Cooljarloo Mineral Sands Mine - Osprey and GR6N Extension

Application Number: **03169** Commencement Date: **01/10/2025** Status: **Locked**

1. About the project

1.1 Project details

1.1.1 Project title *

Cooljarloo Mineral Sands Mine - Osprey and GR6N Extension

1.1.2 Project industry type *

Mining

1.1.3 Project industry sub-type

Mineral sand mine

1.1.4 Estimated start date *

01/02/2027

1.1.4 Estimated end date *

28/02/2029

1.2 Proposed Action details

1.2.1 Provide an overview of the proposed action, including all proposed activities. *

Background

Tronox Management Pty Ltd (Tronox), a subsidiary of Tronox Holdings plc, operates the company's Northern Operations in Western Australia (WA). These operations form a key part of one of the world's largest vertically integrated titanium dioxide production chains. The Tronox Northern Operations in WA comprise the Cooljarloo Mine, Chandala processing plant and the Kwinana pigment plant and represent one of the largest combined titanium mineral and processing operations globally.

The Cooljarloo Mine is located approximately 170 km north of Perth on the northern coastal sand plains of the Swan Coast Plain (Att1_Figures, Figure 1). The mine is distant from major public population centres and significant tourist attractions. Existing land uses in the vicinity of the Cooljarloo Mine include gas exploration, mining exploration, agricultural activities and traditional owner activities such as camping and hunting.

The Cooljarloo Mine is an integrated mineral sands mining and processing facility operating on mining tenement M70/1398. Mineral sands are extracted from the existing mine via both dry mining and dredge mining methods. Dry mining requires mine pits to be dewatered so that the groundwater table is drawn down below the level of the pit floor, whereas dredge mining utilises a floating dredge to extract the ore as a slurry resulting in significantly less drawdown of the groundwater table than dry mining.

The existing Cooljarloo operation was originally authorised in 1988 under Ministerial Statement 037 following assessment under Part IV of the *Environmental Protection Act 1986* (WA) (EP Act) and is currently authorised under Ministerial Statement 1158 (MS 1158).

Since commencement of operations at the Cooljarloo Mine, several extensions to the operation have been referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):

- EPBC 2000/23: referral of Cooljarloo Titanium Sand orebodies 27200 and 28000
    - Decision: not a controlled action;
- EPBC 2007/3556: referral of Cooljarloo Mine Falcon Extension
    - Decision: not a controlled action;
- EPBC 2013/6895: referral of Cooljarloo West Titanium Minerals mining project
    - Decision: controlled action;
    - Controlling provisions: listed threatened species and communities, migratory species;
    - Assessment decision not yet made.

Ministerial Statement 1158 incorporates and authorises the above mine extensions under the EP Act.

Proposed Action

Tronox proposes to extend the Cooljarloo Mine through development of the Osprey and GR6N deposits. These deposits are located on mining tenements M70/1413 and M70/1398 (Att1_Figures, Figure 1) and are continuations of the mineralisation present at the Cooljarloo Mine and Iluka's nearby Cataby mine. Extension of mining into the Osprey and GR6N deposits is expected to sustain the existing mine ore feed rate of 35 Mt/annum for a period of 24-36 months.

The proposed action is the mining and processing of mineral sands from the Osprey and GR6N satellite pits, construction and operation of associated infrastructure and rehabilitation of the Osprey and GR6N pits. The proposed action will produce a heavy mineral concentrate (HMC) which will be transported offsite for further processing. The proposed action includes:

- Mining development with a Disturbance Footprint of up to 241.75 ha in a Project Area of 243.44 ha (Att1_Figures, Figure 2);
- Clearing of vegetation;
- Development of topsoil stockpiles;
- Removal of overburden;
- Development of overburden stockpiles;

- Open pit below water table mining of the Osprey and GR6N pits via dredge mining;
- Concentration and separation of ore using a floating concentrator plant located immediately behind the dredge to produce a HMC;
- Deposition of sand tails into the dredge pond;
- Deposition of clay tails into the dredge pond or into solar drying cells developed in the dredge pond;
- Water management;
- Pumping of HMC to the HMC stockpile located in the existing mine site;
- Construction and operation of infrastructure associated with the mining of the Osprey and GR6N pits, including utilities corridor, road and a temporary, flexible slurry pipeline connected to the dredge;
- Backfilling of mine voids with tailings and overburden to at least 1 m above the average pre-disturbance maximum groundwater level; and
- Rehabilitation of the post-mining landform.

The boundaries of the Project Area and Disturbance Footprint have been separated to enable upload of the spatial data into the EPBC Act Business Portal since the Business Portal does not allow overlapping polygons and requires the Disturbance Footprint to be contained within the Project Area.

The proposed action will result in the clearing of up to 241.75 ha of native vegetation, of which:

- 124.7 ha is the Banksia Woodlands of the Swan Coastal Plan Threatened Ecological Community (TEC); and
- 180.8 ha represents moderate to high value Carnaby's Black Cockatoo (Carnaby's Cockatoo) foraging habitat.

One Threatened flora species (*Macarthuria keigheryi*) has been recorded in the Disturbance Footprint and will be impacted by the proposed action. Two other Threatened flora species as well as Threatened fauna species and listed migratory species may also be present in the Project Area and may be impacted by the proposed action (refer Section 3.2.1).

Exclusions from the Proposed Action

The followings activities are not part of the proposed action:

- Exploration and resource evaluation activities and associated supporting infrastructure;
- Activities associated with the existing Cooljarloo Mine site, including operational activities and rehabilitation activities;
- Installation, maintenance and use of groundwater monitoring bores and associated access tracks for environmental assessment and monitoring purposes;
- Test work, studies, surveys and monitoring associated with design and environmental impact assessment of the proposed action;
- Agricultural activities; and
- Any future proposals, expansions, or modifications beyond the scope of the proposed action, that may be subject to a separate referral and assessment process.

A glossary and reference list for this referral are provided in Attachment 9 (Att9_Glossary_References).

1.2.2 Is the project action part of a staged development or related to other actions or proposals in the region?

No

1.2.6 What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant? *

Legislative Measures:

- *Environment Protection and Biodiversity Conservation Act 1999* (Cth)
  - Matters of National Environmental Significance (MNES) occur in the Project Area; and
  - This referral is to allow a decision under the EPBC Act whether the proposed action is a Controlled Action.
- *Environmental Protection Act 1986* (WA)
  - Mining in part of the Project Area has been assessed and approved under MS 1158 and mining in the remainder of the Project Area is currently under assessment under the EP Act (Environmental Protection Authority (EPA) assessment number 2502).
- *Biodiversity Conservation Act 2016* (BC Act) (WA)
  - Threatened species listed under the BC Act occur in the Project Area; and
  - Section 40 authorisation under the BC Act will be sought if required to disturb or take Threatened species listed under the BC Act.
- *Aboriginal Heritage Act 1972* (AH Act) (WA)
  - Aboriginal Heritage may occur in the Project Area; and
  - Section 18 consent will be sought if required to disturb Aboriginal Heritage.
- *Native Title Act 1993* (NT Act) (Cth)
  - The NT Act provides recognition for the rights and interests over land and water possessed by Australian Indigenous people under traditional laws and custom. The Project Area is located in the Yued People Indigenous Land Use Agreement (ILUA) area as part of the South West Native Title Settlement between the Western Australian Government and the Noongar People. The South West Native Title Settlement resolves native title in the South West of Western Australia through the establishment of ILUAs.
- *Mining Act 1978* (Mining Act) (WA)
  - The Project Area is located on mining tenements M70/1398 and M70/1413 and the Action is regulated under the Mining Act; and
  - Approval will be sought under the Mining Act.
- *Biosecurity and Agriculture Management Act 2007* (BAM Act) (WA)
  - Weeds, pests and/or disease may pose a risk in the Project Area.
- *Rights in Irrigation and Water Act 1914* (RIWI Act) (WA)
  - Licensing of well construction and abstraction of groundwater.

Policy Documents:

- EPBC Act Environmental Offset Policy (Cth)
  - The proposed action may result in significant impacts to MNES and may, therefore, require an environmental offset that meets the requirements of the EPBC Act Offset Policy; and
  - An environmental offset strategy will be prepared if required.

In addition to the above legislation and policy, the environmental impact assessment process is supported by various guidance documents. Relevant guidance considered during the course of the surveys and assessment includes:

- *Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (DEWHA, 2013);
- *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA, 2016);
- *Draft Survey Guidelines for Australia's Threatened Orchids* (DAWE, 2013);
- *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (DoEE, 2016);
- *EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species* (DAWE, 2022);
- *Carnaby's Cockatoo (Calyptorhynchus latirostris) Recovery Plan* (DPaW, 2013);

- *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020);
- *Survey Guidelines for Australia's threatened mammals* (DSEWPAC, 2011a);
- *Survey Guidelines for Australia's threatened reptiles* (DSEWPAC, 2011b); and
- *Survey Guidelines for Australia's threatened birds* (DEWHA, 2010).

1.2.7 Describe any public consultation that has been, is being or will be undertaken regarding the project area, including with Indigenous stakeholders. Attach any completed consultation documentations, if relevant. *

Tronox engages with stakeholders on an ongoing basis to ensure stakeholders are informed about the current operation and future plans for the Cooljarloo Mine site. The consultation schedule is outlined below:

- Department of Mines, Petroleum and Exploration (DMPE)
  - Prior to commencement of a proposal; and
  - Annually during operations.
- Environmental Protection Authority (EPA)
  - Prior to preparation of a referral under the EP Act; and
  - Annually during operations.
- Department of Water and Environmental Regulation (DWER) - annually and as required.
- Radiological Council - annually and as required.
- Department of Biodiversity, Conservation and Attractions (DBCA) - annually and as required.
- Department of Planning, Lands and Heritage (DPLH) - as required.
- Main Roads WA - as required.
- Shire of Dandaragan - as required.
- Local landholders/ neighbours - as required.
- Traditional Owners - annually during operations within affected areas.
- Organisations and groups that Tronox provides support to - as required.

1.3.1 Identity: Referring party

Privacy Notice:

Personal information means information or an opinion about an identified individual, or an individual who is reasonably identifiable.

By completing and submitting this form, you consent to the collection of all personal information contained in this form. If you are providing the personal information of other individuals in this form, please ensure you have their consent before doing so.

The Department of Climate Change, Energy, the Environment and Water (the department) collects your personal information (as defined by the Privacy Act 1988) through this platform for the purposes of enabling the department to consider your submission and contact you in relation to your submission. If you fail to provide some or all of the personal information requested on this platform (name and email address), the department will be unable to contact you to seek further information (if required) and subsequently may impact the consideration given to your submission.

Personal information may be disclosed to other Australian government agencies, persons or organisations where necessary for the above purposes, provided the disclosure is consistent with relevant laws, in particular the Privacy Act 1988 (Privacy Act). Your personal information will be used and stored in accordance with the Australian Privacy Principles.

See our Privacy Policy to learn more about accessing or correcting personal information or making a complaint.

Alternatively, email us at privacy@dcceew.gov.au.

☑ **Confirm that you have read and understand this Privacy Notice ***

1.3.1.1 Is Referring party an organisation or business? *

Yes

Referring party organisation details

ABN/ACN	29001584612
Organisation name	SLR CONSULTING AUSTRALIA PTY LTD
Organisation address	2060 NSW

Referring party details

Name	Fiona Bell
Job title	Technical Director
Phone	0419481682
Email	fbell@slrconsulting.com
Address	Level 1, 500 Hay Street, Subiaco, WA 6008

1.3.2 Identity: Person proposing to take the action

1.3.2.1 Are the Person proposing to take the action details the same as the Referring party details? *

No

1.3.2.2 Is Person proposing to take the action an organisation or business? *

Yes

Person proposing to take the action organisation details

ABN/ACN	59009343364
Organisation name	TRONOX MANAGEMENT PTY LTD
Organisation address	Lot 22 Mason Road Kwinana, WA 6167

Person proposing to take the action details

Name	Cindy Beckley
Job title	Senior Environmental Approvals - MRD
Phone	0461382360
Email	cindy.beckley@tronox.com
Address	Lot 22 Mason Road Kwinana, WA 6167

1.3.2.14 Are you proposing the action as part of a Joint Venture? *

No

1.3.2.15 Are you proposing the action as part of a Trust? *

No

1.3.2.17 Describe the Person proposing the action's history of responsible environmental management including details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against the Person proposing to take the action. *

Tronox is committed to sound environmental management to minimise the potential environmental impacts of Tronox's activities.

Tronox operates in accordance with Tronox's Environmental Policy (Att2_Environmental Policy) (refer to 1.3.2.18 for further information).

Tronox has previously referred the following actions under the EPBC Act for the Cooljarloo Mine site:

- EPBC 2000/23: referral of Cooljarloo Titanium Sand orebodies 27200 and 28000;
- EPBC 2007/3556: referral of Cooljarloo Mine Falcon Extension; and
- EPBC 2013/6895: referral of Cooljarloo West Titanium Minerals mining project.

In 2005, when it was participant in the TiWest Joint Venture, Tronox was the respondent to an appeal by an individual against the dismissal of two complaints for two offences under the EP Act, relating to the discharge into the atmosphere, from a stack at the company's Kwinana pigment plant, of gas containing chlorine. The appeal was dismissed.

1.3.2.18 If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

Tronox operates in accordance with Tronox's Environmental Policy (Att2_Environmental Policy) and is committed to:

- Protecting the environment through compliance with all environmental laws and regulations and the deployment of integrated management systems throughout operations that reflect industry best practice and internationally recognised standards.
- Establishing ambitious environmental sustainability targets for energy, carbon emissions, process and hazardous waste, and water usage.
- Actively seek to reduce emissions, releases and wastes with suppliers and customers by reviewing the environmental performance of operations, as well as up and down stream ecosystem, with a focus on continuous improvement.
- Promoting concern and respect for the environment among employees, business partners, contractors, suppliers, customers, neighbours and stakeholders. Communicating responsibly with those stakeholders and environmental matters.
- Meeting international standards on biodiversity protection, respecting legally designated protected areas, progressive rehabilitation of mines and working towards the goal of no net loss of biodiversity for new sites and major expansions projects.
- Striving to form partnerships with host communities and stakeholders, promoting environmental awareness and participating in the preservation of their environment, traditions and values through regular community consultation.
- Communicating openly, consulting and partnering as appropriate with employees, government, indigenous and local communities, the public and other stakeholders regarding this environmental policy and on all matters pertaining to the environment within the sphere of influence of Tronox's mining and chemical operations.

1.3.3 Identity: Proposed designated proponent

1.3.3.1 Are the Proposed designated proponent details the same as the Person proposing to take the action? *

Yes

Proposed designated proponent organisation details

ABN/ACN	59009343364
Organisation name	TRONOX MANAGEMENT PTY LTD
Organisation address	Lot 22 Mason Road Kwinana, WA 6167

Proposed designated proponent details

Name	Cindy Beckley
Job title	Senior Environmental Approvals - MRD
Phone	0461382360
Email	cindy.beckley@tronox.com
Address	Lot 22 Mason Road Kwinana, WA 6167

1.3.4 Identity: Summary of allocation

Confirmed Referring party's identity

The Referring party is the person preparing the information in this referral.

ABN/ACN	29001584612
Organisation name	SLR CONSULTING AUSTRALIA PTY LTD
Organisation address	2060 NSW
Representative's name	Fiona Bell
Representative's job title	Technical Director
Phone	0419481682
Email	fbell@slrconsulting.com
Address	Level 1, 500 Hay Street, Subiaco, WA 6008

Confirmed Person proposing to take the action's identity

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	59009343364
Organisation name	TRONOX MANAGEMENT PTY LTD
Organisation address	Lot 22 Mason Road Kwinana, WA 6167
Representative's name	Cindy Beckley
Representative's job title	Senior Environmental Approvals - MRD
Phone	0461382360
Email	cindy.beckley@tronox.com
Address	Lot 22 Mason Road Kwinana, WA 6167

Confirmed Proposed designated proponent's identity

The Person proposing to take the action is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

1.4 Payment details: Payment exemption and fee waiver

1.4.1 Do you qualify for an exemption from fees under EPBC Regulation 5.23 (1) (a)? *

No

1.4.3 Have you applied for or been granted a waiver for full or partial fees under Regulation 5.21A? *

No

1.4.5 Are you going to apply for a waiver of full or partial fees under EPBC Regulation 5.21A?

No

1.4.7 Has the department issued you with a credit note? *

No

1.4.9 Would you like to add a purchase order number to your invoice? *

No

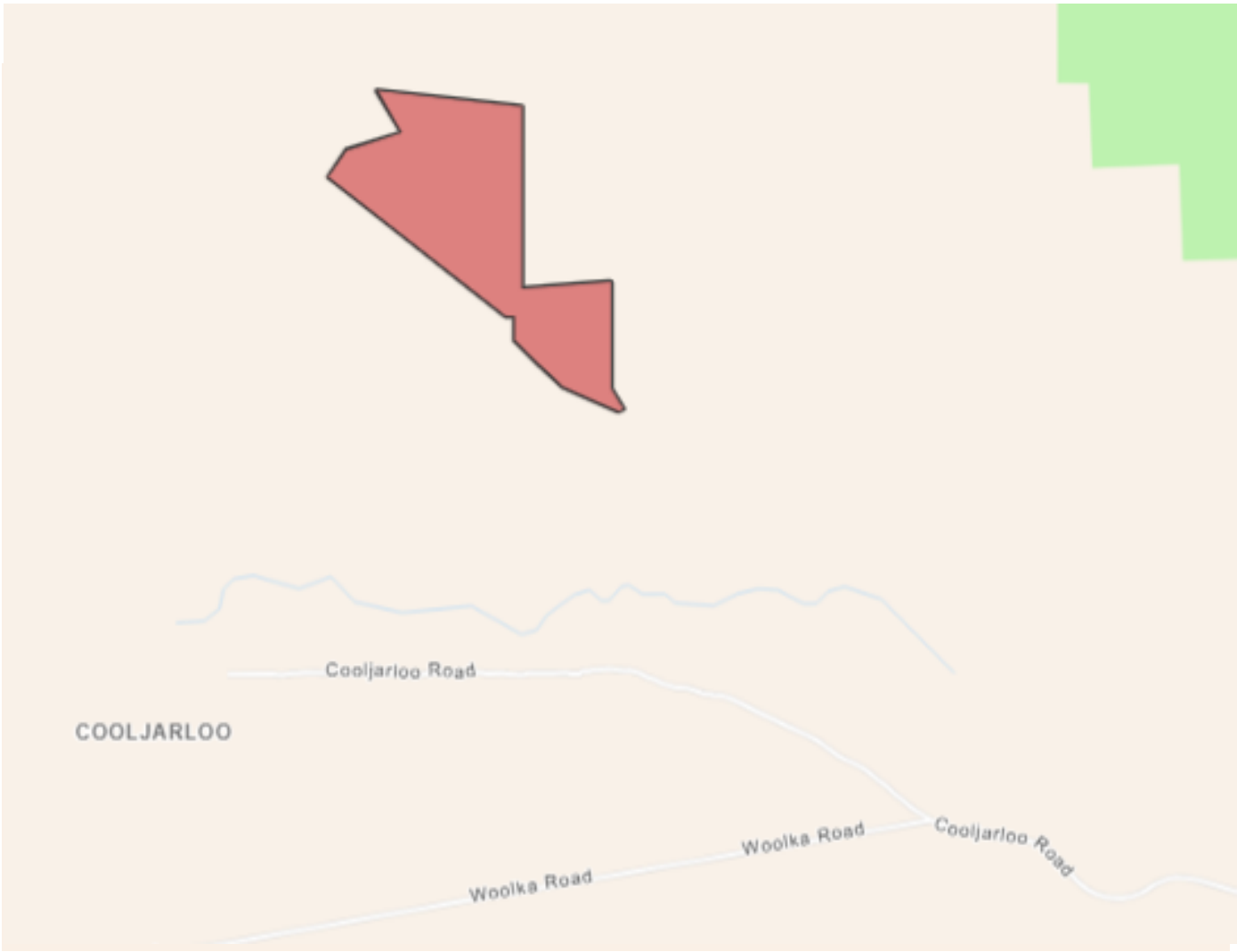
1.4 Payment details: Payment allocation

1.4.11 Who would you like to allocate as the entity responsible for payment? *

Proposed designated proponent

2. Location

2.1 Project footprint



Project Area: 243.44 Ha **Disturbance Footprint:** 241.75 Ha

2.2 Footprint details

2.2.1 What is the address of the proposed action? *

12051 Brand Highway, Cooljarloo, Western Australia 6507

2.2.2 Where is the primary jurisdiction of the proposed action? *

Western Australia

2.2.3 Is there a secondary jurisdiction for this proposed action? *

No

2.2.5 What is the tenure of the action area relevant to the project area? *

The tenure of the Project Area is Unallocated Crown Land.

3. Existing environment

3.1 Physical description

3.1.1 Describe the current condition of the project area’s environment.

The Project Area is located approximately 170 km north of Perth in the Shire of Dandaragan, Western Australia (Att1_Figures, Figure 1). Access to the Project Area is via the Cooljarloo Access Road from the Brand Highway, through the existing mine site.

The Interim Biogeographic Regionalisation of Australia (IBRA) categorises the Australian continent into 89 bioregions of similar geology, landforms, vegetation, fauna, and climate (DCCEEW, 2000). The Project Area lies within the Swan Coastal Plain IBRA region and the Perth subregion (SWA02). The Swan Coastal Plain bioregion is described as low lying coastal plain, mainly covered with woodlands (Mitchell et al., 2022). It is dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. The outwash plains, once dominated by *Casuarina obesa*-Marri woodlands and Melaleuca shrublands, are extensive only in the south of the IBRA bioregion.

The Project Area is zoned as “Public Purposes: Unvested Crown Land” under the Shire of Dandaragan Local Planning Scheme No. 7 (LPS No.7) (DPLH, 2024c). The proposed action is consistent with the intended land uses within the locality as it proposes to extend the existing Cooljarloo Mine, located adjacent to the eastern boundary of the Project Area, through the development of the Osprey and GR6N deposits.

The Project Area is bounded on all sides by mining tenements with an active mine site (the Cooljarloo Mine) located near the northern, eastern and south-eastern boundaries of the Project Area. Agricultural activities occur to the south of the Project Area. The nearest land parcel held by a private landowner is located approximately 600 m south of the Project Area.

Mining, particularly dry mining, at the existing Cooljarloo Mine site has lowered the groundwater table in the immediate vicinity of the mine. The current groundwater level is estimated to be approximately 5 m below ground level (mbgl) across the Project Area, with the exception of a small area in the southeast where the groundwater level is estimated to be approximately 10 mbgl. Depth to groundwater at the Cooljarloo site is dynamic dependent on the location of the mining front and whether dry mining or dredge mining is being utilised. In addition, the relatively high aquifer permeability and high recharge rates during the winter result in rapid recovery of the groundwater table within one to two years following cessation of mining (HGEO, 2025) (linked, Section 5.1, p.33).

The native vegetation extent dataset from the Department of Primary Industries and Regional Development [DPIRD] (2023) (linked) shows that the majority of the Project Area, comprises native vegetation with areas of cleared land that coincide with major tracks.

Vegetation across the Development Footprint was assessed to be in Excellent condition (237.7 ha, 98.3% of the Development Footprint) and Good condition (1.7 ha, 0.7% of the Development Footprint) and to have been relatively long unburnt at the time of the most recent survey (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 4, p.18). With the exception of drill lines and tracks that are present throughout the Project Area, the vegetation is largely undisturbed.

The vegetation in the Project Area generally has a complex vegetation structure in the midstorey and understorey which is likely to support a high abundance and diversity of fauna species (Bamford Consulting Ecologists (BCE), 2025) (Att4_Fauna Assessment, Section 3.6, p.61). The overall Project Area is considered to provide moderate to high value foraging habitat for Carnaby’s Cockatoo due to the high density of Banksia present in parts of the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.6, p.61).

Surveys in areas adjacent to, and partly overlapping with, the Project Area have shown introduced flora taxa are generally present in low numbers (Umwelt, 2024a). However, seven introduced flora species recorded from adjacent areas are considered to have a High ecological impact and 23 species recorded from adjacent areas are considered to exhibit Rapid invasiveness in native vegetation; these species are typically disturbance opportunistic species (Umwelt, 2024a).

Invasion by the plant pathogen *Phytophthora cinnamomi* (Dieback) is a threat to native Western Australian flora, with over 1,000 species of plants known to be affected by dieback caused by *P. cinnamomi* (DCCEEW, 2024). The Project Area is located in a Dieback risk area (DBCA, 2024). Assessments conducted throughout the life of the existing Cooljarloo Mine have recorded *Phytophthora cinnamomi* in areas adjacent to the Project Area (GHD, 2025) (linked, Section 4.3.3.3, p.34).

3.1.2 Describe any existing or proposed uses for the project area.

Exploration and resource evaluation drilling has occurred in the Project Area, with drill lines, pads and access tracks present across the area (Att1_Figures, Figure 2). Between the drill lines, the Project Area largely comprises undisturbed native vegetation.

The existing Cooljarloo Mine was developed following approval under the EP Act in 1988 and is located to the immediate north, east and south-east of the Project Area. Areas to the south of the Project Area are used for agricultural purposes.

3.1.3 Describe any outstanding natural features and/or any other important or unique values that applies to the project area.

There are no natural features in the Project Area that are likely to be considered outstanding natural features.

Vegetation in the Project Area includes a vegetation community that is representative of the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (TEC) (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.2.2.1, p.46).

The Lancelin Defence Training Area wetland (Ref. Code: 119) listed in the Directory of Important Wetlands in Australia, intersects the north-eastern boundary of the Project Area (DBCA, 2019). Approximately 25 ha of the wetland's total extent of 9,930 ha occurs within the Project Area.

The following conservation areas are located in the vicinity of the Project Area (Att1_Figures, Figure 1):

- Badgingarra Conservation Park with an extent of 2,369 ha is located approximately 4.1 km north-east of the Project Area;
- Wongonderrah Nature Reserve with an extent of 439 ha is located approximately 4.5 km north of the Project Area;
- An unnamed Nature Reserve with an extent of 1,012 ha is located approximately 7.8 km south of the Project Area; and
- Badgingarra National Park with an extent of 13,102 ha is located approximately 8.4 km north-east of the Project Area.

3.1.4 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

Elevation within the Project Area ranges from approximately 69 metres Australian Height Datum (mAHD) at the western boundary of the Project Area to 79 mAHD at the eastern boundary. The change in elevation occurs over a distance of approximately 0.9 km. A relatively flat, low-lying area is present in the north-western part of the Project Area.

3.2 Flora and fauna

3.2.1 Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.

Flora, vegetation, fauna and black cockatoo surveys have been undertaken in the Project Area and surrounding area. Surveys were completed in accordance with relevant Commonwealth and State guidelines except where limitations are noted in the survey reports. A recent desktop search using the DCCEEW Protected Matters Search Tool (PMST) was also conducted in June 2025 without a buffer applied (Att5_PMST Results).

Threatened Flora

A PMST search identified eight Threatened flora species as potentially occurring in the Project Area (Att5_PMST Results).

Flora and vegetation surveys have been conducted in the Project Area and surrounds, including detailed and targeted surveys most recently from 2022, 2023 and 2024. Results have been compiled by Umwelt (2025a) (Att3_Flora_Vegetation). The 2023 and 2024 field surveys were conducted during what is considered to be the ideal survey period for the Swan Coastal Plain bioregion (late October to November) (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 4, p.17).

The likelihood of occurrence of the eight Threatened species identified by the PMST was assessed by Umwelt (2025a) (Att6_Likelihood of Occurrence, Section 6.1, Table 1):

- One Threatened flora species known to occur in the Project Area - *Macarthuria keigheryi* (Endangered);
- Two Threatened flora species possibly occur in the Project Area - *Andersonia gracilis* (Endangered) and *Anigozanthos viridis* subsp. *terraspectans* (Vulnerable); and
- Five Threatened flora species considered unlikely to occur in the Project Area - area outside the species' known range and/ or potential habitat is not present.

Records of Threatened flora species from all surveys conducted by Tronox in the Cooljarloo area have been compiled into a spatial dataset. This dataset shows 44,398 records of *Macarthuria keigheryi* have been recorded from 263 locations within 15 km of the Project Area. Of these, two individuals have been recorded in the north-western part of the Project Area (Att1_Figures, Figure 4). The two records are approximately 30 m apart and were found on cleared drill lines in vegetation type (VT) 17 (Woodman Environmental Consulting [Woodman], 2014) (linked, Appendix U, p.U39).

Suitable habitat for *Andersonia gracilis* comprises winter-wet areas near swamps with sand, sandy clay and gravelly loam (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.1.3, p.29). Although suitable habitat is present in parts of the Project Area, *A. gracilis* has not been recorded in the Project Area. Interrogation of the Tronox dataset shows 18,968 records of *A. gracilis* at 1,481 locations within 15 km of the Project Area, with the nearest record 1.6 km to the north-west to the Project Area (Att1_Figures, Figure 4).

Suitable habitat for *Anigozanthos viridis* subsp. *terraspectans* comprises winter-wet flats, wetlands and basins with sand or clay loam and recently burnt areas (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.1.3, p.29). Although suitable habitat is present in parts of the Project Area, *Anigozanthos viridis* subsp. *terraspectans* has not been recorded in the Project Area. This species was purportedly recorded in the northern part of the Project Area. However, following investigation in the field during the 2023 targeted survey, it was determined that the record is likely erroneous as the habitat in the area is Banksia woodland rather than the winter-wet flats or wetland habitat that is appropriate for this species (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.1.3, p.28). Desktop assessment shows that the nearest record of *Anigozanthos viridis* subsp. *terraspectans* to the Project Area is 4.0 km to the south-east (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.2.1.2, p.40) and interrogation of the Tronox dataset shows 320,723 records at 117 locations within 15 km of the Project Area.

Records from the Tronox dataset for all three Threatened flora species are shown in Att1_Figures, Figure 4.

Fauna Habitat

Fauna surveys including mapping of fauna habitats and Black Cockatoo habitat assessment, were conducted in 2024 by BCE (2025) (Att4_Fauna Assessment).

BCE (2025) mapped four VSAs in the Project Area. Although tracks are present throughout the Project Area, these were not mapped as a separate VSA due to their narrow width (BCE, 2025). The VSAs identified in the Project Area (BCE, 2025) are shown in Att1_Figures (Figure 5) and described below:

- **VSA 1**. *Banksia attenuata* and *B. menziesii* Low Woodland – 180.8 ha (75% of the Project Area)
- **VSA 4**. Dampland Shrubland/Open Woodland – 17.5 ha (7% of the Project Area)
- **VSA 5**. *Banksia telmatiaea* Heathland – 39.2 ha (16% of the Project Area)
- **VSA 6**. Mixed Heathland – 2.2 ha (1% of the Project Area)

Threatened Fauna

Fauna assessments have been undertaken in the Project Area and surrounding area, most recently by BCE (2025) (Att4_Fauna Assessment).

A desktop review of the fauna assemblage in the Project Area identified 198 vertebrate fauna species as potentially occurring, comprising 46 reptiles, 120 birds, 17 native mammals and five introduced mammals (BCE, 2025) (Att4_Fauna Assessment, Section 3.2.1, p.34).

The PMST identified ten Threatened fauna species as potentially occurring in the Project Area (Att5_PMST Results). The likelihood of occurrence of each of these species was assessed by BCE (2025) (Att4_Fauna Assessment, Sections 3.2.5.1-3.2.5.3, pp.45-52 and Appendix 10). One species, Carnaby's Cockatoo (*Zanda latirostris*) (Endangered), was considered likely to be a regular visitor. The likelihood of occurrence of each species and associated rationale is provided in Att6_Likelihood of Occurrence (Section 6.2, Table 2)

Migratory Fauna

The PMST identified eight Migratory species as potentially occurring in the Project Area (Att5_PMST Results), of which three of these species are also Threatened fauna species. The likelihood of occurrence of each of these species was assessed by BCE (2025) (Att4_Fauna Assessment, Sections 3.2.5.1-3.2.5.3, pp.45-52 and Appendix 10). None of the species are considered to be regular visitors. The Fork-tailed Swift (*Apus pacificus*) was identified as an irregular visitor. The likelihood of occurrence of each species and associated rationale is provided in Att6_Likelihood of Occurrence (Section 6.3, Table 3).

Black Cockatoo Presence and Habitat

Presence

The Project Area is out of range for the Forest Red-tailed Black Cockatoo and Baudin's Black Cockatoo but is in the range of the Carnaby's Cockatoo.

BCE (2025) did not record Carnaby's Cockatoo in the Project Area, but this species has been recorded in the immediate vicinity (BCE, 2025) (Att4_Fauna Assessment, Section 3.3, p.52). Carnaby's Cockatoo are likely a regular visitor to the general region, with breeding occurring to the south and east of the Project Area and foraging likely to occur in the Project Area mainly in the non-breeding season (BCE, 2025) (Att4_Fauna Assessment, Section 3.3, p.52).

Breeding Habitat

No suitable Black Cockatoo breeding trees were identified in the Project Area (BCE, 2025); trees were either not large enough to be assessed as potential nesting trees or do not form hollows (BCE, 2025) (Att4_Fauna Assessment, Section 3.3, p.52).

There are 72 known breeding sites within 20 km of the Project Area, with the nearest sites located approximately 15 km from the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.3, p.52). Black Cockatoos forage in areas 6-12 km from their nesting site during breeding season and up to 20 km from

night roosting habitat in non-breeding season (DAWE, 2022). Carnaby's Cockatoo foraging in the Project Area is, therefore, expected to occur mainly during the non-breeding season (BCE, 2025) (Att4_Fauna Assessment, Section 3.3, p.52).

Roosting Habitat and Watering Points

No potential water sources, roosting sites (e.g. taller trees that are in close proximity to water), or signs of night-roosting activity were recorded in the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.4, p.59). Given the lack of suitable roost habitat, night-roosting is not expected to occur in the Project Area. The nearest confirmed roost is located less than 2 km south of the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.4, p.59).

Foraging Habitat

Black Cockatoo foraging habitat is present in the Project Area and evidence of foraging has been recorded in the vicinity of the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.3, p.52). The suitability of vegetation in the area as foraging habitat is primarily due to the presence and abundance of *Banksia attenuata* and *Banksia menziesii*, with density of *Banksia* spp. ranging from scattered trees in VSA5 to high density patches particularly in areas of VSA1 (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.3.1, p.54).

Foraging habitat was scored using the BCE methodology (BCE (2025) (Att4_Fauna Assessment, Section 2.4.3.3, p.24) which considers the type, density and condition of trees and shrubs in an area as well as the context such as availability of nearby foraging habitat. Foraging habitat scores in the Project Area are listed below and shown in Att1_Figures (Figure 7):

- Score of 7 – Moderate to High foraging value: VSA 1 (180.8 ha);
- Score of 4 – Low to Moderate foraging value: VSA 5 (39.2 ha); and
- Score of 2 – Very Low foraging value: VSA 4 (17.5 ha) and VSA 6 (2.2 ha).

Given the above scores and extent of each VSA, the habitat in the Project Area is considered to provide moderate to high value foraging habitat for Carnaby's Cockatoo (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.3.1, p.54).

The DCCEEW foraging quality scoring tool (DAWE, 2022) was applied to assess the Project Area as a whole, and the Project Area scored 10 (out of 10) for Carnaby's Cockatoo (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.3.2, p.57). The draft DCCEEW habitat scoring system was also used to assess the Project Area as a whole, and the Project Area scored 9 (out of 10) for Carnaby's Cockatoo (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.3.3, p.58).

3.2.2 Describe the vegetation (including the status of native vegetation and soil) within the project area.

Soil landscapes and land system mapping of WA describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:125,000 (DPIRD, 2022). The Project Area lies within the Bassendean Systems, which are characterised by sand dunes and sandplains with pale deep sand, semi-wet and wet soil, as well as Banksia paperbark woodlands and mixed heaths (DPRID, 2022). The Project Area is located across the following landscape subsystems (DPIRD, 2022). The Bassendean 5 Subsystem is the dominant subsystem within the Project Area, with Bassendean 3 and 4 subsystems also present.

- **Bassendean 3 Subsystem** – Low dune fields; deep pale grey or white sands.
- **Bassendean 4 Subsystem** – Plain, often poorly drained; semi-wet soil, pale shallow sands over pan, sandy duplexes, wet soil.
- **Bassendean 5 Subsystem** – Complex pattern of dunes of low sandy rises, poorly drained plains, saline depressions, and swamps.

Mapping of the pre-European broad vegetation types within WA was completed on a broad scale (1: 1,000,000) by Beard (1976). These vegetation types were later re-assessed by Shepherd et al. (2002), resulting in 819 vegetation associations within WA. Regional vegetation association mapping shows the Project Area is located in one vegetation association, Bassendean 1030 (DPRID, 2018):

- **Bassendean 1030** – Low woodland or open low woodland; Other acacia, banksia, peppermint, cypress pine, casuarina, York gum *Acacia* spp., *Banksia* spp., *Agonis flexuosa*, *Callitris* spp., *Allocasuarina* spp., *Eucalyptus loxophleba*.

Seven VTs have been mapped across the Project Area as shown in Att1_Figures (Figure 6) and described below (Woodman, 2014) (linked, Appendix U, pp.U1-U44):

- **VT 1** – 39.7 ha (16% of the Project Area)
  - Low Open Heathland to Mid Closed Heathland of *Acacia lasiocarpa* var. *lasiocarpa*, *Banksia telmatiae*a, *Melaleuca seriata*, *Hakea obliqua* subsp. *parviflora*, *Regelia ciliata* and/or *Verticordia densiflora* var. *densiflora*, often with Mid Isolated Clumps of Shrubs to Mid Sparse Shrubland of *Melaleuca*. *rhaphiophylla* and mixed species including Low to Mid Shrubs and Low to Mid Sedges of *Schoenus subfascicularis* and *Lepidosperma longitudinale* on white grey to grey brown sand, sandy loam or sandy clay in broad damp depressions on flat to gently undulating plains.
- **VT 6** – 18.1 ha (7% of the Project Area)
  - Low Isolated Clumps of Trees to Low Woodland of *Banksia attenuata*, *Banksia menziesii* and/or *Banksia ilicifolia* over Low Sparse Shrubland to Mid Closed Shrubland of *Adenanthos cygnorum* subsp. *cygnorum*, *Banksia telmatiaea*, *Beaufortia squarrosa*, *Hypocalymma angustifolium*, *Jacksonia nutans* and/or *Melaleuca seriata* over Low Isolated Clumps of Sedges to Mid Sedgeland of Anarthria laevis and/or Low Isolated Clumps of Rushes of *Chordifex sinuosus* on white grey to grey brown sand in damp depressions.
- **VT 7** – 2.2 ha (1% of the Project Area)
  - Low Sparse Heathland to Low Closed Heathland of *Allocasuarina* spp., *Calothamnus quadrifidus*, *Calothamnus sanguineus*, *Hakea incrassata*, *Hakea lissocarpha*, *Hibbertia crassifolia* and/or *Melaleuca seriata* over Low Isolated Clumps of Sedges to Mid Sparse Sedgeland of *Mesomelaena pseudostygia* and *Schoenus clandestinus*, often with Mid Isolated Clumps of Shrubs to Mid Open Shrubland of *Xanthorrhoea preissii* and Low to Mid Shrubs of *Banksia telmatiaea*, on white grey to grey sand or white grey sandy loam to yellow brown clay loam with lateritic surface stones in broad dry depressions or gently undulating plains.
- **VT 9a** – 1.0 ha (0.4% of the Project Area)
  - Mid Open Shrubland to Tall Closed Shrubland of *Melaleuca teretifolia*, *Melaleuca rhaphiophylla* and *Melaleuca viminea* subsp. *viminea*, occasionally with Mid Shrubs of *Melaleuca lateritia* and Low to Tall Sedges and Rushes of *Baumea juncea*, *Chorizandra enodis*, *Meeboldina coangustata* and *Schoenus subfascicularis* on grey to grey brown sandy loam or clay loam in broad shallow basins, wet flats and drainage lines.

- **VT 9b** – 16.6 ha (7% of the Project Area)
  - Low Woodland to Mid Open Forest of *Eucalyptus rudis* subsp. *rudis* over Low Isolated Clumps of Trees to Low Closed Forest of *Melaleuca rhaphiophylla*, often with Tall Sparse Shrubland to Tall Shrubland of *Acacia saligna* subsp. *lindleyi*, over Low Isolated Clumps of Forbs to Low Closed Forbland of **Galium murale*, **Hypochaeris glabra*, **Lysimachia arvensis* and *Trachymene pilosa* (occasionally with Mid Isolated Clumps of Sedges to Mid Closed Sedgeland of *Lepidosperma longitudinale*) on grey to grey black sand, sandy loam, sandy clay or clayey sand in wetlands, broad shallow basins/ depressions and drainage lines.
- **VT 17** – 96.2 ha (40% of the Project Area)
  - Low Isolated Clumps of Trees to Low Open Forest of *Banksia attenuata*, *Banksia menziesii* and *Eucalyptus todtiana* over Mid Isolated Clumps of Shrubs to Mid Shrubland of *Adenanthos cygnorum* subsp. *cygnorum*, *Eremaea pauciflora*, *Jacksonia floribunda*, *Jacksonia nutans*, *Stirlingia latifolia* and *Xanthorrhoea preissii* over Low Isolated Clumps of Shrubs to Low Shrubland of *Bossiaea eriocarpa*, *Dasypogon obliquifolius*, *Eremaea asterocarpa* subsp. *asterocarpa*, *Eremaea pauciflora*, *Hibbertia crassifolia*, *Hibbertia hypericoides*, *Jacksonia nutans*, *Melaleuca clavifolia*, *Patersonia occidentalis* var. ?*occidentalis* and *Petrophile linearis* over Low Isolated Clumps of Sedges to Mid Open Sedgeland of *Mesomelaena pseudostygia* on white or grey sand on undulating plains and low dunes.
- **VT 18** – 69.3 ha (29% of the Project Area)
  - Low Isolated Clumps of Trees to Low Open Forest of *Banksia attenuata* and *Banksia menziesii* over Mid Isolated Clumps of Shrubs to Mid Shrubland of *Allocasuarina humilis*, *Conospermum stoechadis* subsp. *stoechadis*, *Eremaea pauciflora*, *Hakea costata* and/or *Xanthorrhoea preissii* over Low Isolated Clumps of Shrubs to Low Closed Shrubland of *Bossiaea eriocarpa*, *Calothamnus sanguineus*, *Dasypogon obliquifolius*, *Eremaea pauciflora*, *Hibbertia hypericoides*, *Jacksonia nutans* and/or *Melaleuca clavifolia* over Low Isolated Clumps of Sedges to Mid Open Sedgeland of *Mesomelaena pseudostygia* on grey to yellow grey/brown sand on undulating plains and low dunes or yellow grey to grey brown sandy loam to sandy clay loam in open depression or flats within undulating plains.
  -

Vegetation in the Disturbance Footprint was mapped as being in Excellent condition (237.7 ha, 98.3% of the Disturbance Footprint) and Good condition (1.7 ha, 0.7% of the Disturbance Footprint) (Umwelt, 2025a) (Att3_Flora_Vegetation). Consistent with mapping of VTs and fauna habitat, tracks and drill lines that are present throughout the Project Area, were not mapped separately as disturbed areas due to their narrow width.

Threatened Ecological Communities

The PMST search (Att5_PMST results) identified two Threatened Ecological Communities (TECs) as potentially occurring in the Project Area:

- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered) (Tuart Woodlands TEC); and
- Banksia Woodlands of the Swan Coastal Plain ecological community (Endangered) (Banksia Woodlands TEC).

The primary defining feature of the Tuart Woodlands TEC is the presence of at least two living established Tuart (*Eucalyptus gomphocephala*) trees in the uppermost canopy layer (DoEE, 2016). No Tuart trees have been recorded during recent surveys within or in the vicinity of the Project Area, therefore, the Tuart Woodlands TEC is considered not to occur in the Project Area (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.2.2.2, p.52).

The Approved Conservation Advice for the Banksia Woodlands TEC (Department of the Environment and Energy [DoEE], 2016) provides a stepwise methodology for identifying occurrences of the Banksia Woodlands TEC. Using the methodology in DoEE (2016), five patches totalling 124.7 ha (52% of the

Project Area) were identified as meeting the criteria to be classified as the Banksia Woodlands TEC (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.2.2.1, p.46). All five patches are considered to be in Excellent condition (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.2.2.1, p.46). Att1_Figures (Figure 3) shows the mapped locations of the Banksia Woodlands in the Project Area.

An additional patch was identified in the Project Area; however, it did not meet the patch size criteria to be considered representative of the Banksia Woodlands TEC (Att3_Flora_ Vegetation, Section 5.2.2.1, p.46).

3.3 Heritage

3.3.1 Describe any Commonwealth Heritage Places Overseas or other places recognised as having heritage values that apply to the project area.

There are no Commonwealth, World or State Registered Heritage Places registered in or within the vicinity of the Project Area (DCCEEW, 2021; DPLH, 2024a).

3.3.2 Describe any Indigenous heritage values that apply to the project area.

The Project Area is covered by the South West Settlement determination (WCD2021/010) and the Yued Indigenous Land Use Agreement (ILUA NNT No. WI2015/009) (Landgate, 2024).

There are no registered or lodged Aboriginal Heritage sites in the Project Area (DPLH, 2024b) (linked). The closest sites are (DPLH, 2024b) (linked):

- Registered site: Mullering Brook (ID 4640), a creation/dreaming narrative site located approximately 1.5 km south of the Project Area;
- Registered site: Cooljarloo Well (ID 4639), a creation/dreaming narrative and water source site located approximately 1.7 km south of the Project Area;
- Registered site: Wongonderrah Camp (ID 4641), an artefacts/scatter, camp and water source site located approximately 5.2 km east of the Project Area; and

Lodged place: Cooljarloo Swamp (ID 20050), a camp, hunting place and water source place located approximately 5.9 km southwest of the Project Area.

3.4 Hydrology

3.4.1 Describe the hydrology characteristics that apply to the project area and attach any hydrological investigations or surveys if applicable. *

Catchments

The Project Area is located within the Nambung River catchment, of the Moore-Hill Rivers basin (DWER, 2024a). The Nambung River catchment covers just under 3,000 km2 and annual rainfall within the catchment has minimal variation, approximately 600 mm on the coast and approximately 540 mm further inland (DWER, 2025).

Surface Water

The Project Area is located in the Nambung/Cataby Coastal Tributaries surface water area (DWER, 2024c).

No surface water features intersect the Project Area (DWER, 2018). The nearest surface water features are the Mullering Brook and Mount Jetty Creek, located 1.5 km south and 6 km north of the Project Area respectively (DWER, 2018) (Att1_Figures, Figure 1). Both creeks flow westward with Mullering Brook observed to flow only after periods of heavy rainfall (HGEO, 2025) (linked, Section 2.1, p.8).

Other minor ephemeral drainage lines flow westward but become indistinct in the mining tenement area coalescing into ephemeral wetland and damp land areas (HGEO, 2025) (linked, Section 2.1, p.8). DBCA (2017a) has digitally mapped geomorphic wetlands. Four geomorphic wetlands that are seasonally waterlogged have been mapped in the Project Area (DBCA, 2017a):

- UFI: 705 – Palusplain;
- UFI: 704 – Palusplain;
- UFI: 694 – Palusplain; and
- UFI: 706 – Dampland.

There are no Ramsar sites within the Project Area (DBCA, 2017b). The Lancelin Defence Training Area wetland (Ref. Code: 119) listed in the Directory of Important Wetlands in Australia, intersects the north-eastern boundary of the Project Area (DBCA, 2018). Approximately 25 ha of the wetland's total extent of 9,930 ha occurs within the Project Area.

Groundwater

The Project Area falls across the Gingin and Jurien groundwater areas (DWER, 2024d). No Public Drinking Water Source Areas (PDWSA) occur within or in close proximity to the Project Area (DWER, 2024b).

The Project Area is located on the coastal dune sands west of the Gingin Scarp and is underlain by the Jurassic Yarragadee formation (HGEO, 2025) (linked, Section 2.3, p.9). A series of middle to late tertiary period superficial deposits overlie the Yarragadee formation. Regional groundwater flow is westward from the Gingin Scarp to the coast where the groundwater discharges (HGEO, 2025) (linked, Section 2.3, p.9).

The Cooljarloo mineral sand deposit is located above the Yarragadee formation and contained within the superficial deposits at a depth of approximately 15 to 30 mbgl (HGEO, 2025) (linked, Section 2.3.1, p.10). Depth to groundwater in the Project Area is greater than 3 mbgl. However, the area immediately to the north-west of the Project Area is inferred to have a pre-mining depth to groundwater level of less than 3 mbgl, indicating vegetation in that area may be groundwater dependent (HGEO, 2025) (linked, Section 5, p.33 and Figure 15). Groundwater flow in the superficial aquifer is predominantly westward, except where influenced by localised groundwater abstraction for mining activities. Groundwater recharge to the superficial aquifer is mainly by direct infiltration from rainfall over permeable sands, but also from surface water runoff from the Gingin escarpment and vertical groundwater flow from underlying Mesozoic aquifers where there is an upward hydraulic gradient (HGEO, 2025) (linked, Section 2.3.1, p.11).

The superficial formations overlie the Yarragadee formation at a depth of between 30 and 50 mbgl over most of the Cooljarloo mining lease. The Yarragadee formation is a predominantly sand unit which forms part of the regionally extensive Yarragadee aquifer (HGEO, 2025) (linked, Section 2.3.2, p.11). Drilling indicates that the upper surface of the Yarragadee formation comprises weathered sand with a 1 m to 3 m

thick silty and sometimes clayey layer formed discontinuously below the unconformity. Testing, groundwater flow modelling and water level monitoring on the Cooljarloo lease indicates that the Yarragadee and superficial aquifers are in hydraulic continuity (HGEO, 2025) (linked, Section 2.3.2, p.12).

4. Impacts and mitigation

4.1 Impact details

Potential Matters of National Environmental Significance (MNES) relevant to your proposed action area.

EPBC Act section	Controlling provision	Impacted	Reviewed
S12	World Heritage	No	Yes
S15B	National Heritage	No	Yes
S16	Ramsar Wetland	No	Yes
S18	Threatened Species and Ecological Communities	Yes	Yes
S20	Migratory Species	No	Yes
S21	Nuclear	Yes	Yes
S23	Commonwealth Marine Area	No	Yes
S24B	Great Barrier Reef	No	Yes
S24D	Water resource in relation to large coal mining development or coal seam gas	No	Yes
S26	Commonwealth Land	No	Yes
S27B	Commonwealth Heritage Places Overseas	No	Yes
S28	Commonwealth or Commonwealth Agency	No	Yes

4.1.1 World Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.1.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.1.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No World Heritage Areas are located in or near the Project Area. The proposed action will, therefore, not result in direct or indirect impacts to a World Heritage Area.

4.1.2 National Heritage

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.2.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.2.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No declared National Heritage places are located in or near the Project Area. The proposed action will, therefore, not result in direct or indirect impacts to a National Heritage place.

4.1.3 Ramsar Wetland

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.3.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.3.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No Ramsar wetlands are located in or near the Project Area. The proposed action will, therefore, not result in direct or indirect impacts to a Ramsar wetland.

4.1.4 Threatened Species and Ecological Communities

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Threatened species

Direct impact	Indirect impact	Species	Common name
Yes	Yes	Andersonia gracilis	Slender Andersonia
Yes	Yes	Anigozanthos viridis subsp. terraspectans	Dwarf Green Kangaroo Paw
No	No	Banksia mimica	Summer Honeypot
No	No	Caleana dixonii	Sandplain Duck Orchid
No	No	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris ferruginea	Curlew Sandpiper
No	No	Dasyurus geoffroii	Chuditch, Western Quoll
No	No	Drakaea elastica	Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid
No	No	Egernia stokesii badia	Western Spiny-tailed Skink, Baudin Island Spiny-tailed Skink
No	No	Hemiandra gardneri	Red Snakebush
No	No	Leipoa ocellata	Malleefowl
Yes	Yes	Macarthuria keigheryi	Keighery's Macarthuria
No	No	Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew
No	No	Parantechinus apicalis	Dibbler
No	No	Rostratula australis	Australian Painted Snipe
No	No	Thelymitra stellata	Star Sun-orchid
Yes	Yes	Zanda latirostris	Carnaby's Black Cockatoo, Short-billed Black-cockatoo

Ecological communities

Direct impact	Indirect impact	Ecological community
Yes	Yes	Banksia Woodlands of the Swan Coastal Plain ecological community
No	No	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community

4.1.4.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

Yes

4.1.4.2 Briefly describe why your action has a direct and/or indirect impact on these protected matters. *

Threatened Flora

A PMST search identified eight Threatened flora species. Of the eight species, five are considered unlikely to occur in the Project Area. The potential direct and indirect impacts for the Threatened flora species that are known to occur or possibly occur in the Project Area are provided below.

Macarthuria keigheryi (Endangered)

Likelihood of occurrence: known to occur

Potential direct impact:

- Loss of *Macarthuria keigheryi* individuals.

Potential indirect impacts:

- Degradation of habitat due to altered hydrology;
- Degradation of habitat due to altered fire regime;
- Degradation of habitat due to dust; and
- Degradation of habitat due to ingress of weeds or pathogens (e.g. Dieback).

Andersonia gracilis (Endangered) and *Anigozanthos viridis* subsp. *terraspectans* (Vulnerable)

Likelihood of occurrence: possibly occur

Potential direct impact:

- Loss of *Andersonia gracilis* and *Anigozanthos viridis* subsp. *terraspectans* individuals.

Potential indirect impacts:

- Degradation of habitat due to altered hydrology;
- Degradation of habitat due to altered fire regime;
- Degradation of habitat due to dust; and
- Degradation of habitat due to ingress of weeds or pathogens (e.g. Dieback).

Threatened Fauna

A PMST search identified ten Threatened fauna species as potentially occurring in the Project Area. Of the ten species, nine are considered to either possibly occur only as vagrants for very brief periods or are unlikely to occur in the Project Area. Potential direct and indirect impacts to the one species (Carnaby's Cockatoo) that is likely to occur in the Project Area are provided below.

Carnaby's Black Cockatoo (*Zanda latirostris*) (Endangered)

Likelihood of occurrence: likely to occur

Potential direct impacts:

- Loss of foraging habitat due to clearing;
- Potential fragmentation of foraging habitat due to clearing; and
- Potential loss of individuals due to vehicle strike.

Potential indirect impacts:

- Degradation of habitat due to altered hydrology;
- Degradation of habitat due to altered fire regime;
- Increased competition and/or predation due to changes in feral animal populations;
- Degradation of habitat due to dust and noise; and

- Degradation of habitat due to ingress of weeds or pathogens.

Threatened Ecological Communities

A PMST search identified two TECs as potentially occurring in the Project Area. The Tuart Woodlands TEC is considered not to occur in the Project Area. The Banksia Woodlands TEC is known to occur in the Project Area and potential impacts are provided below.

Banksia Woodlands of the Swan Coastal Plain Ecological Community (Endangered)

Likelihood of occurrence: known to occur

Potential direct impact:

- Loss of Banksia Woodlands TEC due to clearing.

Potential indirect impacts:

- Degradation due to edge effects from changes in hydrology and generation of dust;
- Fragmentation of Banksia Woodlands TEC; and
- Degradation due to ingress of weeds or pathogens.

4.1.4.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

Yes

4.1.4.5 Describe why you consider this to be a Significant Impact. *

Following assessment of potential impacts against the Significant Impact Criteria (DEWHA, 2013), the referral guidance for Black Cockatoos (DAWE, 2022) and the Banksia Woodlands TEC (DoEE, 2019), it is considered the proposed action:

- May have a significant impact on the Banksia Woodlands TEC; and
- Is unlikely to have a significant impact on *Macarthuria keigheryi*, *Andersonia gracilis*, *Anigozanthos viridis* subsp. *terraspectans* and Carnaby's Cockatoo.

A summary of the assessment for each relevant protected matter is provided below. Detailed assessment for *Macarthuria keigheryi*, Carnaby's Cockatoo and the Banksia Woodlands TEC is provided in Att7_Assessment of Significance (Sections 7.1-7.2, Tables 1 to 4).

Macarthuria keigheryi (Endangered)

The proposed action is unlikely to have a significant impact on *Macarthuria keigheryi* as:

- Targeted searching has recorded only two individuals in the Project Area (Umwelt, 2025a) (Att3_Flora_Vegetation, Section 5.2.1.1, p.36);
- This species has been recorded in VT 17 which occurs extensively in the vicinity of the Project Area (>16,300 ha mapped within 15 km of the Project Area);
- Interrogation of the Tronox dataset shows 44,398 records at 263 locations within 15 km of the Project Area;
- An additional 11,500 individuals have been recorded in an area of approximately 122.6 km2 immediately to the south and south-west of the Project Area in an area previously disturbed by fire (JBS&G, 2020) (linked, p.24);
- Clearing of 95.7 ha of VT 17 equates to only 0.6% of the mapped area of VT 17 within 15 km of the Project Area (noting that much of the surrounding area has not been mapped);
- Clearing of the two recorded individuals equates to only 0.005% of the population of *Macarthuria keigheryi* within 15 km of the Project Area; and
- Mining in the Project Area will be for a period of up to 3 years, after which the area will be rehabilitated with native vegetation.

Given the limited loss of individuals (0.005%) in the vicinity of the Project Area and the availability of suitable habitat, the relatively short timeframe between clearing and rehabilitation and re-spreading of topsoil, the proposed action is unlikely to have a significant impact on *Macarthuria keigheryi*.

Att7_Assessment of Significance (Section 7.1, Table 1) provides a detailed assessment of significance against the Significant Impact Guidelines (DEWHA, 2013).

Andersonia gracilis (Endangered)

The proposed action is unlikely to have a significant impact on *Andersonia gracilis* as:

- Targeted searching (Umwelt, 2025a) (Att3_Flora_Vegetation, p.14, Figure 3.1) has not recorded the species in the Project Area;
- Interrogation of the Tronox dataset shows 18,968 records of this species at 1,481 locations within 15 km of the Project Area (Att1_Figures, Figure 4); and
- An additional 1,007 individuals have been recorded in an area of approximately 122.6 km2 immediately to the south and south-west of the Project Area (JBS&G, 2020) (linked, p.24).

Umwelt (2025a) (Att3_Flora_Vegetation, Section 5.2.1.2, p.39) note germination of *Andersonia gracilis* appears to be encouraged by fire and that as the vegetation in the Project Area was long unburnt at the time of the 2022, 2023 and 2024 surveys (a fire moved through the area in late 2024), there is a possibility this species may be present within suitable habitat following a fire.

Andersonia gracilis has undergone significant fragmentation of populations and a decline in the number of mature individuals (DEC, 2006) (linked, p.8). Threats include:

- Dieback disease;
- Inappropriate fire regimes – soil seedbanks become rapidly depleted if fires recur before juvenile plants reach maturity and replenish the soil seedbank;
- Weeds;
- Road and firebreak maintenance;
- Mining activities;
- Grazing and trampling by rabbits, kangaroos and livestock; and
- Habitat degradation – development of urban areas and agriculture in seasonally damp areas and rising salinity due to extensive clearing.

The proposed action may impact individuals of this species (if present) through clearing of native vegetation and disturbance to the seedbank. However, given the wide distribution of this species (DEC, 2006) (linked, p.6), the lack of records in the Project Area, and the large number of records in the vicinity of the Project Area (Att1_Figures, Figure 4), the proposed action is unlikely to have a significant impact on this species.

Anigozanthos viridis subsp. *terraspectans* (Vulnerable)

The proposed action is unlikely to have a significant impact on *Anigozanthos viridis* subsp. *terraspectans* as:

- Targeted searching (Umwelt, 2025a) (Att3_Flora_Vegetation, p.14, Figure 3.1) has not recorded *Anigozanthos viridis* subsp. *terraspectans* in the Project Area;
- Interrogation of the Tronox dataset shows 320,723 records of this species at 117 locations within 15 km of the Project Area, (Att1_Figures, Figure 4).

The key threats to *Anigozanthos viridis* subsp. *terraspectans* are (DEWHA, 2008) (linked, p.2):

- Disturbance, particularly road maintenance activities and fragmentation; and
- Inappropriate fire regimes.

Dieback may be a threat to *Anigozanthos viridis* subsp. *terraspectans* but the susceptibility of this species to Dieback is unknown (DEWHA, 2008) (linked, p.2).

The proposed action may impact individuals of this species (if present) through clearing of native vegetation and disturbance to the seedbank. However, given the lack of records in the Project Area and the large number of records in the vicinity of the Project Area, the proposed action is unlikely to have a significant impact on *Anigozanthos viridis* subsp. *terraspectans*.

Carnaby's Cockatoo (*Zanda latirostris*) (Endangered)

The action requires referral under the EPBC Act due to the proposed clearing of approximately 180.8 ha of Moderate to High value foraging habitat, 39.2 ha of Low to Moderate value foraging habitat and 19.7 ha of Very Low value foraging habitat which exceed the referral thresholds of 1 ha of high-quality and 10 ha of lower-quality native foraging habitat. Refer to Att7_Assessment of Significance (Section 7.1.2, Table 3) for further information.

The proposed action may result in a temporary, minor (0.007%) reduction in the area of occupancy and a temporary reduction (0.4%) in the extent of foraging habitat due to the proposed clearing of up to 241.75 ha of native vegetation. These reductions in foraging habitat, and the proposed action more generally, are unlikely to have a significant impact on Carnaby's Cockatoo as:

- No potential breeding or roosting habitat has been recorded in the Project Area;

- The habitat in the Project Area does not provide water sources for Black Cockatoos (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.5, p.59), or otherwise meet the criteria for habitat critical to the survival of the species;
- Extensive foraging habitat is available within 15 km of the Project Area, with approximately 54,135 ha of remnant native vegetation present within 15 km of the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.3.1, p.54):
    - A significant extent of native vegetation in the vicinity of the Project Area is protected in areas with reserve status, including the Badgingarra National Park with an extent of approximately 13,100 ha;
    - The foraging habitat is present in the Bassendean 5 and Bassendean 3 soil subsystems, neither of which is highly restricted in the broader region (BCE, 2025) (Att4_Fauna Assessment, Section 4, p.63); and
    - The proposed clearing of up to 241.75 ha of native vegetation represents only 0.4% of the remaining native vegetation within a 15 km radius of the Project Area.
- The closest known breeding sites are approximately 15 km from the Project Area (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.2, p.52):
    - Black Cockatoos forage within a 6-12 km radius during the breeding season so are unlikely to regularly forage in the Project Area during the breeding season (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.2, p.52); and
    - Given the distance between the Project Area and breeding habitat, dust, noise and light emissions are unlikely to impact breeding habitat.
- Drawdown will not adversely affect Black Cockatoo habitat beyond the tenement boundaries as groundwater drawdown associated with the proposed action is expected to (HGEO, 2025) (linked, Section 5.1, p.33):
    - Extend only 260 m outside the M70/1398 tenement boundary as defined by the -0.5 m drawdown contour;
    - Remain entirely within the M70/1413 tenement; and
    - Be less than 0.5 m (in the order of 0.2 m) along the western boundary of M70/1413, and well within the seasonal variation in groundwater level.
- Mining will be undertaken in the Project Area for a period of up to 3 years, after which the area will be rehabilitated with native vegetation thereby re-establishing the area for foraging:
    - Black Cockatoos have been recorded foraging in re-vegetated areas, including areas re-vegetated with Banksia species, between four to seven years following re-vegetation (Department of the Environment [DoE], 2025a).

Refer to Att7_Assessment of Significance (Section 7.1.2, Table 2) for a detailed assessment of significance against the Significant Impact Guidelines (DEWHA, 2013).

Banksia Woodlands of the Swan Coastal Plain Ecological Community (Endangered)

The proposed action may have a significant impact on the Banksia Woodlands TEC as:

- Clearing of 124.7 ha of Banksia Woodlands TEC that meets the key diagnostic characteristics and condition thresholds (Umwelt, 2025) (Att3_Flora_Vegetation, Section 5.2.2.1, p.46) will:
    - Adversely affect critical habitat as defined by DoEE (2016, p.27);
    - Reduce the extent of, and further fragment, the ecological community;
- Modify abiotic factors necessary for survival of the Banksia Woodlands TEC; and
- May interfere with the recovery of the Banksia Woodlands TEC.

Refer to Att7_Assessment of Significance (Section 7.2, Table 4) for a detailed assessment of significance against the Significant Impact Guidelines (DEWHA, 2013).

4.1.4.7 Do you think your proposed action is a controlled action? *

Yes

4.1.4.8 Please elaborate why you think your proposed action is a controlled action. *

The proposed action may have a significant impact on the Banksia Woodlands TEC.

4.1.4.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Avoid

- Proposed action to utilise infrastructure within the existing Cooljarloo Mine (e.g. HMC stockpile) as much as practical to avoid additional construction.

Minimise

- Active suppression of dust on hauls and pit areas using water trucks.
- Undertake progressive rehabilitation of disturbed areas to minimise the total open area.
- Dust generating activities (e.g. topsoil stripping and placement) to be avoided during high winds conducive to excessive dust generation.
- Undertake pre-disturbance surveys to identify significant species or communities.
- Clearing activities are controlled and monitored to minimise the risk of unauthorised clearing.
- Maintenance of an internal permitting system to manage and record clearing activities.
- A spatial dataset of significant flora species is maintained to include records of site surveys and other reliable data sources (e.g. State and Federal databases)
- A plant herbarium is maintained to facilitate accurate species identification.
- Vehicles and machinery are kept to established roads, tracks or otherwise approved under a clearing permit.
- Implementation of control programmes for feral species observed to be significantly impacting native fauna, rehabilitation, or operations.
    - Feral cat trapping is undertaken in response to reported sightings
    - Domestic animals are not permitted on site.
- Fauna egress matting is provided in lined dams and ponds
- Implementation of speed limits, with traffic speed limited to a maximum of 80 km/h on internal roads and 60 km/h on unsealed roads.
- All vehicles/machinery are to be clean of soil and vegetation upon entry of exit from site. Vehicles pass through the hygiene wash bay or are inspected by an authorised person.
- Access to the mining lease is restricted by way of fencing and/or signage.
- Access to known *P. cinnamomi* infestation areas is restricted to essential services and must be approved by the Group Leader Environment prior to entry.
- The importation of soil and vegetation matter to site is restricted to low risk material and must be approved by the Group Leader Environment.
- Drainage is to be managed to minimise the spread of dieback particularly around known infestations.
- Site specific management plans are developed for known *P. cinnamomi* infestations within the Mining Lease.
- Topsoil from native and agricultural areas is stripped, stockpiled and returned separately. First cut topsoil (upper 50 mm) is stripped, stockpiled and selectively managed according to vegetation type.
- Review of water related aspects and statutory obligations conducted annually to assess the potential for water related environmental impacts and community concerns.
- A Site water balance is maintained to assess groundwater use, including water abstracted from bores, mining voids, water dams and with consideration to water return via tailing discharge.
- Conduct groundwater abstraction as per the conditions of the groundwater licence.
- Review the water balance on a regular basis to ensure use is within the limits stated in the groundwater licence.
- A water quality monitoring programme is undertaken that is commensurate with he risks associated with mining and associated water use/discharge.
- Surface water monitoring is conducted at Mount Jetty Creek and Mullering Brook to assess water chemistry and sediment loads.

Rehabilitate

- Drill holes are capped and backfilled.

- Implementation and maintenance of a Mine Closure Plan (MCP; or Mining Development and Closure Proposal [MDCP], depending on timeframe) as per relevant legislation and guidelines at the time.
- Undertake progressive backfilling to minimise time between clearing and rehabilitation.
- Reconstructed landforms and drainage lines are tied into pre-disturbed topography.

4.1.4.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Investigations into potential offset sites are being undertaken to assess the suitability of these sites in terms of meeting relevant offset criteria. Offset proposals and supporting documentation will be submitted once further details from the assessment process and landholder negotiations are available.

4.1.5 Migratory Species

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

Direct impact	Indirect impact	Species	Common name
No	No	Actitis hypoleucos	Common Sandpiper
No	No	Apus pacificus	Fork-tailed Swift
No	No	Calidris acuminata	Sharp-tailed Sandpiper
No	No	Calidris ferruginea	Curlew Sandpiper
No	No	Calidris melanotos	Pectoral Sandpiper
No	No	Motacilla cinerea	Grey Wagtail
No	No	Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew
No	No	Pandion haliaetus	Osprey

4.1.5.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.5.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The PMST search identified eight Migratory species as potentially occurring in the Project Area, of which three of these species are also Threatened fauna species. One species, *Apus pacificus* (Fork-tailed Swift), is considered an irregular visitor to the Project Area. *Apus pacificus* is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. Being aerial, the species is effectively independent of terrestrial ecosystems when in Australia during its non-breeding season (October to mid-April), and as such is unlikely to utilise the Project Area in any significant manner (BCE, 2025) (Att4_Fauna Assessment, Section 3.3.3.1, p.54). Therefore, the species is unlikely to be impacted by the proposed action.

All other Migratory species are considered to either occur only as vagrants for brief periods or are unlikely to occur in the Project Area and are outlined below:

- Vagrant, may occur in small numbers and/or for very brief periods:
  - Osprey (*Pandion haliaetus*).
- Unlikely to occur – no suitable habitat identified:
  - Common Sandpiper (*Actitis hypoleucos*);
  - Sharp-tailed Sandpiper (*Calidris acuminata*);
  - Curlew Sandpiper (*Calidris ferruginea*);
  - Pectoral Sandpiper (*Calidris melanotos*); and
  - Eastern Curlew (*Numenius madagascariensis*).
- Unlikely to occur – out of range of the species current distribution
  - Grey Wagtail (*Motacilla cinerea*).

4.1.6 Nuclear

4.1.6.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

Yes

4.1.6.2 Briefly describe why your action has a direct and/or indirect impact on this protected matter. *

Low levels of naturally occurring uranium and thorium mineralisation are associated with the mineral sands ore body at Cooljarloo, which results in uranium and thorium, along with their daughter products being present in varying concentrations in the process materials and end products (Radiation Consulting Australia [RCA], 2025) (Att8_Radiation Assessment, Section 2.4, p.11).

A radiation impact assessment was prepared to evaluate the potential radiological impacts associated with the proposed action. The assessment included the following (RCA, 2025) (Att8_Radiation Assessment, Section 1.1, p.7):

- Characterisation of the radioactive content of Osprey ore and associated waste and product streams;
- Identification and modelling of relevant exposure pathways;
- Quantification of cumulative radiological impacts from operations and post-closure scenarios, including product transport; and
- Evaluation of regulatory thresholds for radioactive materials.

The assessment indicates the heavy mineral concentrate (HMC) has the following radionuclide activity concentrations (RCA, 2025) (Att8_Radiation Assessment, Section 2.4, p.11):

- Uranium 238 (U-238) 0.825 Bq/g; and
- Thorium 232 (Th-232) 2.85 Bq/g.

The activity concentration for Th-232 in the HMC exceeds the threshold of 1 Bq/g in Schedule 4 of the EPBC Regulations (RCA, 2025) (Att8_Radiation Assessment, Section 9.1, p.46), resulting in the HMC triggering the following nuclear action:

- Ore, waste, or tailings with radioactivity that exceeds the prescribed concentrations.

The tailings, ore, and general waste streams are below classification thresholds and are not considered to be radioactive material (RCA, 2025) (Att8_Radiation Assessment, Executive Summary, p.5).

Potential environmental impacts associated with the HMC material are:

- Health impacts to members of the public arising from radiological exposure;
- Health impacts to non-human biota arising from radiological exposure; and
- Soil and/or groundwater contamination resulting from loss of containment of HMC material.

In Western Australia radiation safety is regulated by the Western Australian Radiological Council under the *Radiation Safety Act 1975* and for mining operations, is also regulated by the Department of Local Government, Industry Regulation and Safety under the *Work Health and Safety Act 2020.* General radiation safety aspects and management are not discussed in this referral.

4.1.6.4 Do you consider this likely direct and/or indirect impact to be a Significant Impact? *

No

4.1.6.6 Describe why you do not consider this to be a Significant Impact. *

The activity concentration for Th-232 in the HMC exceeds the threshold of 1 Bq/g in the EPBC Regulations (RCA, 2025) (Att8_Radiation Assessment, Section 9.1, p.46). However, beneficiation of the HMC will occur in-pit and the HMC will be transferred via an enclosed flexible pipeline from the mine pit to the existing stockpile outside the Project Area.

An HMC stockpile is not proposed for the Project Area and operation of the existing HMC stockpile and associated infrastructure were developed and approved under the Western Australian regulatory framework prior to the commencement of the EPBC Act in July 2000. These activities are managed in accordance with the *Radiation Safety Act 1975* (WA) and are subject to ongoing oversight by the Radiological Council of Western Australia.

The tailings, ore and general waste streams are below classification thresholds and are not considered radioactive material (RCA, 2025) (Att8_Radiation Assessment, Executive Summary, p.5).

The radiation impact assessment found:

- Doses for all modelled public exposure pathways are significantly below the 1 mSv/year public dose limit. A conservative modelled worst case indicates a dose of 0.0356 mSv/year (RCA, 2025) (Att8_Radiation Assessment, Section 10, p.48).
- Exposure for all relevant non-human species groups is below the no-effect screening threshold of 10 µGy/hour (RCA, 2025) (Att8_Radiation Assessment, Section 10, p.48). This indicates there are no effects from a radiological perspective due to planned operational activities, and that ultimately there is a negligible radiological risk to non-human biota (RCA, 2025) (Att8_Radiation Assessment, Section 10, p.48).
- Doses to members of the public from transport of products from the proposed action are negligible (<0.01 µSv/year) and well below the International Commission on Radiological Protection (ICRP) public dose limit of 1 mSv/year (RCA, 2025) (Att8_Radiation Assessment, Section 3.1, pp.6,14).
- The cumulative impact on public health is considered negligible due to both Cooljarloo Mine and Cataby Mine having maximum public doses below 0.1 mSv/year, which is well below the ICRP limit of 1 mSV/year, (RCA, 2025) (Att8_Radiation Assessment, Section 7.1, p.44).
- Given the low individual dose rates, rapid attenuation with distance and limited operational overlap (considering the timeline of the proposed action), cumulative impacts on non-human biota are considered negligible (RCA, 2025) (Att8_Radiation Assessment, Section 7.1, p.44).

The radiation impact assessment shows exposure through all assessed pathways is low and well below applicable limits. Health impacts to members of the public and to non-human biota are, therefore, unlikely to be significant.

The HMC product is handled in the mine pit and transferred from the dredge via an enclosed, flexible pipeline, with leak detection to an existing stockpile. Loss of containment of the HMC product such that it would result in contamination of soil or groundwater is considered to be unlikely.

In the HMC pipeline, the dominant radionuclides are transported as solids; under neutral, oxygenated process water at ambient temperature there is little mechanism for in-pipe concentration of naturally occurring radioactive material or formation of scale (RCA, 2025) (Att8_Radiation Assessment, Section 2.3.1, p.9). Although radium can co-precipitate into scale in some industries, radium scale formation is primarily an oil/gas brine issue and is not expected in neutral HMC slurries. Any build-up in the line would be physical accumulation of HMC with activity concentrations consistent with the feed material (RCA, 2025) (Att8_Radiation Assessment, Section 2.3.1, p.9).

Given the radiation impact assessment shows exposure through all assessed pathways is low and well below applicable limits and the containment applied to the HMC slurry, the proposed action is not considered to be a significant impact.

4.1.6.7 Do you think your proposed action is a controlled action? *

No

4.1.6.9 Please elaborate why you do not think your proposed action is a controlled action. *

The only process stream in the proposed action that is classified as radioactive is the HMC. Tailings, ore and general waste streams are not classified as radioactive. The HMC will be beneficiated in pit and transferred via an enclosed flexible pipeline to an existing stockpile located at the existing Cooljarloo operations and outside the Project Area.

Modelling of exposure pathways shows public exposure pathways, transport pathways, relevant non-human biota exposure and public cumulative doses are low and well below applicable limits. Due to the low modelled radiation doses, the proposed action is not considered to be a controlled action for the Nuclear action protected matter.

4.1.6.10 Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures. *

Avoid

- In-pit beneficiation of the HMC;
- Transfer of the HMC in an enclosed flexible pipeline from the pit to the existing stockpile outside the Project Area; and
- Leak detection on the HMC slurry pipeline.

Minimise

- Dust suppression such as water sprays, crusting agents or chemical stabilisers, on disturbed areas and roads; and
- Monitoring and maintenance of dust controls.

Rehabilitate

- Progressive backfill of mine pits; and
- Progressive rehabilitation.

Determination of radionuclide (uranium and thorium) content of the HMC and solid waste streams, occupational radiation surveys and dust sampling to monitor radiation risks are conducted, and will continue to be conducted, as part of the existing Cooljarloo operations during implementation of the proposed action.

4.1.6.11 Please describe any proposed offsets and attach any supporting documentation relevant to these measures. *

Not applicable - the action is not considered to be a controlled action for the Nuclear action protected matter.

4.1.7 Commonwealth Marine Area

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.7.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.7.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Project Area is not within or near a Commonwealth Marine Area. No direct or indirect impacts to Commonwealth Marine Areas will result from the Project.

4.1.8 Great Barrier Reef

4.1.8.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.8.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Project Area is not located within or near the Great Barrier Reef Marine Park. No direct or indirect impacts to the Great Barrier Reef will result from the Project.

4.1.9 Water resource in relation to large coal mining development or coal seam gas

4.1.9.1 Is the proposed action likely to have any direct and/or indirect impact on this protected matter? *

No

4.1.9.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Project does not include any coal seam gas developments or large coal mining developments. No direct or indirect impacts to a water resource from coal mining or coal seam gas development will result from the Project.

4.1.10 Commonwealth Land

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.10.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.10.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

The Project Area is not located within or near Commonwealth Land. No direct or indirect impacts to Commonwealth Land will result from the Project.

4.1.11 Commonwealth Heritage Places Overseas

You have identified your proposed action will likely directly and/or indirectly impact the following protected matters.

A direct impact is a direct consequence of an action taken – for example, clearing of habitat for a threatened species or permanent shading on an ecological community as the result of installing solar panels.

An indirect impact is an 'indirect consequence' such as a downstream impact or a facilitated third-party action.

—

4.1.11.1 Is the proposed action likely to have any direct and/or indirect impact on any of these protected matters? *

No

4.1.11.3 Briefly describe why your action is unlikely to have a direct and/or indirect impact. *

No Commonwealth Heritage Places Overseas are located within or near the Project Area. No direct or indirect impacts to Commonwealth Heritage Places Overseas will result from the Project.

4.1.12 Commonwealth or Commonwealth Agency

4.1.12.1 Is the proposed action to be taken by the Commonwealth or a Commonwealth Agency? *

No

4.2 Impact summary

Conclusion on the likelihood of significant impacts

You have indicated that the proposed action will likely have a significant impact on the following Matters of National Environmental Significance:

- Threatened Species and Ecological Communities (S18)

Conclusion on the likelihood of unlikely significant impacts

You have indicated that the proposed action will unlikely have a significant impact on the following Matters of National Environmental Significance:

- World Heritage (S12)
- National Heritage (S15B)
- Ramsar Wetland (S16)
- Migratory Species (S20)
- Nuclear (S21)
- Commonwealth Marine Area (S23)
- Great Barrier Reef (S24B)
- Water resource in relation to large coal mining development or coal seam gas (S24D)
- Commonwealth Land (S26)
- Commonwealth Heritage Places Overseas (S27B)
- Commonwealth or Commonwealth Agency (S28)

4.3 Alternatives

4.3.1 Do you have any possible alternatives for your proposed action to be considered as part of your referral? *

Yes

4.3.2 Do you have an alternative timeline you are proposing for your proposed action? *

No

4.3.3 Briefly describe why an alternate timeline for your proposed action was not possible. *

The Cooljarloo Mine site is an existing mine. For the Cooljarloo Mine to continue to operate efficiently and provide a consistent supply of product to customers, extensions to pits and development of new pits are required to occur in sequence and in a set timeframe. Therefore, no alternative timeframe is proposed.

4.3.4 Do you have an alternative location you are proposing for your proposed action? *

No

4.3.5 Briefly describe why an alternative location for your proposed action was not possible. *

The location of the Osprey and GR6N extension is determined by the location of the mineral sands resource. Therefore, no alternative location is proposed.

4.3.6 Do you have alternative activities you are proposing for your proposed action? *

No

4.3.7 Briefly describe why an alternative activity for your proposed action was not possible. *

Dry mining was considered as an alternative to dredge mining. Consideration of the potential environmental impacts associated with dry mining of the Osprey and GR6N extension indicated dry mining would likely result in additional environmental impacts compared with dredge mining. This alternative activity is, therefore, not proposed. Further information in relation to consideration of dry mining is provided in Section 4.3.5.

4.3.4 Alternatives: Impact and mitigation

4.3.4.1 Do these alternatives have a different impact, avoidance, or mitigation measure compared to what you have already provided? *

No

4.3.5 Alternatives: Considered alternatives

4.3.5.1 Do you have any other alternative actions, including not taking the action, that you have considered but are not proposing as part of this referral? *

Yes

4.3.5.2 Describe the details of this possible alternative that you have considered but are not proposing. *

Dry mining of the Osprey and GR6N extension was considered as an alternative to dredge mining. Dry mining requires drawdown of the groundwater table to below the base of the mine pit which results in a lowered groundwater table in the area surrounding the mine pit.

Dredge mining and dry mining options were discussed with the EPA Services in 2023. Baseline studies were then undertaken to support the environmental impact assessment for development of the Osprey and GR6N. These studies showed potential for greater environmental impacts from dry mining compared with dredge mining. Specifically, potential impacts on MNES from drawdown of the groundwater table were identified as:

- Loss or degradation of habitat for *Macarthuria keigheryi* and (if present) for *Andersonia gracilis* and *Anigozanthos viridis* subsp. *terraspectans* in areas where the current depth to groundwater is less than 10 mbgl;
- Loss or degradation of Carnaby's Cockatoo foraging habitat in areas where the current depth to groundwater is less than 10 mbgl; and
- Loss or degradation of Banksia Woodland TEC where the current depth to groundwater is less than 10 mbgl.

More broadly, potential environmental impacts associated with dry mining of the Osprey and GR6N deposits were identified as:

- Increased exposure and oxidation of potential acid sulfate soils (PASS) in the dry mine pit; and
- Generation of dust as a result of excavation and transfer of ore from the dry mine pit.

Given the likely greater environmental impacts of dry mining compared with dredge mining, Tronox has decided to include only dredge mining in the proposed action.

5. Lodgement

5.1 Attachments

1.2.1 Overview of the proposed action

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	22/10/2025	No	High
#2.	Document	Att9_Glossary_References.pdf Glossary and references	22/10/2025	No	High

1.3.2.17 (Person proposing to take the action) Proposer's history of responsible environmental management

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att2_Environmental Policy.pdf Tronox Environmental Policy	30/09/2022	No	High

1.3.2.18 (Person proposing to take the action) If the person proposing to take the action is a corporation, provide details of the corporation's environmental policy and planning framework

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att2_Environmental Policy.pdf Tronox Environmental Policy	29/09/2022	No	High

3.1.1 Current condition of the project area's environment

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High
#2.	Document	Att3_Flora_Vegetation.pdf Threatened flora and vegetation assessment in the Project Area - confidential version	29/08/2025	Yes	High
#3.	Document	Att3_Flora_Vegetation_Redacted.pdf Threatened flora and vegetation assessment in the Project Area - redacted version	29/08/2025	No	High
#4.	Document	Att4_Fauna Assessment.pdf Basic fauna survey and targeted Black Cockatoo assessment in the Proect Area	15/10/2025	No	High
#5.	Link	Cooljarloo Mine: Osprey and GR6N Project Groundwater Assessment https://www.tronox.com/wp-content/uploads/2025/0..			High
#6.	Link				

		Native Vegetation Extent (DPIRD-005) https://Native Vegetation Extent (DPIRD-005) - D..		High
#7.	Link	Osprey Expansion Environmental Referral Supporting Document https://Tronox Osprey Project_Referral Supportin..		High

3.1.2 Existing or proposed uses for the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High

3.1.3 Natural features, important or unique values that applies to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High
#2.	Document	Att3_Flora_Vegetation_Redacted.pdf Threatened flora and vegetation assessment in the Project Area - redacted version	28/08/2025	No	High

3.2.1 Flora and fauna within the affected area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High
#2.	Document	Att3_Flora_Vegetation_Redacted.pdf Threatened flora and vegetation assessment in the Project Area - redacted version	28/08/2025	No	High
#3.	Document	Att4_Fauna Assessment.pdf Basic fauna survey and targeted Black Cockatoo assessment in the Proect Area	14/10/2025	No	High
#4.	Document	Att5_PMST results.pdf PMST search results	30/06/2025	No	High
#5.	Document	Att6_Likelihood of Occurrence.pdf Likelihood of occurrence	22/10/2025	No	High
#6.	Link				

		Cooljarloo West Titanium Minerals Project Flora and Vegetation Assessment https://Tronox12-37-01 Rep Rev 0			High

3.2.2 Vegetation within the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High
#2.	Document	Att3_Flora_Vegetation_Redacted.pdf Threatened flora and vegetation assessment in the Project Area - redacted version	28/08/2025	No	High
#3.	Document	Att5_PMST results.pdf PMST search results	29/06/2025	No	High
#4.	Link	Cooljarloo West Titanium Minerals Project Flora and Vegetation Assessment https://Tronox12-37-01 Rep Rev 0			High

3.3.2 Indigenous heritage values that apply to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Link	Aboriginal Cultural Heritage Inquiry System https://www.wa.gov.au/government/document-collec..			High

3.4.1 Hydrology characteristics that apply to the project area

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High
#2.	Link	Cooljarloo Mine Osprey and GR6N Project Groundwater Assessment https://www.tronox.com/wp-content/uploads/2025/0..			High

4.1.4.5 (Threatened Species and Ecological Communities) Why you consider the direct and/or indirect impact to be a Significant Impact

Type	Name	Date	Sensitivity	Confidence
#1.	Document Att1_Figures.pdf Figures 1 to 7	21/10/2025	No	High
#2.	Document Att3_Flora_Vegetation_Redacted.pdf Threatened flora and vegetation assessment in the Project Area - redacted version	28/08/2025	No	High
#3.	Document Att4_Fauna Assessment.pdf Basic fauna survey and targeted Black Cockatoo assessment in the Proect Area	14/10/2025	No	High
#4.	Document Att7_Assessment of Significance.pdf Assessment of significance against significant impact criteria and referral guidance	22/10/2025	No	High
#5.	Link Cooljarloo Mine: Osprey and GR6N Groundwater Assessment https://www.tronox.com/wp-content/uploads/2025/0..			High
#6.	Link Raven 2D Seismic Acquisition Survey https://Project Decision · EPBC Act Public Portal			High
#7.	Link SPRAT profiles https://www.environment.gov.au/sprat			High

4.1.5.3 (Migratory Species) Why your action is unlikely to have a direct and/or indirect impact

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att4_Fauna Assessment.pdf Basic fauna survey and targeted Black Cockatoo assessment in the Proect Area	14/10/2025	No	High

4.1.6.2 (Nuclear) Why your action has a direct and/or indirect impact

	Type	Name	Date	Sensitivity	Confidence
#1.	Document	Att8_Radiation Assessment.pdf Radiation impact assessment	08/09/2025	No	High

4.1.6.6 (Nuclear) Why you do not consider the direct and/or indirect impact to be a Significant Impact

	Type	Name	Date	Sensitivity	Confidence

#1.	Document	Att8_Radiation Assessment.pdf Radiation impact assessment	07/09/2025	No	High

5.2 Declarations

Completed Referring party's declaration

The Referring party is the person preparing the information in this referral.

ABN/ACN	29001584612
Organisation name	SLR CONSULTING AUSTRALIA PTY LTD
Organisation address	2060 NSW
Representative's name	Fiona Bell
Representative's job title	Technical Director
Phone	0419481682
Email	fbell@slrconsulting.com
Address	Level 1, 500 Hay Street, Subiaco, WA 6008

☑ Check this box to indicate you have read the referral form. *

☑ Check this box to confirm these are the correct identification details. *

☑ By checking this box, I, **Fiona Bell of SLR CONSULTING AUSTRALIA PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. *

You may receive automated notifications that aim to assist you in tracking the progress of your project. You can opt out of these notifications by updating your communication preferences on your profile.

Completed Person proposing to take the action's declaration

The Person proposing to take the action is the individual, business, government agency or trustee that will be responsible for the proposed action.

ABN/ACN	59009343364
Organisation name	TRONOX MANAGEMENT PTY LTD
Organisation address	Lot 22 Mason Road Kwinana, WA 6167
Representative's name	Cindy Beckley

Representative's job title	Senior Environmental Approvals - MRD
Phone	0461382360
Email	cindy.beckley@tronox.com
Address	Lot 22 Mason Road Kwinana, WA 6167

☑ Check this box to indicate you have read the referral form. *

☑ Check this box to confirm these are the correct identification details. *

☑ I, **Cindy Beckley of TRONOX MANAGEMENT PTY LTD**, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity. *

You may receive automated notifications that aim to assist you in tracking the progress of your project. You can opt out of these notifications by updating your communication preferences on your profile.

✔ Completed Proposed designated proponent's declaration

The Proposed designated proponent is the individual or organisation proposed to be responsible for meeting the requirements of the EPBC Act during the assessment process, if the Minister decides that this project is a controlled action.

Same as Person proposing to take the action information.

☑ Check this box to indicate you have read the referral form. *

☑ Check this box to confirm these are the correct identification details. *

☑ I, **Cindy Beckley of TRONOX MANAGEMENT PTY LTD**, the Proposed designated proponent, consent to the designation of myself as the Proposed designated proponent for the purposes of the action described in this EPBC Act Referral. *

You may receive automated notifications that aim to assist you in tracking the progress of your project. You can opt out of these notifications by updating your communication preferences on your profile.