infrastructure Australia's guidance mandates the national carbon values from FY24 to FY50, past this period carbon values have been estimated based on the trend of available national carbon values. The carbon values are provided in 2023 values and so have been scaled in line with ABS CPI data to represent FY26 values.

The CBA is undertaken with the intent of determining the impact on the South Australia community. As such, the cost of greenhouse gas emissions has been apportioned to that state based on the population of the state relative to the country. This approach aligns with the methodology used to estimate Infrastructure Australia's carbon values, which are based off the least-cost approach to achieving national emissions reduction targets. Approximately 6.9% of the value of the greenhouse gas emissions produced by the country have therefore been apportioned to the South Australia community. This approach is consistent with guidance provided in the technical notes supporting the NSW Guidelines.

To allow for variation in the carbon value, 'Low' and 'High' carbon values from Infrastructure Australia's *Guide to assessing greenhouse gas emissions*[44] have been considered in the sensitivity analysis in Chapter 4.5.

4.3.8.9 Surface Water and groundwater

The Project's incremental impact to surface water and groundwater is expected to be of low significance, and as a result the impacts have not been separately quantified. Costs of the incremental change to surface water and groundwater, such as cost for mitigation measures and market prices paid for additional water supply, are included in the initial capital investment and operational cost of the Project.

The surface water impacts of the Project have been considered in the Surface Water Assessment undertaken by EMM Consulting Pty Ltd.[45] This report concludes that the Project area is not at risk of regional flooding, with no rivers, creek or floodplains in the vicinity of the Project.[46] To accommodate the changes, the existing stormwater management system will be expanded to accommodate rainfall runoff collected from the Project infrastructure.

Further to this, four confirmed impact events have been identified which have been reported as low significance.[47] The four confirmed impact events are:

- Access to surface water may be impacted by changes to prevailing surface water catchments.
- Surface water quality may be impacted by changes to prevailing surface water catchments.
- Chemicals and/or hydrocarbons may be released beyond containment areas.
- Infrastructure placement developed under the Project may impact access to surface water for sites of cultural significance.

Under the Surface Water Assessment, the confirmed impact events were considered low significance because of the minor to nil change that they are expected to cause combined with the management controls in place. According to the Surface Water Assessment, access to surface water and quality of surface water are expected to see ecological functions maintained and minor impacts managed using standard erosion and sediment controls, respectively. Furthermore, runoff from contaminant sources is not expected to pose a risk to the local community, with appropriate guidelines dictating bunding, and contaminate sources stored away from

[43] Infrastructure Australia. (2024). *Guide to assessing greenhouse gas emissions*. https://www.infrastructureaustralia.gov.au/publications/guide-assessing-greenhouse-gas-emissions>
[44] Ibid.
[45] EMM Consulting Pty Ltd. (2026). *Soil and Groundwater Assessment: Olympic Dam Smelter and Refinery Expansion Project* (report commissioned by BHP Olympic Dam Corporation Pty Ltd, 2026).
[46] Ibid.
[47] Ibid.

stormwater pathways. Finally, the claypan located at the site of cultural significance is not expected to see changes to erosion and deposition risk, with no changes to flow velocity expected at the claypan.

The groundwater impacts are captured in the Target Soil Assessment – Soil contamination and Geochemistry undertaken by EMM Consulting Pty Ltd. The report concluded that the Project would not extract any additional water relative to the Base Case, and so there is expected to be no change to the current groundwater effects. There is also likely to be minimal impacts given the lack of reliance on groundwater in the area, with receptors which may rely on groundwater, including Lake Torren and other potential watercourse springs, located over 30km away from the site, meaning they are unlikely to be impacted. Further to this, groundwater utilisation in the area is low.

Mitigation methods have been recommended to ensure that the Project does not have a significant impact on the surface water and groundwater. The costs of implementing and maintaining the additional surface water management infrastructure have been included in the capital investments costs and operation costs for the Project.

The operational costs of the Project include the additional costs required to meet the Project's additional water usage, which are represented by the market prices that BHP pays to water suppliers, including an estimate of costs that will be paid to access water from a right-sized desalination plant for water use additional to that currently available from the GAB.

4.3.8.10 Social

The Project's social impact is determined to be include positive and negative dimensions.

EMM's Social Impact Assessment (SIA) of the Project commissioned by BHP identified and assessed potential social impacts on surrounding local and regional communities. The report investigated key social trends and characteristics of the study area, including population and demography, housing and accommodation, community values, health and wellbeing, social infrastructure, labour force, business and industry and transport and connectivity. Using this to create a Base Case, an assessment can identify impacts of the Project.

Project impacts on housing were determined to be low. FIFO workers will make up all additional employment, at 100% of the construction workforce and 100% of the additional operational workforce.[48] The FIFO workforce is not expected to add significant strain to housing and accommodation in Roxby Downs, as these workers are to primarily reside in Olympic Dam Village (ODV) South outside of Roxby Downs itself and therefore will not add pressure to housing demand. It is expected that additional FIFO workers construction and operational workforces would be accommodated in existing and new accommodation otherwise set up for the Scheduled Campaign Maintenance 2027 and Olympic Dam future campaign maintenance accommodation. Nonetheless, around 10% of the operational workforce (around 50 new workers) are expected to reside locally.

For the 10% of the operational workforce (around 50 new workers) which are expected to reside locally, BHP will locate these workers at Olympic Dam where there are constraints in housing supply available at Roxby Downs. It is noted that the Roxby Downs residential vacancy rate, as of early 2026, is moderate at around 4%,[49] however is constrained due to no additional freehold land being available. Assuming a relatively stable population for Roxby Downs (as per South Australia government projections[50]), this would imply that the vacancy rate would stay stable at around 4% in the Base Case, however, may decline under the Project Case to less than 1% if all are housed in Roxby Downs, indicating stress on supply. While additional demand would be expected to increase the costs of housing in Roxby Downs, the net monetary cost to South Australia is expected to be negligible on balance given the existing owners of housing would gain a commensurate monetary benefit to the cost worn by renters or those entering the market. There are likely to also be psychosocial impacts of increased housing stress, although these are difficult to quantitatively assess.

Aside from housing, the assessment identified key negative impacts related to increased traffic congestion, reduced availability of flights, potential strain on emergency services, and diminished community cohesion in Roxby Downs due to growth in FIFO workforce. Of these, two impacts are assessed as potentially significant:

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[48] BHP Olympic Dam Corporation Pty Ltd. (2026). *Olympic Dam Smelter and Refinery Expansion Project Environmental Impact Statement: Updated Project Description.*

[49] SQM Research, (2025). *Residential Vacancy Rates*. https://sqmresearch.com.au/graph_vacancy.php?postcode=roxby+downs&t=1

[50] Department for Housing and Urban Development (SA). (2024). *Population Projections for SA*. https://data.sa.gov.au/data/dataset/population-projections-for-sa

- Reduced access to emergency services for existing residents in nearby communities due to increased risk of traffic accidents surrounding and workplace accidents on the Project site.
- Lower cohesion in the community of Roxby Downs due to increase in FIFO workers, leading to weaker social ties, lower local investment and less resident engagement.

The increased risk of traffic accidents because of the Project has been separately assessed in the Traffic Impact Assessment where incremental risks were deemed low, as discussed in Chapter 4.3.8.11 below. Further, potential strain on emergency services will be mitigated by maintaining medical and emergency services at the existing Olympic Dam Mine and workforce accommodation villages. This will reduce the need for external emergency support in the event of workplace incidents, and therefore additional pressure on local emergency services.[51]

Further, while there are known psychological and social costs of FIFO workforces, there are no appropriate monetary values to quantify these impacts. Thus, they are acknowledged qualitatively in the CBA.

4.3.8.11 Traffic and transport

The Traffic Impact Assessment (TIA) reported that there would be a noticeable, albeit minor, increase in travel time at key intersections related to the Project. These relate to workers travelling to Olympic Dam from Roxby Downs, in addition to the flow of construction materials and operations outputs between Olympic Dam and Port Augusta, Whyalla, and Adelaide.[52]

Using estimated traffic volumes and vehicle classification data provided in Annexure A of the TIA,[53] it is estimated that increased volumes at key intersections will result in incremental increases in travel time to the value of $0.4 million (present value) ($1.6 million in undiscounted terms). AM and PM traffic volumes at two intersections, Olympic Dam Highway/Olympic Dam Way, north and south of Roxby Downs were considered. The increase in travel times at these intersections are:

- Olympic Dam Highway/Olympic Dam Way – north of Roxby Downs: an increase in delays of between 2.4 seconds (AM peak, construction period) to 9.5 seconds (PM peak, operations period).
- Olympic Dam Highway/Olympic Dam Way – south of Roxby Downs: an increase in delays of between 0.7 seconds (PM peak, construction period) to 1.1 seconds (PM peak, operations period).[54]

The TIA noted that additional freight train volumes could cause delays at the level crossing at Pimba along Olympic Dam Highway. However, the potential impact was rated as negligible, due to ample queuing space available on the road.

The incremental travel time cost was calculated as the additional travel time multiplied by the average hourly cost of travel time. Costs were calculated separately by vehicle type (heavy and light vehicles). In the absence of specific guidance for South Australia, values from ATAP have been used, at $35.71 and $39.82 per hour of travel time for light and heavy vehicles respectively.[55] It is assumed that at the intersection north of Roxby Downs, 9% of movements are heavy vehicles, while at the southern intersection, the share is 26%.[56]

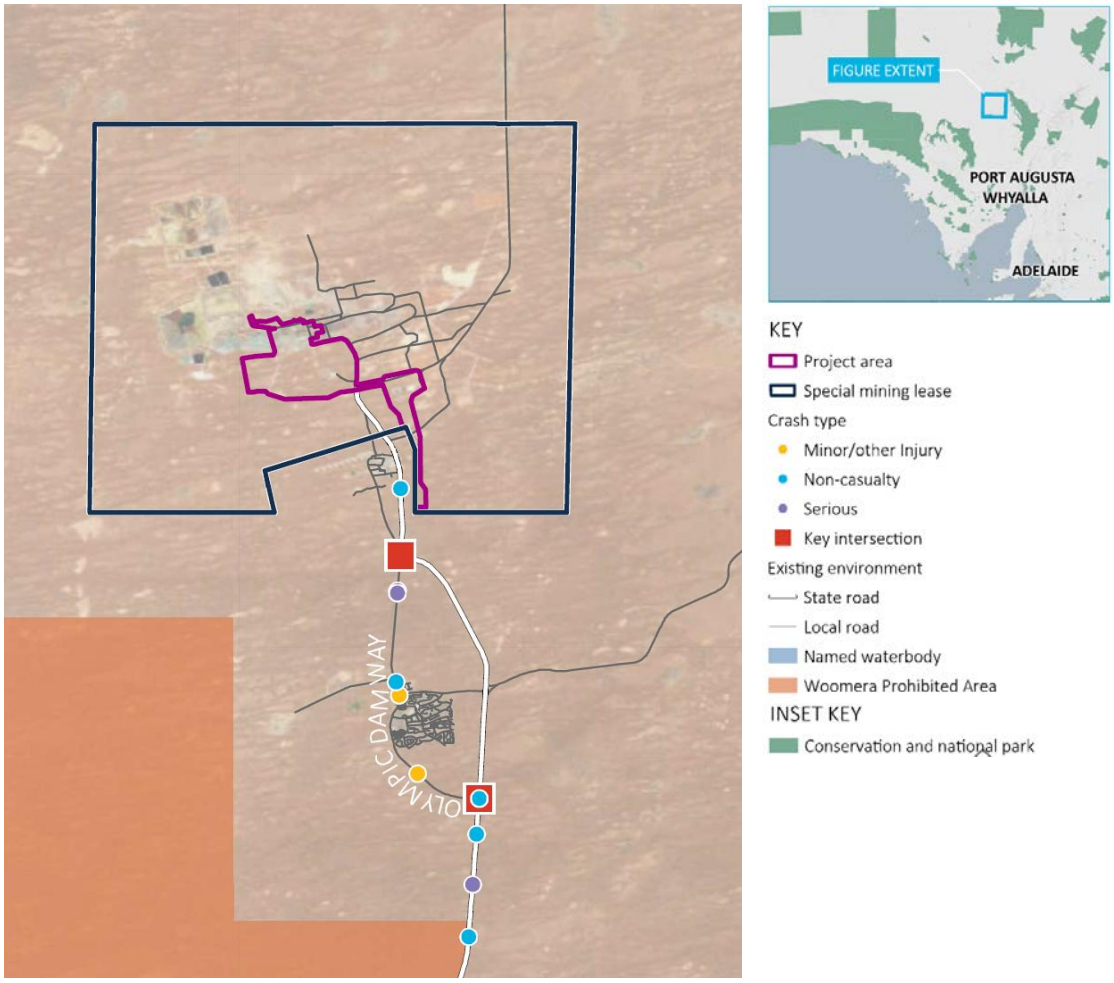
Only existing background traffic volumes (i.e., those that would occur under the Base Case) were used in the calculation of travel time costs. Estimated traffic volumes incurred due to Project construction and operation phases were excluded from calculations, since they capture employees and contractors travelling to the Project. For these individuals, travel time is compensated for as part of their wages and other benefits.

The TIA also considered the expected increase in road accidents in the surrounding road network, which has been determined to be negligible. On existing roads, the TIA identified that ten crashes had occurred in the surrounding road network over five years, which is considered low for a long stretch of road.[57] The report also

[51] EMM. (2026). *Social Impact Assessment: Smelter and Refinery Project.*
[52] EMM. (2026). *Traffic Impact Assessment: Olympic Dam Smelter and Refinery Project*
[53] Ibid.
[54] Ibid.
[55] Heavy vehicle travel time costs are estimated using an unweighted average of values suggested for rigid and articulated trucks. These values have been inflated to FY26 using the rate of increase of the CPI. Australian Transport Assessment and Planning (ATAP). (2016). *Australian Transport Assessment and Planning Guidelines: PV2 Road Parameter Values.* https://www.atap.gov.au/sites/default/files/pv2_road_parameter_values.pdf
[56] EMM. (2026). *Traffic Impact Assessment: Olympic Dam Smelter and Refinery Project*
[57] Ibid.

concluded that Project traffic volumes were insufficient to significantly impact public health and safety through increasing traffic accidents.[58]

Table 4.2 Key intersections at which additional travel time was quantified.



Source: EMM (2026)

4.3.8.12 Visual amenity

The Visual Assessment (VA) identified two potential visual impact events from the Project: the emission of light during operations which may impact the amenity of the local community, and the placement of Project infrastructure causing changes in the prevailing visual amenity of the area. Both impact events were assessed to be not significant. In the absence of appropriate monetary values to quantify these visual impacts, these are acknowledged qualitatively in the CBA.

Mitigation and management measures were proposed to reduce the potential impact to visual amenity to as low as reasonably achievable. For lighting, design considerations include:

- Eliminating upward light spill
- Directing light downwards
- Use of shielded fittings
- Avoiding over-lighting
- Switching lights off when not required

No design and control measures were considered relevant to the assessment of effects for visual amenity. The Project infrastructure will not extend above or beyond existing industrial elements, while the undulating topography and existing vegetation in this vicinity will reduce any visual impacts.

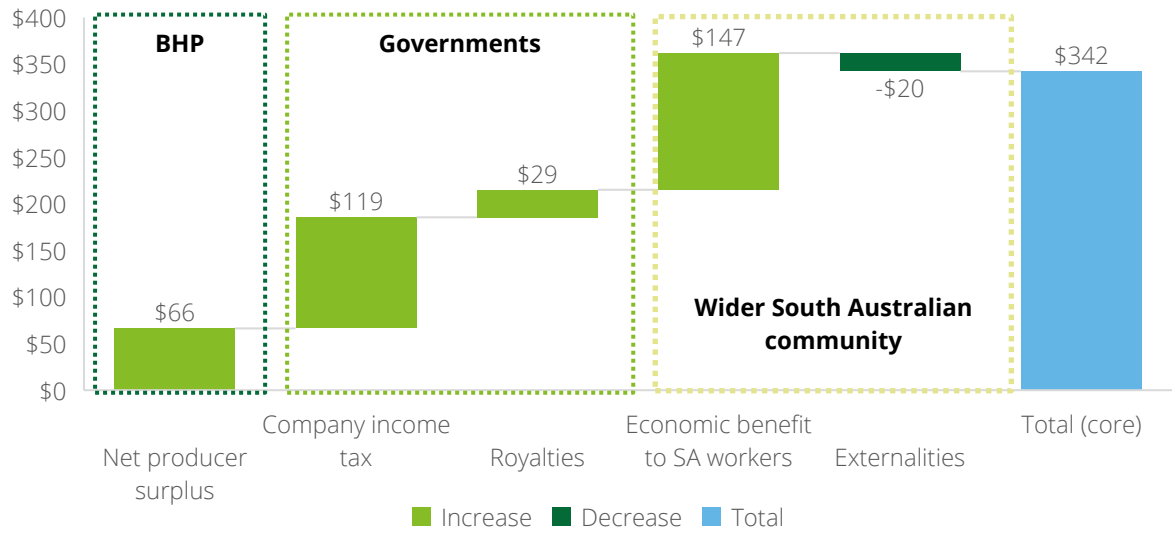
[58] Ibid.

4.4 Overall cost and benefit analysis results

The Project is expected to generate a net incremental economic benefit to the South Australia community of approximately $342 million in present value terms (FY26 $AUD) over the 50-year evaluation period (FY27 to FY76), or a benefit-cost ratio (BCR) of 18.4. The net incremental economic benefit of the Project is estimated using the costs and benefits derived in Chapter 4.3. Including economic benefits to suppliers, which has been presented below the line due to not being typically captured in CBAs, there is a net benefit of $763 million attributed to the Project.

The overall net benefit of the Project to the South Australian community is based on the total direct benefits attributable to South Australia—including net producer surplus, company income tax, royalties, and economic benefits to workers—less the cost of project-related externalities (see Chart 4.3 below). The Project is estimated to generate a net benefit of approximately $342 million in present value terms, with the largest contributors being increased company income tax ($119 million), economic benefits to South Australian workers ($147 million), and net producer surplus ($66 million). The positive producer surplus reflects efficiency gains across Olympic Dam's mining, smelting and refining operations arising from resolving the current copper-to-sulphur limitation of the smelter and refinery, enabling higher-value production and improved copper recovery from existing mining activities.

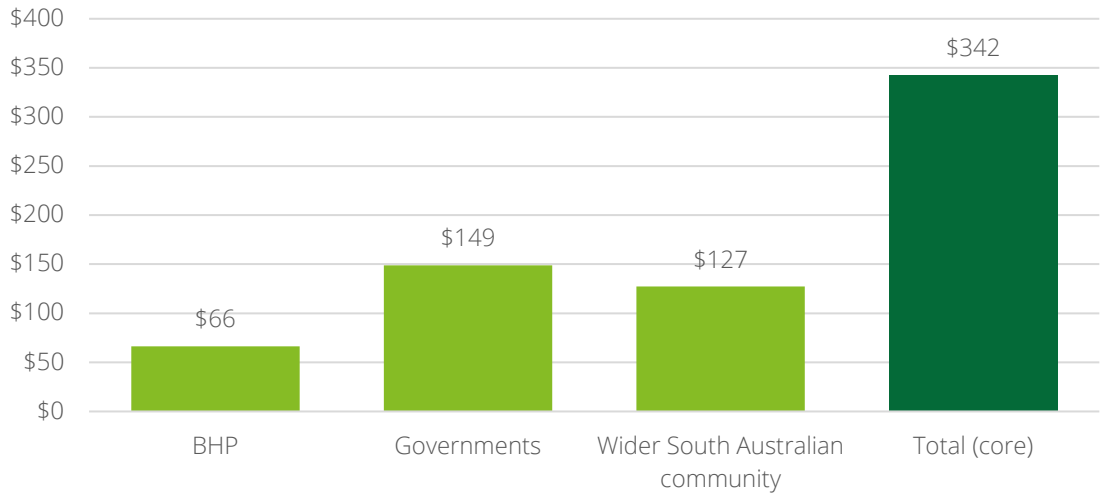
Chart 4.3: Breakdown of core results (NPV, $millions AUD FY26, for FY27-76), 6% real discount rate



Source: Deloitte Access Economics calculations

The Project is expected to generate positive fiscal benefits for the South Australian Government (see Chart 4.4 below). This reflects an estimated $29 million increase in royalty revenue and $119 million in additional company income tax attributable to South Australia, driven by higher forecast producer surplus resulting from improved operational efficiency at Olympic Dam. The wider South Australian community is also expected to receive a net benefit, with $147 million in economic benefits to South Australian workers substantially outweighing $20 million in project-related externality costs associated with changes in ambient noise and vibration, air quality, traffic, and greenhouse gas emissions.

Chart 4.4: Distributional breakdown of core results (NPV, $millions AUD FY26, for FY27-76), 6% real discount rate



Source: Deloitte Access Economics calculations

The $342 million present value net benefit of the Project to South Australia is a result of the state-level disaggregation of results of attribution of national benefits of the Project. More broadly, the Project is projected to generate $963 million in producer surplus to BHP shareholders in Australia in present value terms, $1,730 million in company income tax, and $154 million in labour surplus to Australian workers, offset by $200 million in externalities. Royalties for Australia remain at $29 million in net present value. Overall, the net benefit of the Project to Australia is $3,195 million in present value.

The estimates presented in Table 4.7 and Table 4.8 are an NPV for FY27 to FY76 for Project impacts on the South Australia community, using FY26 price terms and a 6% discount rate in line with the Guideline.

Table 4.7: Overall CBA results for the South Australia community

Item		Value (NPV)
Incremental benefits to SA	$m	$362
Incremental costs to SA	$m	($20)
Overall net benefit of the Project for the South Australia community	**$m**	**$342**
*Overall net benefit of the Project for the South Australia community including economic benefit to suppliers**	*$m*	*$763*

* This benefit is presented below the line due to not being typically captured in CBAs given a degree of uncertainty in estimation.
Note: Numbers in this table may not add up due to rounding.
Source: Deloitte Access Economics calculations.

Table 4.8: Breakdown of CBA results by item

Item	Base Case (NPV $m)	Project Case (NPV $m)	Incremental (NPV $m)	SA community share (%)	Incremental benefit to SA (NPV $m)	Incremental cost to SA (NPV $m)
Net producer surplus	14,335	15,860	1,481	4.5%	66	
Royalties	2,238	2,267	29	100%	29	
Company income tax	7,330	9,061	1,730	6.9%	119	
Economic benefit to workers	249	402	154	95.6%	147	
Externalities	(345)	(566)	(200)	Refer Table 4.1	-	(20)
Total	**23,807**	**27,025**	**3,195**	**-**	**362**	**(20)**
*Economic benefit to suppliers**	*825*	*2,272*	*1,447*	*29.1%*	*421*	*-*
Total including economic benefit to suppliers	***24,632***	***29,297***	***4,642***	***-***	***783***	***(20)***

* This benefit is presented below the line due to not being typically captured in CBAs given a degree of uncertainty in estimation.
Note: Numbers in the table may not add up due to rounding.
Source: Deloitte Access Economics calculations.

4.5 Sensitivity analysis

The results of the CBA presented in Chapter 4.5 are subject to assumptions that are applied to each cost and benefit. To assess the impacts of the assumptions, sensitivity tests consider upper and lower bounds of each of the key assumptions. This testing provides an estimate of the likely range of possible outcomes under the Project Case and identifies key assumptions driving results.

Sensitivities tested in this analysis include:

- Upper and lower bounds of the discount rate (3% and 10% rates, respectively)
- Underestimation and overestimation of capital costs of construction (+/- 20% in value used)
- Underestimation and overestimation of operational input costs (+/- 20% in value used)
- Underestimation and overestimation of commodity prices (+/- 25% to copper, gold, and silver prices)
- Underestimation and overestimation of treatment and refinery charges (TC/RC) (+/- 50% in TC/RC)
- Increase and decrease in the royalty rate (+/- 25% in royalty rates)
- Increase and decrease in company income tax (+/- 15pp decrease in CIT rate, or a 15% or a 45% rate)
- Decreases in labour surplus for SA workers (-50% and -100% sensitivities are tested)
- Pricing the carbon values in line with the 'Low' and 'High' values provided by Infrastructure Australia for use in sensitivity analysis.
- Best- and worst-case scenarios, combining all upside and downside sensitivities to the above parameters, respectively.

Results for these sensitivities have been estimated for each discount rate sensitivity (Table 4.9).

Table 4.9: Sensitivity analysis, comparison of net benefits to South Australia

Parameter	Variation in parameter	Net benefits (NPV $m)		
		3% (real)	6% (real)	10% (real)
Central results		**1,252**	**342**	**(5)**
Capital costs of construction	-20%	1,343	406	42
	+20%	1,161	279	(52)
Operational input costs	-20%	1,395	400	18
	+20%	1,109	284	(27)
Commodity prices	-25%	(898)	(692)	(444)
	+25%	3,402	1,376	434
Treatment and refinery charges (TC/RCs)	-50%	912	166	(91)
	+50%	1,819	636	139
Royalty rate	-25%	1,177	335	5
	+25%	1,327	349	(14)
Company income tax	-15pp	1,198	321	(11)
	+15pp	1,306	363	2
Labour surplus for SA workers	-50%	1,102	271	(37)
	-100% (i.e., no benefit)	943	196	(71)
Carbon values	IA Low value (-30%)	1,260	345	(3)
	IA High value (+28%)	1,244	339	(6)

Best/worst case (combination of above sensitivities)	Best case	4,084	1,678	543
	Worst case	(1,712)	(1,074)	(631)

Note: Numbers in the table may not add up due to rounding.
Source: Deloitte Access Economics calculations

Sensitivity analysis indicates that, while the Project is expected to generate a positive net benefit to South Australia under the central assumptions, the magnitude of this benefit is sensitive to changes in several key input parameters. The central finding of a net benefit is robust to all individual sensitivities tested, except for changes in commodity price assumptions. Further, under the combined worst-case scenario, a combination of adverse movements across key assumptions could result in a significant net cost outcome.

Under the central CBA, net benefits to South Australia range from $1.25 billion under a 3% real discount rate to approximately break-even under a 10% real discount rate (-$5 million), compared with $342 million under the central 6% real discount rate assumption. This indicates that the timing of costs and benefits is an important driver of the estimated net benefit, with the frontloading of capital expenditure and longer-term revenue and employment benefits making results more sensitive to the assumed discount rate.

The sensitivity analysis shows that commodity prices are the largest source of uncertainty. Commodity prices directly affect producer surplus, company income tax and royalty revenues, and therefore have a substantial influence on the Project's overall economic benefits. Under the 6% discount rate, reducing commodity prices by 25% decreases the Project's net benefit to -$692 million, while increasing commodity prices by 25% raises net benefits to $1,376 million. This reflects the importance of copper and associated by-product revenues to Project economics, with higher commodity prices increasing the value of recovered metals and improving the profitability of combined mining, smelting and refining operations at Olympic Dam.

The Project is also sensitive to assumptions regarding treatment and refinery charges (TC/RCs), which alongside commodity prices drives the revenue earned from processing copper concentrate. TC/RCs are subject to significant fluctuations in international benchmark markets, which have been volatile in recent years. As a result, a significant variation (+/- 50%) is considered in sensitivity analysis. Under the 6% discount rate, reducing TC/RCs by 50% decreases net benefits to $166 million, while increasing TC/RCs by 50% increases net benefits to $636 million. These results demonstrate that international smelting and refining margins remain an important driver of Project outcomes.

Changes in construction capital costs and ongoing operational input costs have a moderate influence on estimated net benefits. Under the 6% discount rate, a 20% reduction (increase) in construction capital costs increases (decreases) net benefits to $406 million ($279 million). Further, a 20% reduction (increase) in operational input costs, reflecting changes in the operating efficiency of the Project, increases (decreases) net benefits to $400 million ($284 million). Although these cost assumptions influence Project returns, their impact is materially smaller than changes in commodity prices or treatment and refinery charges, which influence key smelter and refinery revenue streams.

As one of the largest quantified benefits in the central case, the estimated economic benefit to South Australian workers also has a notable effect on the results. Downside sensitivities were tested to reflect uncertainty regarding the persistence of the wage premium assumed for Olympic Dam smelter and refinery workers relative to alternative employment opportunities. Under the 6% discount rate, reducing the labour surplus benefit by 50% decreases the Project's net benefit to $271 million, while removing the benefit entirely reduces net benefits to $196 million. Importantly, the Project continues to generate a positive net benefit under both scenarios, indicating that the overall conclusions are not dependent on the full magnitude of the assumed labour surplus.

Changes to royalty rates and company income tax assumptions have comparatively limited impacts on the overall results. Under the 6% discount rate, varying royalty rates by 25% changes net benefits by less than $10 million relative to the central case, while varying the company income tax rate by 15 percentage points changes net benefits by around $20 million. These relatively modest changes indicate that Project outcomes are driven primarily by underlying commercial performance rather than by government fiscal settings.

Finally, sensitivity testing of greenhouse gas emissions costs using Infrastructure Australia's low (-30%, on average) and high (+28%, on average) carbon value forecasts demonstrates only a minor impact on Project outcomes. Under the 6% discount rate, net benefits vary between $339 million and $345 million, indicating that

uncertainty surrounding carbon valuation assumptions does not materially alter the conclusions of the assessment.

Combining all tested assumptions into best- and worst-case scenarios illustrates the range of potential outcomes. Under the 6% discount rate, the Project's net benefits range from approximately -$1.07 billion under the combined downside scenario to $1.68 billion under the combined upside scenario. These scenarios demonstrate that Project outcomes remain dependent on future market conditions, particularly commodity prices and TC/RCs.

5 Local effect analysis (LEA)

5.1 The local region

This Chapter sets out the LEA for the Project Case. The LEA is concordant with NSW guidelines, with no specific guidelines available for South Australia. The LEA will assess the employment effects, local industry impacts and environmental, social and transport effects under the Project Case. The LEA will complement the CBA for South Australia and will largely translate the effects estimated at the state level to the impacts on the communities located near the Project site. This analysis covers Project impacts on *Roxby Downs* SA2 (the Local Area) and the *Outback – North and East* SA3 (the Local Region).

The Project is located approximately 580 km north-north-west of Adelaide on the existing Olympic Dam mine site, with nearby town of Roxby Downs primarily providing housing for employees of the Olympic Dam mine. The town of Roxby Downs was purpose built to support the Olympic Dam operations after originally being a cattle station, while Andamooka is located 35 km north-west of Olympic Dam.

The Local Area has a population of 3,976 people as of the 2021 Census, with approximately a quarter of the population directly employed by BHP. Copper ore mining is key to the economic prosperity of Local Area, with the mining industry employing approximately 49.9% of the Roxby Downs workforce. Furthermore, mining adjacent industries, such as the construction industry, provide a significant source of employment to the region. The purpose-built nature of the township, and continued stimulus from the mine, means that unemployment in the local area is low, with an unemployment rate of 1.4%. The impact of the mine on the region is also reflected by the median weekly household income, which at $3,140 is more than double that of the state of South Australia (Table 5.1). The region also houses the Olympic Dam Village, which consists of 2,720 rooms, with the transient population providing further economic stimulus to the region.

The Local Region has a population of 25,560 and comprises the majority of South Australia by land size. Relative to the Local Area and the state, the Local Region reported a significantly higher unemployment rate of 13.9%. The median weekly household income of $1,393 in the Local Region further reflects the gap between the economic prosperity of the Project's immediate surrounding area and the rest of regional South Australia, with the Local Region also behind the Local Area and the state in this metric. The differences between the Local Area and the Local Region are attributable to the purpose-built nature of Roxby Downs, whilst compared to the state, given the Local Region comprises a larger non-metro area this aligns with general trends of non-metro areas experiencing generally lower incomes and higher unemployment. These factors represent an opportunity to further utilise and develop the Local Region's higher latent workforce capacity, with overall economic gains possible.

Table 5.1: Local economic information for relevant regions

	Local Area *Roxby Downs (SA2)*	Local Region *Outback – North and East (SA3)*	South Australia	Australia
Population (2021)	3,976	25,560	1,781,516	25,422,788
Proportion indigenous (2021)	5.0%	22.9%	2.4%	3.2%
Labour force (December 2025)	2,719	12.885	1,022,559	15,040,677
Employment (December 2025)	2,681	11,007	979,730	14,401,324
Unemployment rate (December 2025)	1.4%	13.9%	4.2%	4.2%
Median household weekly income (2021)	$3,140	$1,393	$1,455	$1,746
Median household weekly rental payment (2021)	$260	$187	$300	$375
Median monthly mortgage repayment (2021)	$1,517	$1,138	$1,500	$1,863
Total occupied private dwellings (2021)	1,195	8,952	691,313	9,275,217

Note: Values noted as 2021 are reported in 2021 Australian dollars.
Source: ABS 2021 Census data, Department of Employment and Workplace Relations December quarter 2025 SALM Smoothed SA2 Datafiles

5.1.1 Population

The population of the Local Region was approximately 25,560 (or 1.4% of SA's population) at the time of the 2021 Census. This population is expected to reach 26,929 people in the year 2041, reflecting a 5.4% growth in the Local Region's population from 2021 to 2041, which is significantly lower than the 22.1% growth expected for the entire state over the same period.

The Local Area experienced a fall in population of 15.4% between the period of 2011 to 2021, and is expected to have lower population growth over the period of 2021 to 2041 than both the Local Region and the state as a whole. Given the Local Area was purpose-built to serve the Olympic Dam operations, its population is highly reactive to changes at the mine site, with the fall in population growth over the period of 2011 to 2021 partly attributable a review of BHP's operations in 2015 following global challenges in the resources sector.

Table 5.2: Population of Roxby Downs, Outback – North and East, and South Australia, 2011, 2016, 2021, 2041

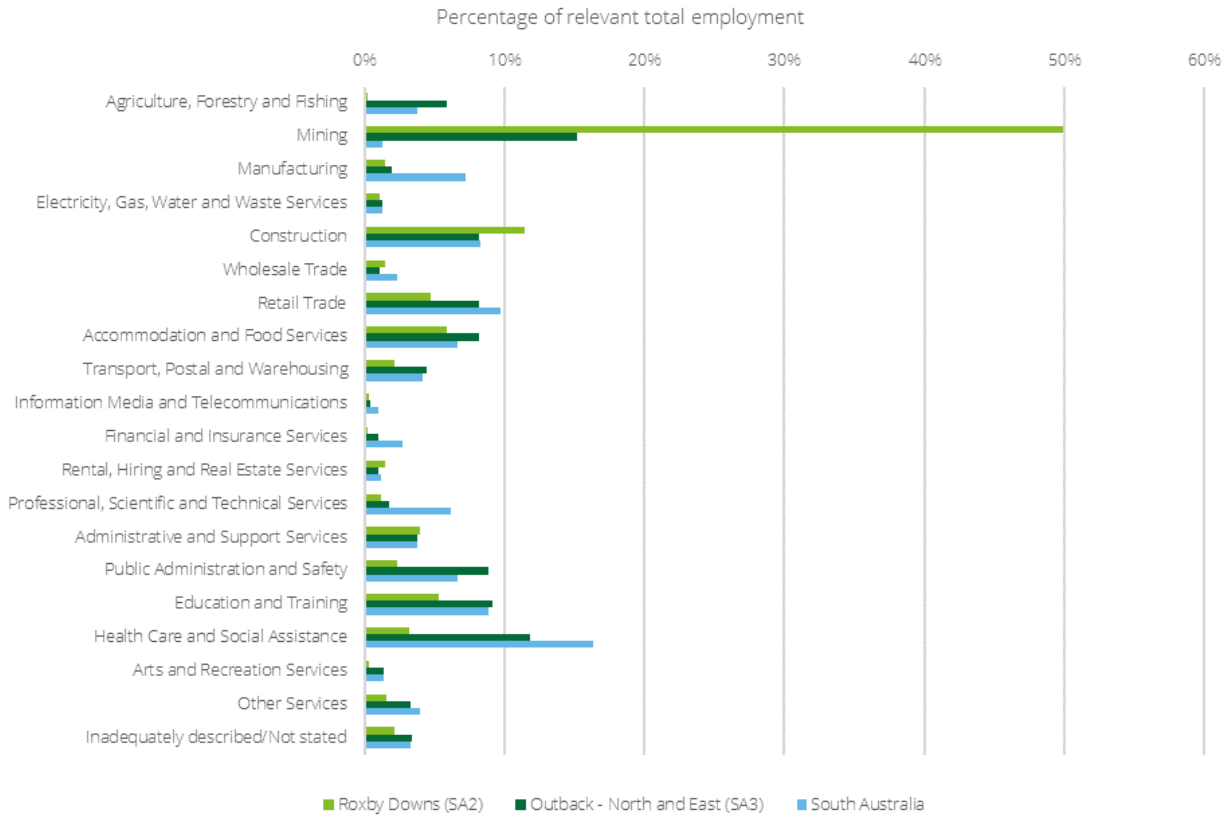
	2011	2016	2021	2041*	2011-2021 change	2021-2041 change
Roxby Downs (SA2)	4,702	3,884	3,976	4,129	-15.4%	3.9%
Outback – North and East (SA3)	28,222	26,203	25,560	26,929	-9.4%	5.4%
South Australia	1,596,572	1,676,653	1,781,516	2,174,497	6.3%	22.1%

*Include projections from the Department for Housing and Urban Development.
Source: ABS 2021 Census data, Department for Housing and Urban Development population projections

5.1.2 Industries of employment

Mining is the largest industry of employment in the Roxby Downs Local Area, accounting for 49.9% of the employed population at the time of the 2021 Census. The mining industry is also the largest industry of employment for the Local Region, accounting for 15.2% of the employed population (Figure 5.1). In relation to the state of South Australia, health care and social assistance is the largest industry of employment, employing approximately 16.4% of the working population, with the mining industry accounting for just 1.3% of the total employed population of the state. Health care and social assistance is the second largest industry of employment for the Local Region.

Figure 5.1: Industry of employment, Roxby Downs, Outback - North and East, and South Australia

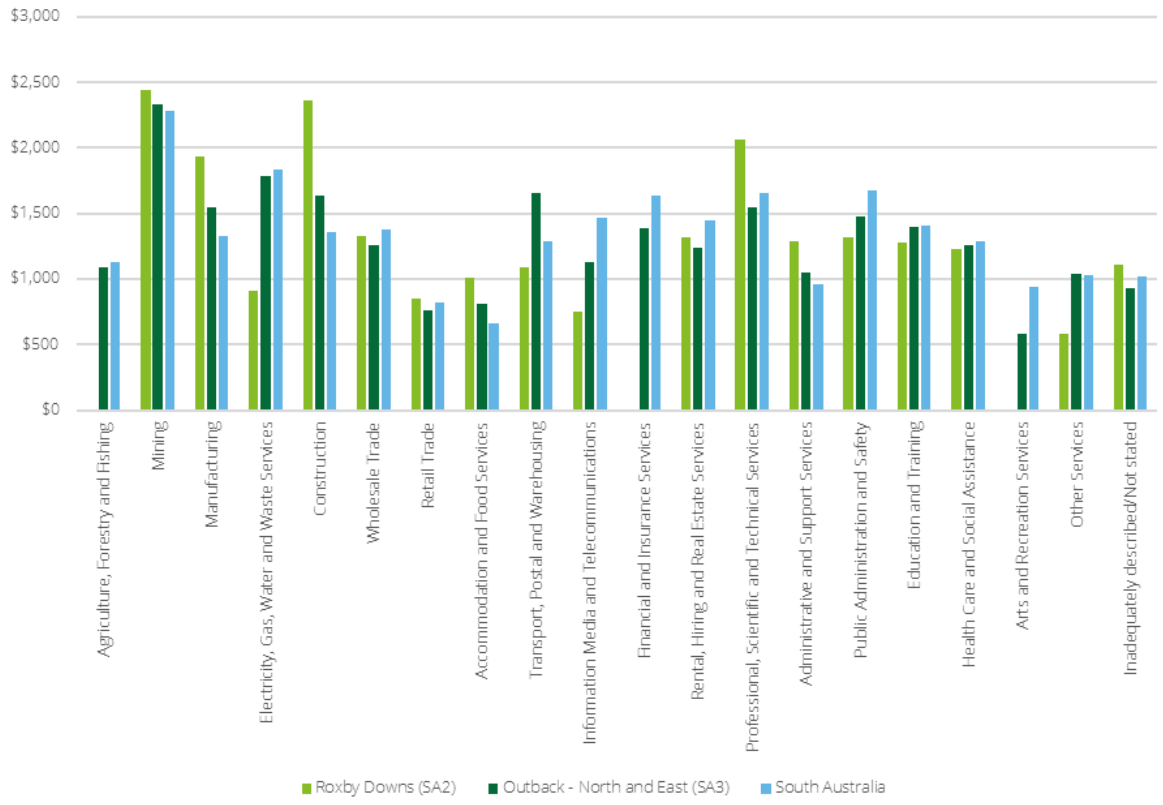


Note: Calculations use employment data categorised by Place of Usual Residence.
Source: ABS 2021 Census data

The Olympic Dam mine site has significantly driven up the average personal weekly income in the Roxby Downs region to $1,158 making it one of the highest earning LGAs in Australia, [59] while the Local Region has an average personal weekly income of $701 compared to the state average of $739 income per week (Figure 5.2). The disparity between the Local Region and the state aligns with trends of generally lower incomes in non-metro areas, with higher tendency for employment in lower paying industries relative to the state as a whole, such as the agriculture and fishing, and manufacturing industries. Further to this, higher unemployment in the Local Region further contributes to lower personal income in the region.

Mining is the highest paying industry in the Local Region, with an average personal weekly income of $2,334. The Electricity, Gas, Water and Waste Services industry follows as the second highest paying industry in the Local Region, following the approximately the same average personal income as the state of South Australia.

Figure 5.2: Roxby Downs, Outback – North and East, and South Australia average weekly personal income by industry, 2021



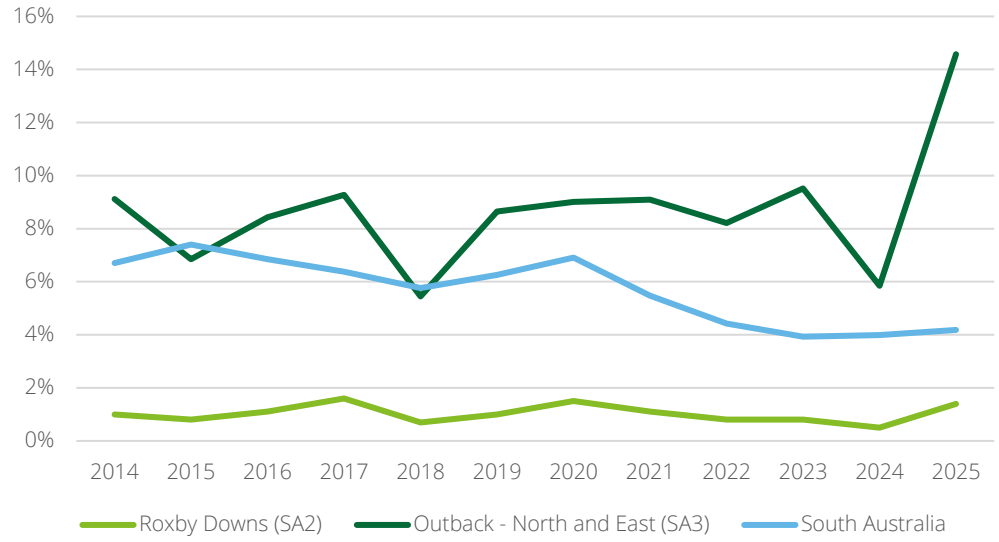
Note: Calculations use employment data categorised by Place of Usual Residence. Values are reported in 2021 Australian dollars.
Source: ABS 2021 Census data

5.1.3 Unemployment

The unemployment rate in the Local Region was approximately 13.9% in 2025, which is higher than both the state and national unemployment rates (Figure 5.3). In the Local Region, the unemployment rate has experienced more variation compared to the state, including a sharp rise in 2025 alongside difficulties such as record flooding.[60] In contrast, the Roxby Downs area unemployment rate has seen less variation over the same period. The Roxby Downs area reported a substantially lower unemployment rate of 1.4%, which is attributable to the fact that the town was purpose built to support the Olympic Dam mine, and consequentially has a high portion of employment stemming from the Olympic Dam mine.

[59] Australian Bureau of Statistics. (2024). *Personal Income in Australia*. https://www.abs.gov.au/statistics/labour/earnings-and-working-conditions/personal-income-australia/latest-release
[60] South Australia Government. (2025). *In pictures: Record flooding closes outback parks.* https://www.environment.sa.gov.au/goodliving/posts/2025/05/record-flooding-innamincka

Figure 5.3: Roxby Downs, Outback – North and East, and South Australia unemployment rate, 2014-2025



Source: Department of Employment and Workplace Relations December quarter 2025 SALM Smoothed SA2 Datafiles

5.2 Local employment effects

A product of mining projects is their ability to generate employment in local labour markets. In this case, the Project will directly employ a peak of 1,313 FTE positions as part of construction, and a peak of 1,067 FTE positions during operations. To facilitate this, all construction and operation positions are expected to be filled by FIFO workers, who reside outside the Local Region. All construction workers are expected to reside within existing and new accommodation to be established by BHP for the scheduled campaign maintenance 2027 (SCM27) shutdown, however 10% of operations positions are expected to reside in the Roxby Downs (the Local Area) itself. Further to this, it has been estimated that 96% of direct employment will be supplied by SA, with 22% of total direct employment supplied by the Local Region.

To consider the effects of the Project on local labour markets, as per the guidelines, the estimation of employment effects should consider the net benefits of the direct employment created by the Project as well as the flow-on employment effects.

The **direct local employment effects** capture the benefits associated with the Project's employment of those that ordinarily reside within the Local Region. The guideline requires that the net effect on direct local employment be estimated, including the additional employment and income generated by the Project, relative to the Base Case. This approach assumes that potential employees of the Project would find employment elsewhere if the Project were to not go ahead.

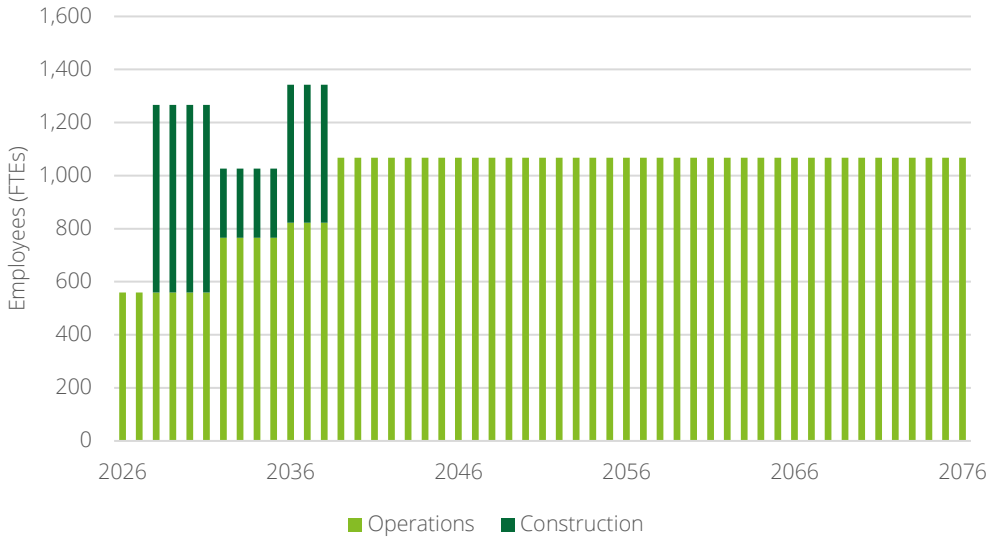
The **local flow-on or second round effects** captures the effects associated with the Project's on those that ordinarily live in, or would temporarily reside in, or commute to, the Local Region. Specifically, flow-on or second round effects capture the additional employment generated by expenditure within the Local Region from those who gain income from the Project, or from local suppliers which support the Project.

This section discusses the results of the direct local employment effects, with flow-on effects discussed in Chapter 5.7.

The results provided below indicate averages of employment under the construction and operations functions. More specifically, construction is estimated to occur from FY28 to FY38, with operations being increased over Base Case from FY32 to FY76 following the completion of construction of Stage 1a. The employment data informing this analysis has been provided by BHP, with the share of employees sourced from the Local Region based on historical data provided by BHP.

Initially, employment in the Project Case increases because of construction activity, reaching peak employment in FY36 to FY38 as construction coincides with an expanded operational workforce (Figure 5.4). Following the end of the construction period, operations employment remains consistent from FY39 until the end of the forecast period in FY76.

Figure 5.4: Project Case employment breakdown



Source: Deloitte Access Economics analysis of BHP Olympic Dam Corporation employment forecasts

Measured incrementally to the Base Case, where employment is expected to continue at FY26 levels, this means a peak of up to 783 additional employees (during construction of Stage 2), or an average of 641 additional employees during the FY28 to FY38 construction phase. On an ongoing basis, operations create an average of 670 additional jobs over the Base Case from FY39 to FY76. This increase is attributable to both the larger scale of the SRE Project compared to existing operations, and the increased length of operations under the Project Case (i.e., operations continue through the end of the forecast period, rather than FY65 as in the Base Case).

As per guidelines for the preparation of an LEA, the estimation of the direct local employment effects should include consideration of the proportion of direct employment that reside within the Local Region, as well as the net increase in the income of workers within the Local Region.[61] In this analysis, it has been conservatively assumed that additional contracted workers, both construction and operational, will receive pay in line with the South Australian average annual income for the construction industry, and copper, silver, lead and zinc smelting and refining industry, respectively. As such, there is not expected to be an increase in net income for contracted workers. However, the additional internal operational workforce is expected to receive an annual income which is above the South Australian Industry average for the copper, silver, lead and zinc refining industry. This wage premium is expected to reflect the high-skill requirements needed to operate a smelter and refinery. Table 5.3 reports the identified direct employment breakdown and estimated net increase in income of workers.

[61] NSW Government. (2015). *Guidelines for the economic assessment of mining and coal seam gas proposals.* https://www.planning.nsw.gov.au/sites/default/files/2023-03/guidelines-for-the-economic-assessment-of-mining-and-coal-seam-gas-proposals.pdf

Table 5.3: Estimated local employment effects, reported incremental to the Base Case – construction phase (FY28 through FY38)

		Operations - External		Operations - Internal		Construction	
		Local Region	Outside Local Region	Local Region	Outside Local Region	Local Region	Outside Local Region
Direct employment	FTE/ year	8	30	24	85	109	385
Project average net income per FTE (post-tax and super)	$/year	74,000	74,000	114,300	114,300	58,100	58,100
SA average net income per FTE (post-tax and super)	$/year	74,000	74,000	74,000	74,000	58,100	58,100
Average increase in net income per FTE	$/year	0	0	40,200	40,200	0	0
Total increase in net income	$m/ year	**0.0**	**0.0**	**1.0**	**3.4**	**0.0**	**0.0**
FTE equivalent of the incremental wage	FTE/ year	**0.0**	**0.0**	**8.4**	**29.9**	**0.0**	**0.0**

Source: Deloitte Access Economics analysis of BHP Olympic Dam Corporation and ABS data.

Table 5.4: Estimated local employment effects, reported incremental to the Base Case – operations phase (FY39 through FY76)

		Operations - External		Operations - Internal	
		Local Region	Outside Local Region	Local Region	Outside Local Region
Direct employment	FTE/ year	38	136	109	387
Project average net income per FTE (post-tax and super)	$/year	74,000	74,000	114,300	114,300
SA average net income per FTE (post-tax and super)	$/year	74,000	74,000	74,000	74,000
Average increase in net income per FTE	$/year	0	0	40,200	40,200
Total increase in net income	$m/year	**0.0**	**0.0**	**4.4**	**15.5**
FTE equivalent of the incremental wage	FTE/year	**0.0**	**0.0**	**38.4**	**136.0**

Source: Deloitte Access Economics analysis of BHP Olympic Dam Corporation and ABS data.

As such, the wage premiums paid to workers during the Project is estimated to generate a total increase in net income of $1 million per year (equivalent to 8 new FTEs) to the Local Region over the construction phase and $4 million per year (equivalent of 38 new FTEs) over the operations phase. This is driven by the wage premium received by the additional internal operational workforce during these phases. It is noted that external contractors are not assumed to receive above-market wages through the project.

5.3 Non-labour expenditure effects

Direct expenditure, excluding labour expenditure, includes the purchase of goods and services associated with the SRE. This expenditure could have a broader economic impact on indirect suppliers within the supply chain. Initial capital expenditure spent on construction and ongoing non-labour operational expenditure inputs will generate economic activity of which a portion will be captured by the Local Region.

As per guidelines for the preparation of the LEA, only the gross effect of non-labour expenditure is reported, without consideration of alternatives.[62] Furthermore, the estimation of non-labour expenditure effects is limited to the direct expenditure attributed to the Project in the Local Region, which should consider the proportion of non-labour purchases made in the Local Region.

Table 5.5 breaks down the non-labour expenditure effects by construction and operations period and attributes them to either the Local Region or outside the Local Region, respectively. Operational expenditure and capital expenditure have been provided by BHP, and adjusted to exclude estimated labour expenditure. Further, the share of expenditure occurring within the Local Region, assumed to be 9% of all non-labour expenditure, has been estimated based on historical supplier location data provided by BHP.

Table 5.5: Estimated non-labour expenditure effects, reported incremental to the Base Case

		Construction phase (FY28 through FY38)		Operations phase (FY39 through FY76)	
		Local Region	Outside of the Local Region	Local Region	Outside of the Local Region
Total direct expenditure	$m/year	66	680	39	398

Source: Deloitte Access Economics analysis of BHP Olympic Dam Corporation and ABS data.

The expenditure values in Table 5.5 show that BHP is estimated to spend an average of approximately $66 million per year in the Local Region during the construction period (FY28 to FY38), incremental to the Base Case.[63] During the operations period (FY39 to FY76), BHP is estimated to spend an average of an additional $39 million per year in the Local Region, incremental to the Base Case.

In addition to rehabilitation activity that occurs as part of the operations period, under the Project Case the decommissioning period is expected to take place from FY2104 to around FY2130, with an average spend of $167 million per year. It is estimated that around $15 million per year of the average total spend will be attributed to Local Region suppliers. Comparatively, this represents a higher spend than the average of $132 million per year during the decommissioning period in the Base Case, which is instead expected to take place from FY65 to FY80. In both cases, most of the local decommissioning spend is expected to be focused in the first ten years of the decommissioning period.

This analysis does not consider the flow-on impacts of direct expenditure in the Local Region. The associated flow-on impacts will be considered in Chapter 5.7.

[62] NSW Government. (2015). *Guidelines for the economic assessment of mining and coal seam gas proposals*. https://www.planning.nsw.gov.au/sites/default/files/2023-03/guidelines-for-the-economic-assessment-of-mining-and-coal-seam-gas-proposals.pdf

[63] It is noted that the analysis of historical supplier locations to determine a local share of expenditure is limited to operations expenditure, and given differences in scope of non-labour expenditure during the construction period, the portion spent in the Local Region may differ.

5.4 Local industry impacts

The development or expansion of mining and manufacturing projects can have effects on other local industry, which are not accounted for in local employment effects and non-labour expenditure effects. In this analysis, local industry impacts include the effects from the purchase of goods and services from the Project. As such, the guidelines require a qualitative discussion of these effects on other industries as well as relevant mitigation strategies.

Specifically, the guidelines provide the following examples of implications of development that can have impacts on existing local industry:

- Displacement of a specific land use
- Choices by external parties, particularly tourism and business travel
- Temporary effects on other industries that cause changes in the cost of living for residents of the Local Region, particularly in the food and housing markets

The Project does not result in a significant change in land use, with all but a small portion of the Project activities contained within BHP's existing SML. Further impact to land use outside of the SML is constrained to the Electricity Infrastructure Ground Re-Profiling Areas. This is expected to result in isolated vegetation disturbance. To mitigate the impacts to the resulting social impacts the Land Use and Planning Assessment recommends a stop works procedure be put in place for unexpected historical archaeological finds. As a result, displacement of land use attributable to the Project is not expected to impact other local industry.

Given the purpose-built nature of the town of Roxby Downs, and location of several other mines within the Local Region, choices by external parties are not expected to significantly change as a result of the Project. Additional business travel is expected to occur as a result of the additional FIFO population required to complete construction and additional operation work. However, existing tourism is not likely to be impacted in the Local Region, given this is a negligible industry in the current economy.

The already constrained Roxby Downs housing market, which is expected to house up to 10% of the operational workforce (around 50 additional workers over the Base Case), may experiencing tightening as a result of the Project. Most recently the vacancy rate in Roxby Downs was calculated at around 4%.[64] While it is expected that some of the locally-residing operational workforce would reside in ODV South, if all were housed in Roxby Downs then it is estimated that the vacancy rate would fall to around 1% at peak operational employment during the Project. A lack of housing supply, an inability to build additional housing and the illiquid nature of real estate assets could increase the cost of housing prices within Roxby Downs for both renters and home buyers. Additionally, some of this effect may spillover to other areas within the Local Region. As such, any stress on housing supply may cause an increase in the costs of housing in Roxby Downs, impacting the overall cost of living for residents of the Local Area.

These operational employees residing within Roxby Downs may also create additional demand for local goods and services. The most likely impacts are on local stores. While this can be a positive impact for local businesses, it can also have adverse price impacts for existing residents. Given these workers will be FIFO or DIDO, there is not expected to be a significant impact to local labour markets nor services demand in the Roxby Downs itself (e.g., health, child care, education).

Overall, workforce impacts are expected to be most significantly concentrated within Roxby Downs given the small nature of the town (50 additional workers residing in Roxby Downs reflects a 2% rise in the town's total population). Less significant impacts are expected to be felt in other parts of the Local Region. Based on historical averages at Olympic Dam it may be expected that around 10-15% of direct employment would be sourced from the Local Region outside of Roxby Downs (or around 50-75 additional workers over Base Case during the operational phase), with employment opportunities potentially encouraging relocation of labour to nearby towns within the Local Region (e.g., Port Augusta).

[64] SQM Research, (2025). Residential Vacancy Rates. https://sqmresearch.com.au/graph_vacancy.php?postcode=roxby+downs&t=1

There will be significant opportunities for local and regional businesses to participate in the supply chains facilitated by the SRE Project through existing platforms such as the Industry Capability Network (ICN Gateway) and BHP's Local Buying Program.[65] To this extent, potential industry flow-on impacts are captured in section 5.7.

5.5 Environmental, social, and transport effects

The Project is expected to generate both positive and negative externalities which will influence the Local Region and its residents. Externalities related to soils and geochemistry, air quality, GHG emission and traffic and transport are estimated to have negative impacts to the community residing within the Local Region. However, additional infrastructure investment occurring during the Project may benefit the community.

As per guidelines for the preparation of an LEA, the LEA should start with the externalities discussed in the CBA and identify those that are estimated to have material, un-mitigated effects within the Local Region.[66] The externalities quantitively measured in the CBA should then be apportioned to the Local Region, while the externalities that were qualitatively assessed should be discussed qualitatively.

Table 5.6 provides the estimated impacts of the externalities quantified in the CBA, which have been apportioned to the Local Region. Of the externalities, the air quality, ambient noise and vibrations, and traffic and transport externalities have been wholly attributed to the Local Region. The GHG externality, however, has been attributed to the Local Region based on the population of the Local Region as a share of the Australian population.

Overall, incremental externalities from the Project Case are estimated to average $0.35 million per year to the Local Region during the construction period and $0.62 million per year during the operations period.

[65] EMM. (2026). Social Impact Assessment: Smelter and Refinery Project.
[66] NSW Government. (2015). *Guidelines for the economic assessment of mining and coal seam gas proposals*. https://www.planning.nsw.gov.au/sites/default/files/2023-03/guidelines-for-the-economic-assessment-of-mining-and-coal-seam-gas-proposals.pdf

Table 5.6: Estimated local externality effects, reported incremental to the Base Case ($m/year)

	Construction phase (FY28 through FY38)		Operations phase (FY39 through FY76)	
	Local Region	Outside of the Local Region	Local Region	Outside of the Local Region
Land use	-	-	-	-
Soils and geochemistry	-	-	-	-
First Nations cultural heritage*	-	-	-	-
Non-First Nations cultural heritage*	-	-	-	-
Air quality	0.03	-	0.13	-
Ambient noise and vibration	0.29	-	0.42	-
Biodiversity	-	-	-	-
Greenhouse gas emissions	0.01	5.29	0.03	31.97
Surface water and groundwater	-	-	-	-
Social*	-	-	-	-
Traffic and transport	0.03	-	0.03	-
Visual amenity*	-	-	-	-
Net environmental, social and transport costs	**0.35**	**5.29**	**0.62**	**31.97**

*Potential impacts have been considered qualitatively.
Source: Deloitte Access Economics calculations

The externalities that have been considered qualitatively include:

- First Nations cultural heritage – Impacts to First Nations cultural heritage are expected to be contained to the Local Region. The clearing of native vegetation may potentially impact sites of cultural significance. As such, this may result in a change in the relationship between First Nations peoples and Country.
- Non-First Nations cultural heritage – There are two heritage sites identified within 30km of the Project site that are not expected to be impacted by the Project.
- Social – Impacts are expected to be focused on the Roxby Downs housing market, social cohesion concerns, and traffic related concerns. Additional operational workforce requirements may put further strain on the housing markets in Roxby Downs, and the Local Region. The increase in FIFO workers is expected to lead to weaker social ties, lower local investment and less resident management within the Local Region. Further to this, increased traffic congestion is expected, although this will be a low incremental change and unlikely to significantly impact emergency services access.
- Visual amenity – Impacts to visual amenity are expected to be constrained to the Local Region, and are estimated to include emission of light during operations and the placement of infrastructure impacting the prevailing visual amenity. However, these impacts were assessed to not be significant.

Mitigation strategies implemented by BHP in the form of rehabilitation and decommissioning activities are expected to contribute to the reduction of certain long-term environmental impacts. The relevant activities will include the management of waste associated with the demolition of the smelter and refinery assets at the end of the Project life, and rehabilitation costs towards optimising landform for final use are expected. Undertaking these rehabilitation activities would improve visual amenity once assets are decommissioned and reduce ongoing externalities.

Environmental, social and transport costs are further discussed in Chapter 4.3.8.

5.6 Overall results

The above analysis of local employment effects, non-labour expenditure effects, local industry impacts, and environmental, social, and transport effects discusses the impacts that the Project is expected to have on the Local Region (Table 5.7). The effects that are estimated to have a significant impact on the Local Region include:

- Non-labour expenditure effects: Total expenditure from the Project spent in the Local Region is estimated to average $66 million per year over the life of the construction period, and $39 million per year over the life of the operations period. For analysis of the flow-on impacts associated with the non-labour expenditure refer to Chapter 5.7.
- Local employment effects: The Project is expected to create an additional 641 FTEs per year during the construction phase, of which 141 are estimated to come from the Local Region, and 670 FTEs per year during the operations phase, of which 147 FTEs are estimated to come from the Local Region.
- Ambient noise and vibration: The largest externality is ambient noise and vibration, which is estimated to have a total negative effect on the Local Region of $0.42 million per year during the operations period.

Table 5.7: Average estimated local effects per year, reported incremental to the Base Case

		Construction phase (average per year, FY28 through FY38)		Operations phase (average per year, FY39 through FY76)	
		Local Region	Outside of the Local Region	Local Region	Outside of the Local Region
Employment					
Average direct increase in full-time equivalent employment	FTE/year	141	500	147	523
Increase in net income (only counted for internal workforce, not contractors)	$m/year	1	3	4	16
Other non-labour expenditure					
Direct expenditure	$m/year	66	680	39	398
Externalities					
Net environmental, social and transport costs	$m/year	0.35	5	0.62	32

Source: Deloitte Access Economics calculations

When interpreting the LEA results, it should be noted that:

- Results from the LEA are not additive to those in the state-level CBA, and the LEA results are a component of that already covered in the CBA.
- Components of the LEA should not be added together to provide a single summary measure since each item captures different local effects.
- The LEA does not provide a measure of economic welfare outcomes.

5.7 Flow-on impacts

This chapter estimates the flow-on impacts of the Project. Input-output analysis is applied to Copper South Australia's local supply chain spend estimates to determine the likely size, timing and location of the additional activity generated by the various stages of the Project to the Local Region and the rest of South Australia. For this, comprehensive data on the supplier expenditure associated with the Project is used, as described in Chapter 4.3. This commercial information includes forward development capital expenditures, operational expenditures, and an assumed rate of local supplier usage over the Project's design and construction, operational, and rehabilitation and decommissioning phases.

5.7.1 Input-Output methodology

Input-Output (IO) modelling is a technique used to estimate the impacts of expenditure on different industries in an economy. It is based on a system of accounts that shows the flow of economic resources between different industries and groups in the economy.

While IO modelling is commonly used for analysing the flow-on impacts of economic activity, it is noted that the multipliers derived from it generally assume that there is an unlimited source of resources available in the economy to meet increases in demand. In contrast, sectors within the economy are often competing for the use of resources. This means that increases in demand from the Project may result in effects such as increased prices in other markets and crowding out effects, resulting in lower ultimate flow-on impacts. These considerations are not captured through IO modelling. For this reason, the use of IO modelling is presented separately to direct impacts and below-the-line in this work. Further, aligning with common cost-benefit analysis guidance, results are conservatively only presented for first-round indirect suppliers, or those that directly supply Copper South Australia smelting and refining processes rather than all suppliers that comprise the flow-on supply chain, while induced consumption related to increased spending by those receiving labour income from the Project.[67]

The economy-wide impacts of the Project have been projected using the Deloitte Access Economics Regional Input Output Model (DAE-RIOM). The model is used to create regional IO tables for small regions for use in analysing flow-on contributions of economic activity through supply chains. More technical detail regarding DAE-RIOM can be found in Appendix B.

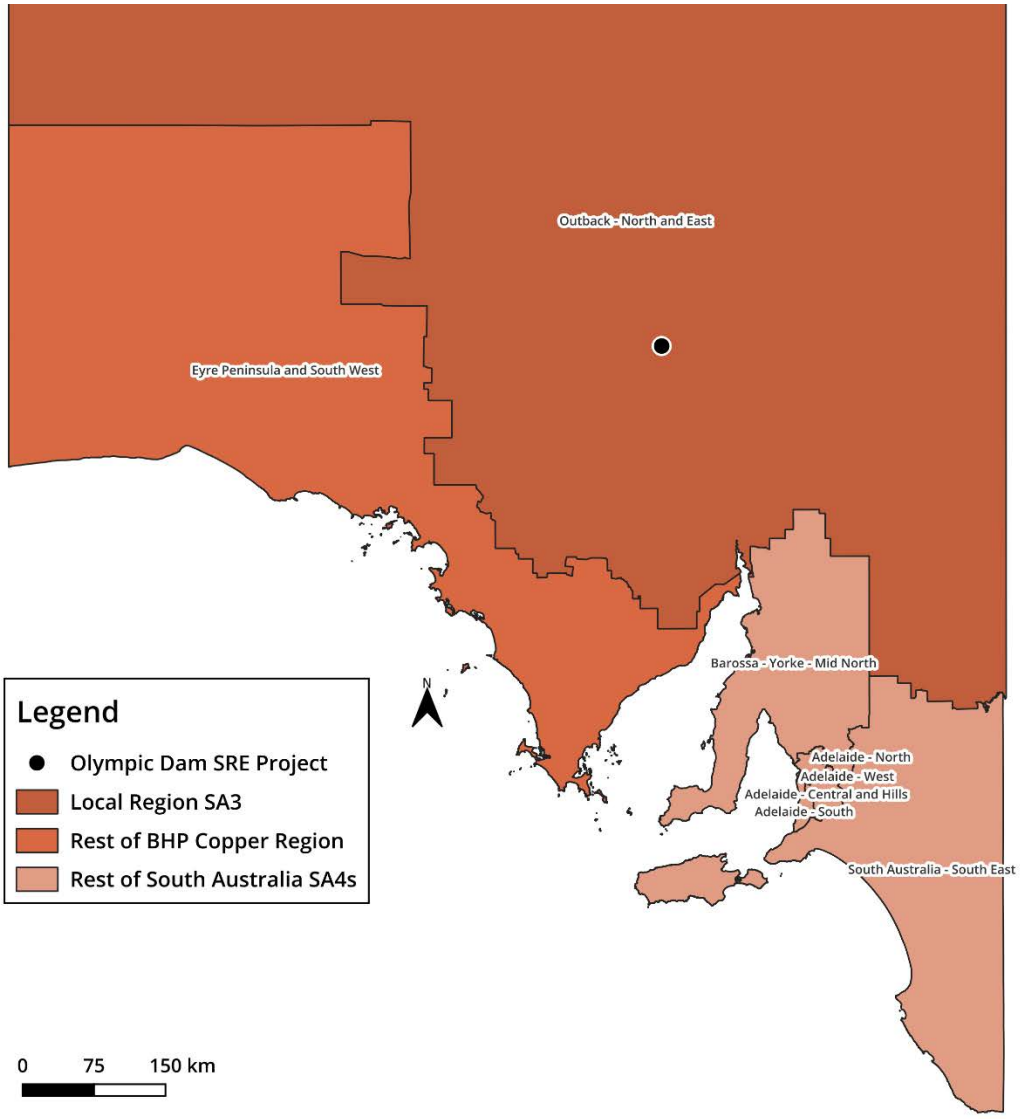
The model has been disaggregated and customised to match the attributes of the broader *Outback – North and East* SA3 regional economy. To disaggregate the broader region from the rest of South Australia in the model, information was used from the most recent 2021 Census on the workforce population.

IO modelling has been undertaken for the period to FY76 for the following economic regions:

- The Local Region – the model has been disaggregated and customised to match the attributes of the *Outback – North and East* SA3 region.
- Rest of South Australia – includes the rest of the State of South Australia.

[67] NSW Treasury. (2023). *NSW Government Guide to Cost-Benefit Analysis.* https://www.nsw.gov.au/sites/default/files/noindex/2025-03/tpg23-08-nsw-government-guide-to-cost-benefit-analysis.pdf

Figure 5.5: The Local Region modelled in the IO model compared to the rest of South Australia.



Source: Deloitte Access Economics

It is noted that economic impact results are presented in the form of economic activity (e.g., changes to GRP, employment, and industry output) rather than economic benefit, and thus are not directly comparable nor additive to the net benefits of a CBA. The results presented in this chapter thus may not necessarily be comparable to the results presented in other areas of the CBA and LEA of this report, which are presented in terms of costs and benefits.

5.7.2 Estimated changes in economy and flow-on effects

5.7.2.1 Economic impacts – gross production and value added

To analyse the flow-on effects from non-labour expenditure, first-round supplier effects have been analysed using IO modelling. IO models provide a number of metrics, of which gross production and value-added are the key metrics used to measure the economic contribution.

- Gross production represents the value of product produced, and is equivalent to the value-added, plus intermediate inputs.
- Value-added describes the measure of a company or industry's economic contribution to Gross Regional Product (GRP) or Gross State Product (GSP). Specifically, it captures the additional value created at each stage of production through the difference between output value and costs of inputs.

- Finally, gross operating surplus (GOS) represents the value of income generated by the company's direct capital inputs, generally measured as the earnings before interest, tax, depreciation, and amortisation (EBITDA.)

Appendix B provides further details of each measure of economic contribution.

Using the average non-labour expenditure over the construction and operations periods from Chapter 5.3, the flow-on non-labour gross production effects and value-added can be estimated using DAE-RIOM model estimate of the Outback South Australia NE and Rest of South Australia regions (Table 5.8). Results from DAE-RIOM estimate that indirect value-added in the Local Region could reach an average of $17 million per year during the construction period, based on the average non-labour expenditure during the construction period. Over the operations period, indirect value-added to the Local Region is estimated to reach $8 million per year. Further, gross operating surplus to the Local Region is estimated to reach $11 million per year and $6 million per year over the construction and operations periods, respectively.

Comparatively, the Rest of South Australia is likely to undertake more activity related to the Project, with higher results across all metrics. Specifically, indirect value added is estimated to reach $36 million per year and $25 million per year over the construction and operations periods, respectively.

Table 5.8: Estimated flow-on gross production effects and value-added, reported incremental to the Base Case

		Construction		Operations	
		Outback South Australia NE (Local Region)	Rest of SA	Outback South Australia NE (Local Region)	Rest of SA
Estimated indirect gross production	$m/year	66	142	39	89
Estimated indirect value-added	$m/year	17	36	8	25
Estimated indirect GOS	$m/year	11	23	6	14

Source: Deloitte Access Economics calculations

It is noted that these results only consider first-round effects, since there is uncertainty around the magnitude of the crowding out effects. As such, it is conservatively assumed that second-round effects are crowded out. Nonetheless, indirect effects should be interpreted as indicative only.

5.7.2.2 Economic impacts – employment and wage

As an output of the IO model, employment measures the number of workers (measured in FTE terms) that are employed within supply chains through Project's flow-on supplier impacts (i.e., through BHP's non-labour expenditure).

Employment estimates are based on an estimate of labour income. Labour income is a subcomponent of value-added and represents the value of output generated by an entity's labour inputs, as measured by the income to labour.

Results from the IO model indicate that most of the flow-on employment effect is expected to be felt in the Rest of South Australia during the construction period, with an average estimated indirect employment of 170 FTEs over the life of the construction period (Table 5.9). Comparatively, the flow-on employment effect for the Local Region is lower, at an average of 79 FTEs per year during the construction period and 37 FTEs per year over the operations period.

Flow-on labour income follows the same trend as employment, and in the Local Region is estimated at an average of $4 million per year over the life of Project operations. Further, during the construction period labour income in the Local Region reaches an average of $9 million per year. However, crowding out effects, including

the fact that employment estimated in Table 5.9 may be drawn from other industries, means that there is not necessarily an increase in wages unless direct suppliers pay comparatively higher wages. This may impact the interpretation of employment and labour income results.

Table 5.9: Estimated flow-on employment effects, reported incremental to the Base Case

		Construction		Operations	
		Outback South Australia NE	Rest of SA	Outback South Australia NE	Rest of SA
Estimated indirect employment	FTE/year	79	170	37	85
Estimated indirect labour income	$m/year	9	19	4	10

Source: Deloitte Access Economics calculations

As estimates are based on an IO model, which assumes the current relationship between gross production and associated labour income and employment continues, the above averages should be interpreted as indicative only. Further, they assume that the relationship between gross output and employment is consistent in real terms over the forecast period.

Appendix A: Checklist

A.1 State Planning Commission (2025) Terms of reference for an Environmental Impact Statement – Olympic Dam Smelter & Refinery Expansion

Requirements		Addressed
6.1 Key factors to consider in determining level of assessment detail	Value to society: • Environmental value (e.g. water quality, natural habitat etc.). • Social value (e.g. community value, landscape, recreation, lifestyle disturbance, water quality, cultural heritage, amenity etc.). • Economic value (e.g. water supply, critical transport routes etc.)	Chapter 4
6.3 Environmental Attributes to be considered in an EIS	Economic Environment: Local, regional and state economies Economic impact assessment which addresses workforce / employment, existing economic land and marine uses (primary production, tourism, ports, fisheries), infrastructure - utilities (energy, water), telecommunications, ports, rail), displacement, competition, opportunities, temporary and ongoing for existing businesses / industries, property and land values.	Chapter 4 Chapter 5
7.1 Statutory Requirements	The EIS must generally include the following (subject to any Practice Direction): A statement of the expected, predicted or potential environmental, social and economic effects of the development, whether positive, neutral or negative. The assessment of effects should include all issues identified in the Assessment Requirements and be cross referenced to supporting technical studies.	Air quality – 4.3.8.5 Noise – 4.3.8.6 Transport – 4.3.8.11 Visual amenity – 4.3.8.12 Biosecurity – 4.3.8.7 Terrestrial flora and fauna – 4.3.8.7 Climate change adaptation – 4.3.8.8 Greenhouse gas emissions – 4.3.8.8 Sustainable use of resources – 4.3.3.2 Waste management – 4.3.3.2 Local, regional and state economies – 5 Hazards assessment and management – 4.3.3.2

		Flooding – 4.3.8.9 Site and groundwater contamination – 4.3.8.9 Dangerous substances – 4.3.3.2 Land tenure – 4.3.8.1 Soils, landforms and geology – 4.3.8.2 Surface water and groundwater – 4.3.8.9 Aboriginal cultural heritage – 4.3.8.3 Community wellbeing / social impact assessment – 4.3.8.10
7.4 Need for the Proposal	The EIS should provide a statement of the objectives and justification for the proposal, including: • The specific objectives that the proposal is intended to meet, including market requirements or government requirements. • Expected local, regional and State benefits and costs, including those that cannot be adequately described in monetary or physical terms (e.g. effects on aesthetic amenity). • A summary of environmental, economic and social arguments to support the proposal including the consequences of not proceeding with the proposal.	Chapter 3.2 Chapter 4
7.6 Project Alternatives	Feasible alternatives considered for the proposed project should be presented in the EIS described and evaluated the comparative environmental, social, and economic impacts (including the option of not proceeding). Each alternative and its potential impacts should be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and courses of action while rejecting others. This may be used to inform a justification of why the proposed project and preferred options should proceed.	Chapter 3.4
7.12 Key Issues and Project Specific Assessment Requirements	The Minister has undertaken a preliminary review of the proposed development, based on the proponent's project scoping application, and identified the following as key issues associated with the development: • Employment opportunities and economic benefits for the local / regional community and the state. • Direct, indirect and cumulative impacts from the smelting process as it relates to emissions and their effect on air quality (and any consequent impacts on the local community and the environment).	Chapter 4 Chapter 5

	• Increased greenhouse gas emissions. • Direct and indirect impacts on local surface water and groundwater. • Increased traffic during construction (especially the delivery of materials and large components) and operation (especially the transport of feed materials, such as copper concentrate, and products, such as copper cathode and sulphuric acid), including the impact on regional road networks (especially through Port Augusta). • Effect of additional demand on accommodation and services in the Roxby Downs township. • Effects of additional demand on infrastructure and services in the region, especially Port Augusta.	
7 LRSE1	The analysis should consider direct and indirect job creation for Roxby Downs, Port Augusta and the region, as well as indirect impacts to demand for housing / accommodation and key services (such as health care and childcare).	Chapter 5 (particularly Chapter 5.4). It is noted that Port Augusta is part of the Local Region.
7 LRSE1	Identify the costs and benefits of the impact of the proposal on economies of interest, which have been determined based on the anticipated geographical distribution of impacts. Provide a Cost Benefit Analysis (CBA) of the impact of the proposal on economies of interest, including the distribution effects. (Refer to Better Regulation Handbook, Guidance Note 5 which provides an overview of steps in completing an CBA). Provide a Regional Impact Analysis (RIA) of the direct and indirect impacts of the proposal on the local, regional and state economies during construction and operation (and decommissioning where relevant). Describe any economic impacts for South Australia and/or the region if the proposal does not proceed. The economic analysis should give consideration to the following matters for both the construction and operational stages (and decommissioning stage where relevant): workforce, existing industries, supply chains relevant to the development, economic infrastructure (energy, waste, water, transport, communications) and existing industrial land supply.	Consistency with the Better Regulation Handbook is detailed in Table A.1 below. Economic impacts of if the proposal does not proceed are identified within the Base Case (articulation in Chapter 3.1, and Base Case costs and benefits provided in Chapter 4.3). Regional Impact Analysis (RIA) is considered within the Local effect analysis in Chapter 5. Required economic analysis components are considered in 4.3.

Table A.1: Key requirements mentioned in the Guideline.

Requirements	Addressed	Reference
The CBA [Cost Benefit Analysis] must:		
Establish the base case	Yes	3.1
Define the short-listed project options		3.2

Identify the timeframe over which the project will be assessed	Yes	3.2
Establish the scope of the assessment of costs and benefits, for most projects this will include the current residents of South Australia	Yes	4.1
Identify impacts, how the impacts will be measured and any uncertainties associated with the occurrence or measurement of the impacts	Yes	4.2
Determine all one-off costs	Yes	4.3.3
Determine recurring and ongoing costs	Yes	4.3.3
Determine societal impacts, including any changes in quality of life	Yes	4.3.8
Determine environmental impacts, including impacts to air, land, water, landscape, cultural heritage and particular species or biological systems	Yes	4.3.8
Attribute costs and benefits to the relevant community segment	Yes	4.3
Predict when impacts will occur, with modelling assumptions, risks and alternate scenarios fully documented		4.5
Monetise impacts, using indirect valuation techniques, market-based techniques or revealed preference techniques	Yes	4.3
Where not impossible or inappropriate to express impacts in monetary terms impacts should be described as clearly as possible in quantitative or qualitative terms	Yes	4.3
Discount future impacts, using a 6% real rate or a different rate that must be justified in the CBA and discussed with DTF	Yes	4.3
Test sensitivity of results to different scenarios or assumptions and identify the factors that will potentially have the greatest impact in determining the outcome of the CBA	Yes	4.5
Identify limitations, including factors which are not able to be taken into account	Yes	Identified throughout Chapter 4.
Rank the project options in order of preference, where the preferred option does not have the highest BCR the rationale should be explained	NA	CBA has been completed for one option, although comparison to non-preferred options is given in 3.3.

A.2 Infrastructure South Australia Impact Analysis Guide – Cost-Benefit Analysis

Table A.2: Key requirements/steps mentioned in the Infrastructure South Australia guideline

Requirements	Addressed	Reference
Establish the base case	Yes	3.1
Define the project case	Yes	3.2
Cost benefit analysis	Yes	4
Identifying impacts		
Inclusion of all relevant capital, land acquisition, maintenance, replacement and operating costs	Yes	4.3.3
Presenting CAPEX costs separately from OPEX costs	Yes	4.3.3
Monetising as many broader impacts as objectively possible	Yes	4.3
Presenting unmonetisable broader impacts in qualitative/ quantitative terms	Yes	4.3
Reporting of net present value, using a 7% discount in the central case	NPVs presented using 6% discount rate (per Table A.1).	4.3
Reporting of BCR	Yes	4.4
Sensitivity analysis of discount rates, a best and worst-case, over/underestimation of CAPEX, and over/underestimation of OPEX	Yes	4.5

Appendix B: Input-Output Modelling

B.1 Economic contribution methodology

Chapter 5.7 of this report estimates the economic impacts of the non-labour expenditure on the Local Region and Rest of South Australia by leveraging an economic contribution methodology. This is done as part of the LEA undertaken in this report, since the flow-on impacts of non-labour expenditure are required to be estimated.

Specifically, the LEA estimates reflect the economic contribution of yearly averages of incremental non-labour expenditure over the Base Case, split into the Project's construction and operations periods.

Economic contribution is intended to quantity how much economic activity is associated with a given industry or firm which operate within a market (i.e. they are private market entities). Economic contribution is quantified through measures such as value added, exports, imports and employment in a historical reference year. It is a measure of the value of production by a firm or industry.

All direct, indirect and total contributions are reported as gross operating surplus (GOS), labour income, value added and employment (with these terms defined in the Table A.1 below).

Table A.1: Economic contribution definitions

Estimate	**Definition**
Gross operating surplus (GOS)	GOS represents the value of income generated by the entity's direct capital inputs, generally measured as the earnings before interest, tax, depreciation, and amortisation (EBITDA)
Labour income	Labour income is a subcomponent of value add. It represents the value of output generated by the entity's direct labour inputs, as measured by the income to labour.
Value added	Value added measures the value of output (i.e., goods and services) generated by the entity's factors of production (i.e., labour and capital) as measured in the income to those factors of production. The sum of value added across all entities in the economy equals GDP.
Employment (FTE)	Employment is a fundamentally different measure of activity to those above. It measures the number of workers (measured in FTE terms) that are employed by the entity, rather than the value of the workers' output.

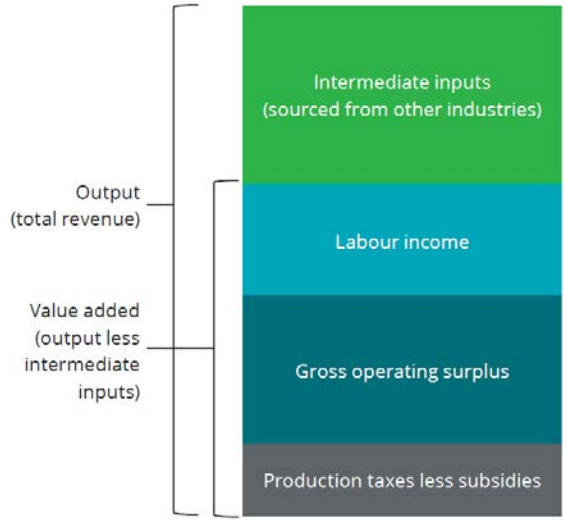
Source: Deloitte Access Economics

Value added is the sum of:

- GOS represents the value of income generated by the entity's capital inputs, generally measured as the EBITDA.
- Tax on production, less subsidy provided for production. This excludes company tax and goods and services tax, which is a tax on consumption (i.e., levied on households).
- Labour income is a subcomponent of value added. It represents the value of output generated by the entity's direct labour inputs, as measured by the income to labour.

Output is the sum of value added and the value of intermediate inputs used by the firm or industry. The value of intermediate inputs can also be calculated directly by summing up expenses related to non-primary factor inputs. Figure A.1 shows the accounting framework used to evaluate economic activity of entities, along with the components that make up output.

Figure A.1: Components of value added



Source: Deloitte Access Economics

B.2 Measuring the economic impact to the Local Region

Estimates of the direct contribution of the SRE are based on expenditure and employment data from BHP.

The indirect contribution estimates involved measuring flow-on contribution of economic activity associated with the SREs construction and operations in upstream industries who provide inputs to the entity. Estimation of the indirect economic contribution is undertaken using BHP supplier data, which is fed through Deloitte Access Economics' Regional Input-Output Model (DAE-RIOM). This model uses a bespoke Input-Output table for the Local Region, estimated using a gravity model disaggregation of the ABS national 2022-23 Input-Output tables, to determine the supply chain-related indirect contribution of the SREs estimated activity.

Importantly, while best efforts are made to be conservative with the estimation of flow-on economic impacts, including through only considering that attributable to first-round suppliers for BHP, IO modelling is still limited through not considering crowding out impacts in an economy which may arise from the Project causing increased competition in local labour and capital markets. For this reason, flow-on impacts have been presented separately to direct Local Region impacts.

Limitation of our work

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Appendix D4.
Historic heritage (non-indigenous)

Historic Heritage (non-Indigenous) Impact Assessment

Olympic Dam Smelter and Refinery Expansion Project

Prepared for BHP Olympic Dam Corporation Pty Ltd

May 2026

Historic Heritage (non-Indigenous) Impact Assessment

Olympic Dam Smelter and Refinery Expansion Project

BHP Olympic Dam Corporation Pty Ltd

May 2026

Approved by

Paul Gibbons
Director – Major Projects and Approvals
22 May 2026

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Executive summary

ES1 Introduction

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (SRE Project) at the Olympic Dam mining operations, in the far north of South Australia (SA) (Figure 1.1).

EMM Consulting Pty Ltd and Lathwida Environmental Pty Ltd (EMM-Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2016* (PDI Act) (SA).

EMM was commissioned by BHP to undertake a historic heritage (non-Indigenous) impact assessment (HHIA) related SRE Project activities to:

- determine if the activities have the potential to result in changes to the existing historic heritage environment (baseline condition assessment in Chapter 2 of this report)
- determine the likely magnitude of the change to existing historic heritage values as a result of the SRE Project (assessment of effects in Chapter 3 of this report).

This report supports the EIS, which will be submitted to the Government of South Australia's Minister for Energy and Mining as the relevant Minister for the SRE Project under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

ES2 Baseline environment

European habitation of the broad region in which the SRE Project sits began in the early 1800s with the search for sheep-grazing land for wool production. The region's non-Aboriginal history for the next 100 years was driven by the struggle to produce wool within the limitations imposed by the arid environment. This resulted in boom/crash cycles associated with periods of good rains or drought.

Andamooka Station was established by one of the Bowman brothers and Charles Burney Young with early activities including fencing, well-sinking and the erection of tanks (*South Australian Register* 1880:2). The Station had a reasonably short life and by 1904 it was being overseen by a government caretaker, later being incorporated into Purple Downs Station.

Historically, mining was not an important economic activity in the region, with only minor deposits discovered in the late 1800s and early 1900s. It was not until the discovery of copper ore deposits at what is now known as Olympic Dam in 1975 that mineral exploration and mining became important in the region. The name 'Olympic Dam' was taken from a small stock dam, built during the Melbourne Olympics in 1956 near the ore discovery hole, within the current Special Mining Lease (SML). Olympic Dam was excised from Andamooka Pastoral Station under a SML, with the operations of the Station continuing outside of the SML area. Beyond the stock dam excavated in 1956, there are no known historical modifications to the SRE Project Area.

A search of both the Australian Heritage Database and the South Australian Heritage Places Database was undertaken to determine the presence of National, State or local heritage places in relation to the Study Area.

No heritage places were identified within the Study Area. Furthermore, there are no surface indications of archaeological sites created during European settlement in the Study Area. While there are no surface indications and no historical sites in the SRE Project, there remains the low to very low potential for the Study Area to contain subsurface historical archaeological features. Features could include wells, evidence of historical fencing alignments, artefact deposits or hut foundations as these are site types known to occur within the region.

ES3 Assessment of effects

No historic archaeological sites have been identified in the SRE Project.

Following completion of the assessment of effects, while there are no surface indications and no historical sites in the SRE Project, there remains the low to very low potential for the Study Area to contain subsurface historical archaeological features that may be encountered during ground disturbing construction activities (i.e. unconfirmed potential impact event).

The event was assessed to quantify the likely significance of the impact against the SRE Project's Environmental Impact Assessment Framework (EIAF) impact significance criteria, which is assessed a significance Level 1 (not significant).

Irrespective of this outcome, the following mitigation and management measure has been proposed to reduce the impact significance to as low as reasonably achievable (ALARA):

- Implement a stop works procedure for unexpected historical archaeological finds in the construction environmental management plan.

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1 Introduction

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EMM was commissioned by BHP to undertake an historic heritage (non-Indigenous) impact assessment of the SRE Project activities to:

- determine if the activities have the potential to result in changes to the existing historic heritage environment (baseline condition assessment in Chapter 2 of this report)
- determine the likely magnitude of the change to existing historic heritage values as a result of the SRE Project (effects assessment in Chapter 3 of this report).

This report supports the EIS, which will be submitted to the Government of South Australia's Minister for Energy and Mining as the relevant Minister for the SRE Project under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

1.1 Project area definitions

To maintain consistency throughout the EIS and supporting technical assessments, the following terminology related to project infrastructure have been defined for the SRE Project where the **SRE Project Area** is defined at the boundary around the SRE Project for which BHP is seeking approval, including:

- **Special Mining Lease (SML) Area**, located within the SML (Figure 1.2), which is further delineated by the following areas:
  - **SRE Area**: the extent of the proposed SRE Project infrastructure required for construction and operation of the SRE Project within the SML. Includes the existing brownfield plant area, proposed facility relocation(s), proposed plant and laydown areas.
  - **General Infrastructure Area**: the extent of the proposed ancillary infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed infrastructure laydown areas, proposed stormwater dam location, proposed topsoil and subsoil storage areas.
  - **Water Infrastructure Area**: the extent of the proposed water infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed water pipeline and water storage dam locations.
- **Electricity Infrastructure Ground Re-Profiling Area (EIGR Area)**: the extent of the isolated proposed vegetation disturbance required to maintain regulatory clearance distances between the 275 kilovolt (kV) transmission line and the ground surface within Clause 28 land. It is noted that the transmission line and infrastructure are already in place, but additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging, and therefore changes to existing clearance distances to enable safe operation (Figure 1.3).

1.2 Regulatory context

The SRE Project was declared an Impact Assessed development pursuant to section 108(1)(c) and 108(7) of the PDI Act on 29 August 2024. The declaration reflects the nature, scale and significance of the SRE Project to SA.

Impact Assessed Development is the most rigorous level of development assessment prescribed under the PDI Act.

Specifically, the Minister made the following declaration:

> Pursuant to Section 108(1)(c) and Section 108(7) of the Planning Development and Infrastructure Act 2016, having taken into account those principles prescribed under Regulation 27(2) of the Planning, Development and Infrastructure (General) Regulations 2017 (the Regulations) and having given consideration to the matters under Regulation 27(3) of the Regulations, I declare that all development of a kind specified in the Schedule to this Notice, to the extent that it is undertaken on land identified in Clause 28(1) of the Indenture as impact assessed development and that references to "development" include a project.

The majority of the SRE Project activities, with the exception of ground re-profiling within the Electricity Infrastructure Area, would be located wholly within the existing SML but does not include business-as-usual (BAU) operations (operations which enable existing approved production of up to approximately 200,000 tonnes per annum (tpa) total copper production) or activities associated with scheduled campaign maintenance 2027 (SCM27) works. These activities are subject to separate regulation (e.g. Environment Protection Authority (EPA) licensing) and approval. The SRE Project may also be supported by low impact development outside the SML, which could include, for example, minor road works and upgrades to accommodation infrastructure. It is proposed that any approvals required for these activities would be sought on an as-needs basis under applicable legislation and guidelines.

Regulatory instruments (Commonwealth and State legislation, policies, and guidelines) considered as part of this historic heritage assessment are summarised below.

1.2.1 Planning Development and Infrastructure Act 2016 (SA)

Development approval is required for the SRE Project under the PDI Act. The PDI Act established a new development assessment system in SA to streamline the assessment process. The PDI Act is supported by subordinate regulations, as well as practice directions and guidelines which are issued by the State Planning Commission, the state's independent principal planning body.

A key feature of the new planning system is the Planning and Design Code (the Code) which contains a single set of planning policy, rules and classifications for SA, which is applied spatially via mapping. The Code establishes a performance-based approach to planning and development assessment by including policies that address the scale, form and design of built structures and the contextual setting of the development.

The planning system established by the PDI Act includes five assessment pathways; accepted development, code assessed development (deemed-to-satisfy or performance assessed) and impact assessed development (restricted and impact assessed). As previously stated, impact assessed development is the most rigorous level of development assessment prescribed under the PDI Act.

i Ministerial declaration – impact assessed development

The declaration subjects the SRE Project to an EIS process requiring detailed environmental, social and economic assessment.

A Scoping Application was prepared by BHP to inform the development of EIS Assessment Requirements by the State Planning Commission (SPC). The EIS Assessment Requirements issued by the SPC summarise all potential issues needing to be addressed by BHP and highlight any further information required by the Minister to enable a proper assessment of the proposed SRE Project.

Due to the operation of the *Roxby Downs (Indenture Ratification) Act 1982*, the Minister for Energy and Mining is the relevant Minister for the SRE Project.

No specific Assessment Requirements were outlined for historic heritage. Notwithstanding this, this HHIA addresses the following standard non-Aboriginal heritage assessment requirements as follows:

- review of relevant Commonwealth, state and local heritage register searches
- detailed historical research and analysis of the historical plans and aerials to determine the presence of historical features
- assessment of the potential of European archaeological sites or built heritage being impacted by the SRE Project.

1.2.2 Environment Protection and Biodiversity Conservation Act 1999 (Cwth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is a Commonwealth Act that provides a legal framework for the protection of the environment.

The EPBC Act definition of environment includes places of natural, Indigenous, and historic heritage value. Heritage places may be listed on statutory registers constituted under the Act, being the World Heritage List, National Heritage List (NHL), Commonwealth Heritage List (CHL) or State-based registers, or may be an unlisted item identified by a Commonwealth agency.

Register of the National Estate (RNE) – the RNE is an archived list of heritage items that were protected under the, now repealed, Commonwealth *Heritage Commission Act 1975*, which was replaced by the EPBC Act. While many items were transferred from the RNE to the NHL, CHL or State-based heritage registers, those that were not transferred remain on the now non-statutory RNE as an indication of their heritage value.

Specific Assessment Requirements for historic heritage are:

- search of heritage registers constituted under the EPBC Act, being:
  - World Heritage List
  - National Heritage List
  - Commonwealth Heritage List
- search of non-statutory RNE
- assess impacts to identified items on the above registers in or adjacent to the SRE Project Areas, if any.

1.2.3 Heritage Places Act 1993 (SA)

The *Heritage Places Act 1993* (HP Act) aims to recognise the importance of South Australia's heritage places and objects, promote an understanding and conservation of the State's heritage, and encourage the retention of the significance of heritage places.

Part 3 of the HP Act requires the South Australian Heritage Council establish and maintain the South Australia Heritage Register that identifies places of natural or historic significance.

Furthermore, Section 26 of the HP Act, dictates that for places of archaeological significance, a person must not, without a permit:

- excavate or disturb a State Heritage Place designated as a place of archaeological significance (pursuant to Section 26(a))
- remove archaeological artefacts from such a place (pursuant to Section 26(b)).

Archaeological objects not located within a State Heritage Place are also projected under Section 27 of the HP Act. Under Section 27 (1), a person must not, without a permit:

- excavate or disturb land for the purpose of searching for or recovering archaeological artefacts of heritage significance
- excavate or disturb land knowing or having reasonably cause to know it contains archaeological artefacts.

Section 27 (2) requires persons who are aware or believe they may have discovered an archaeological artefact to:

a) cease to excavate or disturb the place where the relevant object has been discovered (if relevant)

b) within the period specified by the regulations—

i) notify the Council of the location of the relevant object, unless the person has reasonable grounds to believe that the Council is aware of the location of the relevant object

ii) furnish the Council with such information as the Council may reasonably require

c) take no further action in relation to the recovering of the relevant object without a permit or other authorisation from the Council

d) if required by the Council, surrender the relevant object to the Crown.

Specific Assessment Requirements for historic heritage under the HP Act are:

- search of State Heritage Register constituted under the HP Act
- assess impacts to identified items on the State Heritage Register in or adjacent to the SRE Project Areas, if any
- assess the potential for archaeological sites protected under Section 27 of the HP Act to be present in the SRE Project Areas.

1.2.4 Far North Region Plan 2010–2036

The *Far North Region Plan 2010–2036* (published July 2010) was developed by the former SA Department of Planning and Local Government (now Department for Housing and Urban Development (DHUD) within the Department for Trade and Investment), and incorporates the areas of Port Augusta, Flinders Ranges, Roxby Downs, and the region's unincorporated areas. The Plan guides future land use and development in the region and sets out how the State Government proposes to balance population and economic growth with the need to preserve the environment and protect the heritage, history, and character of regional communities.

The Far North Region Plan, Policy 5.1 states a key objective is to 'protect and conserve places and landscapes of heritage and cultural value, including state, national and local registered sites'.

It is noted that in October 2022, the State Planning Commission endorsed an updated *Proposal to Initiate the Preparation of the Far North Region Plan* (Department of Planning and Local Government (SA) 2010), pursuant to Section 73(1)(a) of the PDI Act to provide a long-term vision for the region to guide land use planning over a 15-to-30-year period. An updated draft regional plan is proposed and may result in changes to policies and objectives related to the preservation of heritage values.

1.3 Project description

The objective of the SRE Project is to expand BHP's smelter and refinery capacity, enabling the Copper SA growth plan by:

- increasing copper production capacity up to 650,000 tonnes per annum (tpa) of total copper plus associated products from the current average production of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet
- ensuring the Cu:S ratio is resolved at Olympic Dam for copper concentrate production
- delivering reliable and predictable production outcomes following the 2023 acquisition of OZ Minerals' Carrapateena and Prominent Hill mining operations to realise Copper SA province opportunities.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable total production of up to 650,000 tpa copper plus associated products
- introduction of two-stage smelting involving the installation of a new primary flash-smelting furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing direct-to-blister flash furnace (DBF) to a flash-converting furnace (FCF), which would process the matte into blister
- addition of an acid plant of similar nature and scale to the existing acid plant and subsequent upgrade of the existing acid plant
- expansion of the electrorefinery and precious metals recovery facilities to produce cathode copper, gold, and silver.

Associated with these key elements, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the SML Area (Figure 1.2).

External to the SML Area, electricity would be supplied to the SRE Project through the existing 275 kV line from Davenport substation (near Port Augusta) to Olympic Dam mine, located within Clause 28 land[1] (EIGR Areas). Whilst the transmission line and infrastructure are already in place, additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging, reducing the existing electrical clearances that are required to enable safe operation. The maintenance of the required electrical clearances between the 275 kV line and the ground surface would necessitate isolated areas of land disturbance and associated vegetation clearance (Figure 1.3).

[1] Clause 28 land as defined under the *Roxby Downs (Indenture Ratification) Act 1982* (SA)

The SRE Project would be constructed and operated in a staged manner to enable production capacity up to 650,000 tpa of total copper and associated products, with stages detailed in Table 1.1.

This technical assessment has been prepared based upon the maximum potential impacts associated with Stage 2 (i.e. the greatest impact scenario) to ensure that the full extent of all potential impacts is identified and assessed.

The indicative location of key infrastructure is shown in Figure 1.2 and Figure 1.3, while the key project characteristics are outlined in Table 1.2.

Table 1.1 Project stages and timing

Stage	Smelter concentrate throughput (tpa)	Description	Anticipated timing
Stage 1a	1,100,000	Stage 1a includes: • an increase of smelter throughput to approximately 1,100,000 tpa of concentrate producing an output of approximately 390,000 tpa of total copper • a new regional concentrate receiving, handling and blending facility • upgrade and expansion of the existing smelter feed preparation, including additional concentrate storage, blending and a new steam dryer • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to an FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure and decommissioning of the existing electric slag reduction furnace (EF) if required • expansion of the brownfield slag concentrator supported by FSF slag cooling pits, a new interim slag stockpile and associated environmental management infrastructure • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant, additional acid storage, and an associated acid loading station to allow the export of acid • a new electrorefinery and associated anode preparation infrastructure • a new slimes treatment plant • expansion of the precious-metals refinery (PMR) facility	2028 to 2032
Stage 1b	1,400,000	Stage 1b includes: • an increase in smelter throughput to approximately 1,400,000 tpa of concentrate producing an output of approximately 500,000 tpa of total copper • installation of additional concentrate leach thickening and filtration infrastructure • development of greenfield slag concentrator and associated stockpile and decommissioning of brownfield slag concentrator • incremental expansion of Stage 1a infrastructure and services, including: – the installation of additional electrorefinery modules – expansion of feed preparation, FCF feed system (including lime addition), off-gas management, acid plant, slimes treatment and PMR capacities.	2032 to 2036

Stage	Smelter concentrate throughput (tpa)	Description	Anticipated timing
Stage 2	2,000,000	Stage 2 includes: • an increase in smelter throughput to approximately 2,000,000 tpa of concentrate producing an output of approximately 650,000 tpa of total copper • installation of new concentrate leach circuit for treatment of imported concentrate • incremental expansion of Stage 1b infrastructure and services, including: – the installation of additional electrorefinery modules – the installation of an additional anode furnace and associated off-gas management infrastructure – expansion of feed preparation, FSF and FCF feed systems, off-gas and slag management, acid plant, slimes treatment and PMR capacities.	2038 to closure

Table 1.2 Key characteristics of the SRE Project

Project element	Summary
Smelter and refinery expansion and additions	Expansion of, and additions to, the existing smelter and refinery to enable production of up to 650,000 tpa copper plus associated products (gold, silver, and acid). This would include: • a new concentrate handling and blending facility • additional concentrate leach capacity • upgrade and expansion of the existing smelter feed preparation • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to a FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure • upgrade of the existing slag concentrator circuit and subsequent development of a new slag concentrator circuit • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant and upgrade of the existing acid plants • a new electrorefinery and associated infrastructure • a new slimes treatment plant • expansion of PMR facility • slag stockpile and treatment.
Electricity demand, supply and distribution	An electricity demand of up to 68 mega volt-amperes (MVA) net load increase would be required for the SRE Project. The additional electrical demand due to the SRE Project would be met by capacity from the national grid via the existing 275 kV transmission line (noting potential for below line land disturbance and associated vegetation clearance outside of the SML). Minor augmentation of existing onsite electricity supply infrastructure at Olympic Dam within the SML would be to ensure the additional capacity could be achieved and maintained. New high voltage and low voltage power supply and reticulation infrastructure would be required to all smelter infrastructure.
Water demand	Water demand of between 2 and 16 megalitres per day (ML/day) required for the SRE Project in addition to the existing supply for current operations.

<table>
<tr><th>Project element</th><th>Summary</th></tr>
<tr><td>Water supply and distribution</td><td>The SRE Project proposes no additional water abstraction from the Great Artesian Basin (GAB) above daily average BAU volumes. Water supply for the SRE Project would nominally be provided from the Department for Infrastructure and Transport (DIT) Northern Water Project (NWP) infrastructure, following commissioning of the initial 90 ML/d capacity of the NWP. This would require new water storage and distribution infrastructure to connect the SRE Project to the NWP connection point at the SML boundary.

The NWP water supply may be supplemented or offset by the provision of local groundwater supply (subject to further approvals). This water supply would occur via existing process storage dams, the desalination plant at the Olympic Dam site, and/or through the distribution of the existing water supply within daily average BAU volumes.

The additional water supplies are likely to require augmentation of the existing desalination water treatment plant and water distribution network, and a demineralised water plant will be required to support the SRE Project operations.</td></tr>
<tr><td>Supporting infrastructure</td><td>Supporting infrastructure includes:
• civil infrastructure works, such as roads and stormwater infrastructure
• new offices and crib rooms
• new workshops
• new laydown areas
• process control system upgrades
• concrete batching
• other supporting infrastructure as required to facilitate the implementation and operation of the SRE Project.</td></tr>
<tr><td>Waste management</td><td>Development of the SRE Project may require decommissioning of the existing processing plant components including dryers, the electric furnace and the existing concentrate storage and transfer system. Some of the decommissioned infrastructure would be retained in-situ to preserve operational flexibility or for future management under the site Closure Management and Rehabilitation Plan, however some elements may require disposal as a component of the SRE Project.

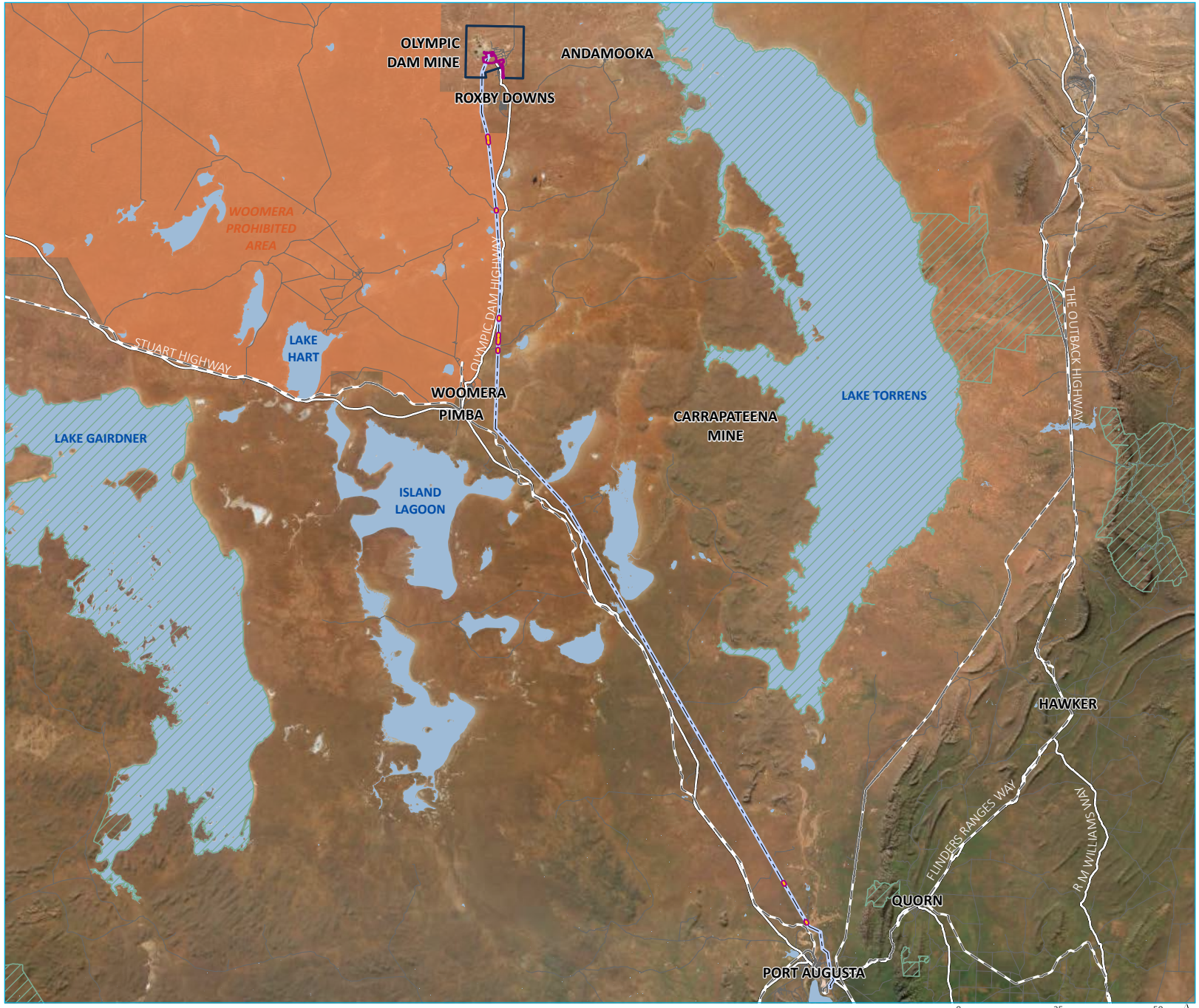
Waste generated during construction would be managed as follows:
• where practicable, demolition materials would be removed from site and recycled
• materials not suitable for removal from site would be managed on the SML via existing waste management facilities.

All waste generated from construction of the SRE Project would be managed in accordance with existing site procedures and approved management plans.

Operational wastes associated with the SRE Project consist of processing and non-processing wastes where:
• processing wastes are limited to low-copper slags generated from the smelting and slag concentrator operations that are not suitable for reprocessing and effluent streams from various process operations that are directed to tailings, including from the PMR and smelter off-gas systems
• non-processing wastes including reagent packaging wastes and operational consumables.</td></tr>
<tr><td>Workforce</td><td>100% fly-in/fly-out (FIFO) workforce is assumed for construction and the SRE operational workforce. Estimated peak construction workforce numbers (in full time equivalents (FTE)) are summarised below.

<table><tr><th>Construction stage</th><th>Average FTE</th><th>Peak FTE</th></tr><tr><td>Stage 1a</td><td>~708</td><td>~1,313</td></tr><tr><td>Stage 1b</td><td>~260</td><td>~515</td></tr><tr><td>Stage 2</td><td>~519</td><td>~978</td></tr></table></td></tr>
</table>

<table>
<tr><th>Project element</th><th>Summary</th></tr>
<tr><td></td><td>Following construction, the SRE Project would require the permanent operational workforce summarised below.
<table>
<tr><th>Operational stage</th><th>Additional SRE Project operational workforce</th><th>Total Olympic Dam Smelter and Refinery workforce</th></tr>
<tr><td>Stage 1a</td><td>~207</td><td>766</td></tr>
<tr><td>Stage 1b</td><td>~57 (additional to Stage 1a)</td><td>823</td></tr>
<tr><td>Stage 2</td><td>~244 (additional to Stage 1b)</td><td>1,067</td></tr>
</table>
SRE Project construction and operational workforce is proposed to utilise existing and new accommodation to be established by BHP for the scheduled campaign maintenance 2027 (SCM27) shutdown, Olympic Dam future campaign maintenance accommodation, and/or greenfield accommodation (subject to separate approvals).</td></tr>
<tr><td>Concentrate import</td><td>Import of copper concentrate from Prominent Hill and Carrapateena mining operations, as well as possible future mining operations (e.g. Oak Dam), and maintain the ability to receive copper concentrate from other third-party suppliers.
Prominent Hill concentrate may be passed through concentrate leach to remove fluorides prior to smelter feed preparation. Carrapateena concentrate to pass directly to smelter feed preparation. Other, third-party concentrates may be passed through concentrate leach to remove deleterious elements (e.g. fluorides) prior to smelter feed preparation as required.</td></tr>
<tr><td>Production and export</td><td>Total production volumes of up to:
~650,000 tpa of cathode copper
~893,000 ounces per annum of gold
~3,950,000 ounces per annum of silver
~4,900 tpa of uranium oxide concentrate; note that the SRE Project does not materially change existing uranium production, with an increase of approximately 1% expected as a result of the leaching of Prominent Hill concentrate to remove fluoride. No upgrade or modification of uranium production facilities is proposed as a part of the SRE Project
~1,700,000–1,900,000 tpa of 98% sulphuric acid (H_2SO_4), of which up to approximately 810,000 tpa may be exported from Olympic Dam (i.e. operations become ‘net’ sulphuric acid producer).</td></tr>
</table>





KEY

- Special Mining Lease
- SRE Project Area
- EIGR Area

Existing environment

- BHP private transmission line (275 kV)
- Rail line
- Major road
- Minor road
- Named waterbody
- National park
- Woomera Prohibited Area

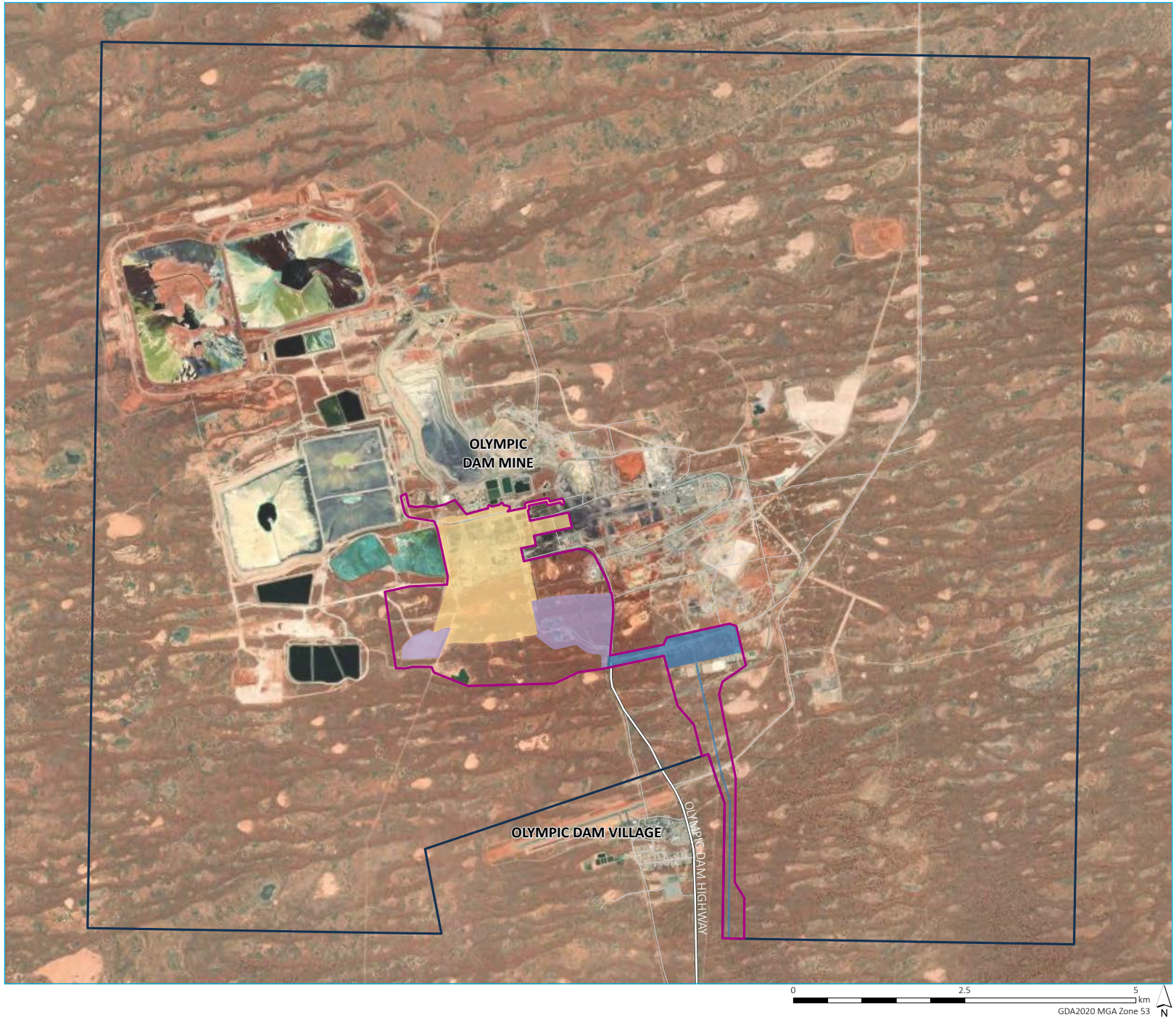
INSET KEY

- Major road
- National park

SRE Project Area - regional locality

BHP SRE Project
Historic Heritage Impact Assessment
Figure 1.1

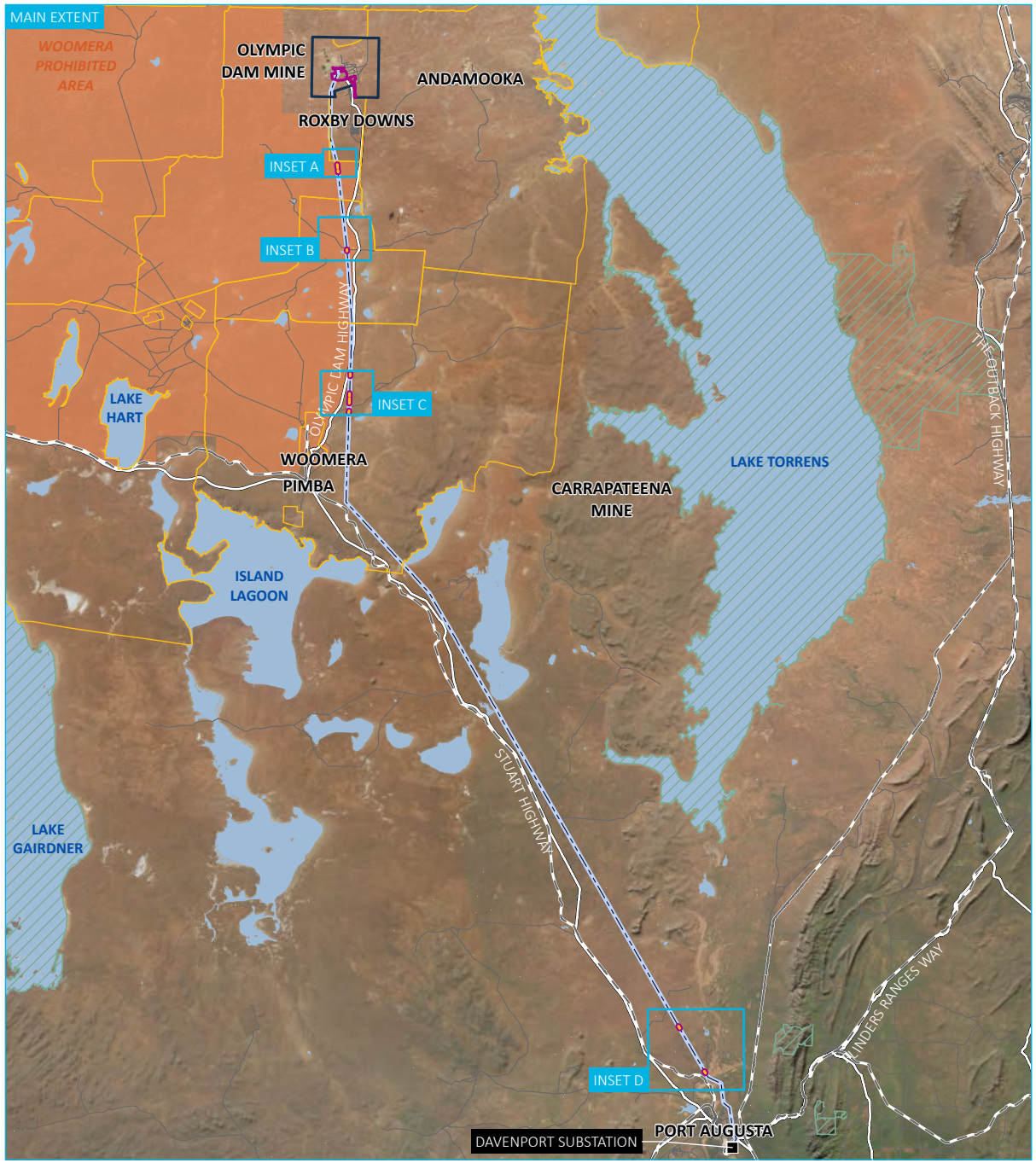
EMM
creating opportunities

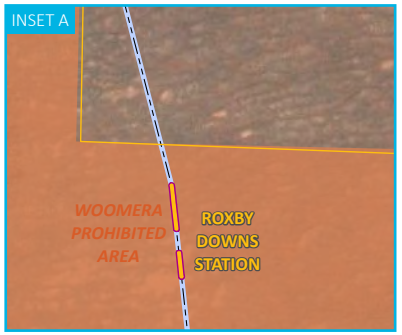


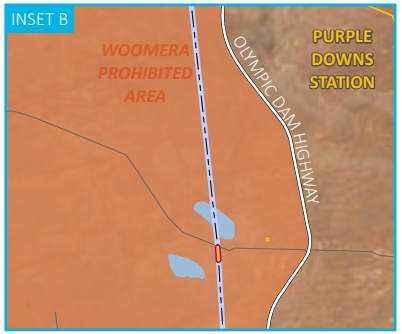
SRE Project Area - SML Area

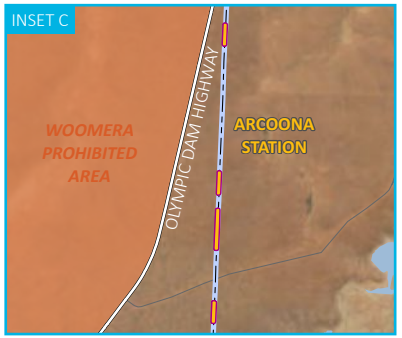
BHP SRE Project
Historic Heritage Impact Assessment
Figure 1.2

EMM
creating opportunities



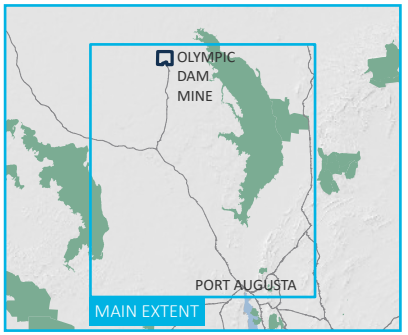








0 25 50 km
GDA2020 MGA Zone 53
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KEY

- Special Mining Lease
- SRE Project Area
- EIGR Area

Existing environment

- Transmission substation
- BHP private transmission line (275 kV)
- Rail line
- Major road
- Minor road
- Named waterbody
- National park
- Pastoral station
- Woomera Prohibited Area

INSET KEY

- Major road
- National park

SRE Project Area - EIGR Areas

BHP SRE Project
Historic Heritage Impact Assessment
Figure 1.3

EMM
creating opportunities

2 Baseline condition assessment

In order to quantify the potential effects of the SRE Project on historic heritage values, it is necessary to understand the existing baseline environment, and specifically:

- to classify and describe the existing historic heritage places prior to the development of the SRE Project
- to assess the likely change in the baseline environment as a result of the development of the SRE Project and quantifying the significance of resultant impacts to historic heritage places, if applicable.

2.1 Baseline environmental and historic context

2.1.1 Site location

The SRE Project is located at the Olympic Dam mining operations, approximately, 580 kilometres (km) north of Adelaide in the far north of South Australia (Figure 1.1, Figure 1.2 and Figure 1.3).

The existing BHP Olympic Dam includes a mining concentrator, smelter and refinery, with the smelter treating high grade copper concentrates through a single-stage DBF smelter, with an average output of approximately 200,000 tonnes per annum (tpa) of total copper (and associated products).

Site access is via Olympic Dam Highway to the existing Olympic Dam mine site. The SRE Project is serviced by internal (and proposed new) access road, with public access restricted at the main entrance to the mine site.

Olympic Dam airport is located approximately 6 km south of the existing Olympic Dam mine. The closest township is Roxby Downs which is approximately 15 km south of the mine site. The town of Andamooka is located approximately 25 km to the east. Beyond and between, there are large areas of native vegetation that are subject to pastoral leasing (with a long history of livestock grazing) and/or other land uses, such as the Woomera Prohibited Area (Department of Defence).

2.1.2 Study area

The Study Area for this report is contained wholly within the SRE Areas, General Infrastructure Area, Water Infrastructure Area and EIGR Area.

Given the topography of the Study Area, which is generally flat with slight undulations, a 500 m buffer has been applied to capture historic heritage places that may have view lines to the SRE Project, with historic heritage sites beyond the buffer not considered to have an impact pathway.

2.1.3 Environmental context

The Study Area is located within the Gawler Bioregion, as defined by the Interim Biogeographic Regionalisation of Australia (IBRA) which spans approximately 123,605 km^2 (DCCEEW 2020).

The Gawler Bioregion is characterised by semi-arid to arid flat to rounded landscapes, rocky hills, plains and salt-encrusted lake beds. Vegetation types across the bioregion include open woodlands of black oak (*Casuarina pauper*) and wattles, open mallee scrub, chenopod shrublands (bluebush/saltbush) and tall mulga (*Acacia aneura*) shrublands. The native vegetation across the area is generally relatively intact, but highly disturbed in some areas particularly near stock watering points or infrastructure.

More specifically, the Study Area sits within the Roxby IBRA Subregion, which is characterised by low sand dunes with low open woodland and mixed grasses, sandy interdune swales within acacia low open woodland over chenopod low open shrubland and interdune swales with clay soils supporting cane-grass tall grasslands.

Broad vegetation communities found in this sub-region include:

- low sand dunes with white cypress-pine (*Callitris glaucophylla*)/narrow-leaf mulga (*Acacia aptaneura*), low open woodland over sandhill cane-grass (*Zygochloa paradoxa*) and loose-flowered rattlepod (*Crotalaria eremaea*)
- sandy interdune swales with western myall (*Acacia papyrocarpa*) and narrow-leaf mulga low open woodland over chenopod low open shrubland or grasses
- cracking clays interdune swales with swamp cane-grass (*Eragrostis australasica*) tall grassland
- occasional inland saline depression of melaleuca and samphire
- occasional drainage lines and swale with tall chenopod shrubs (Lathwida 2024 NWSIA).

2.1.4 Historical context

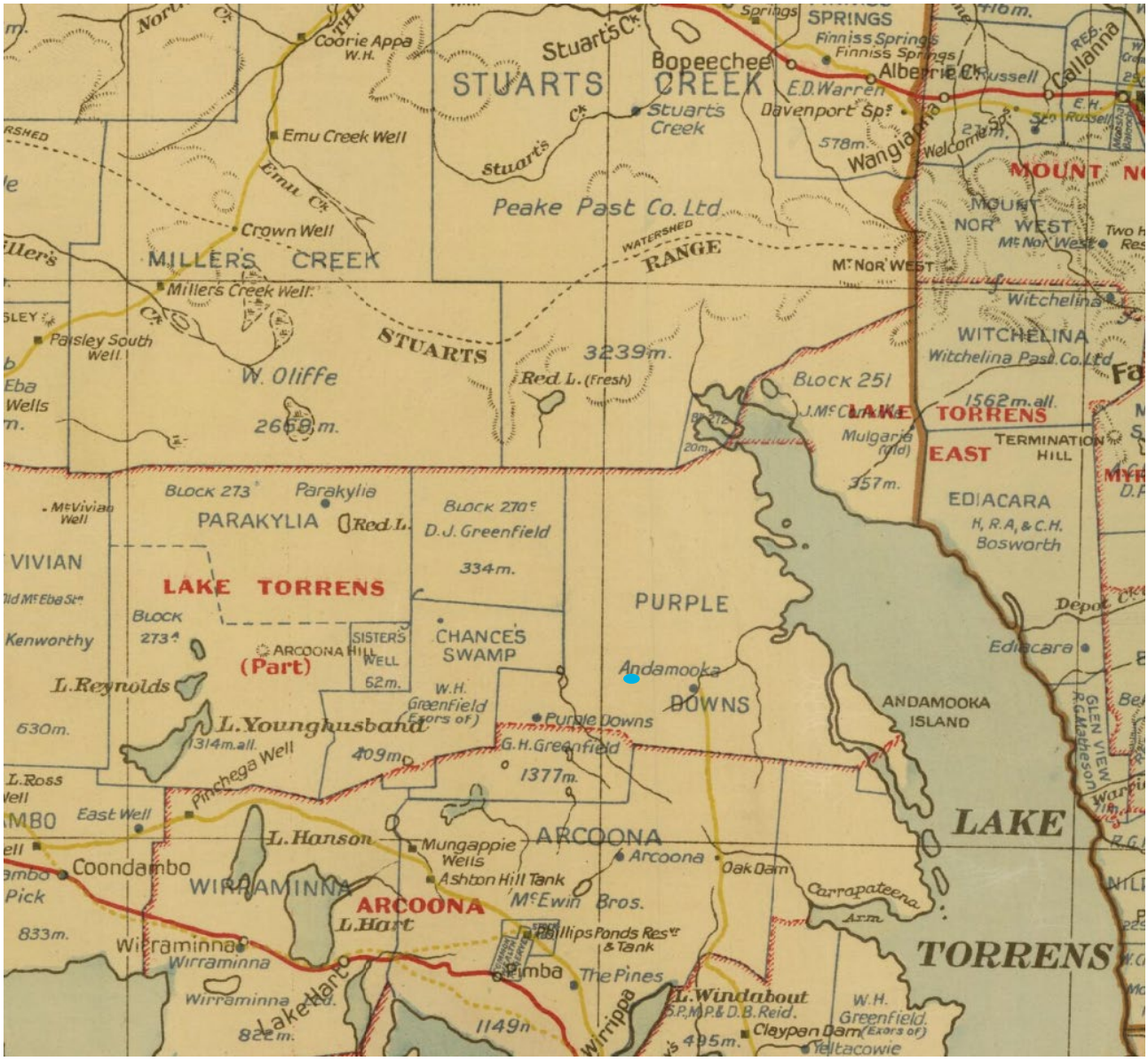
European habitation of the broad region in which the SRE Project sits began in the early 1800s with the search for sheep-grazing land for wool production. The region's non-Aboriginal history for the next 100 years was driven by the struggle to produce wool within the limitations imposed by the arid environment. This resulted in boom/crash cycles associated with periods of good rains or drought.

Early exploration of the far north of South Australia by Edward John Eyre and Charles Sturt in the 1840s occurred during a drought, leading to the area being dismissed as suitable for pastoral activities. In the 1850s, during several seasons of good rain, and in conjunction with high wool prices, government encouragement and supported by the establishment of Port Augusta in 1854, settlement pushed north.

Pernatty Station, to the south of the Study Area, was established in 1868. Andamooka Station, in which the Study Area sits, was established in 1872, with and Arcoona, to the south, and Chances Swamp (now Roxby Downs), to the north, established in 1877 (Plate 2.1).

Andamooka Station was established by one of the Bowman brothers and Charles Burney Young with early activities including fencing, well-sinking and the erection of tanks (*South Australian Register* 1880:2). The Station had a reasonably short life and by 1904 it was being overseen by a government caretaker, Peter Phillip Brown (The Express and Telegraph 1904:2). The Station appears to have been amalgamated into Purple Downs, owned by G.H. Greenfield by the 1920s (Plate 2.1). In 1926, the Station was sold to a syndicate following the death of G.H. Greenfield. Greenfield had evidently run cattle on the Station as the *Transcontinental* reported that fencing was being erected to facilitate the running of sheep instead of cattle (*Transcontinental* 1926:3). By 1952, the homestead of the Station was occupied by Lloyd and Daphne Pollard (*The Advertiser* 1952:7).

Historically, mining was not an important economic activity in the region, with only minor deposits discovered in the late 1800s and early 1900s. It was not until the discovery of copper ore deposits at what is now known as Olympic Dam in 1975 that mineral exploration and mining became important in the region. The name 'Olympic Dam' was taken from a small stock dam, built during the Melbourne Olympics in 1956 near the ore discovery hole, within the current mining lease. Olympic Dam operated within Andamooka Station under a SML, with the operations of the Station continuing outside of the SML area. Beyond the stock dam excavated in 1956, there are no known historical modifications to the SRE Project Area.



Source: National Library of Australia, call no. MAP G9011.G46 [192-?] (Wall map)

Plate 2.1 Excerpt from "Map of South Australia showing pastoral stations &c. by H.E.C. Robinson Ltd". Approximate location of Study Area marked.

2.1.5 Land use and archaeological potential

The SRE Project is located within the freehold land owned by BHP, subject to a Special Mining Lease (SML), and adjacent to Roxby Downs and Andamooka Pastoral Stations and Crown Land under the management of the Municipal Council of Roxby Downs. Activities within the SML are wholly associated with the ongoing Olympic Dam mine operations and associated mineral exploration and infrastructure maintenance activities.

Together with the neighbouring Purple Downs Pastoral Lease (also owned by BHP), the Andamooka and Roxby Downs Pastoral Leases encompass over 5,000 km^2 of land that is sub-leased to and managed by Kokatha Pastoral Pty Ltd for the ongoing management of pastoral activities and is currently stocked with around 2,000 head of Angus cattle.

Towns surrounding Olympic Dam include Olympic Dam Village to the immediate south of the SML, Roxby Down, Woomera and Pimba approximately 95 km and 105 km to the south of the SML respectively and Andamooka, approximately 35 km to the east of the SML, each of which was established within the last 90 years. Andamooka was established in 1933 to support opal mining, Woomera in 1947 to service the Woomera Rocket Range and Roxby Downs and Olympic Dam Village in 1986 to service the Olympic Dam operations.

Historic pastoral activities have resulted in the construction of fences, stockyards, huts and windmills which may be preserved as archaeological sites. There are no surface indications of archaeological sites created during European settlement in the Study Area.

2.1.6 Heritage databases

A search of both the Australian Heritage Database and the South Australian Heritage Places Database was undertaken to determine the presence of National, State or local heritage places in relation to the Study Area.

No heritage places were identified within the Study Area. Table 2.1 provides the two closest listed heritage items to the SRE Area, while Table 2.2 provides the two closest heritage places to southern portion of the EIGR Area.

Table 2.1 Heritage places near the SML Area

Site name	Heritage list	Location	Distance to Study Area	Description
Andamooka Historic Reserve (ID no. 13075)	South Australian Heritage Places (South Australian Heritage Register, (SAHR))	Andamooka	~27 km	Andamooka Historic Precinct (Historical Museum Reserve), including Frank Albertoni's house, Bob Cutzow's Dugout, Tom Brady's Dugout, Mrs Perry's Kitchen, and Andy Absalom's House.
Dick Clark's Residence (ID no. 12663)	South Australian Heritage Places (SAHR)	Andamooka	~27 km	Dick Clark's Residence, including semi-dugout living room, two detached sleep-outs and workroom, together with dry-stone walling and connecting paths.

Table 2.2 Heritage places near the EIGR Area (southern portion)

Site name	Heritage list	Location	Distance to Study Area	Description
Ostrich Farm (ID no. 12702)	South Australian Heritage Places (SAHR)	Port Augusta	~8 km	Former Ostrich Farm, Emeroo Station, including Original Homestead, Ruins of Hatching Shed, Exotic Plants and Ostrich Fences
Port Augusta West Water Tower (ID no. 10198)	South Australian Heritage Places (SAHR)	Port Augusta	~10 km	Water tower

2.1.7 Site description

The majority of the Study Area sits within the SRE Area, being the primary location for proposed smelter and refinery expansion infrastructure, situated directly adjacent to the existing infrastructure associated with the operations of Olympic Dam.

The SRE Area is sparsely vegetated, largely with ground cover species over an undulating surface of red sand dunes; areas denuded of vegetation occur in the swales of some sand dunes (Plate 2.2, Plate 2.3). The area has been subject to some ground surface disturbance associated with the creation of vehicular tracks (Plate 2.2). There are also several areas that have been cleared and levelled to facilitate the operations of Olympic Dam.

The General Infrastructure Area and Water Infrastructure Area within the Study Area that are proposed for minor ancillary infrastructure (i.e. laydown areas, water storage dams, stockpiles, water pipelines, electricity transmission lines) currently accommodate mining and related infrastructure to facilitate the operations of Olympic Dam.

There are no structures that predate the establishment of Olympic Dam in the SRE Area visible on the surface.



Plate 2.2 SRE Area, view north towards Olympic Dam mine



Plate 2.3 SRE Area, view north towards Olympic Dam mine

The EIGR Area is located along the transmission line that runs between Olympic Dam mine and Port Augusta. The EIGR Area traverses a range of environments that include low saltbush covered open plains (Plate 2.4), sparsely vegetated areas (Plate 2.5) and spinifex ground cover with low trees, some of which have previously been pruned (Plate 2.6). Located underneath existing electricity infrastructure, the Area has been subject to varying degrees of prior impact associated with the installation of the transmission towers and lines.

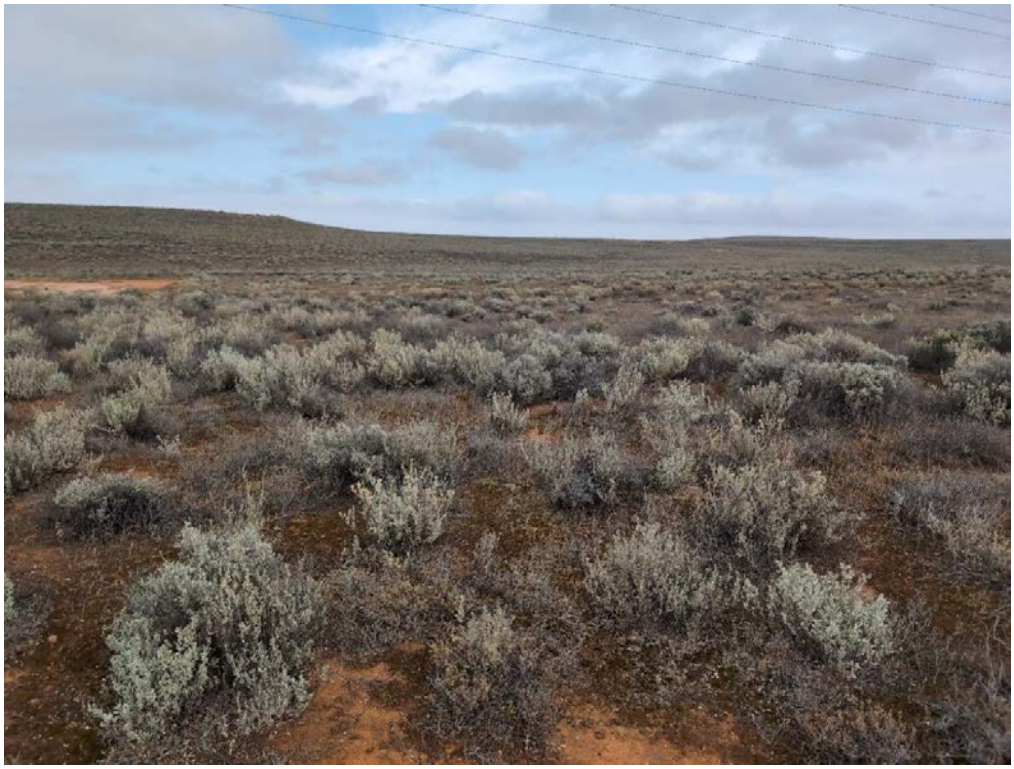


Plate 2.4 EIGR Area example environment



Plate 2.5 EIGR Area example environment



Plate 2.6 EIGR Area example environment

2.1.8 Sensitive receptors

The SRE Project contains:

- no World or National heritage places, Commonwealth heritage properties, or places on the non-statutory RNE
- no heritage places on the SAHR or State Heritage Areas
- no Local Heritage Places.

The closest registered heritage places are located over 5 km from the SRE Project (Table 2.1 and Table 2.2) and will not be affected by the construction, operation, or closure phases of the SRE Project as there is no impact pathway due to the intervening distance.

While there is no surface evidence for historic land use activities occurring in the Study Area, there remains the low potential for unexpected subsurface historic archaeological sites to be present. This potential for subsurface historic archaeological sites is identified as an unconfirmed sensitive receptor.

2.2 Conclusion

The landscape of the SRE Project is characterised by the existing Olympic Dam mine and associated infrastructure (i.e. established mining industrial setting) and surrounded by low density primary production land uses and sparse remnant native vegetation. The majority of the proposed SRE Project activities, with the exception of ground re-profiling within the EIGR Area, would be located within the existing SML.

Due to the arid and isolated environment of the Far North Region in which the SRE Project resides and the long-standing Pastoral Lease on the land prior to the SML, no significant historical heritage items or places have been identified on the Australian Heritage Database or the South Australian Heritage Places Database. The closest registered historic places (Table 2.1) are located at Andamooka, approximately 27 km to the east, and will not be impacted by the SRE Project.

Whilst evidence of past historic land uses and settlement, such as old fences, stockyards, ruined huts and windmills, are scattered throughout the region, most of these features are considered commonplace and not of particular heritage significance. There are no surface indications of such items being located in the Study Area; however, the low potential for subsurface historic archaeological sites is identified as an unconfirmed sensitive receptor.

3 Assessment of effects

An assessment of effects was undertaken to determine the change to existing historic heritage values as a result of the proposed SRE Project activities. The assessment of effects included the following works:

- obtain input and qualitative data to determine the baseline environment
- review of the SRE Project activities and the identified potential impact events for the effects assessment
- complete effects assessment.

3.1 Potential impact events

BHP has identified one potential impact event that may affect the baseline historic heritage environment as a result of the implementation of the SRE Project.

This event represents a scenario for which there is, or is likely to be, a linkage between SRE Project activities (sources), ground disturbance (pathways) and the identified receptors.

To ensure a consistent approach to impact assessment for the SRE Project, sources, pathways, and receptors (SPR) are defined and applied in this assessment as follows:

- **Source** – the SRE Project activities (i.e. potential impact event) which, alone or in combination, has the potential to impact a receptor
- **Pathway** – the pathway, means or route (with consideration of any natural barriers) by which the receptor can be exposed to, or may reasonably be expected to be impacted by, the source
- **Receptor** – the receptor that may be impacted by the source via the pathway.

The detailed list of potential impact events is provided in the Environmental Impact Assessment Tables Appendix to the EIS and are summarised for the land pathway in Table 3.1. The scope of this assessment of effects presented herein has considered the identified potential impact event.

Table 3.1 Preliminary SPR assessment – potential impact events

Impact ID	Potential impact event	Source	Pathway	Receptor	Linkage
L33	During construction, land clearing associated with the construction of SRE Project infrastructure results in disturbance to an unknown non-Indigenous heritage site.	Land clearing	Land	Cultural amenity (Historic heritage)	Unconfirmed

3.2 Assessment of effects

The SRE Project contains:

- no Commonwealth heritage properties, National heritage places or places on the non-statutory RNE
- no heritage places on the SAHR or State Heritage Areas
- no Local Heritage Places.

The closest registered heritage places are located over 5 km from the SRE Project (Table 2.1 and Table 2.2) and will not be affected by the construction, operation, or closure phases of the SRE Project as there is no impact pathway due to the intervening distance.

Furthermore, no historic archaeological sites have been identified in the SRE Project.

While there are no surface indications and no historical sites in the SRE Project, there remains the low to very low potential for the Study Area to contain subsurface historical archaeological features that may be encountered during ground disturbing construction activities. Features could include wells, evidence of historical fencing alignments, artefact deposits or hut foundations as these are site types known to occur within the region.

Table 3.2 presents the revised SPR assessment with respect to historic heritage following completion of the assessment of effects.

Table 3.2 Final assessment – confirmed impact event

Impact ID	Potential impact event	Receptor	Linkage	Linkage justification
L33	During construction, land clearing associated with the construction of SRE Project infrastructure results in disturbance to an unknown non-Indigenous heritage site.	Cultural amenity (Historic heritage)	Unconfirmed	There is low to very low potential for subsurface archaeological sites to be within the SRE Project area (i.e. high level of certainty) due to: • historic records • no unidentified archaeological sites having been encountered during earthworks/excavations associated Olympic Dam site infrastructure within the SML.

3.2.1 Impact significance criteria

To determine impact significance of the potential unconfirmed impact event this HHIA has applied the consequence matrix outlined in the Environmental Impact Assessment Framework (EIAF) Appendix to the EIS and summarised in Table 3.3.

Table 3.3 Consequence definitions and significance determination

Severity level	1	2	3	4	5
Environmental value	**Not significant**		**Significant**		
Historic heritage (heritage values)	No measurable impact to items of historic heritage significance	Isolated damage to locally significant historic heritage features that is readily rectified	Damage to State or national listed natural, cultural or historic heritage site that does not alter its heritage significance as stated in the listing	Permanent damage to State or national listed natural, cultural or historic heritage site that results in a loss of heritage significance as stated in the listing	Permanent damage to State or national listed natural, cultural or historic heritage site resulting in the site no longer meeting the listing criteria

3.2.2 Assessment results

The historic heritage impact assessment, including the determination of impact significance and the understanding of uncertainties, of the unconfirmed potential impact event is summarised in Table 3.4.

Table 3.4 Historic heritage impact assessment

Confirmed impact event	Impact ID	Impact significance	Significance justification	Uncertainty
Land clearing	L33	Level 1 – not significant	Should an archaeological site be uncovered, it would be archaeologically investigated and assessed for heritage significance.	Low

i Mitigation and management

Irrespective of the historic heritage assessment outcome, the unconfirmed impact event is proposed to have management and mitigation measure applied, aimed at reducing any potential impact significance to as low as reasonably achievable (ALARA).

On this basis, EMM recommend:

- implementing a stop works procedure for unexpected historical archaeological finds in the Construction Environmental Management Plan (CEMP).

3.3 Conclusion

No historic archaeological sites have been identified in the SRE Project.

Following completion of the assessment of effects, while there are no surface indications and no historical sites in the SRE Project, there remains the low to very low potential for the Study Area to contain subsurface historical archaeological features that may be encountered during ground disturbing construction activities (i.e. unconfirmed potential impact event).

The event was assessed to quantify the likely significance of the impact against the SRE Project's EIAF impact significance criteria, which is assessed a significance Level 1 (not significant).

Irrespective of this outcome, the following mitigation and management measure has been proposed to reduce the impact significance to ALARA:

- Implement a stop works procedure for unexpected historical archaeological finds in the CEMP.

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Abbreviations and acronyms

Acronym	Expansion
ALARA	As Low As Reasonably Achievable
BAU	Business-as-usual
BHP	BHP Olympic Dam Corporation Pty Ltd
CEMP	Construction Environmental Management Plan
Copper SA	Copper South Australia
DBF	Direct-to-blister flash furnace
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DIT	Department for Infrastructure and Transport
EF	Electric slag reduction furnace
EIS	Environment Impact Statement
EPA	Environment Protection Authority
FCF	Flash-converting furnace
FIFO	Fly-in/fly-out
FSF	Flash-smelting furnace
GAB	Great Artesian Basin
IBRA	Interim Biogeographic Regionalisation for Australia
NWP	Northern Water Project
PDI Act	*Planning, Development and Infrastructure Act 2017* (South Australia)
PMR	Precious metals refinery
RNE	Register of the National Estate
SA	South Australia
SCM27	Scheduled Campaign Maintenance 2027
SML	Special Mining Lease
SPC	State Planning Commission
SPR	Source-pathway-receptor
SRE	Smelter and Refinery Expansion

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BHP

Appendix D5.
Visual amenity

Visual Impact Assessment

Olympic Dam Smelter and Refinery Expansion Project

Prepared for BHP Olympic Dam Corporation Pty Ltd

May 2026

Visual Impact Assessment

Olympic Dam Smelter and Refinery Expansion Project

BHP Olympic Dam Corporation Pty Ltd

May 2026

Approved by

Tadd Andersen
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22 May 2026

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This report has been prepared in accordance with the brief provided by BHP Olympic Dam Corporation Pty Ltd and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. This report is to only be used for the purposed for which it has been provided. Except as permitted by the Copyright Act 1968 (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to BHP Olympic Dam Corporation Pty Ltd (and subject to the terms of EMM's agreement with BHP Olympic Dam Corporation Pty Ltd).

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Executive summary

ES1 Introduction

BHP Olympic Dam Corporation Pty Ltd (BHP) is proposing to develop the Smelter and Refinery Expansion Project (SRE Project) at the Olympic Dam mining operations, in the far north of South Australia (SA) (Figure 1.1).

EMM Consulting Pty Ltd and Lathwida Environmental Pty Ltd (EMM-Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2016* (PDI Act) (SA).

EMM was commissioned by BHP to undertake a visual impact assessment (VIA) of the proposed visual impacts related to SRE Project activities to:

- determine if the activities have the potential to result in changes to the existing landscape character and visual environment (baseline condition assessment in Chapter 2 of this report)
- determine the likely magnitude of the change to baseline visual values as a result of the SRE Project (effects assessment in Chapter 3 of this report)
- quantify the likely impacts resulting from the predicted change to baseline visual values on identified receptors (impact assessment in Chapter 4 of this report).

This report supports the EIS, which will be submitted to the Government of South Australia's Minister for Energy and Mining as the relevant Minister for the SRE Project under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

ES2 Baseline condition assessment

The Visual Study Area extends 4 kilometres (km) around the SRE Area. Visually, this landscape is vast, low sand dunes with low open woodland and mixed grasses, punctuated by the existing Olympic Dam Mine development.

Three sensitive receptors have been identified within the Visual Study Area, comprising:

- public road users
- Olympic Dam Airport visitors
- Olympic Dam Village (ODV) accommodation camp workers and visitors.

A Zone of Influence (ZVI) map was produced to gain an appreciation of where the SRE Project infrastructure may be visible. The ZVI map illustrates the extent to which the SRE Project is potentially visible, based upon proposed maximum surface infrastructure.

The ZVI map identified the following:

- Most locations within the Visual Study Area will have at most a partial view of the proposed SRE Project infrastructure.
- The undulating topography of the Visual Study Area is shown by the large number of widely dispersed small areas that will have no view of the SRE Project infrastructure.
- ODV (i.e. accommodation camp workers and visitors) may have views of the SRE Project. However, because of the flat terrain and generally low, single-storey accommodation buildings, visibility of the SRE Project infrastructure will be blocked by existing vegetation and/or structures from most viewpoints except a small number of locations on the northern edge of the village.

- Travellers on roads within the Visual Study Area, including Olympic Dam Highway and Borefield Road, will not have any significant view of the SRE Project infrastructure that persists while travelling.

ES3 Assessment of effects

Two potential impact events were identified:

- the emission of light during operations (e.g. from infrastructure area lighting and vehicles) may be at a level at which impacts to the amenity of the local community may occur
- placement of SRE Project infrastructure changes the prevailing visual amenity of the area.

Potential visual effects were assessed using ZVI mapping and preparation of photomontages from selected viewpoints.

ES4 Impact assessment

Following completion of the assessment of effects, the two confirmed impact events were assessed to quantify the likely significance of the impact against BHP's Environmental Impact Assessment Framework (EIAF) impact significance criteria, both of which have been assessed a significance Level 1 or Level 2 (not significant) (Table ES1).

Table ES1 Visual amenity impact assessment

Impact ID	Confirmed impact event	Impact significance	Significance justification
A29	Project-related operational activities result in emissions of light leading to changes in visual amenity and impacts to the local community	Level 1 – not significant	Additional night lighting from the SRE Project in the immediate vicinity of the existing Olympic Dam mine infrastructure will cause no significant loss of visual amenity within the Visual Study Area. Due to the distance from any sensitive receptors the SRE Project will have no impact on visual amenity from project related infrastructure or changes to the landscape.
L12	During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area	Level 2 – not significant	The SRE Project infrastructure will not extend above or beyond existing industrial elements, while the undulating topography and existing vegetation in this vicinity will reduce any visual impacts. Due to the distance from any sensitive receptors the SRE Project will have no impact on visual amenity or landscape character from project related infrastructure or changes to the landscape.

Irrespective of this outcome, mitigation and management measures are proposed to reduce the impact significance to as low as reasonably achievable (ALARA).

There are no impacts with an assessed significance Level 3 (significant) or greater.

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1 Introduction

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EMM Consulting Pty Ltd and Lathwida Environmental Pty Ltd (EMM-Lathwida) are preparing an Environmental Impact Statement (EIS) for the SRE Project in accordance with EIS assessment requirements and Practice Direction 17 Impact Assessed Development under the *Planning, Development and Infrastructure Act 2016* (PDI Act) (SA).

EMM was commissioned by BHP to undertake a visual impact assessment (VIA) of the proposed visual impacts related SRE Project activities to:

- determine if the activities have the potential to result in changes to the existing landscape character and visual environment (baseline condition assessment in Chapter 2 of this report)
- determine the likely magnitude of the change to baseline visual values as a result of the SRE Project (effects assessment in Chapter 3 of this report)
- quantify the likely impacts resulting from the predicted change to baseline visual values on identified receptors (impact assessment in Chapter 4 of this report).

This report supports the EIS, which will be submitted to the Government of South Australia's Minister for Energy and Mining as the relevant Minister for the SRE Project under the *Roxby Downs (Indenture Ratification) Act 1982* (SA).

1.1 Project area definitions

To maintain consistency throughout the EIS and supporting technical assessments, the following terminology related to project infrastructure have been defined for the SRE Project where the **SRE Project Area** is defined at the boundary around the SRE Project for which BHP is seeking approval, including:

- **Special Mining Lease (SML) Area**, located within the SML (Figure 1.2), which is further delineated by the following areas:
  - **SRE Area**: the extent of the proposed SRE Project infrastructure required for construction and operation of the SRE Project within the SML. Includes the existing brownfield plant area, proposed facility relocation(s), proposed plant and laydown areas.
  - **General Infrastructure Area**: the extent of the proposed ancillary infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed infrastructure laydown areas, proposed stormwater dam location, proposed topsoil and subsoil storage areas.
  - **Water Infrastructure Area**: the extent of the proposed water infrastructure and ancillary activities required for construction and operation within the SML. Includes the proposed water pipeline and water storage dam locations.
- **Electricity Infrastructure Ground Re-Profiling Area**: the extent of the isolated proposed vegetation disturbance required to maintain regulatory clearance distances between the 275 kilovolt (kV) transmission line and the ground surface within Clause 28 land. It is noted that the transmission line and infrastructure are already in place, but additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging and, therefore, changes to existing clearance distances to enable safe operation (Figure 1.3).

The Visual Study Area is defined and mapped in Chapter 2.

1.2 Regulatory context

The SRE Project was declared an Impact Assessed development pursuant to sections 108(1)(c) and 108(7) of the PDI Act on 29 August 2024. The declaration reflects the nature, scale and significance of the SRE Project to SA.

Impact Assessed Development is the most rigorous level of development assessment prescribed under the PDI Act.

Specifically, the Minister made the following declaration:

> Pursuant to Section 108(1)(c) and Section 108(7) of the Planning Development and Infrastructure Act 2016, having taken into account those principles prescribed under Regulation 27(2) of the Planning, Development and Infrastructure (General) Regulations 2017 (the Regulations) and having given consideration to the matters under Regulation 27(3) of the Regulations, I declare that all development of a kind specified in the Schedule to this Notice, to the extent that it is undertaken on land identified in Clause 28(1) of the Indenture as impact assessed development and that references to "development" include a project.

The majority of the SRE Project activities, with the exception of ground re-profiling within the Electricity Infrastructure Area, would be located wholly within the existing SML but does not include business-as-usual (BAU) operations (operations which enable existing approved production of up to approximately 200,000 tonnes per annum (tpa) total copper production) or activities associated with scheduled campaign maintenance 2027 (SCM27) works. These activities are subject to separate regulation (e.g. EPA licensing) and approval. The SRE Project may also be supported by low impact development outside the SML, which could include, for example, minor road works and upgrades to accommodation infrastructure. It is proposed that any approvals required for these activities would be sought on an as-needs basis under applicable legislation and guidelines.

1.2.1 *Planning Development and Infrastructure Act 2016 (SA)*

Development approval is required for the SRE Project under the PDI Act. The PDI Act established a new development assessment system in SA to streamline the assessment process. The PDI Act is supported by subordinate regulations, as well as practice directions and guidelines which are issued by the State Planning Commission, the state's independent principal planning body.

A key feature of the new planning system is the Planning and Design Code (the Code) which contains a single set of planning policy, rules and classifications for SA, which is applied spatially via mapping. The Code establishes a performance-based approach to planning and development assessment by including policies that address the scale, form and design of built structures and the contextual setting of the development.

The planning system established by the PDI Act includes five assessment pathways; accepted development, code assessed development (deemed-to-satisfy or performance assessed) and impact assessed development (restricted and impact assessed). As previously stated, impact assessed development is the most rigorous level of development assessment prescribed under the PDI Act.

i Ministerial Declaration – Impact Assessed Development

The declaration subjects the SRE Project to an EIS process requiring detailed environmental, social and economic assessment.

A Scoping Application was prepared by BHP to inform the development of EIS Assessment Requirements by the State Planning Commission (SPC). The EIS Assessment Requirements issued by the SPC summarise all potential issues needing to be addressed by BHP and highlight any further information required by the Minister to enable a proper assessment of the proposed SRE Project.

Due to the operation of the *Roxby Downs (Indenture Ratification) Act 1982*, the Minister for Energy and Mining is the relevant Minister for the SRE Project.

Specific Assessment Requirements for the VIA (Annexure A) are as follows:

- Provide a description of the landscape character, features and values of the development area and its environs.
- Assess any effects of the development on visual amenity and landscape quality.

1.2.2 Visual assessment

Currently, there is no formalised standard visual amenity assessment methodology for this type of project at local, state or Commonwealth levels. While various guidelines and frameworks have been produced, they do not provide a definitive assessment methodology or technique for the SRE Project.

To follow a 'best practice' approach, the VIA was conducted using a methodology consistent with:

- *Guidelines for Landscape and Visual Impact Assessment* (United Kingdom Landscape Institute of Environmental Management and Assessment 2013)
- *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects 2018)
- *Guideline for landscape character and visual impact assessment Environmental impact assessment practice note EIA-N04, Version 2.2* (Transport for NSW, Centre for Urban Design 2020) (note: for methodological reference only as does not apply to mine projects)
- *Large-Scale Solar Energy Guideline* (2024) (Solar Guideline), prepared by the NSW Department of Planning, Industry and Environment.

1.2.3 Strategic regional planning policies

i Far North Region Plan 2010–2036

The *Far North Region Plan 2010–2036* was developed by the former SA Department of Planning and Local Government (now Planning and Land Use Services (PLUS) within the Department for Housing and Urban Development), and incorporates the areas of Port Augusta, Flinders Ranges, Roxby Downs, and the region's unincorporated areas.

The Plan guides future land use and development in the region that sets out how the State Government proposes to balance population and economic growth with the need to preserve the environment and protect the heritage, history, and character of regional communities.

The Far North Region Plan, Policy 5.1 states a key objective is to "protect and conserve places and landscapes of heritage and cultural value, including State, National and local registered sites".

It is noted that, on 13 October 2022, the State Planning Commission endorsed Proposal to Initiate documents for the preparation of an updated Far North Region Plan, pursuant to section 73(1)(a) of the PDI Act to provide a long-term vision for a region to guide land use planning over a 15-to-30-year period. An updated draft regional plan is proposed to be provided to the Minister for approval.

1.3 Project description

The objective of the SRE Project is to expand BHP's smelter and refinery capacity, enabling the CopperSA growth plan by:

- increasing copper production capacity up to 650,000 tpa of total copper plus associated products from the current average production of approximately 200,000 tpa
- delivering a sustainable, highly productive, and more resilient smelting and refining flowsheet
- ensuring the Cu:S ratio is resolved at Olympic Dam for copper concentrate production
- delivering reliable and predictable production outcomes following the 2023 acquisition of OZ Minerals' Carrapateena and Prominent Hill mining operations to realise Copper SA province opportunities.

Key elements of the SRE Project are:

- expansion of, and additions to, the existing smelter and refinery to enable total production of up to 650,000 tpa copper plus associated products
- introduction of a two-stage smelting involving the installation of a new primary flash-smelting furnace (FSF) to produce copper matte, adding material smelting capacity
- conversion of the existing direct-to-blister flash furnace (DBF) to a flash-converting furnace (FCF), which would process the matte into blister
- addition of an acid plant of similar nature and scale to the existing acid plant and subsequent upgrade of the existing acid plant
- expansion of the electrorefinery and precious metals recovery facilities to produce cathode copper, gold, and silver.

Associated with these key elements, the SRE Project would require new supporting facilities, infrastructure and services and the upgrade, removal and/or relocation of existing facilities and services within the SML Area (Figure 1.2).

External to the SML Area, electricity would be supplied to the SRE Project through the existing 275 kV line from Davenport substation (near Port Augusta) to Olympic Dam mine, located within Clause 28 land[1] (EIGR Areas). Whilst the transmission line and infrastructure are already in place, additional electricity loads required for the SRE Project will result in increased transmission line temperature and more pronounced line sagging, reducing the existing electrical clearances that are required to enable safe operation. The maintenance of the required electrical clearances between the 275 kV line and the ground surface would necessitate isolated areas of land disturbance and associated vegetation clearance (Figure 1.3).

The SRE Project would be constructed and operated in a staged manner to enable production capacity up to 650,000 tpa of total copper and associated products, with stages detailed in Table 1.1.

This technical assessment has been prepared based upon the maximum potential impacts associated with Stage 2 (i.e. the greatest impact scenario) to ensure that the full extent of all potential impacts is identified and assessed.

The indicative location of key infrastructure is shown in Figure 1.2 and Figure 1.3, while the key project characteristics are outlined in Table 1.2.

[1] Clause 28 land as defined under the *Roxby Downs (Indenture Ratification) Act 1982* (SA)

Table 1.1 Project stages and timing

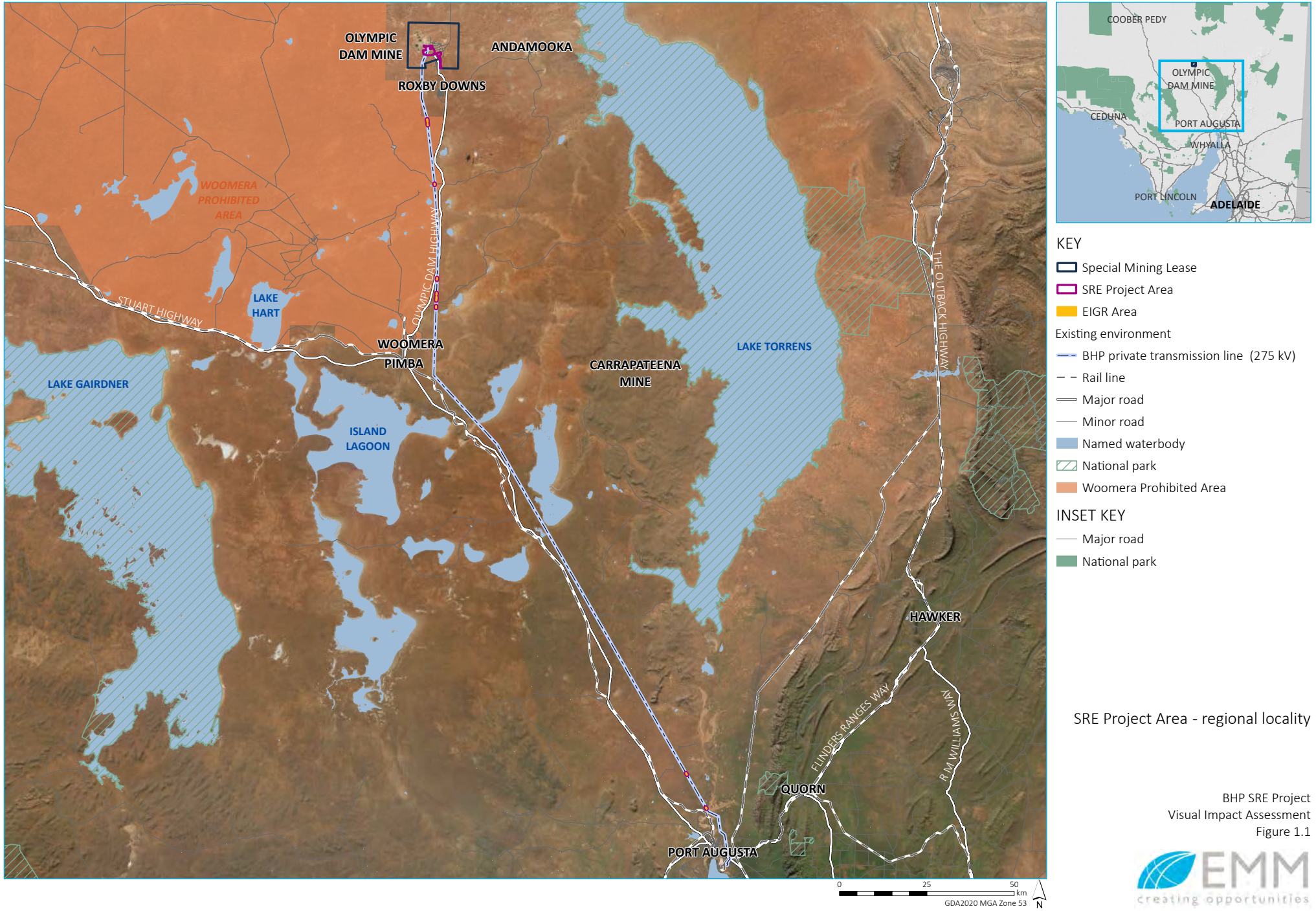
Stage	Smelter concentrate throughput (tpa)	Description	Anticipated timing
Stage 1a	1,100,000	Stage 1a includes: • an increase of smelter throughput to approximately 1,100,000 tpa of concentrate producing an output of approximately 390,000 tpa of total copper • a new regional concentrate receiving, handling and blending facility • upgrade and expansion of the existing smelter feed preparation, including additional concentrate storage, blending and a new steam dryer • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to an FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure and decommissioning of the existing electric slag reduction furnace (EF) if required • expansion of the brownfield slag concentrator supported by FSF slag cooling pits, a new slag stockpile and associated environmental management infrastructure • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant, additional acid storage, and an associated acid loading station to allow the export of acid • a new electrorefinery and associated anode preparation infrastructure • a new slimes treatment plant • expansion of the precious-metals refinery (PMR) facility	2028 to 2032
Stage 1b	1,400,000	Stage 1b includes: • an increase in smelter throughput to approximately 1,400,000 tpa of concentrate producing an output of approximately 500,000 tpa of total copper • installation of additional concentrate leach thickening and filtration infrastructure • development of greenfield slag concentrator and associated stockpile and decommissioning of brownfield slag concentrator • incremental expansion of Stage 1a infrastructure and services, including: – the installation of additional electrorefinery modules – expansion of feed preparation, FCF feed system (including lime addition), off-gas management, acid plant, slimes treatment and PMR capacities	2032 to 2036
Stage 2	2,000,000	Stage 2 includes: • an increase in smelter throughput to approximately 2,000,000 tpa of concentrate producing an output of approximately 650,000 tpa of total copper • installation of new concentrate leach circuit for treatment of imported concentrate • incremental expansion of Stage 1b infrastructure and services, including: – the installation of additional electrorefinery modules – the installation of an additional anode furnace and associated off-gas management infrastructure – expansion of feed preparation, FSF and FCF feed systems, off-gas and slag management, acid plant, slimes treatment and PMR capacities	2038 to closure

Table 1.2 Key characteristics of the SRE Project

Project element	Summary
Smelter and refinery expansion and additions	Expansion of, and additions to, the existing smelter and refinery to enable production of up to 650,000 tpa copper plus associated products (gold, silver, and acid). This would include: • a new concentrate handling and blending facility • additional concentrate leach capacity • upgrade and expansion of the existing smelter feed preparation • installation of a new primary FSF to produce copper matte and conversion of the existing DBF to a FCF to convert matte to blister, including additional anode furnace and anode casting infrastructure • upgrade of the existing slag concentrator circuit and subsequent development of a new slag concentrator circuit • new off-gas management infrastructure, including additional gas and dust handling equipment • a new acid plant and upgrade of the existing acid plants • a new electrorefinery and associated infrastructure • a new slimes treatment plant • expansion of PMR facility • slag stockpile and treatment.
Electricity demand, supply and distribution	An electricity demand of up to 68 mega volt-amperes (MVA) net load increase would be required for the SRE Project. The additional electrical demand due to the SRE Project would be met by capacity from the national grid via the existing 275 kV transmission line (noting potential for below line land disturbance and associated vegetation clearance outside of the SML). Minor augmentation of existing onsite electricity supply infrastructure at Olympic Dam within the SML would be to ensure the additional capacity could be achieved and maintained. New high voltage and low voltage power supply and reticulation infrastructure would be required to all smelter infrastructure.
Water demand	Water demand of between 2 and 16 megalitres per day (ML/day) required for the SRE Project in addition to the existing supply for current operations.
Water supply and distribution	The SRE Project proposes no additional water abstraction from the Great Artesian Basin (GAB) above daily average BAU volumes. Water supply for the SRE Project would nominally be provided from the Department for Infrastructure and Transport (DIT) Northern Water Project (NWP) infrastructure, following commissioning of the initial 90 ML/d capacity of the NWP. This would require new water storage and distribution infrastructure to connect the SRE Project to the NWP connection point at the SML boundary. The NWP water supply may be supplemented or offset by the provision of local groundwater supply (subject to further approvals). This water supply would occur via existing process storage dams, the desalination plant at the Olympic Dam site, and/or through the distribution of the existing water supply within daily average BAU volumes. The additional water supplies are likely to require augmentation of the existing desalination water treatment plant and water distribution network, and a demineralised water plant will be required to support the SRE Project operations.
Supporting infrastructure	Supporting infrastructure includes: • civil infrastructure works, such as roads and stormwater infrastructure • new offices and crib rooms • new workshops • new laydown areas • process control system upgrades • concrete batching • other supporting infrastructure as required to facilitate the implementation and operation of the SRE Project.

<table>
<tr><th>Project element</th><th>Summary</th></tr>
<tr><td>Waste management</td><td>Development of the SRE Project may require decommissioning of the existing processing plant components including dryers, the electric furnace and the existing concentrate storage and transfer system. Some of the decommissioned infrastructure would be retained in-situ to preserve operational flexibility or for future management under the site Closure Management and Rehabilitation Plan; however, some elements may require disposal as a component of the SRE Project.
Waste generated during construction would be managed as follows:
• where practicable, demolition materials would be removed from site and recycled
• materials not suitable for removal from site would be managed on the SML via existing waste management facilities.
All waste generated from construction of the SRE Project would be managed in accordance with existing site procedures and approved management plans.
Operational wastes associated with the SRE Project consist of processing and non-processing wastes where:
• processing wastes are limited to low-copper slags generated from the smelting and slag concentrator operations that are not suitable for reprocessing and effluent streams from various process operations that are directed to tailings, including from the PMR and smelter off-gas systems
• non-processing wastes including reagent packaging wastes and operational consumables.</td></tr>
<tr><td>Workforce</td><td>100% fly-in/fly-out (FIFO) workforce is assumed for construction and the SRE operational workforce. Estimated peak construction workforce numbers (in full time equivalents (FTE)) are summarised below.
<table>
<tr><th>Construction stage</th><th>Average FTE</th><th>Peak FTE</th></tr>
<tr><td>Stage 1a</td><td>~708</td><td>~1,313</td></tr>
<tr><td>Stage 1b</td><td>~260</td><td>~515</td></tr>
<tr><td>Stage 2</td><td>~519</td><td>~978</td></tr>
</table>
Following construction, the SRE Project would require the permanent operational workforce summarised below.
<table>
<tr><th>Operational stage</th><th>Additional SRE Project operational workforce</th><th>Total Olympic Dam Smelter and Refinery workforce</th></tr>
<tr><td>Stage 1a</td><td>~207</td><td>766</td></tr>
<tr><td>Stage 1b</td><td>~57 (additional to Stage 1a)</td><td>823</td></tr>
<tr><td>Stage 2</td><td>~244 (additional to Stage 1b</td><td>1,067</td></tr>
</table>
SRE Project construction and operational workforce is proposed to utilise existing and new accommodation to be established by BHP for the scheduled campaign maintenance 2027 (SCM27) shutdown, Olympic Dam future campaign maintenance accommodation, and/or greenfield accommodation (subject to separate approvals).</td></tr>
<tr><td>Concentrate import</td><td>Import of copper concentrate from Prominent Hill and Carrapateena mining operations, as well as possible future mining operations (e.g. Oak Dam), and maintain the ability to receive copper concentrate from other third-party suppliers.
Prominent Hill concentrate may be passed through concentrate leach to remove fluorides prior to smelter feed preparation. Carrapateena concentrate to pass directly to smelter feed preparation. Other, third-party concentrates may be passed through concentrate leach to remove deleterious elements (e.g. fluorides) prior to smelter feed preparation as required.</td></tr>
</table>

Project element	Summary
Production and export	Total production volumes of up to: • ~650,000 tpa of cathode copper • ~893,000 ounces per annum of gold • ~3,950,000 ounces per annum of silver • ~4,900 tpa of uranium oxide concentrate; note that the SRE Project does not materially change existing uranium production, with an increase of approximately 1% expected as a result of the leaching of Prominent Hill concentrate to remove fluoride. No upgrade or modification of uranium production facilities is proposed as a part of the SRE Project • ~1,700,000–1,900,000 tpa of 98% sulphuric acid (H_2SO_4), of which up to approximately 810,000 tpa may be exported from Olympic Dam (i.e. operations become 'net' sulphuric acid producer)



KEY

- Special Mining Lease
- SRE Project Area
- EIGR Area

Existing environment

- BHP private transmission line (275 kV)
- Rail line
- Major road
- Minor road
- Named waterbody
- National park
- Woomera Prohibited Area

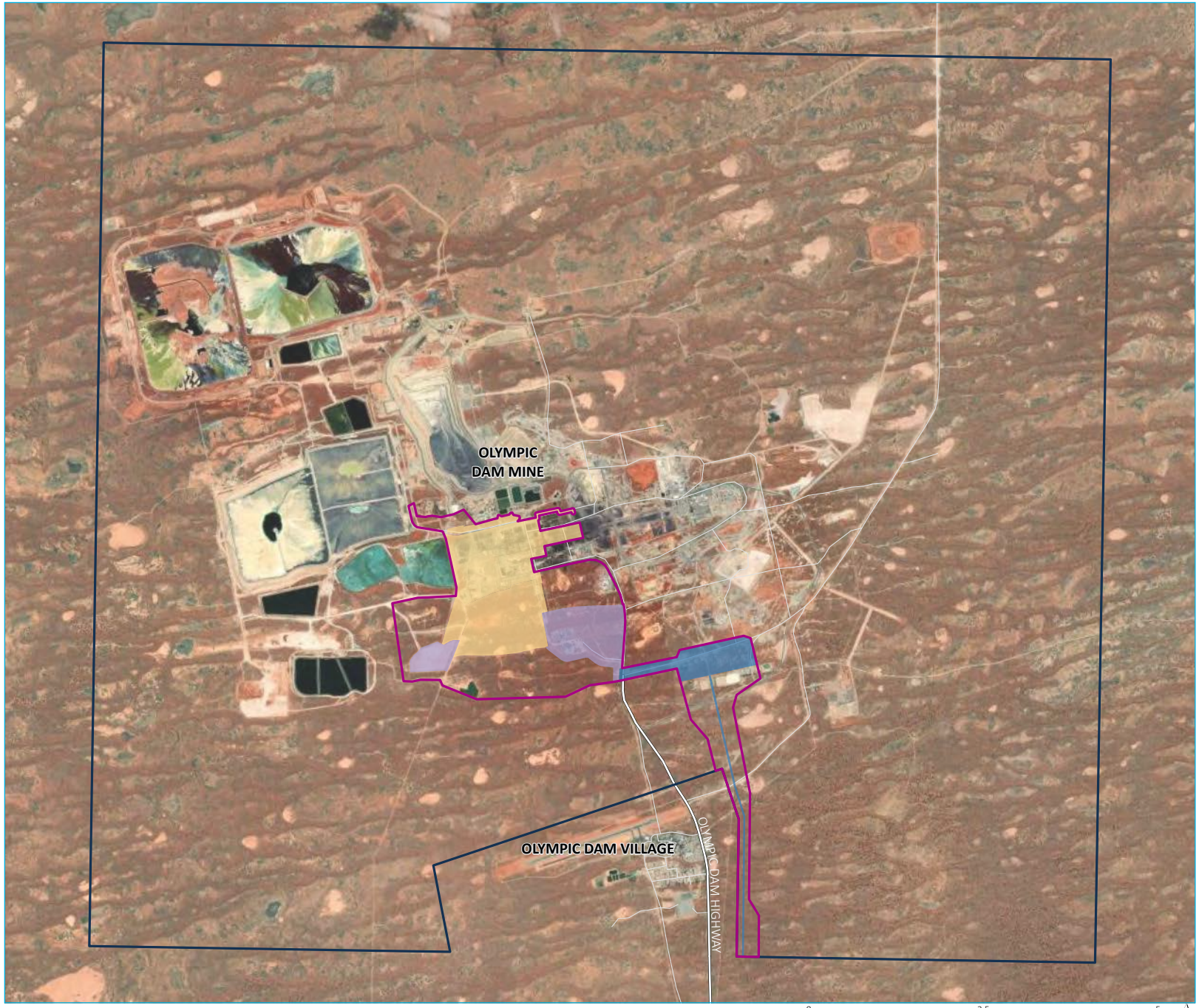
INSET KEY

- Major road
- National park

SRE Project Area - regional locality

BHP SRE Project
Visual Impact Assessment
Figure 1.1

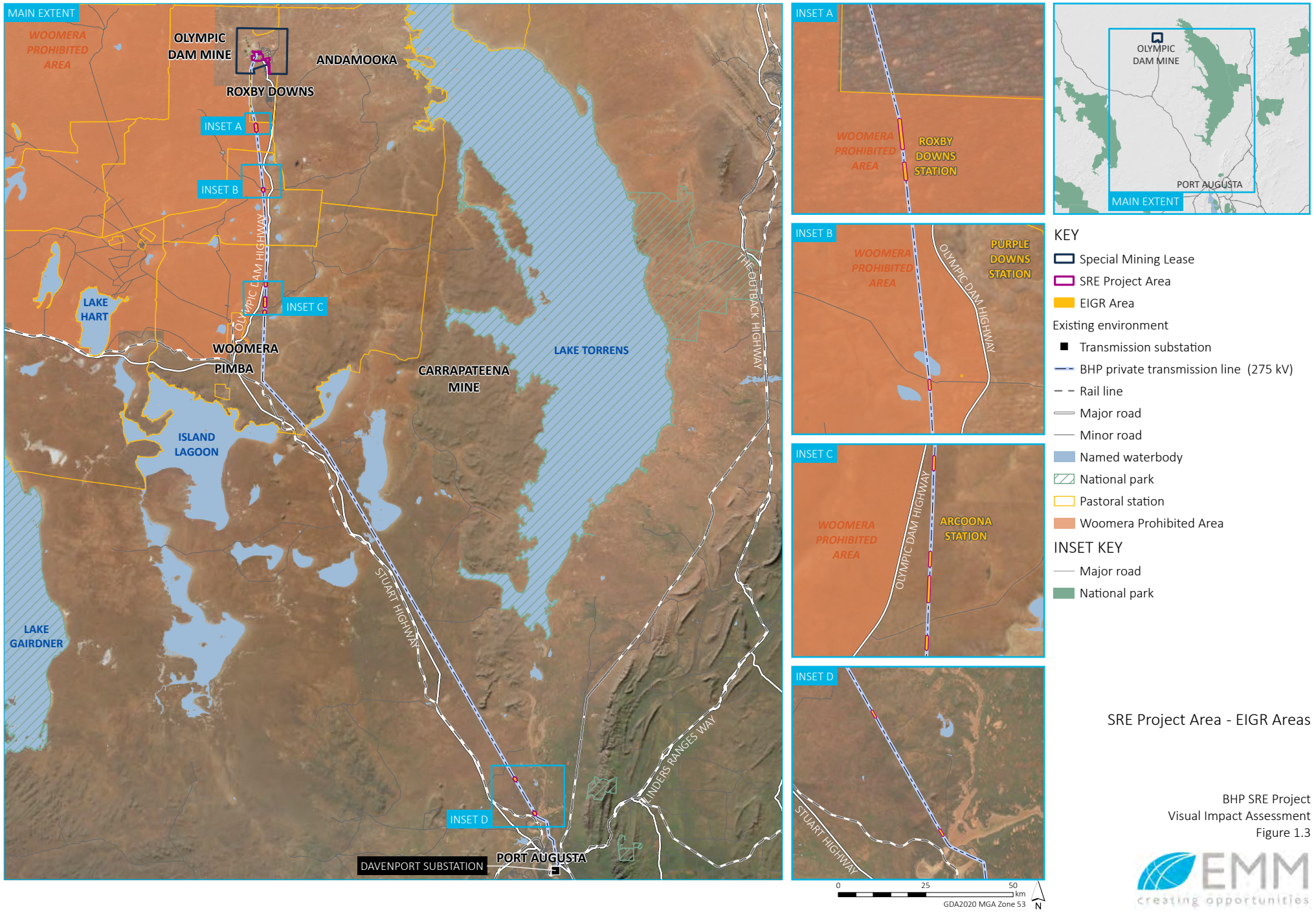
EMM
creating opportunities



SRE Project Area - SML Area

BHP SRE Project
Visual Impact Assessment
Figure 1.2

EMM
creating opportunities



SRE Project Area - EIGR Areas

BHP SRE Project
Visual Impact Assessment
Figure 1.3

EMM
creating opportunities

2 Baseline condition assessment

In order to quantify the potential effects of the SRE Project on visual values and the subsequent impacts to receptors, it is necessary to understand the existing baseline environment, and specifically:

- to classify and describe the existing landscape character and visual environment prior to the development of the SRE Project
- to provide a basis for project activities aimed at describing the likely change in the baseline environment as a result of the development of the SRE Project and quantifying the significance of resultant impacts to receptors.

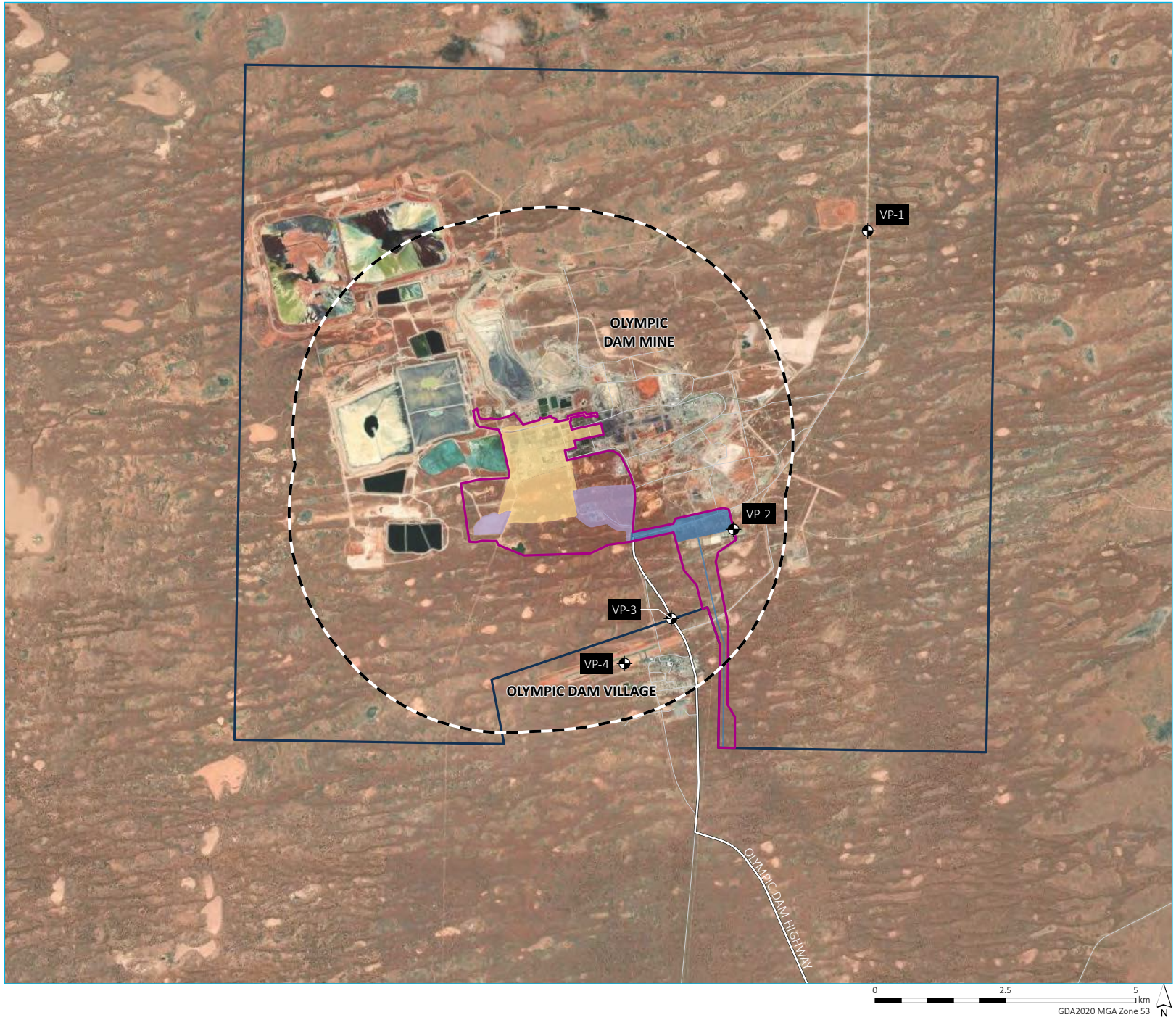
2.1 Environmental context

2.1.1 Study area

The Visual Study Area extends approximately 4 km beyond the SRE Area as shown on Figure 2.1. The distance of 4 km is adopted from the NSW Solar Guideline (NSW Department of Planning, Industry and Environment 2024) and is confirmed by the zone of visual influence map (Section 2.1.1i and Figure 2.2) which indicates limited visibility of project elements beyond this distance.

Some SRE Project activities will have negligible to minor visual impact because their visible horizontal and vertical dimensions are sufficiently small to make them difficult to see from any but very close viewpoints. For this reason, the following SRE Project activities have not been modelled for consideration in this VIA:

- clearing below existing electrical infrastructure
- clearing for and construction of new roads/access tracks
- temporary structures/laydown areas.



Visual study area

BHP SRE Project
Visual Impact Assessment
Figure 2.1

EMM
creating opportunities

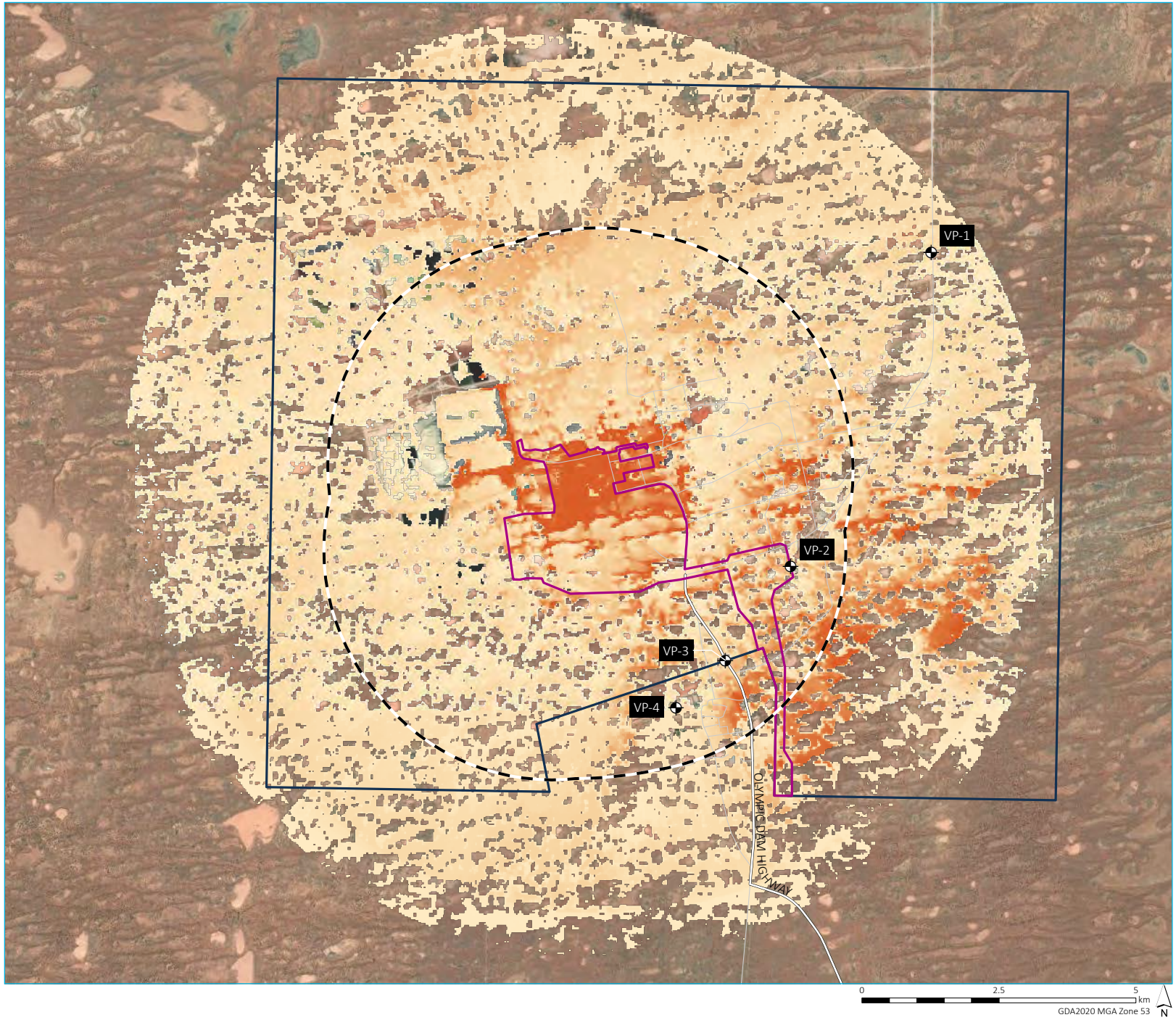
i Zone of visual influence (ZVI)

A ZVI map (Figure 2.2) was produced to gain an appreciation of where the SRE Project infrastructure may be visible. The ZVI map illustrates the extent to which the SRE Project is potentially visible, based upon proposed maximum surface infrastructure.

The analysis uses digital elevation, digital surface and computer-generated models of the proposed infrastructure to illustrate how visible the SRE Project would be from locations around the Visual Study Area. This analysis is based on a bare earth model and does not allow for existing vegetation or structures that may block views. In this way it shows a worst-case scenario.

The ZVI map (Figure 2.2) shows the following:

- Most locations within the Visual Study Area will have at most a partial view of the proposed SRE Project infrastructure.
- Beyond the 4 km Visual Study Area, only a small number of narrow SRE Project Area elements will be potentially visible. From this distance these elements will not increase the visual impact beyond that of the existing infrastructure.
- The undulating topography of the Visual Study Area is shown by the large number of widely dispersed small areas that will have no view of the SRE Project infrastructure.
- The Olympic Dam Village (ODV) (i.e. accommodation camp workers and visitors) may have views of the SRE Project. However, because of the flat terrain and generally low, single-storey accommodation buildings, visibility of the SRE Project infrastructure will be blocked by existing vegetation and/or structures from most viewpoints except a small number of locations on the northern edge of the village.
- Travellers on roads within the Visual Study Area, including Olympic Dam Highway and Borefield Road, will not have any significant view of the SRE Project infrastructure that persists while travelling.



Zone of visual influence

BHP SRE Project
Visual Impact Assessment
Figure 2.2

EMM
creating opportunities

2.1.2 Environmental aspects

The SRE Project is located within the Far North Region of South Australia, approximately 83 km north of Woomera and 13 km north of Roxby Downs. These towns have been established within the last 90 years – Woomera in 1947 to service the Woomera Rocket Range, and Roxby Downs in 1986 to service the Olympic Dam mine.

The surrounding landscape of the SRE Project includes the Olympic Dam operations, Airport, and ODV and the nearby township of Roxby Downs, which is connected by a network of established roads. Beyond this, there are large areas of native vegetation to which are subject to pastoral leasing (with a long history of livestock grazing) and/or other land uses such as the Woomera Prohibited Area (Department of Defence). The closest conservation area is the Arid Recovery Reserve (ARR) (20 km north of Roxby Downs). Lake Torrens is located approximately 40 km to the east of the SRE Project (a gazetted National Park). There are no vegetation Heritage Agreements located within 50 km of the SRE Project.

Physical and anthropogenic aspects of the Visual Study Area are described in Section 2.2.

2.1.3 Sensitive receptors

This VA considers potential impacts from the SRE Project on the visual amenity of sensitive receptors (people) within the Visual Study Area. The sensitive receptors are described under the headings below and summarised in Table 2.1.

i Cultural amenity

a Aboriginal heritage

No sensitive receptors were identified under this classification.

The presence of any artefacts or identified Aboriginal cultural heritage values, including landscape features, within the SRE Project will be handled in accordance with legislation and the agreed procedures and protocols for heritage management with the Kokatha Aboriginal Corporation (KAC), Kuyani Yartah Association (KYA) and Barngarla Determination Aboriginal Corporation (BDAC) Indigenous Groups.

b Non-Aboriginal heritage

No sensitive receptors were identified under this classification.

Evidence of past historic land uses and settlement, such as old fences, stockyards, ruined huts and windmills, are scattered throughout the region. Most of these features, however, are commonplace and not of particular heritage significance.

There are no listed heritage items identified within the Visual Study Area. The non-indigenous heritage items closest to the SRE Project are Andamooka Historic Reserve and Dick Clark's Residence (Andamooka). Both are located approximately 27 km east.

ii Local community

Three sensitive receptors were identified under this classification, as shown in Table 2.1.

There are no towns or settlements within the Visual Study Area. ODV (worker accommodation) and Olympic Dam Airport are located on the southern edge of the Visual Study Area.

The nearest town is Roxby Downs, with a population of approximately 4,000 people approximately 12 km south of the SRE Area. Andamooka is approximately 28 km east of the SRE Project.

Borefield Road is a public road used by tourists travelling to William Creek.

Table 2.1 Sensitive receptors

Receptor category[2]	Receptor	Representative viewpoints (VP)	Description
Local community (amenity)	Public road users (Olympic Dam Highway, Borefield Road)	VP-1 and VP-2	Olympic Dam is a remote location and is not on the route between any significant destinations. Sections of Borefield Road and Olympic Dam Highway within the Visual Study Area will provide potential views of the SRE Project.
Local community (amenity, community values)	Olympic Dam Airport visitors	VP-4	Olympic Dam Airport is a local airport with daily services connecting to Adelaide. Most users are workers from Olympic Dam.
Local community (amenity)	ODV (accommodation camp workers and visitors)	VP-4	Most users are workers from Olympic Dam.

2.2 Baseline visual amenity environment

The purpose of this baseline condition assessment is:

- to determine if the SRE Project will have a visual impact within the Visual Study Area
- if a visual impact is identified, to determine if the magnitude of the impact is sufficient to trigger further detailed assessment.

The baseline upon which the visual impact is determined includes human experience on site and photographs.

2.2.1 Baseline studies

The following studies were undertaken to assess the baseline visual amenity environment.

i Site visit

A site visit was undertaken on 12 November 2024, when the EMM project team was able to experience the site and its visual qualities.

ii Photographic analysis/viewpoints

Based upon the ZVI, four viewpoints were selected for detailed assessment of potential visual impacts, as outlined in Table 2.2 and shown on Figure 2.2. Photographs from each of the viewpoints are shown in Figure 3.1 to Figure 3.4.

[2] From EIAF Table 1.2.

Table 2.2 Photograph location and description

VP No.	VP location	Project feature assessed	Location (mapped on Figure 2.1)		Description
			Latitude	Longitude	
1	Borefield Rd looking south-west towards Olympic Dam	Built elements withing the SRE Area	30.410189	136.925697	This viewpoint is located on the western side of Borefield Road, approximately 9 km north of its intersection with Olympic Dam Highway. Further details and a photograph and photomontage from VP-1 are shown in Figure 3.1.
2	Main Gate, Olympic Dam Highway / Borefield Road	Built elements withing the SRE Area	-30.476956	136.888695	Located on Olympic Dam Highway near the mine entrance gate, approximately 3 km south of the SRE Area. Further details and a photograph and photomontage from VP-1 are shown in Figure 3.2.
3	Olympic Dam Desalination Plant	Built elements withing the SRE Area	-30.460419	136.898823	Looking west from the internal site access road near the desalination plant. Further details and a photograph and photomontage from VP-1 are shown in Figure 3.3.
4	Blinman Road, ODV – near airport and worker accommodation	Built elements withing the SRE Area	-30.482357	136.888182	Located on the northern edge of ODV with the airport in the middle left of this image. Facing north toward the SRE Area. Further details and a photograph and photomontage from VP-1 are shown in Figure 3.4.

2.2.2 Baseline visual environment

The existing topography of the Visual Study Area is characterised by broadly flat terrain with gently undulating dunes creating a finer texture within the broader landscape. This flat topography creates an open landscape with long viewing distances.

Low open woodland and mixed grasses, sandy interdune swales within Acacia low open woodland over Chenopod low open shrubland and interdune swales with clay soils supporting Cane-grass tall grassland create a landscape of varied vistas.

2.2.3 Anthropogenic visual effects

The natural landscape qualities described above (Section 2.2.2) provide a strong contrast to the existing Olympic Dam mine facility. This facility is a large industrial development located in a vast outback landscape surrounded by low density primary production land uses and sparse remnant native vegetation. To illustrate the scale of the existing development Table 3.2 below provides the height above ground level of some of the main existing structures that will form the visual backdrop to the SRE Project.

Due to the isolation of the region in which the SRE Project sits and the long-standing Pastoral Lease use of the land, the recent history of the landscape has been primarily sheep grazing. Evidence of past historic land uses and settlement, such as old fences, stockyards, ruined huts and windmills, are scattered throughout the region.

Table 2.3 Existing built infrastructure elements

Existing Olympic Dam built infrastructure element	Maximum approx. height above ground level (m)
Acid Plant	30
Acid Plant Cooling Tower	20
Acid Plant Stack	90
Anode Furnaces	30
Anode Furnace Filter Stacks	55
Electrorefinery	15
FSF Complex Building	50
Feed preparation	30
Oxygen Plant	10
Smelter	55
Transmission towers	35

2.2.4 Landscape character

Landscape character is a result of natural and anthropogenic effects and the interface between them. The existing landscape character of the Visual Study Area is created by the strong contrast of materials and forms of industrial development that transitions abruptly to the surrounding natural environment of flat or undulating terrain with native vegetation.

2.2.5 Conclusion

The Visual Study Area extends 4 km around the SRE Project. Visually, the landscape character of the Visual Study Area is created by vast, low sand dunes with low open woodland and mixed grasses, punctuated by the existing Olympic Dam Mine development.

Three sensitive receptors have been identified within the Visual Study Area, comprising:

- public road users
- Olympic Dam Airport visitors
- ODV accommodation camp workers and visitors.

The location of the SRE Project minimises visual impacts to sensitive receptors. It is not located near any settlements or homesteads and, therefore, is not expected to impact any residences. Based upon the ZVI, four viewpoints were selected for detailed assessment of potential visual impacts.

3 Assessment of effects

An assessment of effects was undertaken to determine the change in the existing pathway environment as a result of the proposed SRE Project activities. The assessment of effects included the following works:

- obtain input data (i.e. baseline environment) as required for the development of a ZVI map and photomontages
- review of the SRE Project activities and the identified potential impact events to determine possible visual effects for modelling and effects assessment
- complete subsequent effects modelling and effects assessment studies.

3.1 Potential impact events

BHP has identified potential impact events associated with likely changes to the emission of light (amenity) and placement of SRE Project infrastructure (visual amenity) as a result of the implementation of the SRE Project. These events represent scenarios for which there is, or is likely to be, a linkage between SRE Project activities (sources), pathway (air, land) and the identified receptors.

To ensure a consistent approach to impact assessment for the SRE Project, sources, pathways, and receptors (SPR) are defined and applied in this assessment as follows:

- Source – the SRE Project activities (i.e. potential impact event) which, alone or in combination, has the potential to impact a receptor.
- Pathway – the pathway, means or route (with consideration of any natural barriers) by which the receptor can be exposed to, or may reasonably be expected to be impacted by, the source.
- Receptor – the receptor that may be impacted by the source via the pathway.

The detailed list of potential impact events is provided in the Environmental Impact Assessment Tables Appendix to the EIS and are summarised for the visual amenity pathway in Table 3.1. The scope of this assessment of effects presented herein has considered these identified potential impact events.

Table 3.1 Preliminary SPR assessment – potential impact events

Impact ID	Potential impact event	Source	Pathway	Receptor	Linkage
A29	Project-related operational activities result in emissions of light leading to changes in visual amenity and impacts to the local community.	Light	Air	Amenity (Local community)	Unconfirmed
L12	During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area.	All project activities	Land	Amenity (Local community)	Unconfirmed

3.2 Assessment methodology

The VIA was conducted using a three-stage assessment process comprising the following:

- Baseline visual amenity environment – used to establish the existing character of the landscape and visual environment (i.e. baseline condition) and determine the landscape's susceptibility to visual change (known as the visual absorption capacity (VAC)).
- VAC is a measure of the landscape's ability to absorb development without a significant change in the character and is measured as either low, moderate or high. A landscape with a low VAC rating would indicate that it is not capable of absorbing modification/addition without significantly changing the character of the landscape. A landscape with a high VAC rating indicates that it is capable of absorbing a higher degree of modification/addition without significantly changing the landscape character.
- Visual amenity assessment – using the existing landscape and visual environment, the ZVI and a review of relevant planning policies, the VIA determined the sensitivity of the existing landscape to change and assessed the potential visual impacts of the SRE Project on the local community, its visitors and landscape.

3.3 Assessment of effects

This section describes the methods, and outcomes of the visual amenity effects assessment.

3.3.1 Visible project elements

The visible elements of the SRE Project's surface infrastructure are listed in Table 3.2 and have the potential to be visible.

Table 3.2 Project elements

Project element	Maximum approx. height above ground level (m)	Maximum approx. height comparison existing v proposed (m)
Acid Plant Cooling Tower	20	20
Anode Furnace Filter Stacks	55	55
Anode Furnaces	30	30
Anode Furnace Off Gas System – surrounded by larger Anode Furnaces	10	-
FSF Complex Building	50	50
Larox - inside existing OD plant of 30 m in height	30	-
Lasta – located next to existing OD plant of 30 m in height	25	-
Loesche Mill	10	N/A
Oxygen Plant	30	10
Refinery	20	20
Steam Dryer - surrounded by larger FSF complex building of 50 m in height	5	-
Wet Gas Clearing	10	-

i Lighting

The SRE Project requires lighting for safety and is expected to be visible at night.

Additional night lighting from the SRE Project in the immediate vicinity of the existing Olympic Dam mine infrastructure has the potential to cause loss of visual amenity within the Visual Study Area. This assessment assumes that the SRE Project will adopt Australian Standard (AS 4282) for lighting that will shield the lights and minimise light spill directly from light sources. While a number of lights may be visible immediately around the surface infrastructure, most of the visible lighting is expected to be reflected off surfaces (walls, structures and ground).

Both direct light and reflected light has the potential to shine into the night sky, causing a visible glow over the SRE Project at night. For this reason, minimising light pollution of the night sky has been included in the design phases of the SRE Project.

The assessment results presented in Section 3.3.4 has considered this potential impact event.

3.3.2 Visual absorption capacity

VAC is a measure of the landscape's ability to absorb development without a significant change in the character and is measured as either low, moderate or high.

The Olympic Dam mine has a landscape with a high VAC rating given its established mining industrial setting within the SML that is considered capable of absorbing a higher degree of modification/addition, as proposed by the SRE Project, without significantly changing the landscape character.

3.3.3 Visibility

The ZVI illustrates that some of the SRE Project Area elements may be visible up to and even beyond a distance of approximately 8 km. Along Olympic Dam Highway and the Borefield Road; however, fewer project elements are visible as the natural topography is undulating and the landform restricts continuous clear sightlines of the surface infrastructure to distances generally less than approximately 4 km.

Areas of highest visibility are located along the Borefield Road, where there will be limited access for people, as there are no towns or existing built infrastructure along the road. Borefield Road is predominantly used by the BHP, AAR, pastoralists and tourists.

The ZVI indicates that impacts to visual amenity will be low and are unlikely to be observed beyond 4 km of the SRE Project infrastructure.

i Photomontages

A photomontage uses 3D modelling and GIS technology to provide a graphic representation of the potential views experienced by a viewer. This technique also provides a realistic quantitative representation of the scale of the proposed SRE Project development in relation to existing features. Four viewpoints were selected to represent potential visual impacts at the sensitive receptors identified in Chapter 2. Their locations are shown on Figure 2.2.

Photographs from each of the viewpoints are shown in Figure 3.1 to Figure 3.4 below. These show the existing condition of the landscape and a photomontage of the SRE Project infrastructure from each viewpoint location.

Viewpoint 1 - Borefield Rd looking south-west towards Olympic Dam



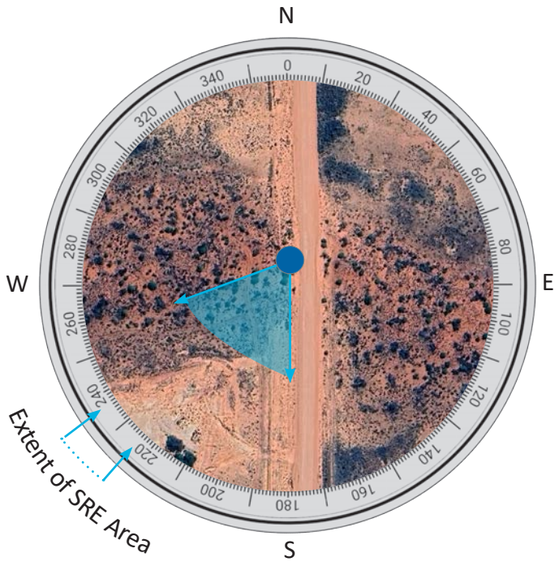
Panoramic view of existing site

Extent of SRE Area



Photomontage of proposed development

Imagery date: 12 November 2024



Coordinates (Long, Lat)	136.925697, 30.410189
Distance to SRE Area	6.4 km
Viewpoint type	Public Road
Impact significance - Light (refer table 4.2)	1 - not significant
Impact significance - Visual amenity (refer table 4.2)	2 - not significant
Maximum visual impact rating	2 - not significant

Description: Oriented toward the southwest at a distance of approximately 6.4 km from the SRE Area.

Baseline condition: The photograph shows typical topography and roadside vegetation in this area.

Visual impact - light: Additional night lighting in the immediate vicinity of the existing development will cause no significant loss of visual amenity within the visual study area.

Dust caused by construction / decommissioning activity will be temporary and cause at most an infrequent and minor loss of visual amenity.

Visual impact - visual amenity: The photomontage above indicates parts of the SRE Project will be visible from this location and will increase the visual impact of the existing site infrastructure. In the scale of this landscape this impact will be minimal / negligible.

Undulating terrain, as visible in the foreground of these images will further mitigate any visual impact.

Visual elements will be introduced into the landscape, however any reduction in visual amenity can be remedied at closure.

Viewpoint 2 - Main gate, Olympic Dam Highway



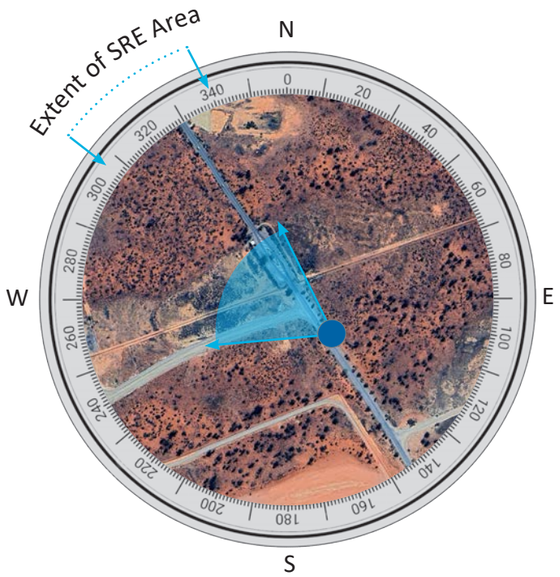
Panoramic view of existing site

Extent of SRE area



Photomontage of proposed development

Imagery date: 12 November 2024



Coordinates (Long, Lat)	136.888695 -30.476956
Distance to SRE Area	3 km
Viewpoint type	Public Road
Impact significance - Light (refer table 4.2)	1 - not significant
Impact significance - Visual amenity (refer table 4.2)	1 - not significant
Maximum visual impact rating	1 - not significant

Description: Located on Olympic Dam Highway near the mine entrance gate, approximately 3 km south of the SRE Area.

Baseline condition: The photograph shows typical topography and roadside vegetation in this area.

Visual impact - light: Additional night lighting in the immediate vicinity of the existing development will cause no significant loss of visual amenity within the visual study area.

Dust caused by construction / decommissioning activity will be temporary and cause at most an infrequent and minor loss of visual amenity.

Visual impact - visual amenity: The photomontage above indicates the SRE Project will not be visible from this location and will have no visual impact.

Viewpoint 3 - Olympic Dam Desalination plant



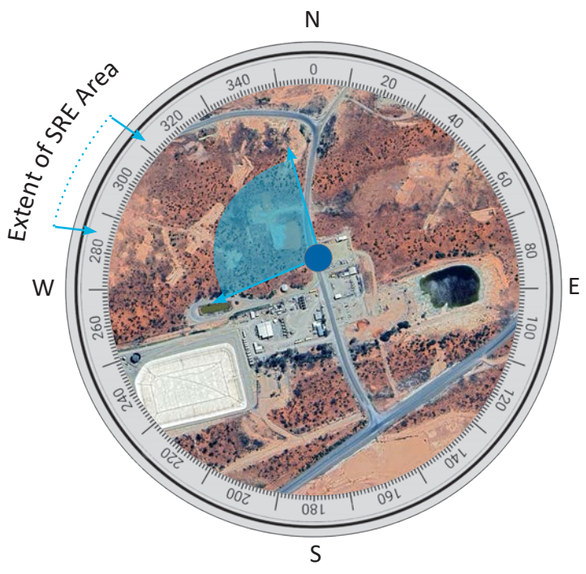
Panoramic view of existing site

Extent of SRE area



Photomontage of proposed development

Imagery date: 12 November 2024



Coordinates (Long, Lat)	136.898823 -30.460419
Distance to SRE Area	2.8 km
Viewpoint type	Private road
Impact significance - Light (refer table 4.2)	1 - not significant
Impact significance - Visual amenity (refer table 4.2)	2 - not significant
Maximum visual impact rating	2 - not significant

Description: Looking west from the road near the desalination plant.

Baseline condition: The photograph shows typical topography and roadside vegetation in this area.

Visual impact - light: Additional night lighting in the immediate vicinity of the existing development will cause no significant loss of visual amenity within the visual study area.

Dust caused by construction / decommissioning activity will be temporary and cause at most an infrequent and minor loss of visual amenity.

Visual impact - visual amenity: The photomontage above indicates parts of the SRE Project will be visible. The SRE Project infrastructure will not extend above or beyond existing industrial elements.

The varied topography and existing vegetation in this vicinity will reduce any visual impacts.

Visual elements will be introduced into the landscape, however any reduction in visual amenity can be remedied at closure.

Viewpoint 4 - Blinman Road, Olympic Dam



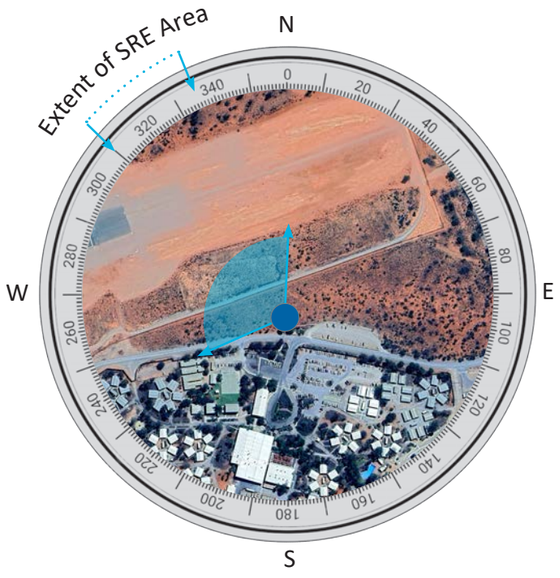
Panoramic view of existing site

Extent of SRE area



Photomontage of proposed development

Imagery date: 12 November 2024



Coordinates (Long, Lat)	136.888182 -30.482357
Distance to SRE Area	3.4 km
Viewpoint type	Public lookout
Impact significance - Light (refer table 4.2)	1 - not significant
Impact significance - Visual amenity (refer table 4.2)	2 - not significant
Maximum visual impact rating	2 - not significant

Description: Located on the northern edge of Olympic Dam with the airport in the middle left of this image. Facing north toward the SRE Area.

Baseline condition: The photograph shows typical topography and roadside vegetation in this area.

Visual impact - light: Additional night lighting in the immediate vicinity of the existing development will cause no significant loss of visual amenity within the visual study area.

Dust caused by construction / decommissioning activity will be temporary and cause at most an infrequent and minor loss of visual amenity.

Visual impact - visual amenity: The photomontage above indicates parts of the SRE Project will be visible from this location. There will be no increase in the horizontal extent of visible development.

The scale and visual characteristics of the SRE Project will blend in with existing development and this will reduce any potential visual impact.

Visual elements will be introduced into the landscape, however any reduction in visual amenity can be remedied at closure.

3.3.4 Assessment results

The potential visual effects using ZVI mapping and photomontages from selected viewpoints are summarised in Table 3.3.

Table 3.3 Assessment of effects – summary

Viewpoint / location	Sensitive receptors / representative locations	ZVI indicates potential visual impact	Photomontage indicates potential visual impact	Visual Amenity Impact
VP-1	Borefield Road	Yes - partial	Yes	Potential visual impact. The photomontage indicates parts of the SRE Project will be visible from this location and will increase the visual impact of the existing site infrastructure, including lighting. In the scale of this landscape this impact will be minimal/negligible. Undulating terrain, as visible in the foreground of these images will further mitigate any visual impact, while adopting AS 4282 for lighting would help minimise light spill directly from light sources. Visual elements will be introduced into the landscape; however, any reduction in visual amenity can be remedied at closure.
VP-2	Olympic Dam Highway	Yes	No visibility	No potential visual impact - the topography prevents any visual impact at this location. The photomontage indicates the SRE Project will not be visible from this location and will have no visual impact, while adopting AS 4282 for lighting would help minimise light spill directly from light sources.
VP-3	Olympic Dam desalination plant	Yes	Yes	The photomontage indicates parts of the SRE Project will be visible, including lighting. The SRE Project infrastructure will not extend above or beyond existing industrial elements. The undulating topography and existing vegetation in this vicinity will reduce any visual impacts, while adopting AS 4282 for lighting would help minimise light spill directly from light sources. Visual elements will be introduced into the landscape; however, any reduction in visual amenity can be remedied at closure.
VP-4	ODV - Blinman Road	Yes	Yes	Potential visual impact. The photomontage indicates parts of the SRE Project will be visible from this location, including lighting. There will be no increase in the horizontal extent of visible development. The scale and visual characteristics of the SRE Project will blend in with existing Olympic Dam mine and this will reduce any potential visual impact, while adopting AS 4282 for lighting would help minimise light spill directly from light sources. Visual elements will be introduced into the landscape; however, any reduction in visual amenity can be remedied at closure.

3.3.5 Conclusion

Table 3.4 presents the revised SPR assessment with respect to visual amenity following completion of the assessment of effects. The potential impact event for which a linkage has been demonstrated has been carried forward for impact assessment (see Section 4).

Table 3.4 Final SPR assessment – confirmed impact events

Impact ID	Potential impact event	Receptor	Linkage	Linkage justification
A29	Project-related operational activities result in emissions of light leading to changes in visual amenity and impacts to the local community	Amenity (Local community)	Yes	Additional night lighting in the immediate vicinity of the existing Olympic Dam mine infrastructure has the potential to impact visual amenity within the Visual Study Area.
L12	During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area	Amenity (Local community)	Yes	Based on ZVI mapping and photomontages there will be a visual link between the SRE Project and some/all of the identified viewpoint locations.

4 Impact assessment

The impact significance of confirmed impact events associated with the proposed SRE Project activities is described in this section.

4.1 Confirmed impact events

Based on the assessment of effects, the impact events presented in Table 4.1, have been confirmed.

Table 4.1 Confirmed impact events

Pathway	Impact ID	Impact event
Air	A29	Project-related operational activities result in emissions of light leading to changes in visual amenity and impacts to the local community.
Land	L12	Project related visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area.

4.2 Impact significance criteria

The impact significance criteria are presented in the Environmental Impact Assessment Framework (EIAF) Appendix to the EIS. Criteria relevant to the assessment of the visual amenity related impact significance is repeated in Table 4.2.

Table 4.2 Consequence definitions and significance determination

Severity level	1	2	3	4	5
Environmental value	**Not significant**		**Significant**		
Light (human amenity)	Local (on-site) short-term, infrequent loss of amenity within the SML boundary	Minimal and short-term, but frequent, loss of amenity within the local area which generates complaints, resolved within one week	Medium-term loss of amenity within the local area which generates complaints, resolved within three months	Medium-term and frequent loss of amenity within the local area resulting in ongoing complaints over an extended period of years with the need to relocate receptor(s)	Long-term loss of amenity within the local area resulting in the need to relocate multiple receptors
Visual amenity (human amenity, indigenous communities, social value)	Introduction of elements in the landscape that may be visible but are consistent with the agreed future landform/closure	Introduction of elements to the landscape that are visible and inconsistent with the agreed future landform/closure resulting in a reduction in visual amenity that will be remediated at closure	Introduction of elements to the landscape that are visible and inconsistent with the agreed future landform/closure resulting in a reduction in visual amenity that cannot be remediated	Introduction of elements that result in long-term (during operations) substantial changes to the agreed future landform/closure with the total loss or degradation of elements, features or characteristics resulting in an adverse impact for several receptors	Introduction of elements that result in substantial permanent changes to the agreed future landform / closure with the total loss or degradation of elements, features or characteristics

4.3 Impact assessment

The impact significance associated with the proposed SRE Project activities is described below and summarised in Table 4.3

4.3.1 Lighting

Additional night lighting for the SRE Project in the immediate vicinity of the existing Olympic Dam Mine will cause no significant loss of visual amenity within the Visual Study Area.

This VIA assessment assumes that the SRE Project will adopt Australian Standard (AS 4282) for lighting that will shield the lights and minimise light spill directly from light sources.

While a number of lights may be visible immediately around the surface infrastructure, most of the visible lighting is expected to be reflected off surfaces (walls, structures and ground).

On the basis of the above, the impact significance has been rated no higher than Level 1 (not significant).

4.3.2 Impact of surface infrastructure on visual amenity and landscape character

The Olympic Dam mine has a landscape with a high VAC rating given its established mining industrial setting within the SML that is considered capable of absorbing a higher degree of modification/addition, as proposed by the SRE Project, without significantly changing the landscape character. The contained footprint of new infrastructure and the similar scale of the SRE Project to existing development further minimises possible changes to landscape character.

The visibility analysis for the SRE Project relies on the ZVI (refer to Figure 2.1) which is limited to a relatively small radius. This equates to approximately 8 km distance from the project infrastructure.

The photomontages support the ZVI by illustrating that the project elements are predicted to be visible only from a short distance away from the SRE Project and not impact visual amenity.

The SRE Project elements will not be visible from any sensitive receptors beyond local roads and ODV. No project elements will be visible from Roxby Downs township or surrounding pastoral stations. This is primarily because the distance and topography between the receptors and the SRE Project.

On the basis of the above, the impact significance has been rated no higher than Level 2 (not significant).

Table 4.3 Visual amenity impact assessment

Confirmed impact event	Impact ID	Impact significance	Significance justification	Uncertainty
Project-related operational activities result in emissions of light leading to changes in visual amenity and impacts to the local community	A29	Level 1 – not significant	Additional night lighting from the SRE Project in the immediate vicinity of the existing Olympic Dam mine will cause no significant loss of visual amenity within the Visual Study Area.	Low - This VIA assessment assumes that the SRE Project will adopt Australian Standard (AS 4282) for lighting that will shield the lights and minimise light spill directly from light sources. While a number of lights may be visible immediately around the surface infrastructure, most of the visible lighting is expected to be reflected off surfaces (walls, structures and ground).

Confirmed impact event	Impact ID	Impact significance	Significance justification	Uncertainty
During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area	L12	Level 2 – not significant	Changes to the prevailing visual amenity may occur as a result of the SRE Project but are unlikely to materially impact the existing industrial landscape of the site	Low - The Olympic Dam mine has a landscape with a high VAC rating given its established mining industrial setting within the SML that is considered capable of absorbing a higher degree of modification/addition, as proposed by the SRE Project, without significant impact on visual amenity or landscape character.

4.4 Mitigation and management

Each confirmed impact event is required to have a description of proposed management and mitigation measures applied, aimed at either breaking the SPR linkage (i.e. avoiding the impact) or otherwise reducing the impact significance to as low as reasonably achievable (ALARA). These are presented in the following sections.

4.4.1 Impact significance level 1 and level 2 (not significant)

The following management mitigation measures are proposed below.

i Siting project elements

No design and control measures, with the exception of lighting for project elements, are considered relevant to the assessment of effects for visual amenity. The SRE Project infrastructure will not extend above or beyond existing industrial elements, while the undulating topography and existing vegetation in this vicinity will reduce any visual impacts.

The small increase in scale of industrial development that will result from the SRE Project will have negligible impact on the landscape character of this area.

Siting project elements can play a large role in reducing the visibility of any required lighting. Good use of the landscape to reduce lighting impacts should include:

- use of landform to shield the SRE Project from view
- use of landscape elements (trees, mounding, walls) to shield effects of lighting from view.

ii Lighting

BHP should continue to adopt good lighting design to minimise light pollution of the night sky. Design standards, such as AS 4282 *Control of obtrusive effects of outdoor lighting*, *National Light Pollution Guidelines for Wildlife* (2020), and the Dark Sky Planning Guideline (2023) should be applied during the design of SRE Project elements.

Design considerations adapted from these guidelines may include:

- eliminating upward spill light
- directing light downwards, not upwards
- use of shielded fittings
- avoiding over lighting
- switching lights off when not required

- use of energy efficient bulbs
- use of asymmetric beams, where floodlights are used
- ensuring lights are not directed towards reflective surfaces
- use of warm white colours.

4.5 Conclusion

The impact assessment demonstrates that the SRE Project elements are not expected to increase visibility of the SRE Project from distances over 4 km from the proposed infrastructure.

A key mitigating factor includes the lack of sensitive receptors within the viewshed area (refer to Section 2.1 and to Figure 2.2). The only receptors would be travellers along the Borefield Road, who will have restricted views of SRE Project elements and limited time to be impacted by the view.

The VIA assessed four viewpoint locations for the SRE Project and concluded that impacts to visual amenity would be negligible for one location, and not significant for three locations where project elements are predicted to be visible.

Table 4.4 presents the revised SPR assessment following completion of the impact assessment.

The impact assessment supports the baseline condition findings that the SRE Project has a high VAC given the distance from which the visible project elements are able to be observed. The SRE Project would not be visible from the nearest sensitive receptor, being Roxby Downs township located approximately 12 km to the south.

Table 4.4 Final SPR assessment – Confirmed impact events

Impact ID	Final impact event	Receptor	Linkage/Justification
A29	Project-related operational activities result in emissions of light leading to changes in visual amenity and impacts to the local community	Local community (amenity)	Level 1 – not significant – Additional night lighting from the SRE Project in the immediate vicinity of the existing Olympic Dam mine infrastructure will cause no significant loss of visual amenity within the Visual Study Area. Due to the distance from any sensitive receptors the SRE Project will have no impact on visual amenity from project related infrastructure or changes to the landscape.
L12	During construction, visual changes may occur as a result of the SRE Project, impacting on the prevailing visual amenity or landscape character of the area	Local community (amenity)	Level 2 – not significant – The SRE Project infrastructure will not extend above or beyond existing industrial elements, while the undulating topography and existing vegetation in this vicinity will reduce any visual impacts. Due to the distance from any sensitive receptors the SRE Project will have no impact on visual amenity or landscape character from project related infrastructure or changes to the landscape.

References

BHP (2024). *BHP Olympic Dam: Smelter and Refinery Expansion Project: Environmental Impact Assessment Framework*. August 2024. BHP, South Australia, Adelaide.

Commonwealth of Australia (2020), *National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds*.

Landscape Institute and Institute of Environmental Management and Assessment (2013), *Guidelines for Landscape and Visual Impact Assessment (GLVIA)* Third Edition.

NSW Department of Planning, Housing and Infrastructure 2024, *Large Scale Solar Energy Guidelines*.

NSW Department of Planning and Environment 2023, *The Dark Sky Planning Guideline*.

Transport for NSW, Centre for Urban Design (2020), *Guideline for Landscape Character and Visual Impact Assessment*, EIA-N04, Version 2.2.

Tudor, Christine (2019), *An approach to landscape sensitivity assessment – to inform spatial planning and land management*. Natural England.

Abbreviations and acronyms

Acronym	Expansion
ALARA	As Low As Reasonably Achievable
ARR	Arid Recovery Reserve
BAU	Business-as-usual
BDAC	Barngarla Determination Aboriginal Corporation
BHP	BHP Olympic Dam Corporation Pty Ltd
Copper SA	Copper South Australia
DBF	Direct-to-blister flash furnace
DIT	Department for Infrastructure and Transport
EF	Electric slag reduction furnace
EIAF	Environmental Impact Assessment Framework
EIS	Environment Impact Statement
EPA	Environment Protection Authority
FCF	Flash converting furnace
FIFO	Fly-in/fly-out
FSF	Flash smelting furnace
GAB	Great Artesian Basin
KAC	Kokatha Aboriginal Corporation
KYA	Kuyani Yartah Association
N/A	Not applicable
NWP	Northern Water Project
ODV	Olympic Dam Village
PDI Act	*Planning, Development and Infrastructure Act 2017* (South Australia)
PMR	Precious metal refinery
SA	South Australia
SML	Special Mining Lease
SPC	State Planning Commission
SPR	Source-pathway-receptor
SRE	Smelter and Refinery Expansion
VAC	Visual absorption capacity
VIA	Visual Impact Assessment
ZVI	Zone of visual influence

Annexure A

Assessment requirements

EMM
creating opportunities

A.1 Assessment requirements

Visual amenity assessment requirements and cross reference to where these are addressed in this report are outlined in Table A.1.

Table A.1 Assessment requirements

Environmental attributes	Reference	Assessment requirements	Cross reference
Visual Amenity	AEQ4	Provide a description of the landscape character, features and values of the development area and its environs and any effects of the development on visual amenity and landscape quality.	Section 3.3 and Section 4

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