Report and recommendations of the Environmental Protection Authority

Cooljarloo West Titanium Minerals Project

Tronox Management Pty Ltd

Report 1692

November 2020

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
05/06/2013	EPA decided to assess – level of assessment set	
30/08/2013	EPA approved Environmental Scoping Document	12
08/05/2017	EPA accepted Environmental Review Document	201
29/05/2017	Environmental Review Document released for public review	3
26/06/2017	Public review period for Environmental Review Document closed	4
07/10/2020	EPA received proponent's draft Response to Submissions	173
15/10/2020	EPA board considered assessment	1
01/11/2020	EPA received proponent's updated Response to Submissions	2
06/11/2020	EPA provided report to the Minister for Environment	1
11/11/2020	EPA report published	3 days
25/11/2020	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the Environmental Protection Authority (EPA) decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.

Dr Tom Hatton
Chairman

4 November 2020

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Summary

This document is an assessment report for Western Australia's Minister for Environment. It describes the outcomes of an Environmental Protection Authority (EPA) environmental impact assessment of the Cooljarloo West Titanium Minerals Project (the proposal), located 175 kilometres north of Perth. The proponent is Tronox Management Pty Ltd.

Proposal

The proposal is to develop the Cooljarloo West Titanium Minerals Project situated west of the existing Cooljarloo Mine and involves the dredge mining of three orebodies: Woolka, Harrier and Kestrel. The proposal will require movement of the mining dredge and ore processing plant (concentrator) from the existing Cooljarloo Mine to Cooljarloo West and back again, via flotation, across an open channel (approximately 6 kilometres long and 100 metres wide).

Background and Context

The proponent referred the proposal to the EPA on 14 May 2013. On 5 June 2013, the EPA decided to assess the proposal and set the level of assessment at Public Environmental Review.

The proposal was also determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC 2013/6895) to be assessed by an accredited process under the *Environmental Protection Act 1986* (EP Act).

The EPA approved the Environmental Scoping Document for the proposal on 30 August 2013.

During the assessment, the proponent made several applications to change the proposal. The changes are discussed in section 2.1 of this report and include:

- an overall reduction in the development envelope from 4,925 hectares (ha) to 3,812 ha
- an overall reduction in the disturbance footprint from 2,250 ha to 2,033 ha
- an overall reduction in clearing from 2,000 ha to 1,884 ha
- removal of option 1 for the transportation channel from the proposal.

These changes were approved under s. 43A of the EP Act.

The Environmental Review Document was released for public review from 29 May 2017 to 26 June 2017. Twelve submissions were received.

Public Submissions

Key issues raised in the submissions include:

- impacts on significant flora (especially threatened flora) and significant vegetation (especially the Banksia woodlands of the Swan Coastal Plain) from clearing and potential spread of Phytophthora dieback
- impacts on the habitat of the Carnaby's cockatoo from clearing and potential spread of Phytophthora dieback
- cumulative and indirect impacts on significant flora, vegetation and fauna
- potential impacts on groundwater dependent ecosystems from drawdown
- evidence of successful rehabilitation
- concerns about the proposed offset at the time.

Key Environmental Factors and Relevant Principles

The EPA identified the following key environmental factors during the course of its assessment:

1. **Flora and Vegetation** – direct impacts on Banksia woodlands vegetation, threatened flora and priority flora from clearing, groundwater drawdown and dieback.
2. **Terrestrial Fauna** – direct impacts on foraging habitat for Carnaby's cockatoo from clearing.
3. **Inland Waters** – impacts on groundwater dependent ecosystems from drawdown, and on groundwater quality from dredge mining.

In identifying the key environmental factors, the EPA had regard to the object and principles set out in s. 4A of the EP Act. The EPA considered that the following principles were particularly relevant to this assessment:

1. The precautionary principle
2. The principle of intergenerational equity
3. The principle of the conservation of biological diversity and ecological integrity.

Conclusion

The EPA has taken the following into account in its assessment of the proposal as a whole:

- impacts to all the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- relevant EP Act principles and the EPA's objectives for the key environmental factors
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Recommendations

Having assessed the proposal, the EPA recommends that the proposal may be implemented subject to conditions.

The EPA recommends that the Minister for Environment notes:

1. The proposal assessed is for the Cooljarloo West Titanium Minerals Project situated west of the existing Cooljarloo Mine and involves the dredge mining of three orebodies: Woolka, Harrier and Kestrel. The proposal will require movement of the mining dredge and ore processing plant (concentrator) from the existing Cooljarloo Mine to Cooljarloo West and back again, via flotation across an open channel.
2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation, Terrestrial Fauna and Inland Waters, set out in section 4 of this report.
3. The EPA has recommended that the proposal may be implemented, provided that implementation is carried out in accordance with the recommended conditions and procedures set out in Appendices 4 and 5. Matters addressed in the conditions include:
    a) implementation of avoidance areas to avoid impacts to threatened species
    b) revision and implementation of the current Flora and Vegetation Management Plan (condition 5) to minimise impacts to priority and threatened flora and vegetation and to incorporate the Cooljarloo West proposal (condition 5)
    c) revision and implementation of the current Surface Water and Groundwater Management Plan to incorporate the Cooljarloo West proposal (condition 6)
    d) revision and implementation of the current Acid Sulfate Soils Management Plan to incorporate the Cooljarloo West proposal (condition 7)
    e) revision and implementation of the current Disease Hygiene Management Plan to incorporate the Cooljarloo West proposal (condition 8)
    f) preparation and implementation of a Research and Restoration Plan including additional regional surveys to improve the knowledge of regional distribution and abundance of conservation significant flora taxa and to improve performance of rehabilitation and reinstatement of perched aquifer wetlands (condition 9)
    g) preparation and implementation of a Flora and Fauna Offset Strategy to counterbalance the significant residual impact to the loss of Banksia woodlands, threatened flora and Carnaby's cockatoo (condition 10).
4. Other information, advice and recommendations provided by the EPA, set out in section 8.

Contents

Tables

Figures

1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the outcomes of the EPA's environmental impact assessment of the Cooljarloo West Titanium Minerals Project (the proposal). The proponent is Tronox Management Pty Ltd.

The proposal is to develop a dredge mining operation adjacent to the existing Cooljarloo Mine, located 175 kilometres (km) north of Perth. The proposal will require the movement of the mining dredge and ore processing plant (concentrator) from the existing Cooljarloo Mine to Cooljarloo West and back again via flotation across a temporarily open channel (transportation channel).

The EPA has prepared this report in accordance with s. 44 of the *Environmental Protection Act 1986* (EP Act). This section of the EP Act requires the EPA to prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister. The assessment report must set out:

(a) what the EPA considers to be the key environmental factors identified during the assessment

(b) the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The proponent referred the proposal to the EPA on 14 May 2013. On 5 June 2013, the EPA decided to assess the proposal and set the level of assessment at Public Environmental Review with a four-week public review period. The EPA approved the Environmental Scoping Document for the proposal on 30 August 2013. The Environmental Review Document (ERD) was released for public review from 29 May 2017 to 26 June 2017.

EPA Procedures

The EPA introduced a new suite of environmental impact assessment procedures on 13 December 2016. The EPA approved the Environmental Scoping Document under the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012* (State of Western Australia 2012). The proponent's ERD and Response to Submissions was accepted under the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (State of Western Australia 2016).

The EPA followed the procedures in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* and the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020a), to the extent that it was appropriate and practicable. The EPA consulted the proponent on the application of the current procedures to its assessment of the proposal.

1.1 Assessment on behalf of Commonwealth

The proposal was determined to be a controlled action by a delegate of the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 10 July 2013 as it will, or is likely to have, a significant impact on the following Matters of National Environmental Significance (MNES):

- listed threatened species and communities (s. 18 and s. 18A)
- migratory species (s. 20 and s. 20A).

The proposal (EPBC reference 2013/6895) was assessed as an accredited assessment between the Commonwealth and Western Australian governments.

The EPA has addressed the MNES under each relevant factor and has summarised its assessment of MNES in section 6.

2. The Proposal

The proponent operates the Cooljarloo Mineral Sands Project located 175 km north of Perth (Figure 1). The proponent proposes a change to this currently approved project to include the Cooljarloo West Mineral Sands Mine (Figure 2), referred to in this report as the 'Cooljarloo West proposal'.

Existing Operations

The Cooljarloo Mineral Sands Project consists of the previous and existing approved proposals:

- *Mineral Sands (Cooljarloo) Mining and Processing Agreement Act 1988 – State Agreement Act* for the mining of mineral sands at the Cooljarloo deposit.
- *Cooljarloo Mineral Sands Project* (Ministerial Statement 037, 3 October 1988), for the mining of titanium minerals.
- *Cooljarloo Mineral Sands Project – Mining of Titanium Minerals, Orebodies 27 200 and 28 000, Shire of Dandaragan* (Ministerial Statement 557, 10 November 2000), for the mining of titanium minerals from ore bodies 27 200 and 28 000 adjacent to the southern mining operations of the existing Cooljarloo mineral sands mine.
- *Cooljarloo Mine – Falcon Extension* (Ministerial Statement 790, 16 March 2009), for an extension of open pit mining by dredging and dry mining adjacent to the existing Cooljarloo Mineral Sands Mine.
- *Cooljarloo Mine – Falcon Extension* (Ministerial Statement 977, 30 July 2014), extension of open pit mineral sands mining by dredging and dry mining adjacent to the existing Cooljarloo Mineral Sands Mine.

The proposed change is to extend the existing Cooljarloo Mineral Sands Project to include the Cooljarloo West proposal comprising dredge mining of three mineral deposits – Woolka, Harrier and Kestrel – located adjacent to the existing project (Figure 3). The ore will be processed to produce a concentrate to be transported to the Tronox Chandala Site (Muchea) for processing and separation into the various mineral components. The two mining dredges and ore processing plant (feed preparation unit and primary concentrator) will be relocated from the existing Cooljarloo Mine to Cooljarloo West and back again via flotation across a temporary open channel. The proposed change will utilise existing ancillary facilities at the Cooljarloo site.

Proposed Change

The proposed change comprises the following additional activities:

- constructing a transportation channel approximately 6 km long and 100 metres (m) wide to facilitate the relocation of the dredge from the Cooljarloo operation to Cooljarloo West
- abstracting groundwater to enable flotation of the dredge and concentrator through the channel

- constructing topsoil and overburden stockpiles
- dredge mining of Kestrel, Harrier and Woolka deposits
- construction of tailing storage facility
- moving the dredge and concentrator from Cooljarloo West back to Cooljarloo, through the same transportation channel.

Revised Proposal

The revised proposal is an amalgamation of the existing operations and the proposed change. The Cooljarloo West proposal overlaps some of the existing operations but is mostly adjacent to the existing operations.

A development envelope is not defined in the Ministerial Statements for the existing operations. For the purposes of the revised proposal, the EPA has defined the development envelope as:

- Mining Lease M268SA for the existing operations (9,745 ha), plus
- Cooljarloo West proposal development envelope (3,812 ha), minus
- the overlap (1,182 ha).

The total area for the revised proposal development envelope is 12,375 ha.

The majority of the existing operation is covered under Ministerial Statement 037. This statement does not define a disturbance footprint, but the proponent has used the extent of disturbance identified in the original Environmental Review and Management Programme to define the extent of disturbance. For the purposes of the revised proposal, the EPA has defined the disturbance footprint as:

- 5,806 ha within Mining Lease M268SA for the existing operations, plus
- 2,033 ha within the Cooljarloo West proposal development envelope, minus
- the existing disturbance within the overlap between the proposed Cooljarloo West proposal development envelope and the existing Cooljarloo Mine area of 139 ha.

The total disturbance footprint for the revised proposal is 7,700 ha.

The key characteristics of the revised proposal (i.e. amalgamation of the existing operations and the proposed change) are summarised in Tables 1 and 2. A detailed description of the proposed change in relation to the existing operations is provided in section 2 of the ERD (Tronox 2017) and the Response to Submission document (Tronox 2020).

In undertaking this assessment, the EPA has assessed the impacts of the proposed change in the context of the approved operations, considering the cumulative impacts of the entire revised proposal where appropriate.

Table 1: Summary of the proposal

Proposal title	Cooljarloo Mineral Sands Revised Proposal
Short description	The revised proposal is to mine the orebodies within the disturbance footprint shown in Figure 4. The revised proposal is to expand the Cooljarloo Mineral Sands Mine located approximately 175 kilometres north of Perth and includes: • construction of a dredge transportation channel between Cooljarloo West and Cooljarloo • construction of topsoil and overburden stockpiles • dredge mining of Kestral, Harrier, Woolka North and Woolka South orebodies • construction of tailings storage facility.

Table 2: Location and proposed extent of physical and operational elements

Element	Location	Existing operations (Ministerial Statements)	Proposed change (Cooljarloo West proposal)	Proposed extent (revised proposal)
Disturbance	Figures 2, 3 and 4	Disturbance footprint up to 5,807 ha. The disturbance footprint includes: • 5,012 ha of native vegetation • 795 ha of pasture.	Disturbance footprint up to 2,033 ha within a development envelope of 3,812 ha. The disturbance footprint includes: • 1,884 ha of additional native vegetation • 53 ha of already cleared native vegetation (of which 43 ha is within the existing operations) • 96 ha of pasture within the existing operations.	Disturbance footprint up to **7,700** ha within a development envelope of **12,375** ha. The disturbance footprint includes: • **6,905** ha of native vegetation • **795** ha of pasture.

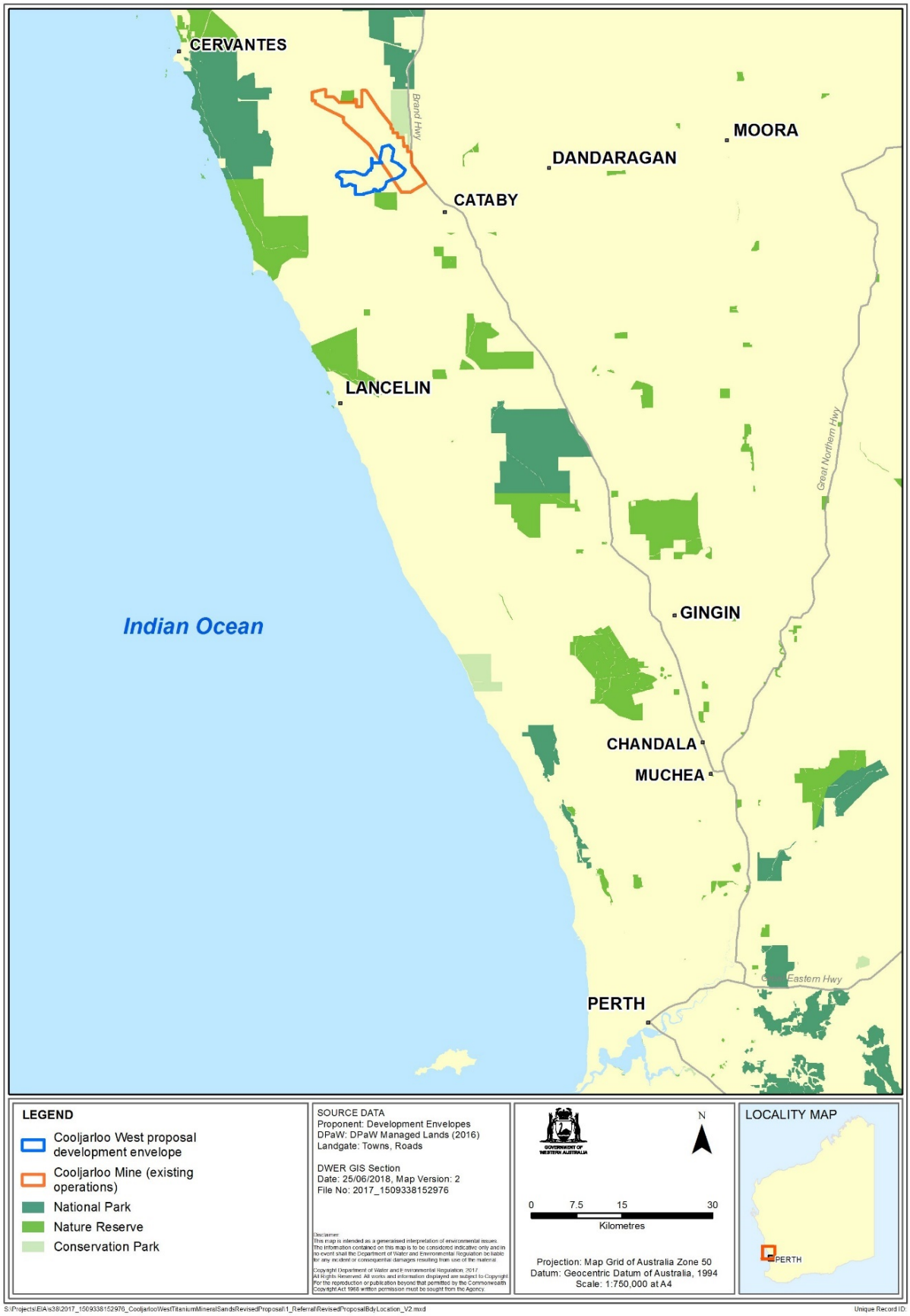

Figure 1: Regional location

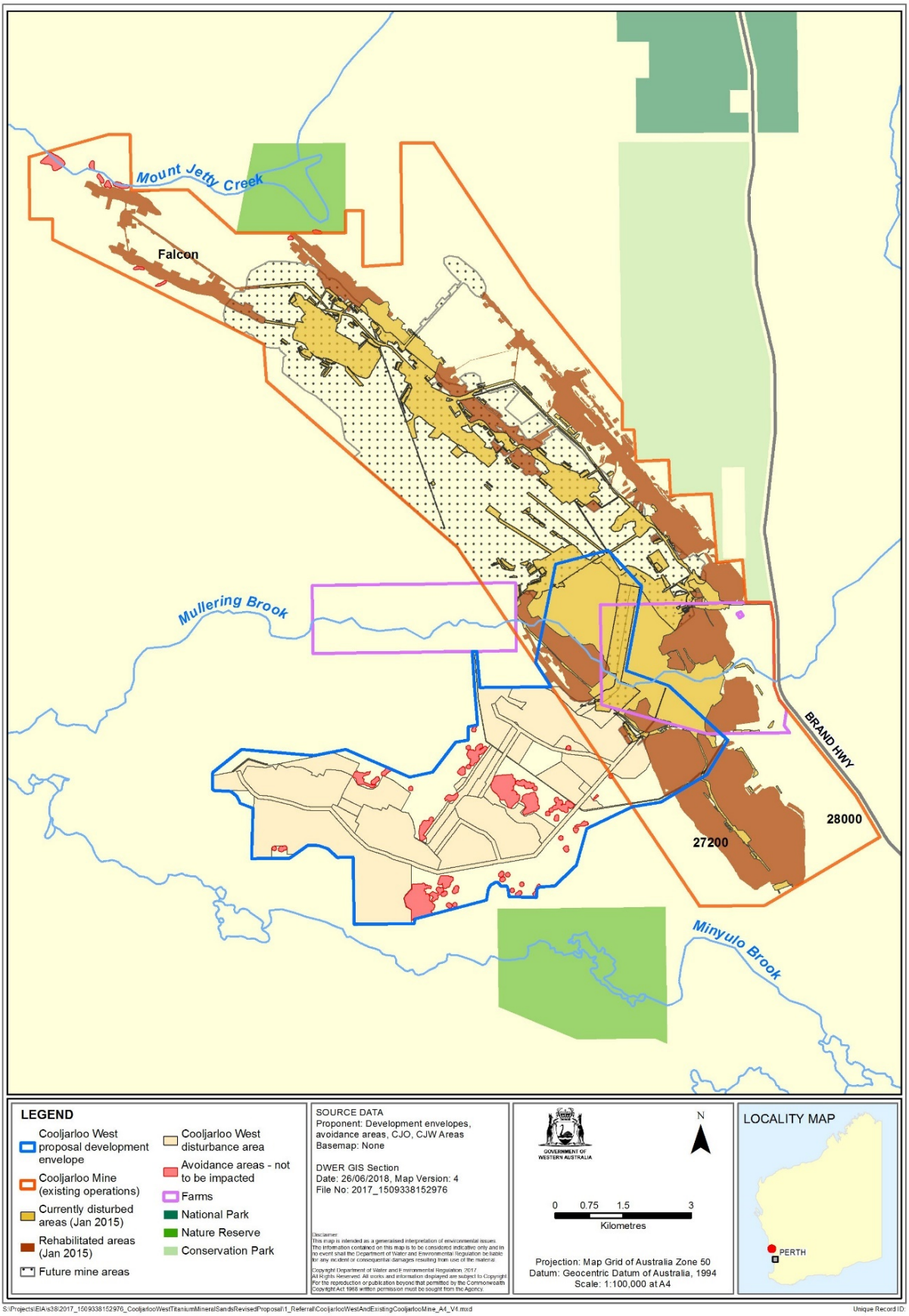

Figure 2: Existing operations and Cooljarloo West proposal

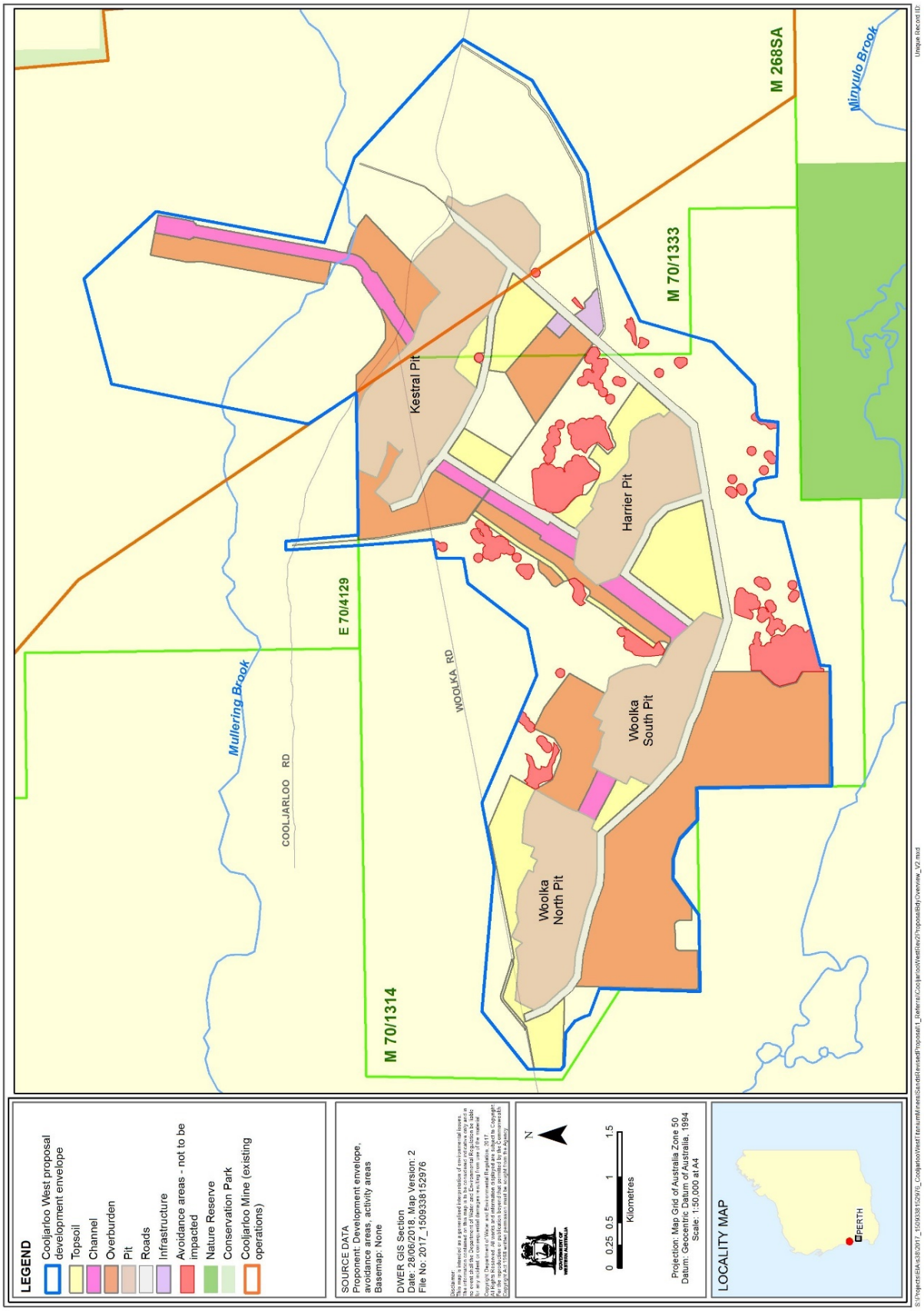

Figure 3: Cooljarloo West proposal development envelope and indicative disturbance footprint

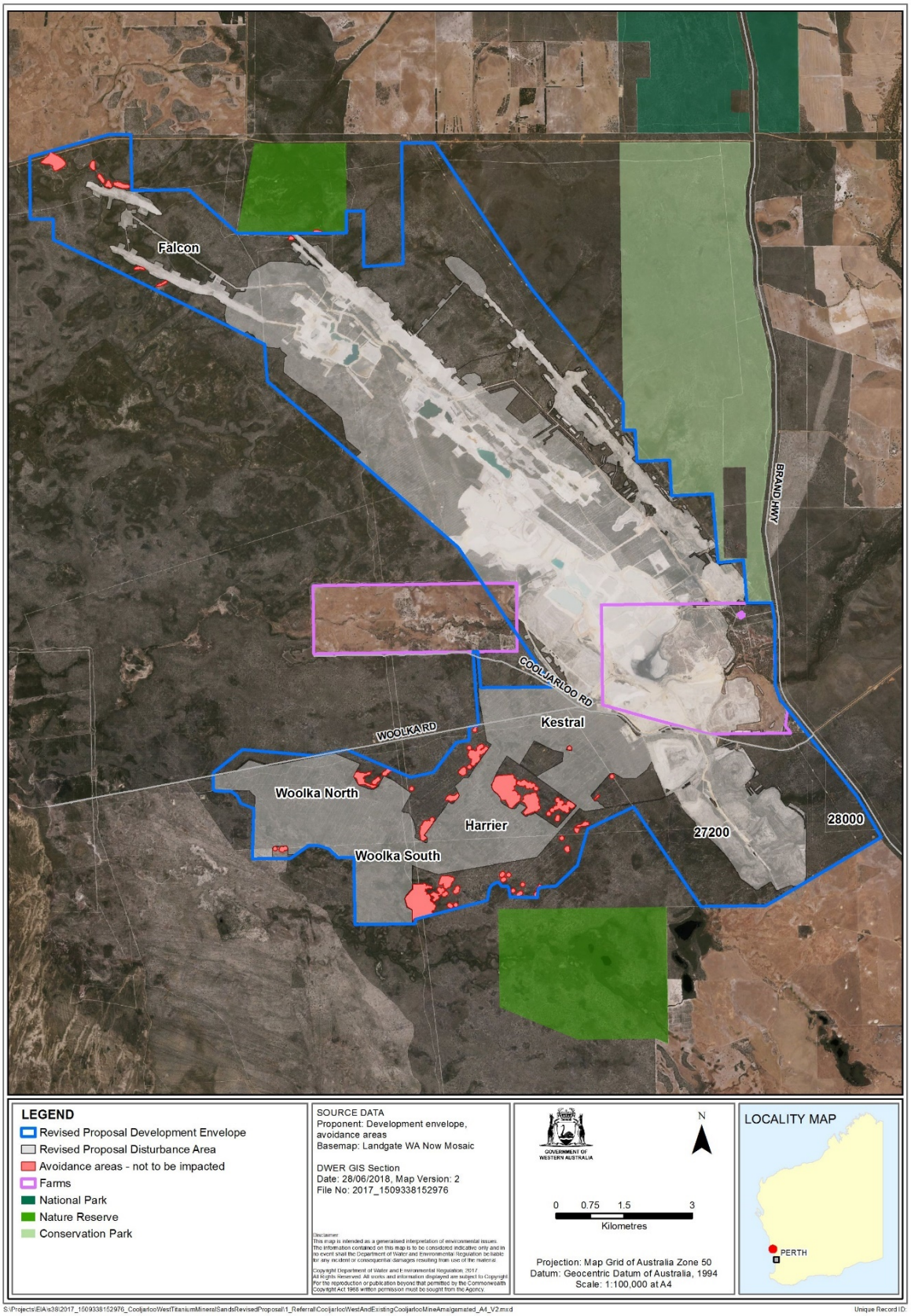

Figure 4: Revised proposal development envelope and indicative disturbance footprint

2.1 Changes to the proposal during assessment

The proponent requested the EPA consent to a change to the proposal during assessment on 5 May 2017. The change was to:

- expand the development envelope from 4,925 ha to 5,082 ha to include areas of the existing Cooljarloo Mine area that are common to the proposal
- reduce the disturbance footprint from 2,250 ha to 2,000 ha
- reduce the area of clearing from 2,000 ha to 1,890 ha.

The EPA Chairman, as a delegate of the EPA, concluded that the changes were unlikely to significantly increase any impact that the proposal may have on the environment and gave consent under s. 43A of the EP Act to the change on 16 May 2017.

The proponent requested a further change to the proposal during assessment on 30 October 2017. The change was to:

- reduce the development envelope from 5,082 ha to 3,812 hectares (ha)
- reduce the area of clearing from 1,890 ha to 1,886 ha
- remove option 1 for the transportation channel from the proposal.

The EPA Chairman, as a delegate of the EPA, concluded that the changes were unlikely to significantly increase any impact that the proposal may have on the environment and gave consent under s. 43A of the EP Act to the change on 7 December 2017.

The proponent requested a final change to the proposal during assessment on 27 June 2018. The change was to:

- increase the disturbance footprint from 2,000 ha to 2,033 ha
- reduce the area of clearing of native vegetation from 1,886 ha to 1,884 ha.

The EPA Chairman, as a delegate of the EPA, concluded that the changes were unlikely to significantly increase any impact that the proposal may have on the environment and gave consent under s. 43A of the EP Act to the changes on 2 August 2018.

Tables 1 and 2 above include these changes.

2.2 Context

The proposal is located on the swan coastal plain approximately 175 km north of Perth in the transition area of the Geraldton Sandplains Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and Swan Coastal Plain IBRA bioregion. The majority of the proposal is within the northern edge of the Swan Coastal Plain IBRA bioregion, specifically the SWA02 Swan Coastal Plain subregion. The biological diversity within this bioregion and subregion is high.

The proposal is adjacent to the existing Cooljarloo mineral sands mine. The existing operation is located within the Geraldton Sandplain IBRA bioregion, specifically the Lesueur Sandplains subregion.

Threats to the environmental values of the region include land clearing for development and mining, dieback diseases, invasive weeds, feral animals, changes to fire regimes, hydrological degradation (including changes to groundwater and soil acidification) and climate change.

The Cooljarloo West proposal is on unallocated crown land. The land uses surrounding the proposal are agriculture, including a farm 1 km to the north of the development envelope. The existing Cooljarloo mine is located to the east of the Cooljarloo West proposal development envelope. There are several nature reserves within 15 km of the development envelope, with the closest (un-named Nature Reserve R 40916) about 1 km to the south. The nearest town site is Cataby, located approximately 10 km south east of the development envelope.

3. Consultation

The EPA advertised the referral information for the proposal for seven days public comment in May 2013 and received two submissions. Both submissions requested the proposal be assessed at the Public Environmental Review level, with an eight-week public review period.

The proponent consulted with government agencies and key stakeholders during the preparation of the ERD. The ERD was released for public comment for four weeks from 29 May 2017 and 26 June 2017. During the public review period, the EPA received 10 agency submissions and two public submission on the proposal. The key issues raised relate to:

- impacts on significant flora (especially threatened flora) and significant vegetation (especially the Banksia woodlands of the Swan Coastal Plain) from clearing and potential spread of Phytophthora dieback
- impacts on the habitat of the Carnaby's cockatoo from clearing and potential spread of Phytophthora dieback
- cumulative and indirect impacts on significant flora, vegetation and fauna
- potential impacts on groundwater dependent ecosystems from drawdown
- evidence of successful rehabilitation
- concerns about the proposed offset at the time.

The proponent addressed the issues raised in the Response to Submissions document (Tronox 2020).

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders about the proposed development. Relevant significant environmental issues identified from this process were taken into account by the EPA during its assessment of the proposal.

4. Key Environmental Factors

In undertaking its assessment of the proposal and preparing this report, the EPA had regard for the object and principles in s. 4A of the EP Act to the extent relevant to the particular matters that were considered.

The EPA considered the following information during its assessment:

- proponent's referral information and ERD
- public comments received on the referral, stakeholder comments received during the preparation of the proponent's documentation and public and agency comments received on the ERD
- proponent's response to submissions raised during the public review of the ERD
- EPA's own inquiries
- *Statement of Environmental Principles, Factors and Objectives* (EPA 2020b)
- relevant principles, policy and guidance referred to in the assessment of each key environmental factor in sections 4.1 to 4.3.

Having regard to the EP Act principles, the EPA considered that the following principles were particularly relevant to its assessment of the proposal:

1. **Precautionary principle** – the EPA has considered whether the proponent's investigations into the biological and physical environment provide the means to assess risk and identify measures to avoid or minimise impacts. Where greater certainty regarding risk to flora and vegetation, terrestrial fauna and inland waters is required, the EPA has recommended conditions to ensure that certainty is provided.
2. **Principle of intergenerational equity**– the EPA has considered whether the health, diversity and productivity of the environment would be maintained or enhanced during the implementation of the proposal, with particular regard to the diversity and productivity of flora and vegetation and terrestrial fauna. The EPA has recommended conditions to ensure the biological environment is maintained for the benefit of future generations.
3. **Principle of the conservation of biological diversity and ecological integrity** – the EPA has considered the impacts on flora and vegetation and terrestrial fauna with particular regard to listed threatened and priority species. The EPA has recommended conditions to manage the impacts on conservation significant flora and fauna so that biological diversity is maintained.

Appendix 2 of this report provides a summary of all the principles and how the EPA considered these principles in its assessment.

Having regard to the above information, the EPA identified the following key environmental factors during the course of its assessment of the proposal:

- **Flora and Vegetation** – direct impacts on Banksia woodlands vegetation, threatened flora and priority flora from clearing, groundwater drawdown and dieback.
- **Terrestrial Fauna** – direct impacts on foraging habitat for Carnaby's cockatoo from clearing.
- **Inland Waters** – impacts on groundwater dependent ecosystems from drawdown, and on groundwater quality from dredge mining.

The EPA considered other environmental factors during its assessment of the proposal. These factors, which were not identified as key environmental factors, are discussed in the proponent's ERD (Tronox 2017). Appendix 3 of this report contains an evaluation of why these other environmental factors were not identified as key environmental factors.

The EPA's assessment of the proposal's impacts on the key environmental factors is provided in sections 4.1 to 4.3. These sections outline whether or not the EPA considers that the impacts on each factor are manageable. Section 7 provides the EPA's recommendation as to whether or not the proposal may be implemented.

Changes to EPA Policy and Guidance

The EPA introduced a new suite of environmental guidance for environmental impact assessment on 13 December 2016. This replaced EPA policy and guidance that were current at the time the Cooljarloo West proposal was referred.

In its assessment of the Cooljarloo West proposal, the EPA considered and gave due regard to, where relevant, its current environmental impact assessment policy and guidance documents. The EPA consulted the proponent on the application of the current environmental impact assessment policy and guidance documents relevant to its environmental review and the EPA's assessment of the proposal.

Assessment on behalf of the Commonwealth

The EPA assessed the proposal on behalf of the Commonwealth Minister for Environment as an accredited assessment. The EPA has addressed MNES under each relevant factor and has summarised its assessment of MNES in section 6.

4.1 Flora and Vegetation

The EPA's environmental objective for Flora and Vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained*.

Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessmen*t (EPA 2016b)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a).

In addition to the relevant current policy and guidance above, the EPA also had regard to the *EPBC Act Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community* (Threatened Species Scientific Committee 2016) and *Banksia woodlands of the swan Coastal Plain: a nationally-protected ecological community* (Commonwealth of Australia 2016)[1].

EPA Assessment

Existing environment

The proposal is in the Drummond Botanical subdistrict of the Swan Coastal Plain subregion in the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion. The area is largely characterised by low Banksia woodland on leached sands with poorly drained areas containing Melaleuca swamps (Beard 1979, 1990). Vegetation within the development envelope which has not been cleared, is in excellent condition.

Due to a general lack of data at a regional level in this area, the proponent set a study area of 34,403 ha for the Cooljarloo West proposal. This involved vegetation mapping within the Cooljarloo area defined by the Brand Highway to Nambung National Park/Wanagarren Nature Reserve (approximately 26 km east to west) and Wongonderrah Road to the Lancelin Defence Training Area (24 km north to south) (Figure 5) (Woodman 2014).

Section 8.2 of the proponent's ERD (Tronox 2017) outlines the survey effort undertaken to inform the assessment. After the release of the ERD, the proponent

[1] Banksia woodlands is not a MNES for the proposal and only the technical advice from these documents were drawn upon.

completed further surveys in 2017 and 2018 to address issues raised during the public review and has provided the results of these surveys in the Response to Submissions document (Tronox 2020).

The surveys were undertaken mostly in accordance with the standards set out in the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016b) and *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a). Some surveys were conducted prior to 2016 in accordance with EPA Guidance Statement No. 51 (EPA 2004a), which was the relevant guidance at the time.

The use of multiple surveys across different seasons and supplementary follow up surveys provides confidence in the overall identification of species.

Vegetation

Four vegetation systems (Bassendean, Guilderton, Jurien and Le Sueur) occur near the development envelope (Beard 1979). At a regional scale, the Cooljarloo West proposal would result in the reduction of the Pre-European extent remaining of the vegetation system association of Bassendean 1030 by 1.5% and Lesueur 1031 by 0.1%. The cumulative impacts of the Cooljarloo West proposal when combined with the existing operations is 6.5% on Bassendean 1030 and 0.3% on Lesueur 1031. The proposal would impact on approximately 0.5% of the Banksia woodlands at a regional scale[2].

Eighteen vegetation types were identified (Woodman 2014a) within the survey area and are described in the ERD (Tronox 2017). Of these, nine are represented within the development envelope (Figure 6):

- VTs 1, 2, 5, 6, 7, 9a, 9b, 17 and 18.

VT 9a has been identified as similar to the Claypan of the Swan Coastal Plain Threatened Ecological Community. VTs 6, 17 and 18 represent the Banksia woodlands. All vegetation types except VT 7 are represented in local reserves with similar plant communities considered likely to occur more broadly and in regional conservation estate.

At the time of the original vegetation surveys undertaken for the ERD (2014), there were no identified Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) within the development envelope. After the release of the ERD, *Banksia woodlands of the Swan Coastal Plain*, was listed as a TEC under the EPBC Act and Priority 3 PEC under the *Biodiversity Conservation Act 2016* (BC Act). Three of the vegetation types identified, VTs 6, 17 and 18 are considered part of this TEC/PEC and represent 2,356 ha of the development envelope (Tronox 2020). This ecological community is referred to as the Banksia woodlands in this report.

[2] The regional scale impact is an underestimation because the approximate extent of the Banksia woodlands is based on broad scale vegetation mapping.

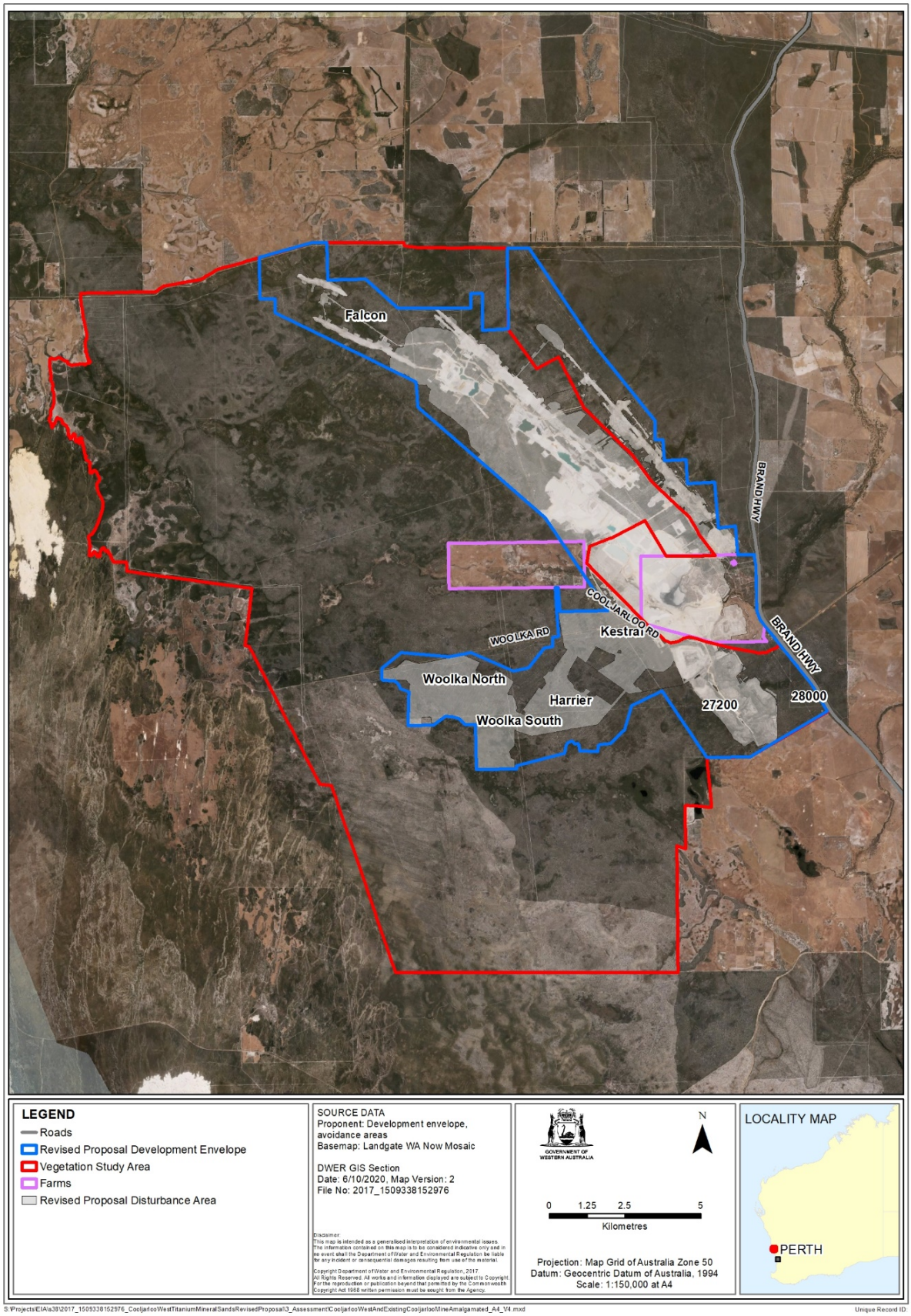

Figure 5: Cooljarloo West proposal vegetation study area

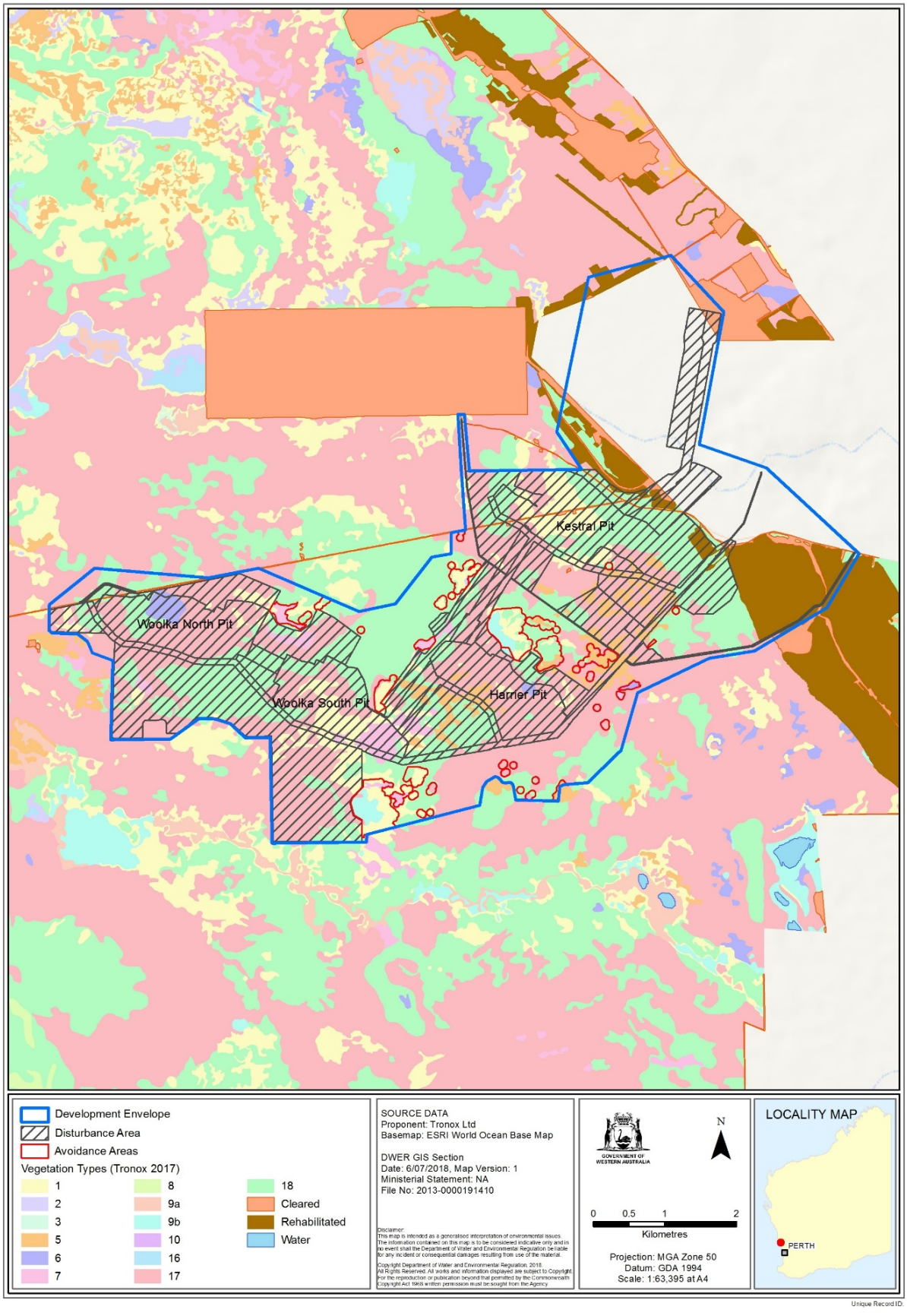

Figure 6: Vegetation types within and adjacent to the Cooljarloo West proposal development envelope

Threatened flora

Surveys identified the following threatened species may occur within the development envelope (Figure 7):

- *Andersonia gracilis* (Andersonia gracilis) – Vulnerable under the BC Act and Endangered under the EPBC Act
- *Anigozanthos viridis* subsp. *terraspectans* (Dwarf green kangaroo paw) – Vulnerable under both the BC Act and EPBC Act
- *Macarthuria keigheryi* (Keighery's macarthuria) – Endangered under both the BC Act and EPBC Act
- *Paracaleana dixonii* (Sandplain duck orchid) – Vulnerable under the BC Act and Endangered under the EPBC Act.

Andersonia gracilis, Anigozanthos viridis subsp. *terraspectans* and *Macarthuria keigheryi* grow abundantly following a fire. Plants regenerate in large numbers from seed stored in the soil. Little is known about the survival rates of seedlings post fire for *A. gracilis*. For *A. virdis* subsp *terraspectans* and *M. keigheryi*, populations of reproductively mature individuals are significantly larger in the first few years following fire compared to long-unburnt areas. Numbers can fluctuate over the years depending on time since fire (Mattiske 2017). All three species are susceptible to *Phytophthora cinnamomi* (dieback).

Andersonia gracilis and *Anigozanthos viridis* subsp. *terraspectens* have 1,463 and 166 individuals within the development envelope respectively. Of these, 1,100 individuals of *A. gracilis* and one individual of *A. viridid* subsp. *terraspectans* will be in the proposed exclusion zone. The individuals remaining represent 1.7% and 0.1% of the regional population estimates.

Two records of *Paracaleana dixonii* are known from the development envelope, but surveys for the proposal did not record the species (Mattiske 2017). The proposal would avoid impact on the location of these records, which are included in the avoidance areas.

Similarly, all known specimens of *Macarthuria keigheryi* within the development envelope (6,360 individuals of a regional population of 39,295) will be within the proposed avoidance areas (Figure 7).

Priority flora

Twenty-five priority (P) species were recorded in the development envelope (Figure 7), including: three P2 species, ten P3 species and eight P4 species. Of these 17 are within the disturbance footprint.

Of these species *Chordifex reseminans* (P2), *Babingtonia urbana* (P3), *Guichenotia alba* (P3) and *Stylidium hymenocraspedum* (P3) are considered to be more important for the purpose of this assessment due to proportion of the regional population present within the development envelope.

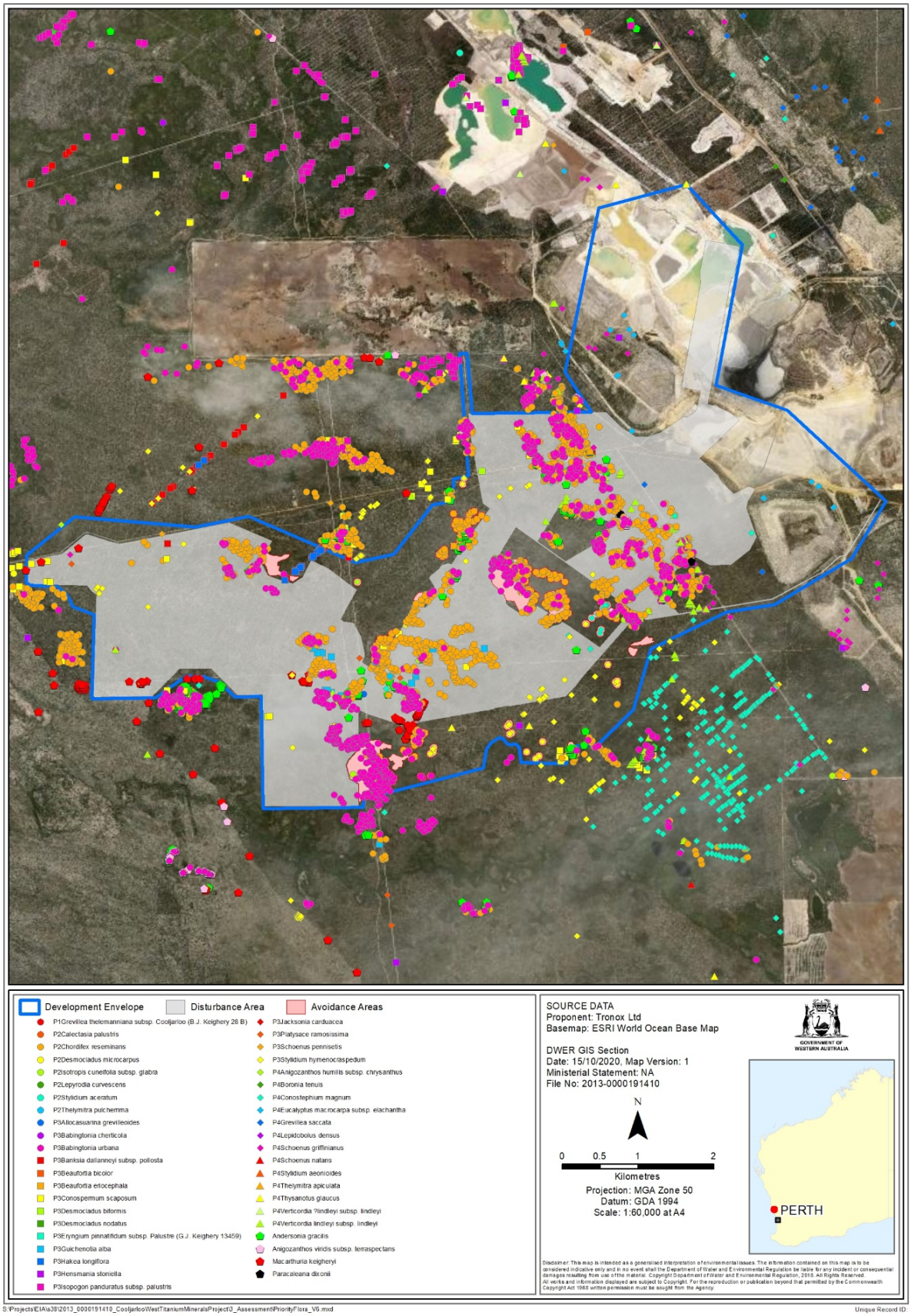

Figure 7: Threatened and priority flora species

Groundwater dependent ecosystems

The proponent assessed the development envelope for areas likely to be considered groundwater dependent ecosystems. Areas considered at risk were defined as areas within the 1 m draw down contour and where depth to groundwater is less than 15 m and soil permeability is high and not likely to provide sufficient soil moisture content to support vegetation. Groundwater drawdown is discussed further in section 4.3 below.

Of the vegetation species occurring in the study area, the proponent has determined facultative groundwater dependence (gain only a portion of water requirements from groundwater when available) for *Banksia attenuate, Banksia menziesii, Banksia prionotes, Corymbia calophylla, Eremaea paucifolia, Eucalyptus todtiana and Stirlingia latifolia.*

Only one species (*Banksia littoralis*) was determined to be an obligate user (dependent on groundwater). However this species is only found in the north of the study area, over 10 km from the development envelope and will not be affected by the proposal.

Dieback

No dieback (*Phytophthora* sp.) was recorded in the Cooljarloo West proposal development envelope during surveys conducted for the assessment (Glevan 2012).

Potential impacts

The proposal could potentially impact flora and vegetation directly or indirectly through:

- clearing of 1,884 ha of native vegetation, of which 1,532 ha is Banksia woodlands
- additional 82 ha of vegetation impacted through groundwater drawdown
- cumulative impact of 7,578 ha when combined with the existing Cooljarloo mine
- impact on three threatened flora species (*Andersonia gracilis*, *Anigozanthos viridis* subsp. *terraspectans* and *Macarthuria keigheryi*)
- impact on priority flora species
- introduction and/or spread of weeds
- changes to hydrological regimes impacting on groundwater dependent ecosystems
- introduction of dieback.

Mitigation and management

The EPA notes that the proponent has applied the mitigation hierarchy to avoid and minimise impacts on flora and vegetation in accordance with the *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a).

In response to concerns raised in the submissions about the need to reduce the extent of the proposal, the proponent modified the proposal as described in the Response to Submissions document (Tronox 2020) by:

- reducing the size of the development envelope from 5,082 ha to 3,812 ha
- reducing the area of additional clearing from 1,890 ha to 1,884 ha
- identifying avoidance areas within the development envelope and disturbance footprint, where locations of significant flora species will not be impacted (Figure 3)
- using the transportation channel that is already cleared, to connect the existing operations to the Cooljarloo West proposal.

These modifications resulted in a reduction in the direct impact of the proposal on significant flora and vegetation. It is also unlikely that there will be any change to conservation status of any species or vegetation type from implementation of this proposal.

The proponent has designed the proposal to minimise the amount of clearing by having multiple uses for a single area. For example, overburden would be placed in future mining areas where possible, and backfilled pits would be used as solar drying cells for tailings.

The proponent intends to manage the indirect impacts of the proposal on flora and vegetation by updating the environmental management plan and the mine closure plan for the existing operations, to incorporate the Cooljarloo West proposal.

The Department of Biodiversity, Conservation and Attractions (DBCA) has advised that the likelihood and consequence of any new introductions of dieback is high. Surface and groundwater provide pathways for the spread of dieback and many species within the proposal area are known to be susceptible to dieback. It is likely that the dredge channel required for mining in Cooljarloo West would be left open for the life of the mine and this increases the risk of dieback transport compared to the current operations.

DBCA advised that there should be no impact on the un-named Nature Reserve R40916 to the south of the proposal.

Rehabilitation

The proponent has undertaken rehabilitation at the existing operations based on four broad rehabilitation groups: dry woodlands, dry heaths, wet heaths and wetlands. There has been some success with the dry woodlands, but the other groups have not met the required completion criteria.

The Department of Water and Environmental Regulation (DWER) and DBCA provided advice to the EPA that the information provided by the proponent in the ERD on their rehabilitation outcomes was not sufficient to demonstrate the performance of rehabilitation. In response to these comments, the proponent provided additional information on rehabilitation performance (Woodman 2019) in the Response to Submissions (Tronox 2020). This information has demonstrated an

improvement in rehabilitation outcomes, however the EPA considers that the proponent needs to continue its work in this areas as a result of the new impacts.

In response to a comment by DBCA which noted that the regional distribution of threatened species is likely higher, and based on this impacts may be less, the proponent has proposed to fund regional surveys to improve knowledge of regional distribution and abundance of some of the significant flora species.

The EPA notes that the majority of the clearing for the proposal (1,532 ha) is of excellent condition Banksia woodlands, which also includes habitat for the threatened flora species *Macarthuria keigheryi*. The EPA considers that while the proponent has demonstrated some success when working with research organisations on restoring threatened and priority species, it needs to continue this work so that important biodiversity conservation values can be restored, as much as reasonably practicable, by the proponent.

A Research and Restoration Plan should be developed to include the identification of vegetation groups to be restored that adequately represent the vegetation types that have been cleared. A species list should be prepared for each of the vegetation groups to help define the restoration target. The species list should contain all the structural elements, keystone species that defines the target community and the number of species required to meet species richness targets. The species list should also be used to determine which species will require direct seeding and planting and at what densities. The Plan should also include the following approach:

- manage the cause of disturbance or damage to the ecosystem of degraded sites
- define the restoration target by referring to historic data
- trial restoration methods if these are not yet understood
- develop and implement a restoration design
- track restoration performance through monitoring
- devise adaptive management strategies that evolve from scientific activities and monitoring outcomes.

The EPA notes that the proponent has been operating the existing Cooljarloo mine for nearly 30 years. The proponent should summarise the findings of the rehabilitation performance to date and determine what techniques worked and what did not work. The restoration design should be informed by this information.

The Research and Restoration Plan should identify annual performance criteria to track restoration performance (for example from seedling emergence through to plant maturity). Annual performance criteria would allow restoration underperformance to be determined early, providing an opportunity for management measures. The Plan should identify techniques to restore recalcitrant species, including threatened and priority species. The Plan should also identify the completion criteria, which set the final measures to determine when restoration is complete.

Noting the above, the EPA considers based on the current information that offsets will be required to counterbalance the potential significant residual impacts on flora and vegetation including:

- impact on 1,532 ha of VTs 6, 17 and 18 that represent the Banksia woodlands
- impact on 167 individuals of *Andersonia gracilis* (threatened flora) or 296 ha of preferred habitat for the species
- impact on 165 individuals of *Anigozanthos viridis* subsp. *Terraspectans* (threatened flora) or 201 ha of preferred habitat for the species
- impact on 1,511 ha of habitat for *Macarthuria keigheryi* (threatened flora).

Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- cumulative impact of 7,578 ha of the proposal when combined with the existing Cooljarloo mine
- the proponent's application of the mitigation hierarchy to avoid and minimise clearing of conservation significant flora and vegetation and the avoidance areas
- proposed impact to 1,532 ha of Banksia woodlands
- proposed impact to threatened flora.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for flora and vegetation that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 5)
- implementation of avoidance areas as defined in schedule 2 (Appendix 5)
- revision and implementation of the existing Flora and Vegetation Management Plan to include the Cooljarloo West proposal (condition 5)
- revision and implementation of the existing Disease Hygiene Management Plan to include the Cooljarloo West proposal (condition 8)
- preparation and implementation of a Research and Restoration Plan including additional regional surveys to improve the knowledge of regional distribution and abundance of conservation significant flora taxa (condition 9)
- implementation of offsets (see section 5, condition 10) to counterbalance the significant residual impact of:
    - impacts on 1,532 ha of Banksia woodlands of the Swan Coastal Plain
    - impact on 167 individuals of *Andersonia gracilis* (threatened flora) or 296 ha of preferred habitat for the species
    - impact on 165 individuals of *Anigozanthos viridis* subsp. *terraspectans* (threatened flora) or 201 ha of preferred habitat for the species
    - impact on 1,511 ha of habitat for *Macarthuria keigheryi* (threatened flora).

4.2 Terrestrial Fauna

The EPA's environmental objective for Terrestrial Fauna is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*.

Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c)
- *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2020c)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c).

In addition to the relevant current policy and guidance above, the EPA also had regard to the methodologies and information in EPA Guidance Statement No. 56 (EPA 2004b) and *Technical Guidance – Terrestrial Fauna Surveys* (EPA 2016d), noting that these guidance statement were relevant at the time the original fauna surveys were conducted and during the assessment.

EPA Assessment

Existing environment

The proponent has undertaken the necessary terrestrial fauna surveys for the assessment. The EPA considers that the surveys were conducted in accordance with the relevant policy and guidance. Some surveys were conducted prior to 2016 in accordance with EPA Guidance Statement No. 56, which was the relevant guidance at the time.

The fauna habitats within the development envelope were identified based on the Vegetation and Soil Association (VSA) that support fauna. Three broad habitat types were identified:

- Low Heath on flats – the proposal would impact on 5.1% of the local extent of this habitat.
- Banksia woodland on low dunes – the proposal would impact on 7.9% of the local extent of this habitat.
- Riparian and Riverine Woodland – the majority of this habitat is outside the disturbance area and is located within the avoidance areas. The proposal would impact on 0.7% of the local extent of this habitat.

Multiple fauna surveys of the project area have been conducted over the past 30 years and these have been used to identify existing terrestrial fauna values relevant

to this proposal. A total of 183 vertebrate species have been identified from a desktop assessment as potentially being present in the area. Of these, 101 species have been recorded in the study area.

Significant fauna

At the time of the original referral, seven conservation significant fauna species were recorded in the study area. These were:

- Carnaby's cockatoo (*Calyptorhynchus latirostris*) (endangered)
- rufous fieldwren (*Calamanthus campestris montanellus*)
- crested bellbird (*Oreoica gutturalis gutturalis*)
- southern emu-wren (*Stipiturus malachurus*)
- brush wallaby (*Macropus irma*)
- graceful sun moth (*Synemon gratiosa*) (P4)
- *Bothriembryon perobesus* (P1).

The rufous fieldwren (*Calamanthus campestris montanellus*), crested bellbird (*Oreoica gutturalis gutturalis*) and southern emu-wren (*Stipiturus malachurus*) are no longer considered conservation significant.

Carnaby's cockatoo is listed as Endangered under the BC Act and EPBC Act. The proposal would clear 1,884 ha of foraging habitat, which is 7.2% of the foraging habitat within the local area. There is no evidence of nesting or breeding within the development envelope (Bamford 2015).

Pezoporus flaviventris (western ground parrot) is listed as critically endangered under the BC Act and EPBC Act. There are no records within the development envelope.

A further 19 significant species have either been recorded as occurring within the development or may occur within the development envelope, but because of their wider distribution, are considered unlikely to be significantly impacted by the proposal (Tronox 2017).

Short Range Endemics

The proponent has undertaken desktop and targeted surveys for Short Range Endemics (SREs) to inform the assessment (Bennelongia 2013a). Desktop surveys identified 72 potential SRE species within a 50 x 50 km area around the proposal. Based on the relatively high number of potential SRE species likely to be present and the identification of two potential SRE habitats within the proposal area a targeted survey was undertaken.

One Priority listed SRE fauna species and five potential SRE species were recorded within the vicinity of the development envelope. The snail, *Bothriembryon perobesus* (P1) was recorded (a single dead specimen) at one site within the development envelope but outside the disturbance footprint. This species is also known to exist

outside the development envelope. All five potential SRE species were collected from outside the development envelope. Consequently, it is considered that the threat to SRE species from the proposal is very low.

Potential impacts

The proposal would directly impact on terrestrial fauna habitat and individual fauna from the clearing of up to 1,884 ha of native vegetation required for the construction of mine pits, dredge channel, overburden stockpiles and roads.

The proposal has the potential to indirectly impact on fauna habitat through fragmentation, changes to hydrology from groundwater drawdown and the introduction of weeds. The proposal has the potential to indirectly impact on individual fauna through the introduction of predators and vehicle movement.

The proposal would require clearing of 1,884 ha of potential foraging habitat for Carnaby's cockatoo but there no known nesting or roosting sites within the development envelope.

Mitigation and management

The EPA recognises that the proponent has taken measures to reduce the impact on terrestrial fauna through avoidance and minimisation where possible.

There are no known or potential breeding hollows for Carnaby's cockatoos in the development envelope. The proponent has sought to minimise impacts to flora and vegetation as outlined under the 'Flora and Vegetation' key environmental factor.

The EPA notes the clearing of habitat for conservation significant fauna (Carnaby's cockatoo) will still occur as a result of implementing the proposal, which would result in a significant residual impact. The EPA does not consider it necessary for the proponent to provide a Fauna Management Plan as impacts associated with loss of fauna habitat are addressed through the Flora and Vegetation Management Plan as described in section 4.1 above.

The proponent has proposed to purchase 5,900 ha of foraging habitat to achieve 100% offset, once rehabilitation of the mine footprint has been accounted for (Tronox 2020). The offset is discussed further in section 5.

Rehabilitation and offset

Rehabilitation of the Banksia woodlands (key foraging species) is discussed in section 4.1 (Flora and Vegetation) and is not discussed further under this factor. To offset the impact of clearing up to 1,884 ha of foraging habitat for Carnaby's cockatoo, the proponent proposes to provide funds to purchase up to 5,900 ha of land that:

- contains Carnaby's cockatoo foraging habitat
- is predominantly Banksia woodlands
- is able to be afforded a higher level of protection.

DBCA has advised that there is available offset for this proposal.

Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016c).
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- direct impact to 1,884 ha of Carnaby's cockatoo foraging habitat
- proponent's commitments to minimise impacts to terrestrial fauna through the reduction of habitat clearing.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for terrestrial fauna that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 5)
- implementation of offsets (see section 5, condition 10) to counterbalance the significant residual impact of clearing 1,884 ha of Carnaby's cockatoo habitat.

4.3 Inland Waters

The EPA's environmental objective for Inland Waters is *to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.*

Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Inland Waters* (EPA 2018).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Inland Waters* (EPA 2018).

In June 2018, the EPA combined the factors Inland Waters Environmental Quality and Hydrological Processes into one factor, named Inland Waters, and released a new *Environmental Factor Guideline – Inland Waters*, which replaces the Environmental Factor Guidelines for the previous factors.

In its assessment of the proposal, the EPA considered and gave due regard to, where relevant, its current environmental impact assessment policy and guidance documents, unless otherwise stated. The EPA consulted with the proponent on the application of the current environmental impact assessment policy and guidance documents relevant to the EPA's assessment of the proposal.

EPA Assessment

Existing environment

The proponent has undertaken peer reviewed modelling to evaluate groundwater drawdown impacts associated with the proposal (Worley Parsons 2015).

The regional aquifer systems in the vicinity of the development envelope are the Superficial and the Yarragadee aquifers.

The Superficial aquifer ranges from 18 to 50 m in depth and is comprised of layers of sand and clay, which form an unconfined to semi confined groundwater flow system. The majority of recharge to the Superficial aquifer occurs by direct infiltration of rainfall and recharge in places where Guildford Formation clays are absent. Recharge and leakage also occurs from and to the Yarragadee aquifer (Parsons Brinckerhoff 2011; WorleyParsons 2012). The inherent complexity of the Superficial aquifer has resulted in a diverse structure of localised perched aquifers and underlying groundwater flows.

The Yarragadee aquifer is overlain in part by the superficial formation, and is between 40 to 50 metres below ground level. It is a series of inter-bedded sandstone, siltstone and shale layers that underlies the superficial aquifer and extends to depths of many hundreds of metres.

Groundwater at the Cooljarloo mine site varies, with pH ranging from slightly acidic to neutral. Total Dissolved Solids (TDS) range considerably from 1,760 to 10,500 milligrams per litre (mg/L) in the Upper Superficial Unit (USU) to 159 to 3,410 mg/L in the Lower Superficial Aquifer (LSA) (WorleyParsons 2015).

All watercourses, including Mullering Brook to the north of the development envelope, and Minyulo Brook to the south, are seasonal streams with highly variable flows. Surface water quality is generally slightly acidic to neutral with TDS ranging from 97 to 6,000 mg/L. The high electrical conductivity upstream of the site is due to the salinisation of the upstream catchment as a result of agricultural land clearing.

Potential impacts

The proposal would directly impact on the Superficial aquifer and the underlying Yarragadee aquifer through drawdown required for mining and processing. The proposal has the potential to affect inland waters from:

- groundwater drawdown from bore abstraction, dewatering for mining, dredging, construction and operation of the channel
- impacts to groundwater dependent ecosystems through changes to localised groundwater regimes
- generation of acid sulfate soils through exposure of sulfidic soil via excavation, dewatering and drawdown
- impact to surface water flows through the alteration of existing drainage patterns of Mullering Brook.

Groundwater dependant ecosystems

The proposal has the potential to indirectly impact on groundwater dependent ecosystems through changes to groundwater levels as a result of drawdown from the mine. A groundwater model was developed to predict drawdown from mine dewatering operations and also to determine which areas could potentially be impacted by the drawdown. The proponent considered the areas at greatest risk were those within the 1 m drawdown contour where:

- the depth to groundwater was less than 15 m
- the ratio of vertical permeability to layer thickness for the intermediate superficial unit indicates that vegetation is reliant on the water table derived from the superficial aquifer (“high recharge zones”) (Tronox 2017).

Approximately 251 ha with relatively high connectivity between the rooting zone (USU) and the regional groundwater (LSA) is expected to experience more than 1 m of drawdown. Of this 251 ha, approximately 169 ha has been cleared for agriculture. Of the remaining 82 ha, the majority will experience less than 2 m of drawdown and has a depth to groundwater between 6 to 10 m. As the drawdown will be gradual (1 m in 10 years) and the magnitude is below the generally accepted impact thresholds, no measurable change in vegetation health is anticipated to result.

Acid sulfate soils

The processes of excavation, dredging and dewatering associated with the proposal may result in exposure of acid sulfate soils (ASS) to air, resulting in oxidation of the predominantly iron sulfide (pyrite) materials. This in turn may lead to the acidification of the groundwater and mobilisation of metals.

ASS identification was undertaken within the development envelope with samples screened for both Actual Acid Sulfate Soils (AASS) and Potential Acid Sulfate Soils (PASS). Only two of the 1,806 samples indicated the presence of AASS. It was determined that PASS is extensive within the Kestral Deposit and along the south western boundary of the Woolka Deposit.

The majority of the overburden and resource is not considered PASS and represents only a minor risk. PASS material was located within the ore body and areas adjacent to the pits and represents a potential risk to the groundwater quality.

Changes to surface water flows

Relocation of the dredge from Cooljarloo Mine to Cooljarloo West will require the construction of a channel across Mullering Brook, impacting on natural flows. The channel will only be filled temporarily for the transport of the dredge. Once the dredge has been transported in one direction, the section of channel around the Brook will be reinstated in order to maintain hydrology. Given the temporary nature of the channel it is unlikely that interaction between water in the channel and the perched aquifer will be significant.

Mitigation and management

The proponent has managed the adjacent Cooljarloo Mineral Sands Project since approval was granted (Ministerial Statement 037) in 1988. Practices currently employed at the operation to mitigate the risk to Inland Waters will be extended to the Cooljarloo West proposal.

To reduce the impacts on inland waters and in particular the direct and indirect impacts associated with drawdown, the proponent has committed to the backfill of the mine voids and the dredge channel, which will reinstate the watertable.

In addition to this, the proponent has committed to undertaking groundwater and vegetation health monitoring including:

- monitoring of groundwater levels to compare results to the predicted drawdown extent and approved ecological thresholds
- monitoring abstraction from bores and water transfers from dewatering locations
- assessing changes in foliage cover and biomass using aerial imagery within high risk areas
- monitoring vegetation composition in permanent plots to assess change over time.

To mitigate the risk of ASS and prior to commencement of mining, the proponent has committed to undertaking three-dimensional mapping of PASS materials to confirm their presence and inform the development of the mine plan. Where PASS is not specifically required to be excavated for mining purposes, disturbance of these soils will be avoided. ASS containing overburden will be placed in the pit below the watertable as soon as is practical to minimise exposure to air and subsequent oxidation of iron sulfides.

Where PASS stockpiling is required, it will be stored on a bunded treatment pad of crushed limestone or other neutralising material to reduce the surface area exposed to oxygen and will be kept moist using iron free water or neutralising solution.

The proponent has also committed to a revision of the current Acid Sulfate Soils Management Plan to incorporate the Cooljarloo West proposal.

Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Inland Waters* (EPA 2018)
- current operational performance at the Cooljarloo Mineral Sands Project
- potential direct impact on groundwater drawdown and potential indirect impact on groundwater dependent ecosystems.
- potential direct impact and indirect impacts thorough groundwater drawdown on PASS
- application of the mitigation hierarchy to avoid, where possible, interaction with PASS material and minimise its exposure to air through either neutralization or direct return below the watertable.
- application of the mitigation hierarchy to minimise drawdown through reuse of water, return of material to the pits and backfilling above the watertable.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Inland Waters that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 5)
- revision and implementation of the current Surface Water and Groundwater Management Plan to incorporate operations at Cooljarloo West condition 6)
- revision and implementation of the current Acid Sulfate Soils Management Plan to incorporate the Cooljarloo West proposal (condition 7)
- preparation and implementation of a Research and Restoration Plan (condition 9) which includes the establishment of perched aquifer systems.

5. Offsets

Relevant Policy and Guidance

The EPA considers that the following policy and guidance is relevant to its assessment of offsets for the proposal:

- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014)
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020a).

EPA Assessment

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal. The EPA may apply environmental offsets where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation and rehabilitation have been pursued.

Consistent with Principle 1 of the *WA Environmental Offsets Policy* (Government of Western Australia 2011) the proponent has applied the mitigation hierarchy by identifying measures to avoid and minimise environmental impacts. Mitigation measures are assessed under the relevant key environmental factor (see section 4.1 – Flora and Vegetation and section 4.2 – Terrestrial Fauna).

In applying the residual impact significance model (Government of Western Australia 2014), the EPA considers that the proposal would have a significant residual impact from:

- clearing of 1,532 ha of VTs 6, 17 and 18 that represent the Banksia woodlands
- clearing of 296 ha of the preferred habitat for the threatened flora species *Andersonia gracilis* (including impact on 167 individuals of the species)
- clearing of 201 ha of the preferred habitat for the threatened flora species *Anigozanthos virdis* subsp. *terraspectans* (including impact on 165 individuals of the species)
- clearing of 1,511 ha of habitat for the threatened flora species *Macarthuria keigheryi*
- clearing of 1,884 ha of foraging habitat for Carnaby's cockatoo listed as Endangered under the BC Act and EPBC Act.

In noting the above significant residual impacts, the EPA has considered Principle 2 (environmental offsets are not appropriate for all projects) of the *WA Environmental Offsets Policy* and has determined that offsets are appropriate and applicable for this proposal.

During the assessment, the proponent updated its proposed offset to address concerns raised regarding the adequacy of the original proposed offset which is

consistent with Principle 4 (sound knowledge) of the *WA Environmental Offsets Policy*. The proponent has now proposed an offset for the direct impact to 1,884 ha of Carnaby's cockatoo foraging habitat and 1,532 ha of Banksia woodlands. This offset will also include habitat suitable for *Andersonia gracilis, Anigozanthos virdis* subsp. *terraspectans* and *Macarthuria keigheryi.*

The proponent has proposed to fund the direct acquisition of 5,900 ha of land to offset the significant residual impact of the proposal. The acquired land will include all the following values:

- provide foraging habitat for Carnaby's cockatoo
- is predominantly Banksia woodlands
- provide habitat for *Andersonia gracilis, Anigozanthos virdis* subsp. *terraspectans* and *Macarthuria keigheryi*
- is able to be afforded a higher level of protection.

The proponent has proposed to acquire the land prior to project commencement, however has not specified a time frame.

The EPA acknowledges that the proponent has proposed an offset that meets most of the requirements of Principle 3 of the *WA Environmental Offsets Policy*. The EPA considers that the restoration plan will require an applied research component and this would contribute towards the offsets under the offsets policy. Whilst acknowledging the proponents commitments, the EPA advises that the proponent may need to provide further land acquisition which are currently available in this area to meet every aspect of the offsets policy and this would be a requirement of condition 10.

The Department of Agriculture, Water and the Environment (DAWE) have provided advice on the offset proposed by the proponent. DAWE's comments align with the offsets requirements proposed by the EPA above and can apply additional offset requirements following the consideration of offsets at a state level.

Summary

In considering Principles 5 and 6 of the *WA Environmental Offsets Policy*, the EPA recommends that an offset condition (condition 10) is imposed to ensure that the offset is applied with an adaptive frame work and is focused on the longer term strategic outcomes for the state. The offset will be set to counterbalance the significant residual impacts of the proposal. The EPA recommends that offsets are provided for:

- impacts on 1,532 ha of Banksia woodlands of the Swan Coastal Plain
- impact on 167 individuals of the threatened flora species *Andersonia gracilis* or 296 ha of preferred habitat for the species
- impact on 165 individuals of the threatened flora species *Anigozanthos virdis* subsp. *terraspectans* or 201 ha of preferred habitat for the species

- impact on 1,511 ha of habitat for the threatened flora species *Macarthuria keigheryi*
- impact on 1,884 ha of foraging habitat for *Calyptorhynchus latirostris* (Carnaby's cockatoo).

As stated in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020a), if a proposal relates to a change to, or an expansion of an approved proposal, current offsets practice applies to these changes. Consistent with this, the EPA is only assessing whether offsets are appropriate for the additional impacts arising from this proposal. Clearing approved under Ministerial Statements 037, 557, 790 and 977 are exempt from offsets requirements, as offsets were not applied at the time the implementation agreement or decision was made.

6. Matters of National Environmental Significance

The Commonwealth Minister for the Environment has determined that the proposal is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it is likely to have a significant impact on one or more MNES. It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- listed threatened species and communities (s. 18 and s. 18A)
- migratory species (s. 20 and s. 20A).

The EPA has undertaken an accredited assessment of the controlled action on behalf of the Commonwealth.

This assessment report is provided to the Commonwealth Minister for Environment who will decide whether or not to approve the proposal under the EPBC Act. This is separate from any Western Australian approval that may be required.

Commonwealth Policy and Guidance

The EPA had regard to the following relevant Commonwealth guidelines, policies and plans during its assessment:

- EPBC Act *Environmental Offsets Policy* (Commonwealth of Australia 2012a)
- EPBC Act *Referral guidelines for three threatened black cockatoo species* (Commonwealth of Australia 2012b)
- Recovery Plan for Carnaby's cockatoo *(Calyptorhynchus latirostris)* (Department of Parks and Wildlife 2013)
- Recovery Plan for Slender Andersonia *(Andersonia gracilis)* (DEC 2006)
- Recovery Plan for Keighery's Macarthuria *(Macarthuria keigheryi)* (DEC 2009)
- Survey guidelines for Australia's Threatened Birds (Commonwealth of Australia 2010)
- Threat Abatement Plan for disease in natural ecosystems caused by *Phytophthora cinnamomi* (Commonwealth of Australia 2014)
- EPBC Act Policy Statement: Translocation of Listed Threatened Species - Assessment under Chapter 4 of the EPBC Act (Commonwealth of Australia 2013). – noting the proponent has not proposed translocation of any threatened species.

EPA Assessment

In its assessment the EPA has considered the impacts to the MNES - Listed threatened species and communities (s. 18 and s. 18A). The EPA has considered the direct and indirect impacts to

- Carnaby's cockatoo, specifically the loss of 1,884 ha of foraging habitat

- impact on 167 individuals of the threatened flora species *Andersonia gracilis* (Slender Andersonia) or 296 ha of preferred habitat for the species
- impact on 165 individuals of the threatened flora species *Anigozanthos virdis* subsp. *terraspectans* (Dwarf Green Kangaroo Paw) or 201 ha of preferred habitat for the species
- impact on 1,511 ha of habitat for the threatened flora species *Macarthuria keigheryi (*Keighery's Macarthuria)
- *Paracaleana dixonii* (Sandplain Duck Orchid).

The Carnaby's cockatoo is listed as Endangered under EPBC Act. The proposal would clear 1,884 ha of foraging habitat. There is no evidence of nesting or breeding within the development envelope (Bamford 2015). The EPA considers that there remains a significant residual impact to this species from the proposal and has recommended an offset condition be applied.

Andersonia gracilis, Macarthuria keigheryi and *Paracaleana dixonii* are listed as endangered under the EPBC Act and *Anigozanthos virdis* subsp. *terraspectans* is listed as threatened. The EPA considers that there remains a significant residual risk to *Andersonia gracilis, Macarthuria keighery* and *Anigozanthos virdis* subsp. *terraspectans* from the proposal and has recommended an offset condition be applied for these species. The EPA considers that an offset is not required for *Paracaleana dixonii* as the proponent has amended the proposal to avoid the known individuals of this species.

The MNES - Migratory species (s. 20 and s. 20A) as relating to the Western Ground Parrot was not considered further in this assessment. *Pezoporus flaviventris* (western ground parrot) is listed as Critically Endangered under the EPBC Act. Multiple surveys targeting the western ground parrot have been conducted in the Cooljarloo area over a number of years. There have been no recorded observations of the species within the development envelope or surrounding area as a result of these surveys. The EPA considers that it is highly unlikely that this species exists in the area and therefore has not considered an offset for the species.

Summary

The EPA recommends the following environmental conditions to minimise impacts on MNES:

- limit the location and authorised extent of the clearing of vegetation to 1,884 ha in Table 2 of Schedule 1
- implementation of an offset (see section 6; condition 10) which takes into account the significant residual impact to the loss of 1,884 ha of Carnaby's cockatoo foraging habitat.
- implementation of offsets (see section 5, condition 10) to counterbalance the significant residual impact of:
    - impact on 167 individuals of the threatened flora species *Andersonia gracilis* or 296 ha of preferred habitat for the species

- impact on 165 individuals of the threatened flora species *Anigozanthos viridis* subsp. *terraspectans* or 201 ha of preferred habitat for the species
- impact on 1,511 ha of habitat for the threatened flora species *Macarthuria keigheryi.*

The EPA's view is that a significant residual impact remains from the proposal and that offsets are required for the MNES listed above. This offset combined with the application of proposed conditions and adherence to the recovery and threat abatement plans identified above will result in the impacts being acceptable.

7. Conclusion

The EPA has considered the proposal by the proponent for the Cooljarloo West Titanium Minerals Project, located 175 km north of Perth. The proposal is a revised proposal and will incorporate the proponents' existing Cooljarloo Mineral Sands operations.

Application of the Mitigation Hierarchy

Consistent with relevant policies and guidance, the proponent has addressed the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate environmental impacts including:

- avoiding impact on priority species through the reduction of the disturbance footprint and development envelope
- avoiding impact to priority flora species through the implementation avoidance areas
- managing impacts to flora and fauna through management plans
- managing impacts to disease hygiene through a management plan
- minimising impacts to groundwater drawdown through back filling of the open pits
- minimising impacts to surface and groundwater through implementation of management plans.

Offsets

The EPA considers the proposal would have a significant residual impact from:

- impacts on 1,532 ha of Banksia woodlands of the Swan Coastal Plain
- impact on 167 individuals of the threatened flora species *Andersonia gracilis* or 296 ha of preferred habitat for the species
- impact on 165 individuals of the threatened flora species *Anigozanthos virdis* subsp. *terraspectans* or 201 ha of preferred habitat for the species
- impact on 1,511 ha of habitat for the threatened flora species *Macarthuria keigheryi*
- impact on 1,884 ha of foraging habitat for Carnaby's cockatoo.

The EPA has recommended condition 10 which includes the provision for a Flora and Fauna Offset Strategy to offset the significant residual impact to significant flora, vegetation and fauna.

Conclusion

The EPA has taken the following into account in its assessment of the proposal as a whole:

- impacts to all the key environmental factors

- EPA's confidence in the proponent's proposed mitigation measures
- relevant EP Act principles and the EPA's objectives for the key environmental factors
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Given the above, the EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix 5.

8. Other Advice

The EPA notes that many of the potential emissions and discharges assessed in this report will be regulated under Part V of the EP Act via the implementation of a licence. The DWER will assess the emissions and discharges in detail, and mitigation and monitoring conditions are expected to be applied to the proposal.

The EPA notes that regulation of impacts related to mining will be via the implementation of an approved Mining Proposal and Mine Closure Plan, regulated by the Department of Mines, Industry Regulation and Safety (DMIRS). The EPA considers that the backfilling of mine voids is imperative to mitigate risks associated with drawdown, PASS and final landform stability. Due to the location of the site, and its biodiversity values, DMIRS should consider revegetation with native vegetation as the first choice when determining the final land use. The chosen species should be those with the highest potential for providing habitat and foraging resources for the conservation significant fauna listed in this report.

The EPA notes that the management of radiation associated with the mining of mineral sands will be subject to a Radiation Safety Management Plan required by the Radiological Council of Western Australia and the DMIRS Mine Safety Division as party of the Mining Proposal.

9. Recommendations

The EPA recommends that the Minister for Environment notes:

1. The proposal assessed is for the Cooljarloo West Titanium Minerals Project situated west of the existing Cooljarloo Mine and involves the dredge mining of three orebodies: Woolka, Harrier and Kestrel. The proposal will require movement of the mining dredge and ore processing plant (concentrator) from the existing Cooljarloo Mine to Cooljarloo West and back again via flotation across an open channel.
2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation, Terrestrial Fauna and Inland Waters, set out in section 4 of this report.
3. The EPA has recommended that the proposal may be implemented, provided that implementation is carried out in accordance with the recommended conditions and procedures set out in Appendix 5. Matters addressed in the conditions include:
    a) implementation of avoidance areas as defined in schedule 2 (Appendix 5) to avoid impacts to threatened species
    b) revision and implementation of the current Flora and Vegetation Management Plan to minimise impacts to priority and threatened flora and vegetation and to incorporate the Cooljarloo West proposal (condition 5)
    c) revision and implementation of the current Groundwater and Surface Water Management Plan to incorporate the Cooljarloo West proposal (condition 6)
    d) revision and implementation of the current Acid Sulfate Soils Management Plan to incorporate the Cooljarloo West proposal (condition 7)
    e) revision and implementation of the current Disease Hygiene Management Plan to incorporate the Cooljarloo West proposal (condition 8)
    f) preparation and implementation of a Research and Restoration Plan including additional regional surveys to improve the knowledge of regional distribution and abundance of conservation significant flora taxa and to improve performance of rehabilitation and reinstatement of perched aquifer wetlands (condition 9)
    g) preparation and implementation of a Flora and Fauna Offset Strategy to counterbalance the significant residual impact to the loss of Banksia woodlands, threatened flora and Carnaby's cockatoo (condition 10).
4. Other information, advice and recommendations provided by the EPA, set out in section 8.

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Appendix 1: List of Submitters

Organisations

Department of Agriculture, Water and the Environment (formerly Department of Environment and Energy)
Department of Water and Environmental Regulation (formerly Office of the Environmental Protection Authority)
Department of Water and Environmental Regulation (formerly Department of Environmental Regulation)
Department of Water and Environmental Regulation (formerly Department of Water)
Department of Biodiversity, Conservation and Attractions (formerly Department of Parks and Wildlife)
Department of Planning, Lands and Heritage (formerly Department of Aboriginal Affairs)
Minister for Lands
Department of Mines, Industry Regulation and Safety (formerly Department of Mines and Petroleum)
Department of Jobs, Tourism, Science and Innovation (formerly Department of State Development)
Shire of Dandaragan

Individuals

Wildflower Society of Western Australia
South West Aboriginal Land and Sea Council

Appendix 2: Consideration of Environmental Protection Act Principles

EP Act Principle	Consideration
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of this precautionary principle, decisions should be guided by –* *a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *b) an assessment of the risk-weighted consequences of various options.*	This principle is a fundamental and relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of Flora and Vegetation, Terrestrial Fauna and Inland Waters. The EPA notes that the proponent has identified measures to avoid or minimise impacts including the reduction of the disturbance footprint and inclusion of flora avoidance areas. The EPA has considered these measures during its assessment. The EPA has recommended conditions to ensure that environmental protection outcomes are achieved and that management plans for the current operations are revised to incorporate the proposed Cooljarloo West operations and impacts. The EPA has also recommended an offsets strategy be prepared by the proponent to counterbalance the significant residual impact to: • 1,884 ha of Carnaby's cockatoo habitat • 1,532 ha of direct impacts to Banksia woodlands. From its assessment of this proposal, the EPA has concluded there is no threat of serious or irreversible harm provided that the recommended conditions are implemented.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*	In considering this principle, the EPA notes that Flora and Vegetation and Terrestrial Fauna could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.

EP Act Principle	Consideration
	The EPA notes that the proponent has identified measures to avoid or minimise impacts including additional measures to prevent impacts to significant flora through implementation of avoidance areas and the reduction in the development envelope and clearing. The EPA has also considered the proponents commitment to undertake rehabilitation of the entire disturbance footprint. The EPA has considered these measures during its assessment. In assessing this proposal, the EPA has recommended conditions to manage impacts to Flora and Vegetation, Terrestrial Fauna and Inland Waters. The EPA had regard to potential impacts to Carnaby's cockatoo habitat and Banksia woodlands of the Swan Coastal Plain and has recommended a condition on offsets. The EPA notes that the proponent will be required to implement a Mine Closure Plan to ensure appropriate consideration is given to closure planning, and that the proposal is closed in a manner to ensure that the environment is maintained for the benefit of future generations. From its assessment of this proposal, the EPA has concluded that the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	This principle is a fundamental and relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of Flora and Vegetation and Terrestrial Fauna. This principle is particularly significant in regard to the direct and indirect impacts to Carnaby's cockatoo habitat and Banksia woodlands. This principle is also relevant to the EPA consideration of the proposed offset strategy.

EP Act Principle	Consideration
	In considering this principle, the EPA notes that Flora and Vegetation and Terrestrial Fauna could be significantly impacted by the proposal. The assessment of these impacts is provided in this report. The proponent has undertaken comprehensive baseline studies to understand and assess potential threats to biological diversity and ecological integrity. The EPA notes that the proponent has identified measures to avoid or minimise impacts to these factors and has committed to undertaking additional regional survey work to improve the understanding of the flora and vegetation in the area. The EPA has considered these measures during its assessment (provided in this report) and has recommended an offset strategy for the significant residual impact on Flora and Vegetation and Terrestrial Fauna. Furthermore, the EPA has recommended conditions relating to these factors. From its assessment of this proposal the EPA has concluded that the proposal would not compromise the biological diversity and ecological integrity of the affected area.
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.*	In considering this principle, the EPA notes that the proponent would bear the cost relating to management and monitoring of environmental impacts during operation and the management and monitoring of closure activities including earth works, rehabilitation and ongoing monitoring to demonstrate performance against completion criteria. The EPA has had regard to this principle during the assessment of the proposal.

EP Act Principle	Consideration
(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimize costs to develop their own solution and responses to environmental problems.	
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	In considering this principle, the EPA notes that the proponent proposes to minimise waste through establishment of waste recycling programmes, minimisation of chemical use and packaging through bulk storage, reuse of process water, use of suitable bulk storage facilities to reduce impacts of spills and investigate further waste minimisation opportunities. The EPA has had regard to this principle during the assessment of the proposal.

Appendix 3: Evaluation of Other Environmental Factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Land			
Subterranean Fauna	Excavation for the pits and the channel may impact on troglofauna by removing any habitat. Groundwater drawdown during the process of dredge mining may impact on stygofauna by removing any habitat.	There were no government agency or public comments relating to subterranean fauna.	Subterranean Fauna was identified as a preliminary key environmental factor in the Environmental Scoping Document. A subterranean fauna desktop study (Bennelongia 2013) found that: • it is very unlikely that troglofauna occur within the proposal footprint • excavation of pits is not expected to intersect prospective troglofauna habitat due to the high watertable in the vicinity of the proposal and the likely lack of air-spaces within the recent deposits and Bassendean Sand that remain unsaturated • there is prospective stygofauna habitat in the vicinity of the proposal area. In response, a pilot-scale field survey was undertaken. However, the survey did not collect any definitive stygofauna species. The only possible stygofaunal animal collected within the proposal area was a single nematode specimen (Bennelogina 2013b).

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Having regard to: • the desktop survey identifying a low likelihood of troglofauna being present in the proposal area • the pilot survey identifying a lack of significant stygofauna species in the proposal area • *Environmental Factor Guideline – Subterranean Fauna* (EPA 2016e) • the significance considerations in the *Statement of Environmental Principles, Factors and Objectives* (EPA 2020b), the EPA considers that it is unlikely that the proposal would have a significant impact on Subterranean Fauna and that the impacts to this factor are manageable. Accordingly, the **EPA did not consider Subterranean Fauna to be a key environmental factor** at the conclusion of its assessment.
Air			
Air Quality	The proposal will generate dust from land clearing and mining.	There were no government agency or public comments relating to air quality.	Air Quality was not identified as a preliminary environmental factor in the scoping document. Significant air quality impacts from dust and other emissions are not anticipated to occur due to a lack of sensitive receptors near the project.

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Air quality impacts from the project can be managed through Works approvals and Licences required under Part V of the EP Act. Accordingly, the **EPA did not consider Air Quality to be a key environmental factor** at the conclusion of its assessment.
Greenhouse Gas Emissions	Scope 1 greenhouse gas emissions, including those from clearing would be less than 100,000 tonnes per annum (tpa) CO2-e.	There were no government agency or public comments relating to Greenhouse Gas emissions.	The proponent has committed to the management of greenhouse gas emissions in accordance with relevant legislation and national and state strategies relating to greenhouse gas emissions. Greenhouse gas emissions will be managed in accordance with the Clean Energy Act 2011 (Cwth) and reported under the National Greenhouse and Energy Reporting Act 2007 (Cwth). Having regard to: • significance considerations in the *Statement of Environmental Principles, Factors and Objectives* (EPA 2020b) • the Scope 1 emissions are expected to be equivalent to those of the existing Cooljarloo Mine which do not exceed 100,000 tpa CO2-e • *Environmental Factor Guideline – Greenhouse Gas Emissions* (EPA 2020d), the EPA considers it is unlikely that the proposal would have a significant impact on Greenhouse

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Gas Emissions and that the impacts to this factor are manageable. Accordingly, the **EPA did not consider Greenhouse Gas emissions to be a key environmental factor** at the conclusion of its assessment.
People			
Social Surroundings	Mining of mineral sands as the potential to impact on Aboriginal cultural materials. Mineral sands mining and processing has the potential to generate significant noise emissions impacting on sensitive receptors.	There was one public comment from the South West Land and Sea Council regarding social surroundings concerning communication and consultation with Traditional Owners.	Social Surroundings was not identified as a preliminary environmental factor in the scoping document. The Department of Planning, Lands and Heritage (DPLH) (formerly Department of Aboriginal Affairs) recommends an ongoing dialogue with the Yued People. The potential impacts on Aboriginal heritage are managed and regulated by the DPLH. There are no noise sensitive premises in proximity to the Cooljarloo area that are likely to be significantly impacted by the proposal. Noise impacts that may affect human amenity can be adequately managed under the Environmental Protection (Noise) Regulations 1997. The environmental review document should assess any noise impacts from the proposal on sensitive receptors.

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			Accordingly, the **EPA did not consider Social Surroundings to be a key environmental factor** at the conclusion of its assessment.
Human Health	Mining and processing of titanium mineral sands may impact on human health due to the concentration of low-level radioactive minerals through the processing of the heavy mineral concentrate.	There were no government agency or public comments relating to Human Health.	Human Health (Radiation) was not identified as a preliminary environmental factor in the scoping document. The proponent is required to prepare and have approved a Radiation Safety Management Plan which is administered and approved by the Radiological Council of Western Australia. This plan will cover all aspects associated with the safe handling and transport of the low level radiation associated with the titanium minerals. Accordingly, the **EPA did not consider Human Health to be a key environmental factor** at the conclusion of its assessment.

Appendix 4: Proposed Changes to Conditions for Revised Proposal

Proposed Implementation Agreement (Ministerial Statement)

The EPA recommends that the proposal may be implemented and further recommends that the implementation of the proposal be subject to the Implementation Agreement (Ministerial Statement) set out in Appendix 5.

The recommended Ministerial Statement has been developed in accordance with the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (2020b) and includes a review of the following implementation conditions:

- Ministerial Statement 037: Cooljarloo Mineral Sands Project MS 037, issued on 3 October 1988
- Ministerial Statement 557: Cooljarloo Mineral Sands Project, Mining of Titanium Minerals, Orebodies 27 200and 28 000 Shire of Dandaragan, issued on 10 November 2000.
- Ministerial Statement 790: Cooljarloo Mine- Falcon Extension approximately 10 kilometres north-west of Cataby, Shire of Dandaragan, issued on 12 March 2009
- Ministerial Statement 977: Cooljarloo Mine- Falcon Extension approximately 10 kilometres north-west of Cataby, Shire of Dandaragan, issued on 30 July 2014.

Proposed changes

The main changes between the proposed new Ministerial Statement (Appendix 5) and the existing Ministerial Statements relates to:

- removal of redundant conditions
- removal of conditions that are managed under other processes (e.g. dust and waste management) and do not require regulation under Part IV of the EP Act
- updating conditions to refer to approved environment management plans and objectives
- inclusion of additional conditions to ensure consistency with current EPA guidance (condition 9 and condition 10)
- updating conditions to reflect contemporary conditions.

Recommended proposal details (Schedule 1)

The revised proposal details contained in Schedule 1 (Appendix 5) have been amended to include an updated description which reflects the EPA's contemporary approach to project descriptions described in the EPA's Procedures Manual.

Changes include:

- clearing values updated to reflect the cumulative area in the revised proposal.

Appendix 5: Identified Decision-Making Authorities and Recommended Environmental Conditions

Identified Decision-Making Authorities

Section 44(2) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) of the *Environmental Protection Act 1986* requires the Minister for Environment to consult with decision-making authorities (DMAs), and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following DMAs have been identified:

Decision-Making Authority	Legislation (and approval)
1. Minister for Aboriginal Affairs	*Aboriginal Heritage Act 1972* (Consent under section 18)
2. Minister for Environment	*Biodiversity Conservation Act 2016* (Section 40 Taking of protected flora and fauna)
3. Minister for Mines and Petroleum	*Mining Act 1978* (Approval of mining lease)
4. Minister for State Development	*Mineral Sands (Cooljarloo) Mining and Processing Agreement Act 1988* (Approval of proposal/ amendment to proposal under State Agreement Act)
5. Minister for Water	*Rights in Water and Irrigation Act 1914* (Groundwater abstraction licence)
6. Chief Dangerous Goods Officer, Department of Mines, Industry Regulation and Safety	*Dangerous Goods Safety Act 2004* (Storage and handling of dangerous goods)
7. Chief Executive Officer, Department of Water and Environment Regulation	*Environmental Protection Act 1986* (Part V Works approval and licence)
8. Chief Executive Officer, Shire of Dandaragan	*Planning and Development Act 2005* (Planning Approval)
9. Executive Director, Environment Resources and Environmental Compliance Division, Department of Mines, Industry Regulation and Safety	*Mining Act 1978* (Mining Proposal)

Decision-Making Authority	Legislation (and approval)
10. Mining Registrar, Department of Mines, Industry Regulation and Safety	*Mining Act 1978* (Miscellaneous licences)
11. Secretary, Radiological Council of Western Australia	*Radiation Safety Act 1975* (Radiation Safety Management Plan)
12. State Mining Engineer Department of Mines, Industry Regulation and Safety	*Mines Safety and Inspection Act 1994* (Mining Proposal)

Note: In this instance, agreement is only required with DMAs 1 to 5 since these DMAs are Ministers.

Recommended Environmental Conditions

STATEMENT THAT A REVISED PROPOSAL MAY BE IMPLEMENTED (*Environmental Protection Act 1986*)

COOLJARLOO AND COOLJARLOO WEST MINERAL SANDS PROJECT

Proposal: Proposal to amend Cooljarloo Mineral Sands Project, the subject of Statement No. 037 dated 3 October 1988

Proponent: Tronox Management Pty Ltd
Australian Company Number 009 343 364

Proponent Address: 1 Brodie Hall Drive, BENTLEY WA 6152

Assessment Number: 2024

Report of the Environmental Protection Authority: 1692

Previous Assessment Number: 033, 1272, 1749, 1999

Previous Report of the Environmental Protection Authority: 330, 990, 1299, 1512

Previous Statement Numbers: 037, 557, 790, 977

Pursuant to section 45, read with section 45B of the *Environmental Protection Act 1986,* it has been agreed that:

1. the Proposal described and documented in Table 1 of Schedule 1 may be implemented;
2. Environmental Management Plans required by Ministerial Statements 037, 557, 790 and 977 will remain in place until updated plans required by this Statement have been approved;
3. this Statement supersedes Statement Nos. 037, 557, 790 and 977, and from the date of this Statement each of the implementation conditions in Statement Nos. 037, 557, 790 and 977 no longer apply in relation to the revised proposal; and
4. the implementation of the revised proposal, being the Cooljarloo Mineral Sands Project as amended by this proposal, is subject to the following revised implementation conditions:

1 Proposal Implementation

1-1 When implementing the revised proposal, the proponent shall not exceed the authorised extent of the revised proposal as defined in Table 2 of Schedule 1,

unless amendments to the revised proposal and the authorised extent of the Revised Proposal have been approved under the *Environmental Protection Act 1986*.

2 Contact Details

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Compliance Reporting

3-1 The proponent shall prepare and maintain a Compliance Assessment Plan which is submitted to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 3-6, or prior to implementation of the proposal, whichever is sooner.

3-2 The Compliance Assessment Plan shall indicate:

(1) the frequency of compliance reporting;

(2) the approach and timing of compliance assessments;

(3) the retention of compliance assessments;

(4) the method of reporting of potential non-compliances and corrective actions taken;

(5) the table of contents of Compliance Assessment Reports; and

(6) public availability of Compliance Assessment Reports.

3-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 3-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 3-1.

3-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 3-1 and shall make those reports available when requested by the CEO.

3-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.

3-6 The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from

the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

(1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;

(2) include a statement as to whether the proponent has complied with the conditions;

(3) identify all potential non-compliances and describe corrective and preventative actions taken;

(4) be made publicly available in accordance with the approved Compliance Assessment Plan; and

(5) indicate any proposed changes to the Compliance Assessment Plan required by condition 3-1.

4 Public Availability of Data

4-1 Subject to condition 4-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

4-2 If any data referred to in condition 4-1 contains particulars of:

(1) a secret formula or process; or

(2) confidential commercially sensitive information,

the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.

5 Flora and Vegetation Management Plan

5-1 The proponent shall implement the proposal to meet the following environmental objectives:

(1) avoid where possible, otherwise minimise direct and indirect impacts to significant flora and vegetation communities within the revised proposal development envelope delineated in Figure 2 of Schedule 1 during ground disturbing activities and during all phases of mining activities;

(2) ensure there are no proposal-related direct or adverse indirect impacts to flora within the avoidance areas as shown on Figure 3 and delineated by coordinates in Schedule 2; and

(3) ensure there are no proposal-related direct or adverse indirect impacts to flora and vegetation within the un-named Nature Reserve (No. R 40916).

5-2 In order to meet the requirements of condition 5-1, prior to ground disturbing activities within the Cooljarloo West proposal development envelope delineated in Figure 3 of Schedule 1, unless otherwise agreed by the CEO, the proponent shall prepare and have approved by the CEO, a Flora and Vegetation Management Plan for the revised proposal to the requirements of the CEO on advice of the Department of Biodiversity, Conservation and Attractions. The Flora and Vegetation Management Plan shall:

(1) when implemented, substantiate and ensure that condition 5-1 is being met;

(2) include details of the timing and methods of preclearance surveys and demonstrate how the findings of the survey(s) would be considered, including provision of mitigation measures;

(3) present objectives for priority flora and vegetation communities to minimise direct or indirect impacts;

(4) specify trigger criteria that will trigger the implementation of management and/or contingency actions to prevent further direct or indirect impacts to significant flora and vegetation communities;

(5) specify threshold criteria to demonstrate compliance with 5-1;

(6) specify monitoring to determine if trigger criteria and threshold criteria have been met;

(7) specify management and/or contingency actions to be implemented if trigger criteria required by condition 5-2(4) have not been met; and

(8) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 5-1 has been met over the reporting period in the Compliance Assessment Report required by condition 3-6.

5-3 The proponent shall implement the most recent version of the Flora and Vegetation Management Plan which the CEO has confirmed by notice in writing, addresses the requirements of condition 5-2.

5-4 In the event that monitoring, or investigations indicates exceedance of threshold criteria specified in the Flora and Vegetation Management Plan, the proponent shall:

(1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified;

(2) implement the threshold contingency actions specified in the Flora and Vegetation Management Plan within twenty-four (24) hours of the exceedance being reported as required by condition 5-4(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required;

(3) investigate to determine the cause of the threshold criteria being exceeded;

(4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded;

(5) provide a report to the CEO within twenty-one (21) days of the exceedance being reported as required by condition 5-4(1). The report shall include:

(a) details of threshold contingency actions implemented;

(b) the effectiveness of the threshold contingency actions implemented against the threshold criteria;

(c) the findings of the investigations required by conditions 5-4(3) and 5-4(4);

(d) measures to prevent the threshold criteria being exceeded in the future;

(e) measures to prevent, control or abate the environmental harm which may have occurred; and

(f) justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that objectives will continue to be met.

5-5 The proponent:

(1) may review and revise the Flora and Vegetation Management Plan, or

(2) shall review and revise the Flora and Vegetation Management Plan as and when directed by the CEO.

5-6 The proponent shall continue to implement the Flora and Vegetation Management Plan, or any subsequent revisions as approved by the CEO in condition 5-3, until the CEO has confirmed by notice in writing that the plan meets the objective specified in condition 5-1.

6 Surface Water and Groundwater Management Plan

6-1 The proponent shall implement the proposal to meet the following environmental objectives:

(1) avoid where possible, otherwise minimise direct and indirect impacts to surface and groundwater quality and quantity within the revised proposal development envelope delineated in Figure 2 of Schedule 1 during ground disturbing activities and during all phases of mining activities, as far as practicable; and

(2) ensure there are no proposal related groundwater drawdown or proposal-related direct or adverse indirect impacts or to the un-named Nature Reserve (No. R 40916).

6-2 In order to meet the requirements of condition 6-1, prior to ground disturbing activities within the Cooljarloo West proposal development envelope delineated in Figure 3 of Schedule 1, unless otherwise agreed by the CEO, the proponent shall prepare and have approved by the CEO, a Surface Water and Groundwater Management Plan for the revised proposal to the requirements of the CEO. The Surface Water and Groundwater Management Plan shall:

(1) outline how monitoring of groundwater and surface water will be undertaken;

(2) specify trigger criteria that must provide an early warning that the environmental objectives identified in condition 6-1 may not be met;

(3) specify threshold criteria to demonstrate compliance with the environmental objectives specified in condition 6-1;

(4) specify monitoring to determine if trigger criteria and threshold criteria are exceeded;

(5) specify trigger level actions to be implemented in the event that trigger criteria have been exceeded;

(6) specify threshold contingency actions to be implemented in the event that threshold criteria are exceeded; and

(7) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 6-1 has been met over the reporting period in the Compliance Assessment Report required by condition 3-6.

6-3 After receiving notice in writing from the CEO that the Surface Water and Groundwater Management Plan satisfies the requirements of condition 6-2, the proponent shall:

(1) implement the provisions of the Surface Water and Groundwater Management Plan; and

(2) continue to implement the Surface Water and Groundwater Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated the objectives specified in conditions 6-1 have been met.

6-4 In the event that monitoring, tests, surveys or investigations indicates exceedance of threshold criteria specified in the Surface Water and Groundwater Management Plan, the proponent shall:

(1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified;

(2) implement the threshold contingency actions specified in the Surface Water and Groundwater Management Plan within twenty-four (24) hours of the exceedance being reported as required by condition 6-4(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required;

(3) investigate to determine the cause of the threshold criteria being exceeded;

(4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; and

(5) provide a report to the CEO within twenty-one (21) days of the exceedance being reported as required by condition 6-4(1). The report shall include:

(a) details of threshold contingency actions implemented;

(b) the effectiveness of the threshold contingency actions implemented against the threshold criteria;

(c) the findings of the investigations required by conditions 6-4(3) and 6-4(4);

(d) measures to prevent the threshold criteria being exceeded in the future;

(e) measures to prevent, control or abate the environmental harm which may have occurred; and

(f) justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that objectives will continue to be met.

6-5 The proponent:

(1) may review and revise the Surface Water and Groundwater Management Plan; or

(2) shall review and revise the Surface Water and Groundwater Management Plan as and when directed by the CEO.

6-6 The proponent shall implement the latest revision of the Surface Water and Groundwater Management Plan, which the CEO has confirmed by notice in writing meets the objectives specified in condition 6-1.

7 Acid Sulfate Soils Management Plan

7-1 The proponent shall implement the proposal to meet the following environmental objectives:

(1) avoid where possible, otherwise minimise direct and indirect impacts of acid sulfate soils within and adjacent to the revised proposal development envelope delineated in Figure 2 of Schedule 1 during ground disturbing activities and during all phases of mining activities, as far as practicable;

(2) at all times, the proponent shall ensure that the limit of groundwater drawdown in the proposal area and in the vicinity of the proposal area does not approach the potentially acid-forming substrate to the extent that acidic waters are generated and/or released; and

(3) ensure there are no proposal-related direct or adverse indirect impacts to the un-named Nature Reserve (No. R 40916).

7-2 In order to meet the requirements of condition 7-1, prior to ground disturbing activities within the Cooljarloo West proposal development envelope delineated in Figure 3 of Schedule 1, unless otherwise agreed by the CEO, the proponent shall prepare and have approved by the CEO, an Acid Sulfate Soils Management Plan for the Revised Proposal to the requirements of the CEO. The Acid Sulfate Soils Management Plan shall:

(1) when implemented, substantiate and ensure that the objectives in condition 7-1 are being met:

(2) present objectives and monitoring protocols to ensure impacts from acid sulfate soils are minimised;

(3) outline how monitoring of acid sulfate soils will be undertaken;

(4) specify trigger criteria that must provide an early warning that the environmental objectives identified in condition 7-1 may not be met;

(5) specify threshold criteria to demonstrate compliance with the environmental objectives specified in condition 7-1;

(6) specify monitoring to determine if trigger criteria and threshold criteria are exceeded;

(7) specify trigger level actions to be implemented in the event that trigger criteria have been exceeded;

(8) specify threshold contingency actions to be implemented in the event that threshold criteria are exceeded; and

(9) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 7-1 has been met over the reporting period in the Compliance Assessment Report required by condition 3-6.

7-3 After receiving notice in writing from the CEO that the Acid Sulfate Soils Management Plan satisfies the requirements of condition 7-2, the proponent shall:

(1) implement the provisions of the Acid Sulfate Soils Management Plan; and

(2) continue to implement the Acid Sulfate Soils Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated the objectives specified in conditions 7-1 have been met.

7-4 In the event that monitoring, tests, surveys or investigations indicates exceedance of threshold criteria specified in the Acid Sulfate Soils Management Plan, the proponent shall:

(1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified;

(2) implement the threshold contingency actions specified in the Acid Sulfate Soils Management Plan within twenty-four (24) hours of the exceedance being reported as required by condition 7-4(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required;

(3) investigate to determine the cause of the threshold criteria being exceeded;

(4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; and

(5) provide a report to the CEO within twenty-one (21) days of the exceedance being reported as required by condition 7-4(1). The report shall include:

(a) details of threshold contingency actions implemented;

(b) the effectiveness of the threshold contingency actions implemented against the threshold criteria;

(c) the findings of the investigations required by conditions 7-4(3) and 7-4(4);

(d) measures to prevent the threshold criteria being exceeded in the future;

(e) measures to prevent, control or abate the environmental harm which may have occurred; and

(f) justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that objectives will continue to be met.

7-5 The proponent:

(1) may review and revise the Acid Sulfate Soils Management Plan; or

(2) shall review and revise the Acid Sulfate Soils Management Plan as and when directed by the CEO.

7-6 The proponent shall implement the latest revision of the Acid Sulfate Soils Management Plan, which the CEO has confirmed by notice in writing that the plan meets the objectives specified in condition 7-1.

8 Disease Hygiene Management Plan

8-1 The proponent shall implement the proposal to meet the following environmental objectives:

(1) minimise impacts from the implementation of the proposal to flora and vegetation from Dieback (*Phytophthora spp*); and

(2) ensure there is no proposal-related direct or adverse indirect impacts to the un-named Nature Reserve (No. R 40916).

8-2 In order to meet the requirements of condition 8-1, prior to ground disturbing activities within the Cooljarloo West proposal development envelope delineated in Figure 3 of Schedule 1, unless otherwise agreed by the CEO, the proponent shall update and have approved by the CEO, the Disease Hygiene Management Plan for the revised proposal to the requirements of the CEO on advice of the Department of Biodiversity, Conservation and Attractions. The Disease Hygiene Management Plan shall:

(1) when implemented, substantiate and ensure that the objectives in condition 8-1 are being met:

(2) present objectives and monitoring protocols to ensure impacts from *Phytophthora spp* are minimised;

(3) specify trigger criteria that must provide an early warning that the environmental objectives identified in condition 8-1 may not be met;

(4) specify threshold criteria to demonstrate compliance with the environmental objectives specified in condition 8-1;

(5) specify monitoring to determine if trigger criteria and threshold criteria are exceeded;

(6) specify trigger level actions to be implemented in the event that trigger criteria have been exceeded;

(7) specify threshold contingency actions to be implemented in the event that threshold criteria are exceeded; and

(8) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 8-1 has been met over the reporting period in the Compliance Assessment Report required by condition 3-6.

8-3 In the event that monitoring, tests, surveys or investigations indicates exceedance of threshold criteria specified in the Disease Hygiene Management Plan, the proponent shall:

(1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified;

(2) implement the threshold contingency actions specified in the Disease Hygiene Management Plan within twenty-four (24) hours of the exceedance being reported as required by condition 8-3(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required;

(3) investigate to determine the cause of the threshold criteria being exceeded;

(4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; and

(5) provide a report to the CEO within twenty-one (21) days of the exceedance being reported as required by condition 8-3(1). The report shall include:

(a) details of threshold contingency actions implemented;

(b) the effectiveness of the threshold contingency actions implemented against the threshold criteria;

(c) the findings of the investigations required by conditions 8-3(3) and 8-3(4);

(d) measures to prevent the threshold criteria being exceeded in the future;

(e) measures to prevent, control or abate the environmental harm which may have occurred; and

(f) justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that objectives will continue to be met.

8-4 The proponent:

(1) may review and revise the Disease Hygiene Management Plan; or

(2) shall review and revise the Disease Hygiene Management Plan as and when directed by the CEO.

8-5 The proponent shall implement the most recent version of the Disease Hygiene Management Plan which the CEO has confirmed by notice in writing, addresses the requirements of condition 8-1.

8-6 The proponent shall continue to implement the Disease Hygiene Management Plan, or any subsequent revisions as approved by the CEO in condition 8-5, until the CEO has confirmed by notice in writing that the plan meets the objective specified in condition 8-1.

9 Research and Restoration Plan

9-1 The proponent shall ensure that the proposal is implemented to meet the following environmental objective:

(1) restoration of native vegetation communities that adequately represent the vegetation types that have been cleared.

9-2 To verify that the objective of condition 9-1(1) will be met, prior to ground disturbing activities within the Cooljarloo West proposal development envelope delineated in Figure 3 of Schedule 1, unless otherwise agreed by the CEO, the proponent shall prepare and have approved by the CEO, a Research and Restoration Plan for the revised proposal to the requirements of the CEO. The Research and Restoration Plan shall include the following requirements as a minimum:

(1) a programme of regional surveys to be completed by the proponent to improve the knowledge of regional distribution and abundance of conservation significant flora taxa;

(2) definition of the restoration target by referring to historic data;

(3) identification of restoration trials to be conducted to improve understanding and performance of restoration requirements;

(4) a programme for tracking restoration performance and provide feedback into future research; and

(5) a research programme to improve restoration of perched aquifer wetlands.

9-3 In order to meet the requirements of condition 9-1, the proponent shall:

(1) specify trigger criteria that must provide an early warning that the requirements identified in condition 9-2(4) may not be met;

(2) specify threshold criteria to demonstrate compliance with the requirements specified in condition 9-2;

(3) specify monitoring to determine if the trigger criteria required by condition 9-3(1) and the threshold criteria required by condition 9-3(2) are exceeded;

(4) specify trigger level actions to be implemented in the event that trigger criteria required by condition 9-3(1) have been exceeded;

(5) specify threshold contingency actions to be implemented in the event that threshold criteria required by condition 9-3(2) are exceeded; and

(6) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 9-1 has been met over the reporting period in the Compliance Assessment Report required by condition 3-6.

9-4 In the event that monitoring, tests, surveys or investigations indicates exceedance of threshold criteria specified in the Research and Restoration Plan, the proponent shall:

(1) report the exceedance in writing to the CEO within seven (7) days of the exceedance being identified;

(2) implement the threshold contingency actions specified in the Research and Restoration Plan within twenty-four (24) hours of the exceedance being reported as required by condition 9-4(1) and continue implementation of those actions until the CEO has confirmed by notice in writing that it has been demonstrated that the threshold criteria are being met and the implementation of the threshold contingency actions is no longer required;

(3) investigate to determine the cause of the threshold criteria being exceeded;

(4) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; and

(5) provide a report to the CEO within twenty-one (21) days of the exceedance being reported as required by condition 9-4(1). The report shall include:

(a) details of threshold contingency actions implemented;

(b) the effectiveness of the threshold contingency actions implemented against the threshold criteria;

(c) the findings of the investigations required by conditions 9-4(3) and 9-4(4);

(d) measures to prevent the threshold criteria being exceeded in the future;

(e) measures to prevent, control or abate the environmental harm which may have occurred; and

(f) justification of the threshold remaining, or being adjusted based on better understanding, demonstrating that objectives will continue to be met.

9-5 The proponent:

(1) may review and revise the Research and Restoration Plan; or

(2) shall review and revise the Research and Restoration Plan as and when directed by the CEO.

9-6 The proponent shall implement the most recent version of the Research and Restoration Plan which the CEO has confirmed by notice in writing, addresses the requirements of condition 9-2.

9-7 The proponent shall continue to implement the Research and Restoration Plan, or any subsequent revisions as approved by the CEO in condition 9-6, until the CEO has confirmed by notice in writing that the plan meets the objective specified in condition 9-1.

10 Offset Strategy

10-1 The proponent shall undertake offsets with the objective of counterbalancing the significant residual impact on the following environmental values:

(1) 1,884 ha of conservation significant fauna, Carnaby's cockatoo (*Calyptorhynchus latirostris*), foraging habitat; and

(2) direct impacts to conservation significant flora and vegetation including;

(a) 1,532 ha of Banksia woodlands of the Swan Coastal Plain of Western Australia;

(b) 167 individuals of the threatened flora species *Andersonia gracilis* or 296 ha of preferred habitat for the species;

(c) 165 individuals of the threatened flora species *Anigozanthos virdis* subsp. *terraspectans* or 201 ha of preferred habitat for the species; and

(d) 1,511 ha of habitat for the threatened flora species *Macarthuria keigheryi,*

as a result of the implementation of the proposal, as defined in Table 2 of Schedule 1 and delineated by coordinates in Schedule 2.

10-2 Within twelve (12) months of the publication of this Statement and prior to the commencement of ground disturbance activities in the Cooljarloo West proposal development envelope as delineated by Figure 3 of Schedule 1, the proponent shall prepare and submit an Offset Strategy to the requirements of the CEO.

10-3 The Offset Strategy, as required by condition 10-2, shall:

(1) demonstrate that the objectives in condition 10-1 will be met;

(2) be prepared on advice of Department of Biodiversity, Conservation and Attractions;

(3) identify an area, or areas, to be acquired (Offset Conservation Area) which contains the environmental values identified in condition 10-1(1) and 10-1(2);

(4) demonstrate how the environmental values within the Proposed Offset Conservation Area counterbalances the significant residual impact to the environmental values identified in conditions 10-1(1) and 10-1(2) through application of the principles of the *WA Environmental Offsets Policy* and completion of the WA Offsets Template, as described in the *WA Environmental Offsets Guidelines*, and the *Environmental Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* Assessment Guide, or any subsequent revisions of these documents;

(5) demonstrate that the proposed Offset Conservation Area contains at least 1,532 ha of Banksia woodlands of the Swan Coastal Plain of Western Australia;

(6) demonstrate how the proposed Offset Conservation Area aligns with the National Recovery Plans for Carnaby's cockatoo (*Calyptorhynchus latirostris*), or any subsequent revisions of these plans;

(7) demonstrate how the proposed Offset Conservation Area aligns with the National Recovery Plans for Slender Andersonia (*Andersonia gracilis*), or any subsequent revisions of these plans;

(8) demonstrate how the proposed Offset Conservation Area aligns with the National Recovery Plans for Keighery's Macarthuria (*Macarthuria keighyi*), or any subsequent revisions of these plans;

(9) identify how the proposed Offset Conservation Area will be acquired and specify:

(a) a timeframe and quantum of works associated with establishing the proposed Offset Conservation Area prior to ground disturbing activities at Cooljarloo West, including a contribution for maintaining the offset for at least twenty (20) years after completion of purchase, and details pertaining to monitoring, evaluating and reporting;

(b) the mechanism for ensuring the proposed Conservation Offset Area is able to be afforded a higher level of protection; and

(c) the relevant management body for the on-going management of the proposed Offset Conservation Area, including its role, and the role of the proponent, and confirmation in writing that the relevant management body accepts responsibility for its role; and

(10) where an on-ground management is proposed:

(a) state the objective/s and target/s to be achieved, including completion criteria, which result in a tangible improvement to the environmental value/s being offset;

(b) the consistency of the objective/s and target/s with the objectives of any relevant guidance (e.g. Recovery Plans or Area Management Plans);

(c) detail the on-ground management actions with associated timeframes for implementation, including contingency actions, to achieve the objective/s and target/s identified in condition 10-3(9)(a); and

(d) detail the monitoring, reporting and evaluation mechanisms for the objective/s, target/s and actions identified under conditions 10-3(9)(a) and condition 10-3(9)(c).

10-4 The proponent:

(1) may review and revise the Offset Strategy; or

(2) shall review and revise the Offset Strategy as and when directed by the CEO.

10-5 The proponent shall implement the latest version of the Offset Strategy, which the CEO has confirmed by notice in writing meets the objectives specified in condition 10-1.

Schedule 1

Table 1: Summary of the proposal

Proposal title	Cooljarloo and Cooljarloo West Mineral Sands Project
Short description	The revised proposal is to mine the orebodies within the revised proposal disturbance area shown in Figure 2. The revised proposal is to expand a mineral sands mine located 175 kilometres north of Perth and includes: • construction of a transportation channel; • construction of topsoil and overburden stockpiles; • dredge mining of Kestral, Harrier, Woolka North and Woolka South orebodies; • construction of tailings storage facility; and • movement of the dredge and concentrator from Cooljarloo West back to the Cooljarloo Mine through the transportation channel.

Table 2: Location and authorised extent of physical and operational elements

Element	Location	Existing operations (Ministerial Statements)	Proposed change (Cooljarloo West proposal)	Proposed extent (revised proposal)
Disturbance	Figures 2 and 3	Disturbance footprint up to 5,807 ha. The disturbance footprint includes: • 5,012 ha of native vegetation • 795 ha of pasture.	Disturbance footprint up to 2,033 ha within a development envelope of 3,812 ha. The disturbance footprint includes: • 1,884 ha of additional native vegetation • 53 ha of already cleared native vegetation (of which 43 ha is within the existing operations)	Disturbance footprint up to **7,700** ha within a development envelope of **12,375** ha. The disturbance footprint includes: • **6,905** ha of native vegetation • **795** ha of pasture.

Element	Location	Existing operations (Ministerial Statements)	Proposed change (Cooljarloo West proposal)	Proposed extent (revised proposal)
			• 96 ha of pasture within the existing operations.	

Table 3: Abbreviations and Definitions

Acronym or Abbreviation	Definition or Term
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or his delegate.
ha	Hectare

Figures (attached)

Figure 1: Regional location
Figure 2: Revised proposal development envelope
Figure 3: Cooljarloo and Cooljarloo West proposals

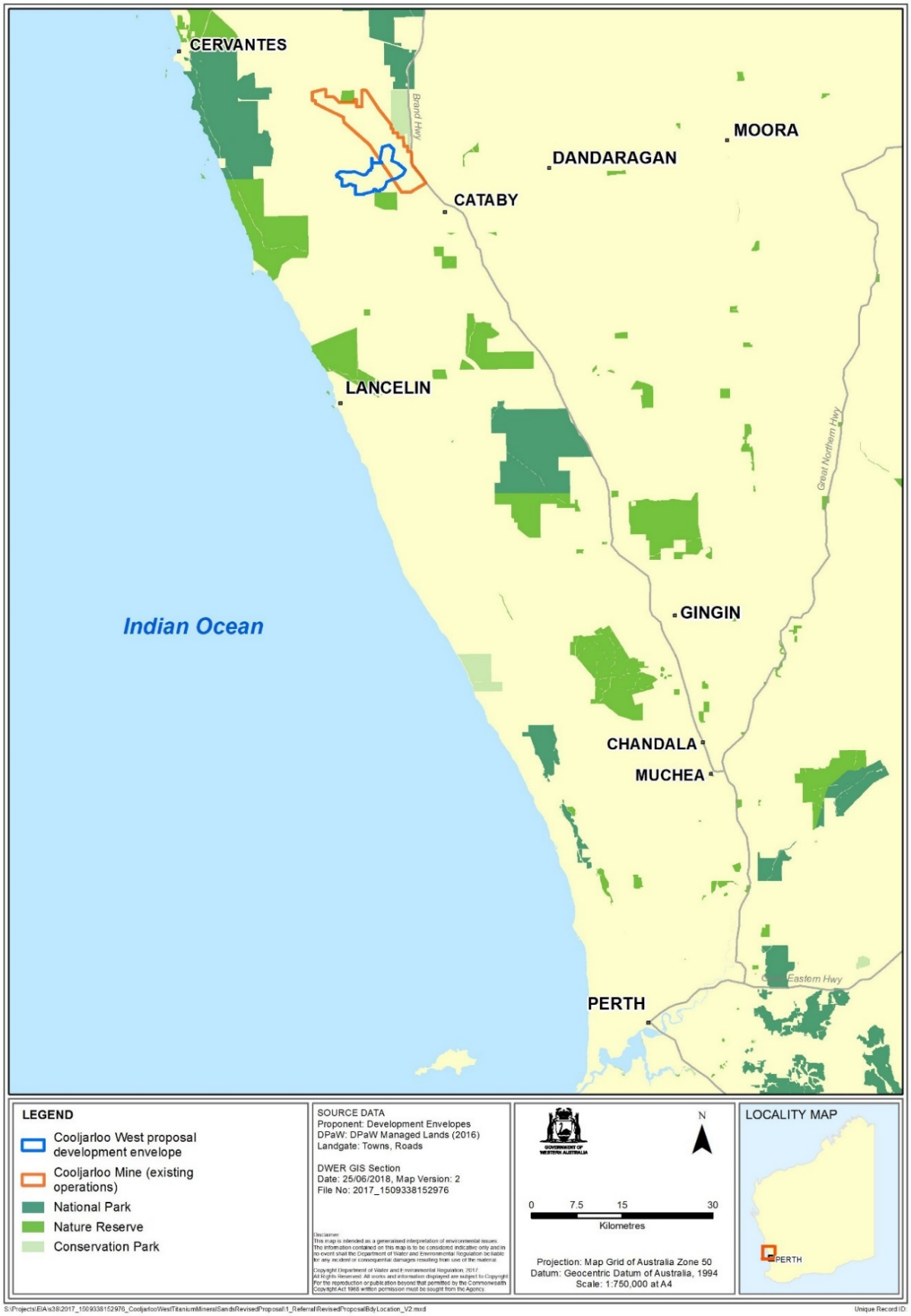

Figure 1: Regional location

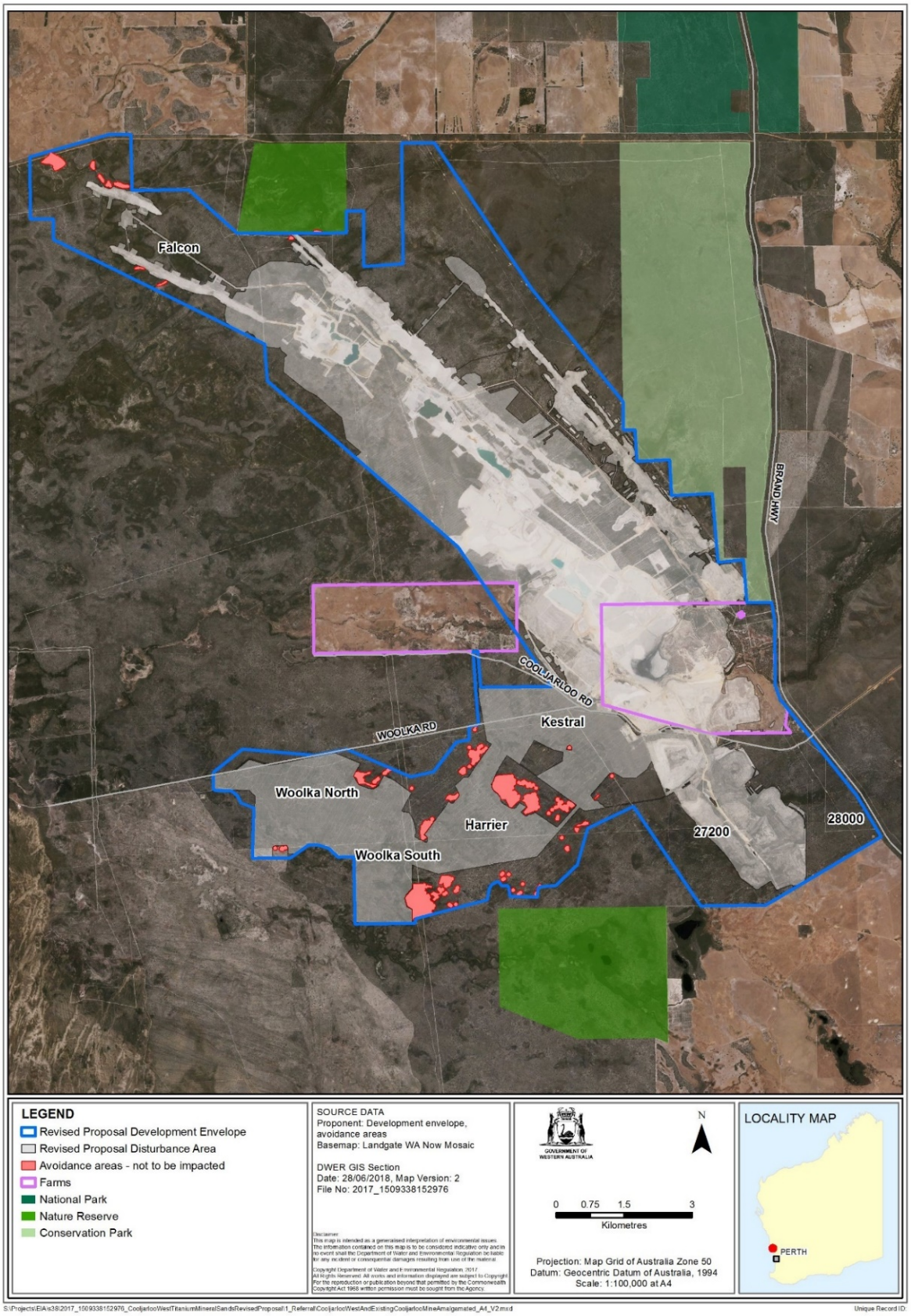

Figure 2: Revised proposal development envelope

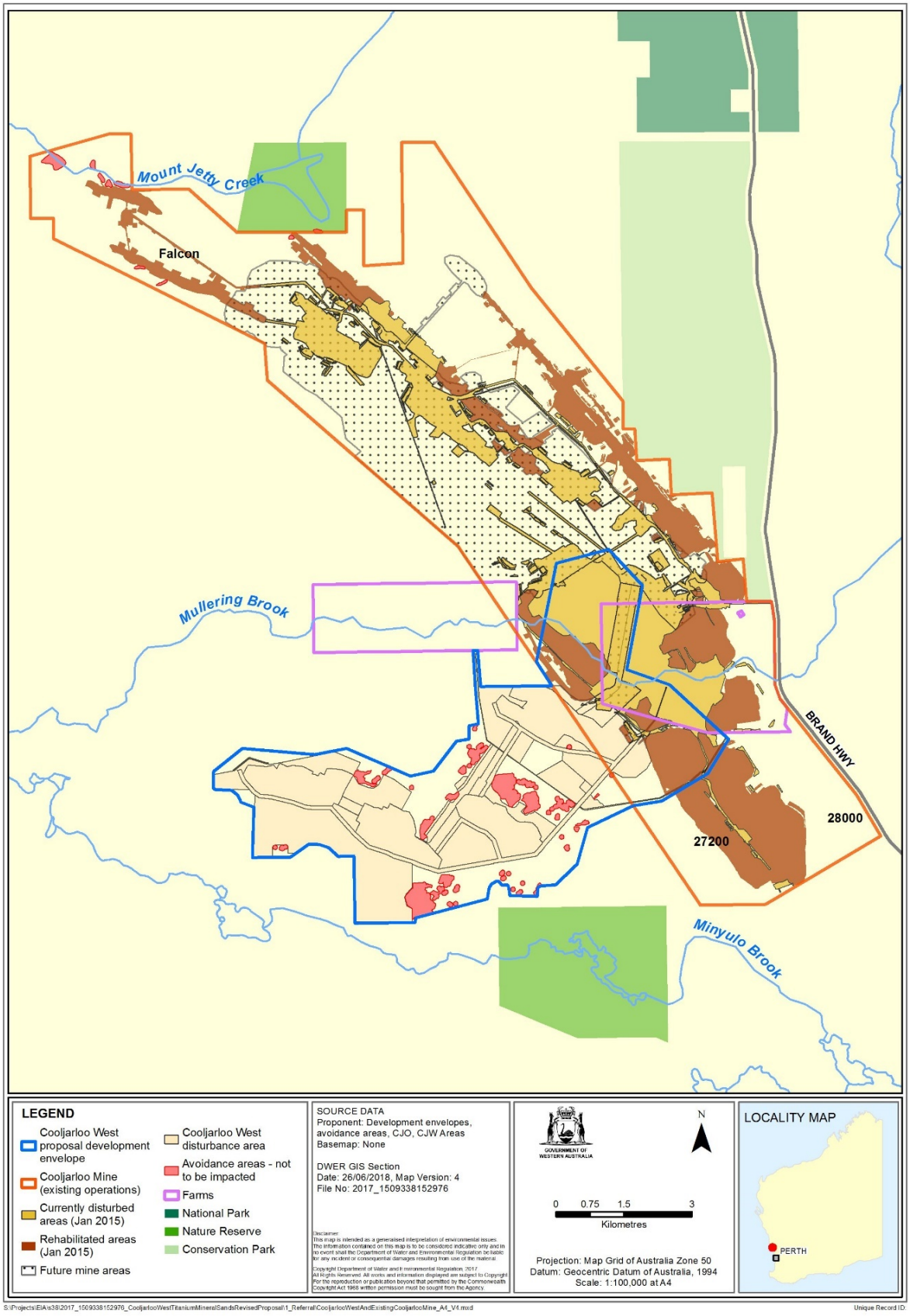

Figure 3: Cooljarloo and Cooljarloo West proposals

Schedule 2

All co-ordinates are in metres, listed in Map Grid of Australia Zone 51 (MGA Zone 51), datum of Geocentric Datum of Australia 1994 (GDA94).

Coordinates defining the development envelope are held by the Department of Water and Environmental Regulation, Document Reference Number 2020 – DWERDT34988.

Coordinates defining the flora avoidance areas are held by the Department of Water and Environmental Regulation, Document Reference Number 2020 – DWERDT349932.

Notes

The following notes are provided for information and do not form part of the implementation conditions of the Statement:

- The EPA notes that many of the potential emissions and discharges associated with the proposal will be regulated under Part V of the *Environmental Protection Act 1986* via the implementation of a licence. The Department of Water and Environmental Regulation will assess the emissions and discharges in detail, and mitigation and monitoring conditions are expected to be applied to the proposal.

- No conditions have been included as part of the implementation conditions to manage impacts associated with mine closure and rehabilitation. The Department of Mines, Industry Regulation and Safety (DMIRS) is the key regulator and decision-making authority for mining projects under the *Mining Act 1978*. DMIRS has the role of regulating the industry to ensure that closure conditions applied and commitments made are implemented during the life of the mining project. The *Mining Act 1978* requires a Mine Closure Plan to be submitted to the DMIRS for assessment and approval as part of the Mining Proposal assessment and approval process.

- The EPA notes that the management of radiation associated with the mining of mineral sands will be subject to a Radiation Safety Management Plan required under the *Radiation Safety Act 1975* to be approved by the Radiological Council of Western Australia.