

**Alcoa of Australia
Limited**

**Pinjarra Alumina Refinery
Revised Proposal**

**Environmental Scoping
Document**



May 2021

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Environmental Scoping Document

Proposal name:	Pinjarra Alumina Refinery Revised Proposal
Proponent:	Alcoa of Australia Limited
Assessment number:	2253
Location:	The Pinjarra Alumina Refinery is located approximately 6 km east of Pinjarra town site; the Myara North mining area is adjacent to the Jarrahdale town site; and the Holyoake mining area lies approximately 5 km east of Dwellingup.
Local Government Area:	Shires of Murray, Serpentine-Jarrahdale and Boddington.
Public review period:	Environmental Review Document – 8 weeks
EPBC reference no:	2020/8743

1. Introduction

The Environmental Protection Authority (EPA) has determined that the above Proposal is to be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act).

The purpose of the Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required under s 40(3) of the EP Act. Alcoa has prepared this ESD in consultation with the EPA, decision-making authorities and interested agencies, consistent with the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2018, hereafter the Procedures Manual).

Form

The EPA requires that the form of the report on the environmental review required under s. 40 (Environmental Review Document, ERD) is according to the Environmental Review Document template (EPA 2020).

Content

The EPA requires that the environmental review includes the content outlined in Sections 2 to 6 of this ESD.

Timing

Table 1 sets out the timeline for the assessment of the Proposal agreed between the EPA and the Proponent.

Table 1 Assessment timeline

Key assessment milestones	Completion date*
EPA approves Environmental Scoping Document	June 2021
Proponent submits first draft Environmental Review Document	31 August 2021
EPA provides comment on first draft Environmental Review Document (6 weeks from receipt of ERD)	12 October 2021

Key assessment milestones	Completion date*
Proponent submits revised draft Environmental Review Document	29 October 2021
EPA authorises release of Environmental Review Document for public review (2 weeks from EPA approval of ERD)	26 November 2021
Proponent releases Environmental Review Document for public review for 8 weeks	10 December 2021
Close of public review period	10 February 2022
EPA provides Summary of Submissions	10 March 2022
Proponent provides Response to Submissions	10 May 2022
EPA reviews the Response to Submissions (4 weeks from receipt of Response to Submissions)	7 June 2022
EPA prepares draft assessment report and completes assessment (6 weeks from EPA accepting Response to Submissions)	25 August 2022
EPA finalises assessment report (including two weeks consultation on draft conditions) and gives report to Minister (6 weeks from completion of assessment)	6 October 2022

*Dates are indicative

Procedure

The EPA requires the Proponent to undertake the environmental review according to the procedures in the *Administrative Procedures* and the *Procedures Manual*, including requirements for public review.

This ESD has not been released for public review. The ESD will be available on the EPA website (www.epa.wa.gov.au) once endorsed and must be appended to the Environmental Review document.

Assessment as accredited assessment

The Proposal was referred to the Commonwealth Minister for Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 6 August 2020. The delegate for the Commonwealth Minister for Environment determined on 4 September 2020 that this Proposal is a controlled action under the EPBC Act as it may impact on the following Matters of National Environmental Significance (MNES):

- Listed threatened species and communities (sections 18 and 18A)
- The ecological character of a declared Ramsar wetland (s16 & 17B)
- Listed migratory species (s20 & 20A).

The EPA acknowledges that the Proposal will need to be assessed by accredited assessment under Part IV of the EP Act and will proceed with the assessment on this basis. The assessment will be undertaken at the level of Public Environmental Review.

This ESD includes work required to be carried out and reported on in the ERD in relation to MNES as identified in sections 16, 17B, 18, 18A, 20 and 20A of the EPBC Act. The ERD will also address the matters in Schedule 4 of the *Environment Protection and Biodiversity*

Conservation Regulations 2000, by including a table within the ERD that makes reference to how Sections 3-5 have been addressed.

MNES that may be impacted by the Proposal will be identified, and the potential impacts on these matters addressed within each relevant preliminary environmental factor as identified in Table 4. The ERD will include a separate section which summarises the potential impacts on MNES and describes, to the extent practicable, any feasible alternatives to the proposed action and mitigation measures. Proposed offsets to address significant residual impacts on MNES are also to be discussed and demonstrate how any proposed offsets are consistent with the EPBC Act Environmental Offsets Policy, October 2012.

2. The Proposal

Proposal description

Alcoa of Australia Limited (the Proponent) is proposing to increase production at the Pinjarra Alumina Refinery (the refinery) and increase the rate of bauxite mining at the existing Huntly Mine (the mine) within Mineral Lease 1SA (ML1SA) to supply 2.5 Mtpa bauxite for export to third party customers (the Proposal).

The Pinjarra Alumina Refinery is located approximately 6 km east of Pinjarra town site on South West Highway within the Shire of Murray in the Peel Region of Western Australia (**Figure 1**). It lies on cleared land on the Swan Coastal Plain. The Huntly Mine is located predominantly within the Shires of Murray, Serpentine-Jarrahdale and Boddington within the Peel Region of Western Australia (**Figure 1**). The Huntly Mine lies on the Jarrah Forrest of the Darling Plateau.

The Proposal is primarily subject to two State Agreements; the *Alumina Refinery Agreement Act 1961* and the *Alumina Refinery (Pinjarra) Agreement Act 1969*. These detail the rights, obligations, terms and conditions in relation to the operation of the refinery, and the mine within Mineral Lease 1SA (ML1SA). The Proposal also has considerations in relation to the *Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978*. Alcoa's State Agreements, read together, and in conjunction with a range of Ministerial Statements issued under the EP Act, create a regulatory framework that Alcoa has operated under since it first began operations in Western Australia.

The refinery is subject to approvals under environmental legislation including Ministerial Statement 646 (MS 646) under Part IV of the EP Act. Mining operations at Huntly Mine are undertaken in accordance with a five-year Mining and Management Program (MMP) that is approved by the Minister for State Development on advice of the Minister for Environment and the Mining and Management Program Liaison Group (MMPLG).

Alcoa has gradually increased alumina production at the refinery through ongoing efficiency upgrades and expects that production will exceed the 5.0 Mtpa authorised under MS 646, reaching 5.25 Mtpa over the next decade (5% increase from existing 5.0 Mtpa approved rate). The current rate of alumina production at the refinery is approximately 4.7 Mtpa.

The current approved MMP for 2020-2024 authorises mining of an average of just over 16.0 Mtpa (dry tonnes) of bauxite per year at Huntly Mine with associated vegetation clearing at an average of approximately 350 ha/year over the five-year period. The MMP also includes mining for up to 2.0 Mtpa (dry tonnes) of bauxite for export in 2020 and 2021. Mining for 2.5 Mtpa of bauxite export would require approximately 50 hectares of clearing per year.

The Huntly Mine will be making a progressive transition from the current Myara mining area to the Myara North and Holyoake mining areas starting from 2023 (**Figure 1**). This is an inherent part of bauxite mining and consistent with previous mining area transitions within ML1SA. This will enable continuity of bauxite supply to the Pinjarra Alumina Refinery as well as bauxite export.

Alcoa referred the Proposal as a revised Proposal to the previous Pinjarra Refinery Efficiency Upgrade, to enable an increase to alumina production and inclusion of 2.5 Mtpa bauxite mining for export. Alcoa referred the Proposal to the EPA as a 'significant proposal', to facilitate an Environmental Impact Assessment (EIA) that will inform stakeholders on the longer-term mine planning (2025-2035) and environmental management requirements and facilitate the setting of contemporary approval conditions.

The key Proposal characteristics are presented in **Table 2** and **Table 3**.

Modifications to proposal since referral

On 2 February 2021 Alcoa submitted a request to the EPA to modify the proposal under s43A of the EP Act, and a request to Department of Agriculture Water and Environment (DAWE) to vary the proposal under s156A of the EPBC Act.

The modification to the Proposal incorporated the following changes:

Development Envelope Refinery: increase from 10 ha to 89 ha of vegetation clearing within a disturbance footprint of 299 ha (**Figure 2**).

Holyoake Development Envelope: reduction of the 10,170 ha Development Envelope by 1,012 ha to 9,158 ha.

Development Envelope Mining: reduction in clearing within the overall Development Envelope from 6,700 ha to 6,621 ha to account for the 79 ha increase in clearing within the Refinery Development Envelope.

These variations to the original proposal were approved by EPA on 30 March 2021 and approved by DAWE on 16 March 2021.

Table 2 Summary of the Proposal

Proposal title	Pinjarra Alumina Refinery Revised Proposal
Proponent name	Alcoa of Australia Limited (Alcoa)
Short description	The Proposal is to increase production rate at the Pinjarra Alumina Refinery located on South West Highway, Pinjarra, and supply of bauxite for export.

Table 3 Location and proposed extent of physical and operational elements

Element	Current authorised extent	Proposed change to the Proposal	Final approved extent
Alumina production	5 Mtpa	0.25 Mtpa	5.25 Mtpa
Project life	>45	2045	2045
Development envelope refinery	3241 ha	Incorporate previous disturbance (1,396 ha) with additional 299 ha of disturbance.	Disturbance of no more than 1695 ha ¹ within the 3241 ha development envelope
Development envelope mining	Clearing authorised under Part V of the EP Act	Clearing of no more than 6,621 ha within the 41,403 ha development envelope	Clearing of no more than 6,621 ha within the 41,403 ² ha development envelope ³
Bauxite export	2.0 Mtpa	2.5 Mtpa	2.5 Mtpa
Refinery outputs (atmospheric emissions)			
Particulates (from stacks)	140 tpa	Refinery outputs to be estimated in Environmental Review Document to inform EPA assessment	Refinery outputs to be estimated in Environmental Review Document to inform EPA assessment
NO _x	860 tpa		
CO	900 tpa		
VOCs	162 tpa		
Greenhouse gases	2,581,700 tpa		
Net CO ₂ – Refinery with Alinta Cogeneration Project	564 kgCO ₂ / t alumina		
Bauxite residue	10 Mtpa		
1 Final approved extent of disturbance and associated clearing within the refinery development envelope includes the current disturbance of 1,396 ha and proposed disturbance of 299 ha. The total refinery disturbance is no more than 1,695 ha. Disturbance and associated clearing to be approved under relevant legislation: EPBC Act - 299 ha EP Act – 1695 ha 2 Total Mine Development envelope includes 17,449 ha for Myara North and 9,158 ha for Holyoake mine areas and Myara North 5,254 ha and 9,542 ha Holyoake mining infrastructure corridors. 3 Clearing approved under Section 6 of the EP Act is not included in the 6,621 ha approved extent.			

Figure 1 Locality Plan and Development Envelope

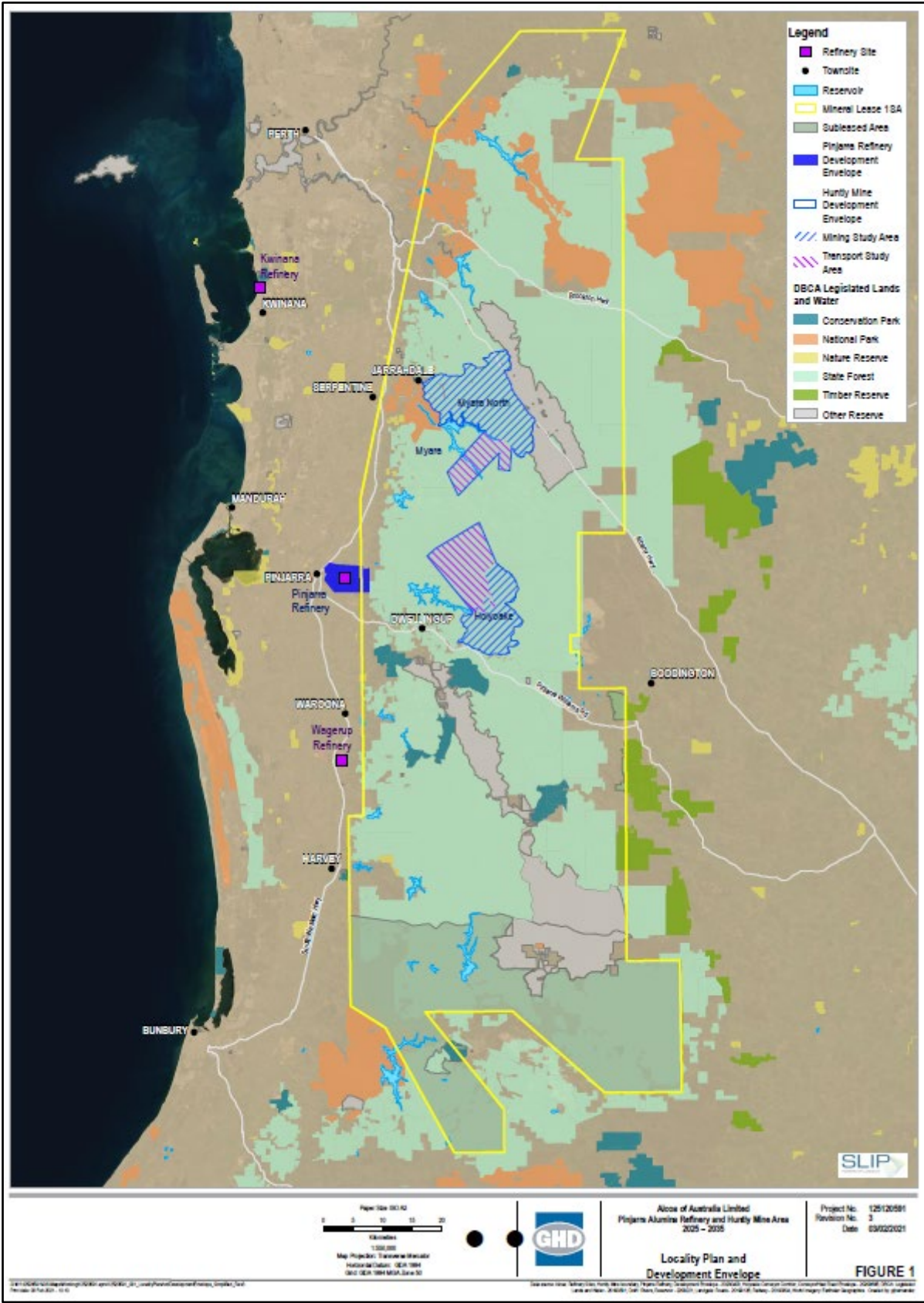
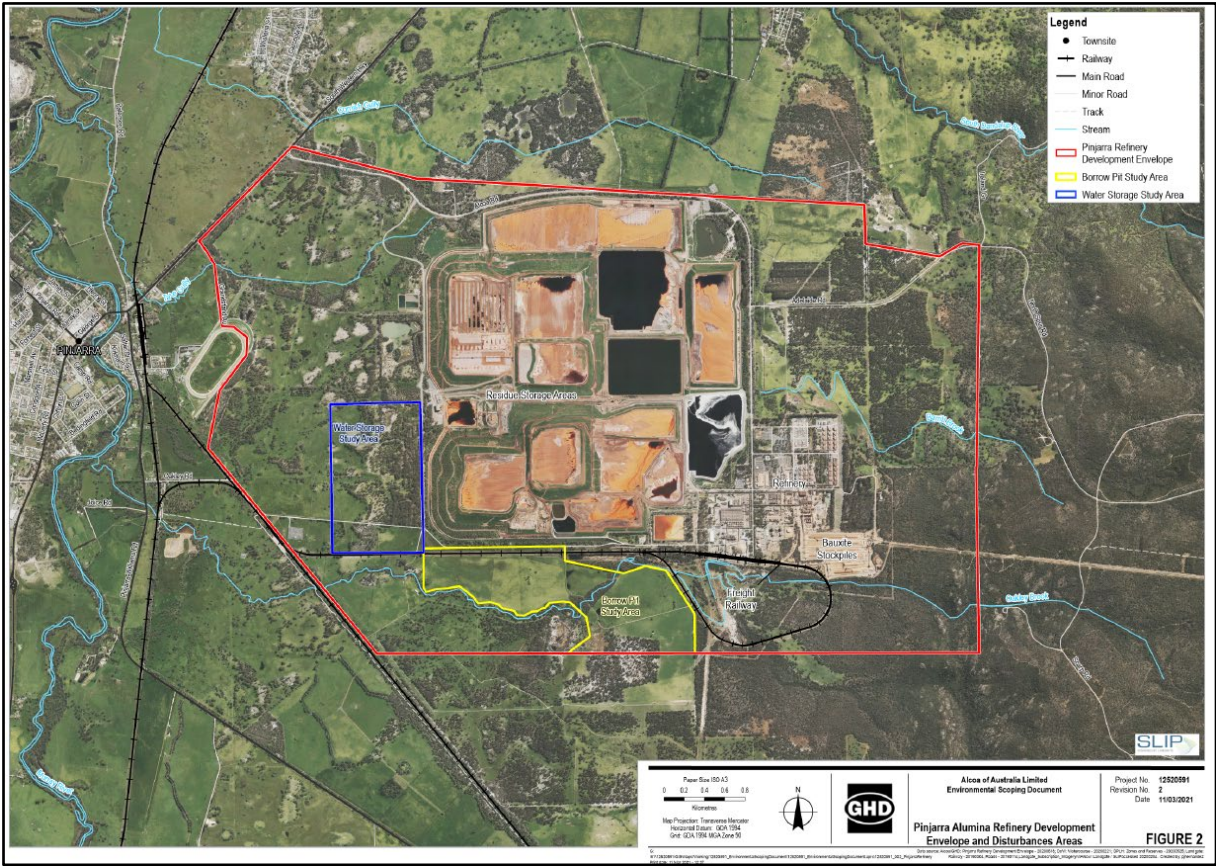


Figure 2 Pinjarra Refinery Development Envelope and Disturbance Areas



3. Preliminary key environmental factors and required work

The preliminary key environmental factors for the environmental review are:

1. Flora and Vegetation
2. Terrestrial Fauna
3. Terrestrial Environmental Quality
4. Inland Waters
5. Air Quality
6. Greenhouse Gas Emissions
7. Social Surroundings.

Table 4 outlines the work required for each preliminary key environmental factor and contains the following elements for each factor:

- EPA objective for that factor
- Relevant activities – the Proposal activities that may have a significant impact on that factor.
- Potential risk and impacts associated with the factor
- Required work for that factor
- Relevant policy and guidance – EPA (and other) guidance and policy relevant to the assessment.

Table 4 Preliminary key environmental factors and required work

Flora and Vegetation	
EPA objective	<i>To protect flora and vegetation so that biological diversity and ecological integrity are maintained.</i>
Relevant activities	The transition in mining associated with ongoing and increased production at Pinjarra Refinery and to supply bauxite for export requires 6,621 hectares (ha) of clearing between 2023 and 2035. The refinery development envelope requires additional disturbance and associated clearing of up to 299 ha.
Potential impacts and risks	• Direct impacts to flora and vegetation as a result of clearing • Indirect impacts to flora and vegetation as a result of: ○ Introduction and/or spread of weeds ○ Introduction and/or spread of dieback ○ Spills and/or leaks from storage and handling of hazardous materials and waste ○ Dust emissions ○ Erosion ○ Altered hydrology/groundwater regimes
Required work	1. Identify and characterise the flora and vegetation within the Mining Development Envelope through a detailed flora and vegetation survey in accordance with EPA guidance. Survey should include all areas that are

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- likely to be directly or indirectly impacted (including by changes to groundwater, or surface water flow) as a result of the Proposal.
2. Identify and characterise the flora and vegetation in land adjacent to the Mining Development Envelope where studies indicate that this land may be subject to significant indirect impacts. The survey will be undertaken in accordance with EPA guidance and to a detail commensurate with the significance of indirect impacts.
 3. Identify and characterise the flora and vegetation within the proposed disturbance and associated clearing footprint within the Refinery Development Envelope through a flora and vegetation survey in accordance with EPA guidance.
 4. Demonstrate how surveys are relevant, representative, and consistent with current EPA and Commonwealth (EPBC Act) guidance. Where surveys have not been undertaken consistent with the guidance provide a justification for any variation. Ensure database searches and taxonomic identifications are up-to-date. If multiple surveys have been undertaken to support the assessment, a consolidated report should be provided including the integrated results of the surveys. All surveys will be appended to the environmental review documentation.
 5. Reports provided should be accompanied by IBSA Data Packages that are prepared following EPA guidance.
 6. Undertake baseline weed mapping in areas likely to be directly or indirectly impacted by the Proposal.
 7. Determine whether any flora species recorded are significant and provide an analysis of local and regional context (refer to *Environmental Factor Guideline – Flora and Vegetation* for definition of significant flora).
 8. Undertake targeted searches for significant flora as identified in Item 7, in accordance with EPA and Commonwealth guidance (EPBC Act). Include an assessment of all MNES records within a 5 km radius surrounding the Proposal Development Envelope.
 9. Determine whether any vegetation and ecological communities are identified as significant, including old growth areas, and provide an analysis of local and regional context (refer to *Environmental Factor Guideline – Flora and Vegetation* for definition of significant vegetation).
 10. Provide figures of the proposed clearing and predicted indirect impact to vegetation, significant flora species and ecological communities, including but not limited to, threatened/priority ecological communities, threatened/priority flora, old growth forest areas, and significant flora and significant vegetation as defined by EPA guidance.
 11. Provide a quantitative assessment of impact for:
 - a. significant flora, including:
 - number of individuals and populations identified in surveys in a local and regional context.
 - numbers and proportions of individuals and populations identified in surveys directly or potentially indirectly impacted; and
 - numbers/proportions/populations currently protected within the conservation estate (where known).

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- b. vegetation units (noting threatened and priority ecological communities and significant vegetation) including:
 - area (in hectares) and proportions directly or potentially indirectly impacted; and
 - proportions/hectares of the vegetation unit currently protected within conservation estate (where known).
 - c. Analyse the direct and indirect impacts from the proposed mining and refinery clearing and discuss the significance of the direct and indirect impacts to flora and vegetation at a local and regional level.
 - d. Analyse risk of *Phytophthora cinnamomi* (dieback) and other forest diseases that have the potential to be introduced or spread as part of the Proposal, undertake preliminary surveys where relevant, and describe management actions to prevent spread to protectable areas within the Proposal Development Envelope and to adjacent conservation areas.
- 12. Demonstrate that the Proposal has been designed to avoid and minimise impacts regarding placement of access roads and infrastructure within vegetated areas, and that placement has had regard to utilising existing areas of disturbance.
- 13. Discuss proposed management, monitoring and mitigation methods to be implemented demonstrating that the Proposal has addressed the mitigation hierarchy.
- 14. Discuss the regional and cumulative impacts of other existing or reasonably foreseeable development in the vicinity of the Proposal with the potential to impact the flora and vegetation values, particularly the Jarrah Forest. These may include rehabilitation, projected climate change impacts, fire, mining, timber harvesting, disease, weed invasion; impacts to biodiversity, recreation and water management.
- 15. Determine and quantify any significant residual impacts by considering the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the *WA Environmental Offsets Guidelines* (2014) and include reference to the Commonwealth Assessment Guide for any MNES.
- 16. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the *WA Environmental Offsets Policy and Guidelines* and *Environment Protection and Biodiversity Conservation Act 1999 – Environmental Offsets Policy*. Spatial data defining the area of significant residual impacts should also be provided.
- 17. Describe the proposed rehabilitation methodology, using current practice, evidence and demonstrated outcomes, including but not limited to:
 - a. physical and chemical characteristics of soil and soil profile;
 - b. topsoil management;
 - c. retention or reuse of vegetative material;
 - d. return of species and communities consistent with the pre-existing composition of the affected area; and
 - e. timeframes for rehabilitation, including sequencing of excavation and progressive rehabilitation, to meet short-term and long-term targets where applicable.

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18. Describe the expected outcomes of rehabilitation based on previous research and monitoring conducted in the Northern Jarrah Forest subregion, and describe where rehabilitation outcomes may differ.
19. Prepare a Mine Closure Plan for the Huntly Mine consistent with the Department of Mines, Industry Regulation and Safety *Statutory Guidelines for Mine Closure Plans* (2020). The plan should include but not be limited to:
 - a. the proposed rehabilitation methodologies to achieve successful progressive rehabilitation of all areas disturbed by mining to achieve closure objectives and completion criteria (quantitative or qualitative).
 - b. establish and where possible measure, vegetation and fauna reference and analogue sites, to inform completion criteria.
 - c. rehabilitation and decommissioning for areas of habitat for significant fauna.
 - d. rehabilitation and decommissioning to create stable and non-polluting landforms that maintain soil and land quality, and the quality of groundwater and surface water.
 - e. rehabilitation and decommissioning to create safe, stable and non-polluting landforms that maintain the post-closure amenity of surrounding land uses and are consistent with State Forest objectives under the Forest Management Plan.
20. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.

Relevant policy and guidance

EPA Policy and guidance

Environmental Factor Guideline – Flora and Vegetation (EPA 2016).

Technical Guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016).

Guidance Statement No. 6 – *Rehabilitation of Terrestrial Ecosystems* (EPA 2006).

Instructions on how to prepare an Environmental Review Document (EPA 2018).

Instructions on how to prepare *Environmental Protection Act 1986 Part IV* Environmental Management Plans (EPA 2017).

Relevant guidance

Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi (Commonwealth Department of the Environment 2014).

Threat abatement plan for competition and land degradation by rabbits (Department of the Environment and Energy, Canberra, ACT: Commonwealth of Australia 2016)

Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (2017) (Department of the Environment and Energy, Canberra, ACT: Commonwealth of Australia 2017)

Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities 2012).

Approved Conservation Advice for Anthocercis gracilis (Slender Tailflower) (Canberra: Department of the Environment, Water, Heritage and the Arts 2008)

Approved Conservation Advice for Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain. (Canberra: Department of the Environment and Energy 2018)

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Approved Conservation Advice for Diuris drummondii (Tall Donkey Orchid) (Canberra: Department of the Environment, Water, Heritage and the Arts 2008)

Approved Conservation Advice for Diuris micrantha (Dwarf Bee-orchid) (Canberra: Department of the Environment, Water, Heritage and the Arts 2008)

Approved Conservation Advice for Diuris purdiei (Purdie's Donkey-orchid) (Canberra: Department of the Environment, Water, Heritage and the Arts 2008)

Approved Conservation Advice for Eleocharis keigheryi (Keighery's Eleocharis) (Canberra: Department of the Environment, Water, Heritage and the Arts 2008)

Approved Conservation Advice for Grevillea flexuosa (Zig Zag Grevillea). (Canberra: Department of the Environment, Water, Heritage and the Arts 2008)

Approved Conservation Advice for Synaphea stenoloba (Dwellingup Synaphea). (Canberra, ACT: Department of the Environment, Water, Heritage and the Arts 2009)

Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community. (Canberra: Department of the Environment and Energy 2016)

Approved Conservation Advice (incorporating listing advice) for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community. (Canberra: Department of the Environment and Energy 2019).

Approved Conservation Advice for Clay Pans of the Swan Coastal Plain. (Canberra: Department of Sustainability, Environment, Water, Population and Communities 2012).

Approved Conservation Advice for Synaphea sp. Fairbridge Farm (D. Papenfus 696) (Selena's Synaphea). (Canberra, ACT: Department of the Environment, Water, Heritage, and the Arts 2009) *Conservation Advice Lasiopetalum pterocarpum (wing-fruited lasiopetalum)* (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2017)

Conservation Advice Synaphea sp. Pinjarra Plain (A.S. George 17182). (Canberra: Department of the Environment and Energy 2018) *Draft survey guidelines for Australia's threatened orchids* (Canberra: Department of the Environment 2013)

Verticordia fimbrialepis subsp. fimbrialepis Interim Recovery Plan 2010-2015. Interim Recovery Plan No. 304 (Department of Environment and Conservation, Western Australia 2010)

Wing-fruited Lasiopetalum (Lasiopetalum pterocarpum ms) Interim Recovery Plan 2003-2008. Interim Recovery Plan No. 134. (Prepared by Stack, G. and V. English, Wanneroo, Western Australia: Department of Conservation and Land Management 2003)

Corymbia calophylla - Kingia australis woodlands on heavy soil, (Swan Coastal Plain Community type 3a - Gibson et al. 1994), *Interim Recovery Plan No. 315*, 2011-2016 (Department of Environment and Conservation 2011).

National Recovery Plan for the Clay pans of the Swan Coastal Plain Ecological Community (Department of the Department of Biodiversity, Conservation and Attractions 2019). *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (Department of Environment 2013).

EPBC Referral Guidance - Banksia Woodlands of the Swan Coastal Plain ecological community (Canberra: Department of the Environment and Energy 2019).

EPBC Referral Guidance - Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community (Canberra: Department of the Environment and Energy 2019).

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Other policy and guidance

WA Environmental Offsets Policy (Government of Western Australia 2011).

WA Environmental Offsets Guidelines (Government of Western Australia 2014).

Statutory Guidelines for Mine Closure Plans (DMIRS 2020).

Forest Management Plan 2014-2023 (Conservation Commission of Western Australia 2013).

Terrestrial Fauna

EPA objective	<i>To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.</i>
Relevant activities	The transition in mining associated with ongoing and increased production at Pinjarra Refinery and to supply bauxite for export, requires 6,621 hectares (ha) of clearing between 2023 and 2035. The refinery development envelope requires additional disturbance and associated clearing of up to 299 ha.
Potential impacts and risks	• Direct impacts to terrestrial fauna as a result of clearing • Direct impacts to terrestrial fauna as a result of injury/mortality from fauna entrapment or vehicle/equipment collisions • Indirect impacts to fauna as a result of: ○ Introduction and/or spread of weeds ○ Introduction and/or spread of dieback ○ Attraction of feral animals ○ Light emissions from infrastructure ○ Noise emissions from construction and operational equipment ○ Spills and/or leaks from storage and handling of hazardous materials and waste
Required work	21. Conduct desktop studies, including literature review of previous fauna surveys and studies, for terrestrial vertebrate fauna including migratory species, aquatic fauna and short range endemic (SRE) invertebrate fauna in accordance with EPA and Commonwealth (EPBC Act) guidance. The desktop studies should identify the expected fauna assemblages, the likely fauna habitats and the potential occurrence of species. The desktop study should identify data and sampling gaps for terrestrial vertebrate fauna, aquatic fauna and SRE invertebrate fauna in the Mining Development Envelope, to determine the level of survey required. 22. Identify and characterise the fauna communities and fauna habitats present within the Mine Development Envelope, through a terrestrial vertebrate fauna survey, aquatic fauna survey and SRE fauna survey, in accordance with EPA and Commonwealth (EPBC Act) guidance and level of survey identified in Item 21. 23. Conduct desktop studies, in accordance with EPA and Commonwealth (EPBC Act) guidance, for terrestrial vertebrate fauna, aquatic fauna and SRE invertebrate fauna species in the Refinery Development Envelope, to determine the level of survey required. 24. Identify and characterise the fauna communities and fauna habitats present within the disturbance and associated clearing footprint within the

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- Refinery Development Envelope, through survey in accordance with EPA and Commonwealth (EPBC Act) guidance and level of survey identified in Item 23.
25. Undertake a fauna habitat assessment to identify the types and quality of fauna habitats and map the extent.
 26. Provide figures and maps illustrating the locations of all relevant survey sites, including those identified in the desktop study, in relation to the Proposal areas and fauna habitats.
 27. Include a consolidated review and summary of previous relevant fauna surveys as part of the fauna survey reports, to support the assessment of the Proposal including integrated results of the surveys.
 28. Based on the outcomes of the desktop study and field surveys, list and evaluate the likelihood of occurrence of all significant vertebrates (including migratory birds), significant aquatic fauna, and SRE invertebrates potentially occurring in the Mine Development Envelope and the disturbance and associated clearing footprint within the Refinery Development Envelope, and conduct additional targeted surveys for significant species, as appropriate. Undertake a black cockatoo habitat assessment in accordance with Commonwealth (EPBC Act) guidance. Map the known locations of significant species, with reference to their occurrence in the Mine Development Envelope and in relation to the fauna habitat.
 29. Reports provided will be accompanied by IBSA Data Packages prepared following EPA guidance.
 30. Justify that the desktop study, field surveys and habitat assessment have addressed all baseline knowledge gaps, are representative of the current conditions in the Mine Development Envelope, provide current information on populations and locations of significant fauna, and have been carried out using methods consistent with EPA guidance.
 31. Discuss the regional and cumulative impacts of other existing or reasonably foreseeable development in the vicinity of the Proposal with the potential to impact the terrestrial fauna values, with respect to significant habitats, significant fauna, and fauna that are known or likely to occupy restricted habitats (including SRE). These may include habitat fragmentation, rehabilitation, projected climate change impacts, fire, mining, timber harvesting, disease, weed invasion, impacts to biodiversity, recreation and water management.
 32. Describe and assess the direct and indirect impacts of implementation of the Proposal to fauna, significant fauna including SREs and MNES (include a consideration of MNES records within a 5 km radius surrounding the Proposal Development Envelope), and fauna habitats. Provide figures illustrating the likely extent of loss of habitat types and the extent of areas planned to be rehabilitated or revegetated from both direct and indirect impacts. Quantify the extent of direct, indirect and cumulative impacts, including percentages of habitat types to be disturbed or otherwise impacted.

Terrestrial Fauna

33. Determine the likelihoods of the fauna habitats to support SRE invertebrate species. Provide figures identifying the locations of known, likely and potential SRE species in relation to the fauna habitat and predicted areas of impact clearly showing impacts to SREs.
34. Demonstrate that the Proposal has been designed to avoid and minimise impacts to fauna and significant fauna habitat, including the placement of any access roads and infrastructure, within fauna habitat areas and that placement has had regard to utilising existing areas of disturbance.
35. Describe the proposed management, monitoring and mitigation methods to be implemented to address direct and indirect impact on fauna, including actions to prevent fauna death, injury and displacement as a result of the Proposal.
36. Demonstrate that the proposed management, monitoring and mitigation methods to be implemented address the mitigation hierarchy, including monitoring of rehabilitated and revegetated areas.
37. Determine and quantify any significant residual impacts by considering the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the *WA Environmental Offsets Guidelines* (2014) and include reference to the Commonwealth Assessment Guide for any MNES.
38. Where significant residual impacts remain, propose an appropriate offsets package that is consistent with the *WA Environmental Offsets Policy* and *Guidelines*, and the *Environment Protection and Biodiversity Conservation Act 1999 – Environmental Offsets Policy*. Spatial data defining the area of significant residual impacts should also be provided.
39. Demonstrate and document in the ERD how the EPA's objective for these factors can be met.

Relevant policy and guidance

EPA Policy and guidance

Environmental Factor Guideline – Terrestrial Fauna (EPA 2016).

Technical Guidance - Terrestrial fauna surveys (EPA 2016).

Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020).

Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA 2017).

Relevant guidance

Survey guidelines for Australia's threatened birds (Commonwealth Department of the Environment, Water, Heritage and the Arts 2010).

Carnaby's Cockatoo (Calyptorhynchus latirostris) Recovery Plan: Western Australian Wildlife Management Program No. 52, (Department of Parks and Wildlife October 2013).

EPBC Act Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo, Baudin's cockatoo and Forest red-tailed black cockatoo (Commonwealth Department of the Sustainability, Environment, Water, Population and Communities 2012).

Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan, (Department of Environment and Conservation 2008).

Terrestrial Fauna

Survey guidelines for Australia's threatened mammals (Commonwealth Department of the Sustainability, Environment, Water, Population and Communities 2011).

Survey guidelines for Australia's threatened reptiles (Commonwealth Department of the Sustainability, Environment, Water, Population and Communities 2011).

Chuditch (Dasyurus geoffroii) National Recovery Plan: Wildlife Management Program No. 54 (Department of Environment and Conservation 2012).

National Recovery Plan for the Woylie (Bettongia penicillata ogilbyi): Wildlife Management Program No. 51 (Department of Environment and Conservation 2012).

Quokka Setonix brachyurus Recovery Plan. Wildlife Management Program No. 56. (Department of Environment and Conservation 2013).

Threat abatement plan for predation by feral cats, (Commonwealth Department of the Environment 2015).

Threat abatement plan for competition and land degradation by rabbits, (Commonwealth Department of the Environment and Energy 2016).

Threat abatement plan for predation by the European red fox, (Commonwealth Department of Environment, Water, Heritage and the Arts 2008).

Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (Department of Sustainability, Environment, Water, Population and Communities 2012).

EPBC Act Policy Statement 3.10: Significant impact guidelines for the vulnerable western ringtail possum (Pseudocheirus occidentalis) in the southern Swan Coastal Plain, Western Australia (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2009)

EPBC Act Policy Statement 3.21 - Industry Guidelines for avoiding, assessing and mitigating impacts on EBBC Act listed migratory shorebird species (Department of the Environment 2015)

Wildlife Conservation Plan for Migratory Shorebirds (Canberra, ACT: Department of the Environment, Commonwealth of Australia 2015)

Approved Conservation Advice for Calyptorhynchus banksii naso (Forest Red-tailed Black Cockatoo) (Department of the Environment, Water, Heritage, and the Arts 2009)

Approved Conservation Advice for Rostratula australis (Australian painted snipe) (Canberra: Department of Sustainability, Environment, Water, Population and Communities 2013)

Conservation Advice Bettongia penicillata woylie (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2018)

Conservation Advice Atrichornis clamosus noisy scrub-bird (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2018)

Conservation Advice Botaurus poiciloptilus Australasian Bittern (Threatened Species Scientific Committee, Canberra, ACT: Department of the Environment and Energy 2019)

Conservation Advice Calidris canutus Red knot (Threatened Species Scientific Committee, Canberra: Department of the Environment 2016)

Conservation Advice Calidris ferruginea curlew sandpiper (Canberra: Department of the Environment 2015)

Conservation Advice Calyptorhynchus baudinii Baudin's cockatoo (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2018)

Terrestrial Fauna

Conservation Advice Myrmecobius fasciatus numbat (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2018).

Conservation Advice Numenius madagascariensis eastern curlew (Canberra: Department of the Environment 2015)

Conservation Advice Phascogale calura red-tailed phascogale (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2016)

Conservation Advice Pseudocheirus occidentalis Western ringtail possum (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2018).

Draft referral guideline for 14 birds listed as migratory species under the EPBC Act (Department of the Environment 2015)

National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (Department of the Environment and Energy 2020)

National Recovery Plan for Malleefowl (Prepared by J. Benshemesh, Department for Environment and Heritage, South Australia 2007).

Numbat (Myrmecobius fasciatus) Recovery Plan. Wildlife Management Program No. 60 (Prepared by J.A. Friend and M.J. Page, Department of Parks and Wildlife, Perth, WA 2017).

Western Ringtail Possum (Pseudocheirus occidentalis) Recovery Plan. Wildlife Management Program No. 58. (Department of Parks and Wildlife, 2017). *Threat abatement plan for competition and land degradation by unmanaged goats* (Department of the Environment, Water, Heritage, and the Arts (DEWHA), Canberra: Commonwealth of Australia 2008)

Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi (Department of the Environment and Energy, Canberra: Commonwealth of Australia 2018).

Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (Sus scrofa) (2017) (Department of the Environment and Energy, Canberra, ACT: Commonwealth of Australia 2017).

Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (Department of Environment 2013)

Conservation Advice Westralunio carteri Carter's freshwater mussel (Threatened Species Scientific Committee, Canberra: Department of the Environment and Energy 2018).

Other policy and guidance

WA Environmental Offsets Policy (Government of Western Australia 2011).

WA Environmental Offsets Guidelines (Government of Western Australia 2014).

Statutory Guidelines for Mine Closure Plans (DMIRS 2020).

Terrestrial Environmental Quality

EPA objective	<i>To maintain quality of land and soils so that environmental values are protected.</i>
Relevant activities	• Clearing of native vegetation • Alteration of natural drainage regimes • Waste disposal • Storage and handling of contaminants

Terrestrial Environmental Quality	
	• Closure and decommissioning
Potential impacts and risks	• Soil salinisation as a result of mining-induced saline groundwater rise • Disturbance of potential acid sulfate soils • Erosion of post-mining landforms • Contamination from spills and/or leaks from storage and handling of hazardous materials and waste
Required work	40. Undertake a desktop assessment of soil landscape mapping over the Mine Development Envelope. 41. Undertake a desktop assessment into the potential for acid forming materials in the Mine Development Envelope and disturbance and associated clearing footprint within the Refinery Development Envelope in accordance with contemporary guidance. 42. Include in the ERD, figures of the mapped soil and landscape units and soil profile. 43. Describe the proposed management, monitoring and mitigation methods to be implemented to address direct and indirect impact on soils/lands/receiving environment. This description is to include soil handling methods to mitigate erosion, compaction, contamination, and salinisation of soils. 44. Outline the outcomes/objectives, trigger and contingency actions to ensure impacts (direct and indirect) are not greater than predicted. 45. Demonstrate that the proposed management, monitoring and mitigation methods to be implemented addressed the mitigation hierarchy, and ensure residual impacts (direct and indirect) are not greater than predicted. 46. Demonstrate and document in the ERD how the EPA's objective for this factor can be met.
Relevant policy and guidance	EPA Policy and guidance <i>Environmental Factor Guideline – Terrestrial Environmental Quality</i> (EPA 2016). Relevant guidance <i>Statutory Guidelines for Mine Closure Plans</i> (DMIRS 2020). <i>Identification and investigation of acid sulfate soils and acidic landscapes</i> (DER 2015) <i>Treatment and management of soil and water in acid sulfate soil landscapes</i> (DER 2015)

Inland Waters	
EPA objective	<i>To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.</i>
Relevant activities	• Clearing of native vegetation • Alteration of natural drainage regimes • Water use for construction, mining and refining activities • Waste disposal

Inland Waters	
	• Storage and handling of contaminants • Closure and decommissioning • Mining activities within Public Drinking Water Source Areas • Human and Mining presence within the Reservoir Protection Zones • Application of chemicals (fertilizers and pesticides) within Public Drinking Water Source Areas • Alteration of current hydrological regimes.
Potential impacts and risks	• Increases in stream salinity as a result of mining-induced saline groundwater discharge • Increased water supply for alumina refining • Increased sediment from erosion of post-mining landforms • Contamination from spills and/or leaks from storage and handling of hazardous materials and waste • Potential impacts to public health • Potential for service interruption of the public drinking water supply • Water quality deterioration in streams and reservoirs (for example, turbidity, salinity, pathogens, hydrocarbons, PFAS, nutrients, pesticides), including cumulative impacts from existing mining operations • Potential disturbance to the Peel-Yalgorup System Ramsar site through potential changes to water quality and changes to the hydrological regime of the region
Required work	47. Characterise the surface water and groundwater systems in a local and regional context and describe recharge and discharge mechanisms, aquifer connectivity, surface water/groundwater interaction and water chemistry. This should include identifying and mapping groundwater and surface water dependent ecosystems, including the catchment interactions with the Peel-Yalgorup System Ramsar Site. 48. Undertake surveys to establish baseline water quality and the environmental values identified. 49. Characterise the hydrology of the Serpentine and South Dandalup Rivers and upper Wungong Brook catchment, and the beneficial use of the Serpentine, Pipehead and South Dandalup reservoirs, including reservoir protection zone. Characterise the current water quality and hydrodynamics of the Serpentine, Pipehead and South Dandalup reservoirs. Describe the impacts from this Proposal on the water yield and water and sediment quality of the Serpentine, Pipehead and South Dandalup reservoirs, upstream rivers, tributaries, upper Wungong Brook, and Peel-Yalgorup System Ramsar Site. This is to include a detailed description of the development of river crossings for access/haul roads and conveyors. 50. Undertake a public drinking water risk assessment for the Serpentine, Pipehead and South Dandalup reservoirs and upper Wungong Brook catchment, including source vulnerability assessment, in accordance with the Australian Drinking Water Quality Standards and relevant contemporary guidance. The risk assessment should consider potential contaminants arising from mining activities and infrastructure, as well as mobilisation of existing contaminants from past catchment activities. For identified high risks to public drinking water beneficial uses, undertake a

Inland Waters

	detailed assessment of potential impacts to human health in accordance with contemporary guidance. 51. Analyse, describe and assess surface water and groundwater impacts, including direct and indirect impacts, from the Proposal. This should include, but not limited to: a. changes to groundwater levels and surface water flows associated with the Proposal; b. changes to water quality; c. the nature, extent and duration of impacts; and d. impacts on environmental values of ground and surface water dependent ecosystems; e. impacts to aquatic fauna species or communities; f. impacts to Peel-Yalgorup System – Ramsar Site; g. cumulative impacts with existing operations, and other development and activities in the region including mining, timber harvesting, rehabilitation activities, fire, and interactions under projected climate change. 52. Quantify the water consumption for the Pinjarra Refinery and Huntly Mine and describe the water supply strategy and options. Assess the impacts of proposed abstraction and other water supply options to surface water or groundwater hydrological regimes and water quality and consider future climate. 53. Demonstrate how the mitigation hierarchy of avoid, minimise, mitigate has been applied during the mine planning and design stages of the Proposal. 54. Discuss the proposed management, monitoring and mitigation to ensure impacts on inland water quality and ecological values are not greater than predicted as a result of implementing the Proposal. Include a monitoring and response program to mitigate the risk to drinking water quality. Detail how mining activities in drinking water catchments will be managed in accordance with relevant Western Australia guidance. 55. Prepare a Mine Closure Plan for the Pinjarra Alumina Refinery consistent with the DMIRS (2020) <i>Statutory Guidelines for Mine Closure Plans</i>. The plan should include rehabilitation and decommissioning of the refinery, bauxite stockpiles and Residue Storage Areas (RSA) and be consistent with the Pinjarra Alumina Refinery Long Term Residue Management Strategy. 56. Demonstrate and document in the ERD how the EPA's objective for this factor can be met. 57. Commission and include in the ERD a peer review of the hydrology assessment and drinking water risk assessment for the Mine Development Envelope.
Relevant policy and guidance	<i>EPA Policy and guidance</i> <i>Environmental Factor Guideline – Inland Waters</i> (EPA 2018).

Inland Waters

Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA 2017).

Relevant guidance

Preventing acid and metalliferous drainage – Leading practice sustainable development program for the mining industry (Commonwealth Department of Industry Innovation and Science, September 2016).

Western Australian water in mining guidelines (Department of Water 2013).

Water Quality Protection Note 15 - Extractive Industries near sensitive water resources (Department of Water 2013).

Water Quality Protection Note 44 - Roads near sensitive water resources (Department of Water 2006).

Water Quality Protection Note 52 - Stormwater management at industrial sites (Department of Water 2010).

Water Quality Protection Note 81 - Tracks and trails near sensitive water resources (Department of Water 2015).

Water Quality Protection Note 83 - Infrastructure corridors near sensitive water resources (Department of Water 2007).

Statutory Guidelines for Mine Closure Plans (DMIRS 2020).

Pinjarra Alumina Refinery Long Term Residue Management Strategy.

Australian Drinking Water Guidelines (NHMRC, 2018)

Strategic policy: Protecting public drinking water source areas in Western Australia (DoW, 2016)

Manual for the application of Health-based Targets for Drinking Water Safety (WSAA, 2015)

Serpentine Dam Catchment Area and Serpentine Pipehead Dam Catchment Area Drinking Water Source Protection Plan (DoW, 2007)

South Dandalup Dam & South Dandalup Pipehead Dam Catchment Areas Drinking Water Source Protection Plan – WRP 55 (DoE, 2005)

Ecological Character Description of the Peel-Yalgorup Ramsar Site (Prepared by J. Hale and R. Butcher, Department of Environment and Conservation and the Peel-Harvey Catchment Council, Perth, Western Australia 2007).

Peel-Yalgorup System Information Sheet on Ramsar Wetland (RIS) (Western Australian Department of Conservation and Land Management (DCLM) 2003)

Significant Impact Guidelines 1.1 - Matters of National Environmental Significance (Department of Environment 2013)

Air Quality

EPA objective	<i>To maintain air quality and minimise emissions so that environmental values are protected.</i>
Relevant activities	• Clearing of native vegetation and soil disturbance from construction and mining activities • Power generation • Alumina refining and residue storage
Potential impacts and risks	• Dust generation from construction and mining activities • Gaseous and particulate emissions from power generation, alumina refining and residue storage
Required work	58. Conduct an air quality assessment of the Huntly Mine in accordance with EPA and contemporary guidance to predict dust emissions and impact on

Air Quality

	ambient air quality. The assessment should include atmospheric dispersion modelling and consider Jarrahdale and Dwellingup townsites, rural properties and other dust sensitive receptors. 59. Compare predicted dust ground level concentrations with appropriate standards and assess potential impacts of dust deposition on sensitive receptors. 60. Update the 2014 air quality assessment of the Pinjarra Alumina Refinery in accordance with EPA and contemporary guidance to account for increased alumina production from 5 Mtpa to 5.25 Mtpa, and dust emissions from bauxite stockpiling and RSAs. The updated assessment should include desktop assessment of the 2014 air quality modelling, an updated emissions inventory based on stack monitoring data since 2014 and stack testing where required to address data gaps. 61. Based on the updated emissions inventory, conduct atmospheric dispersion modelling to predict ground level concentrations of concentrations of contaminants of potential concern (CoPC). 62. Update the 2014 health risk assessment for the Pinjarra Alumina Refinery in accordance with EPA and contemporary guidance, based on the predicted ground level concentrations of CoPC. The updated health risk assessment will consider risks associated with cancer, and non-cancer acute and chronic hazards, and will identify any changes to guidelines due to updates to regulations or research on health effects since 2014. 63. Demonstrate how the mitigation hierarchy of avoid, minimise, mitigate has been applied during the mine planning and design stages of the Proposal. 64. Update the Air Quality Management Plan for the Pinjarra Alumina Refinery to reflect the outcomes of the updated air quality assessment and health risk assessment. 65. The ERD will demonstrate and document how the EPA's objective for this factor can be met. 66. Commission and include in the ERD a peer review of the health risk assessment for the Pinjarra Alumina Refinery.
Relevant policy and guidance	EPA Policy and guidance <i>Environmental Factor Guideline – Air Quality</i> (EPA 2016). <i>Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986): Separation Distances between Industrial and Sensitive Land Uses</i> (EPA 2005). Relevant guidance <i>Air Quality Modelling Guidance Notes</i> (Department of Environment March 2006). <i>A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities</i> (Department of Environment and Conservation 2011). <i>Health Risk Assessment (Scoping) Guidelines</i> (WA Department of Health 2010). <i>Health Risk Assessment in Western Australia</i> (WA Department of Health 2006).

Air Quality

Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards (Commonwealth of Australia 2012).

Greenhouse Gas Emissions

EPA objective	<i>To reduce net greenhouse gas emissions in order to minimise the risk of environmental harm associated with climate change.</i>
Relevant activities	Greenhouse gas emissions from mining, refining and power generation activities.
Potential impacts and risks	Increased net greenhouse gas emissions from mining and refining activities.
Required work	67. Estimate the expected Scope 1 (direct), Scope 2 (energy indirect) and Scope 3 greenhouse gas emissions over the life of the Proposal. The estimates will include: a) the detailed methods used to estimate emissions; b) a breakdown of estimated scope 1, scope 2 and scope 3 greenhouse gas emissions in tonnes of CO₂-e by all sources. Consider all proposed activities in determining the sources of emissions (e.g. mining, ore processing, ore refining, clearing of land, etc.); c) projected emissions intensity/intensities (emissions per unit of production) for the Proposal, including each calculation and calculation methodology; and d) benchmarking of the Proposal's annual emissions and emissions intensity against other comparable projects. 68. Prepare a Greenhouse Gas Management Plan that details the Proposal's contribution towards the Western Australian aspiration of net zero emissions by 2050. The plan will include: a) the information listed in Item 67; b) mitigation (avoidance, reduction, offset) measures to be implemented in association with the Proposal; c) analysis of other potential abatement measures relevant to the Proposal that are not proposed to be implemented, including rationale to support why the measures are unable to be implemented. d) interim and long-term targets that reflect an incremental reduction in scope 1 emissions over the life of the proposal; and e) reporting requirements for reporting against the stated targets, 69. Demonstrate and document how the EPA's objective for this factor can be met.
Relevant policy and guidance	EPA Policy and guidance <i>Environmental Factor Guideline – Greenhouse Gas Emissions</i> (EPA 2020). <i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA 2017). Relevant legislation

Greenhouse Gas Emissions

National Greenhouse and Energy Reporting Act 2007.

Other policy and guidance

Western Australian Climate Policy 2020

Greenhouse Gas Emissions Policy for Major Projects (Government of Western Australia 2019).

Social Surroundings

EPA objective	<i>To protect social surroundings from significant harm</i>
Relevant activities	• Clearing of native vegetation • Construction, mining, refining and operational activities • Physical presence of infrastructure
Potential impacts and risks	• Disturbance to Aboriginal heritage sites • Disturbance to European heritage sites • Impacts to amenity through construction and operational noise • Impact to visual amenity from mining operations and infrastructure • Impact on recreational use of areas.
Required work	Aboriginal Heritage 70. Conduct Aboriginal archaeological and ethnographic surveys of the Mine Development Envelope and disturbance and associated clearing footprint within the Refinery Development Envelope. The surveys will cover areas likely to be directly and/or indirectly impacted by the Proposal in order to identify and characterise any Aboriginal heritage sites and their relevance and importance to Aboriginal People and their culture. 71. If the timing for an Aboriginal archaeological or ethnographic surveys of the Mine Development Envelope or the disturbance and associated clearing footprint within the Refinery Development Envelope is impacted for any reason, demonstrate that adequate consultation has occurred with Traditional Owners and Aboriginal heritage groups to address future Aboriginal survey requirements prior to ground disturbing activities being undertaken. 72. Describe the Aboriginal heritage values recorded within the survey area with supporting maps. 73. Identify, describe, assess and analyse any potential impacts (direct and indirect) to identified Aboriginal Heritage values that may occur as a result of implementation of the Proposal, including Aboriginal cultural and heritage values of lands managed under the <i>Conservation and Land Management Act 1984</i>. 74. Describe any proposed mitigation measures to avoid or minimise the identified direct and indirect impacts on Aboriginal heritage values that are to be implemented. Include management actions that will be undertaken to manage the potential for disturbance to unknown sites of Aboriginal heritage significance during construction.

Social Surroundings

75. Include any proposed management and/or monitoring plans for Aboriginal heritage values that will be implemented pre- and post-construction to demonstrate and ensure the EPA's objective can be met.
76. Identify and describe the potential residual impacts (direct and indirect) that may occur following implementation of the proposed mitigation measures and determine the significance of the residual impacts on the identified environmental values of Aboriginal heritage.

European Heritage

77. Identify and describe the European heritage values that occur in and near the Mine Development Envelope.
78. Identify, describe, assess and analyse any potential impacts (direct and indirect) as a result of both construction and operational elements of the Proposal on identified important European heritage sites.
79. Describe any proposed mitigation measures to avoid or minimise the identified direct and indirect impacts on European heritage values.
80. Include any proposed management and/or monitoring plans for European heritage that will be implemented pre and post-construction to demonstrate and ensure the EPA's objective can be met.
81. Identify and describe the potential residual impacts (direct and indirect) that may occur following implementation of the proposed mitigation measures and determine the significance of the residual impacts on the identified environmental values of historical and natural heritage.

Noise

82. Characterise the surrounding land use and amenity values in and adjacent to the Mine Development Envelope and Refinery Development Envelope, with a focus on the sensitive receptors and important areas for human use that could be affected by noise, and alterations to the land from mining. Include relevant maps to show the locations of the sensitive receptors likely to be affected by the Proposal.
83. Conduct a noise assessment for the Huntly Mine in accordance with EPA and contemporary guidance. Characterise noise impacts on sensitive receptors including but not limited to Jarrahdale, Dwellingup and rural properties. Demonstrate that noise can be managed such that it complies with the *Environmental Protection (Noise) Regulations 1997* at sensitive receptor locations.
84. Characterise impacts on sensitive receptors from ground vibration due to activities including but not limited to blasting at the Huntly Mine.
85. Conduct a noise assessment for the Pinjarra Alumina Refinery in accordance with EPA and contemporary guidance. Characterise noise impacts on sensitive receptors associated with the current refinery (baseline) and upgrade to 5.25Mtpa. Demonstrate that noise can be managed such that it complies with the *Environmental Protection (Noise) Regulations 1997* at sensitive receptor locations.
86. If the predicted noise levels are unlikely to comply with the Regulations at one or more sensitive receptors, prepare a noise management plan to mitigate and monitor noise impacts at affected sensitive receptors.

Visual Amenity

87. Characterise the environment by providing a description and associated maps/figures of the visual landscape character and scenic quality values. This is to include but not be limited to landforms, vegetation, waterways (including wetlands), and will be undertaken by way of three dimensional modelling and photographs.
88. Conduct a visual impact assessment (VIA) for before, during and after the proposed mining activities, to assess the impacts of the Huntly Mine on visual amenity in accordance with the Western Australian Planning Commission (2007) *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design*, and in consultation with the Department of Biodiversity, Conservation and Attractions (DBCA).
89. For work item 87 (VIA), identify and describe the aspects of the Proposal which may potentially affect the visual landscape character and scenic quality values, both temporarily and permanently, using agreed (by EPA, in consultation with the DBCA) reference and vantage points of surrounding areas, including travel routes and use area's viewer positions and perceptions.
90. Conduct a VIA of the proposed development within the disturbance and associated clearing footprint of the Refinery Development Envelope, to assess the impacts on visual amenity in accordance with the Western Australian Planning Commission (2007) *Visual Landscape Planning in Western Australia: a manual for evaluation, assessment, siting and design*.

Recreational Trails and Facilities

91. Identify and characterise the recreational trails, facilities and areas in the Mine Development Envelope and adjacent land, including but not limited to the Munda Biddi Trail, Bibbulmun Track, Serpentine National Park, Modnadmacks Conservation Park, Lane Poole Reserve and long term scientific measurement and monitoring sites. The recreational and scientific values will be identified in consultation with DBCA.
92. Discuss the impacts of the Huntly Mine on the identified recreational values including direct and indirect impacts.
93. Prepare a Recreational Trails and Facilities Management Plan to address mitigation and monitoring of impacts to recreational and scientific facilities within the Mine Development Envelope, including but not limited to management of the Munda Biddi Trail and Bibbulmun Track.

Amenity

94. Identify the types, sizes and number of construction and operational vehicles on public roads, the proposed traffic routes and proximity to sensitive receptors. Demonstrate how construction and operational road traffic will be managed to protect the amenity of sensitive receptors.
95. Discuss the impacts of noise, light spill, alteration to landforms and construction and operational traffic from the Huntly Mine on sensitive receptors.

Social Surroundings

	96. Provide a detailed description of the cumulative impacts associated with this Proposal on heritage, recreation and other important areas for human use. 97. Predict the residual amenity impacts from the Proposal on the sensitive receptors and important areas for human use after considering and applying avoidance and minimisation measures. 98. Identify management and mitigation measures for the Proposal including closure and rehabilitation outcomes to ensure residual impacts are not greater than predicted. 99. Demonstrate and document how the EPA's objective for this factor can be met.
Relevant policy and guidance	EPA Policy and guidance <i>Environmental Factor Guideline – Social Surroundings</i> (EPA 2016). <i>Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans</i> (EPA 2017). <i>Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986): Separation Distances between Industrial and Sensitive Land Uses</i> (EPA 2005). <i>Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986): Assessment of Aboriginal Heritage No. 41</i> (EPA 2004). Relevant legislation and guidance <i>Environmental Protection (Noise) Regulations 1997.</i> <i>Aboriginal Heritage Act 1972.</i> <i>Engage early – guidance for proponents on best practice Indigenous engagement for environmental assessments under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Department of Environment 2016).</i> <i>Visual Landscape Planning in Western Australia: A manual for evaluation, assessment, siting and design</i> (Western Australian Planning Commission 2007). <i>Guidelines for Landscape and Visual Impact Assessment</i>, 3rd Edition (Landscape Institute and Institute of Environmental Management & Assessment 2013) <i>Aboriginal Heritage – Due Diligence Guidelines (Version 3.0)</i> (Department of Aboriginal Affairs and Department of the Premier and Cabinet 2013). <i>Statutory Guidelines for Mine Closure Plans</i> (DMIRS 2020). <i>Pinjarra Alumina Refinery Long Term Residue Management Strategy.</i>

4. Other environmental factors or matters

The ERD should include a desktop assessment of Subterranean Fauna within the Mine Development Envelope. No significant impacts are expected to subterranean fauna, due to the presence of localised and minor aquifers in the lateritic geology. Should the desktop assessment indicate the potential for significant habitats or populations to be present within the Mine Development Envelope, then the proponent will consult with the EPA to determine whether Subterranean Fauna is to be assessed as a preliminary key environmental factor, and the required work to assess the factor.

It is important that the proponent be aware that other factors or matters may be identified during the course of the environmental review that were not apparent at the time that this ESD was prepared. If this situation arises, the proponent must consult with the EPA to determine whether these factors and/or matters are to be addressed in the ERD, and if so, to what extent.

5. Stakeholder consultation

The Proponent will consult with stakeholders who are affected by or are interested in the Proposal. This includes the decision-making authorities (see Section 6), other relevant state (and Commonwealth) government agencies and local government authorities, the local community and environmental non-government organisations.

The Proponent will document the following in the ERD:

- identified stakeholders;
- the stakeholder consultation undertaken and the outcomes, including decision-making authorities' specific regulatory approvals and any adjustments to the Proposal as a result of consultation; and
- any future plans for consultation.

Key stakeholders in relation to the Proposal include but are not limited to:

- State Government agencies, including the EPA, Department of Water and Environmental Regulation (DWER), DBCA, DMIRS, Department of Planning, Lands and Heritage (DPLH), Department of Jobs, Tourism, Science and Innovation (DJTSI)
- Commonwealth Department of Agriculture, Water and Environment
- Water Corporation
- Peel Development Commission
- Conservation and Parks Commission
- Members of State and Federal parliament
- Local Governments, including Shires of Murray, Serpentine Jarrahdale and Boddington
- Traditional Owners and Heritage representative groups including the Gnaala Karla Booja and South West Aboriginal Land and Sea Council (SWALSC)
- Landholders in the Pinjarra, Dwellingup and Jarrahdale communities
- Community members including participants in Alcoa's Pinjarra Community Consultative Network (CCN)
- Community and non-government organisations including Peel Harvey Catchment Council, Dwellingup Community Compact, Dwellingup Futures Group, Jarrahdale Forest Protectors,

Jarrahdale Heritage Society, Jarrahdale Community Collective, Munda Biddi Trail Foundation, Bibbulmun Track Foundation.

- Alcoa employees and contractors.

6. Decision-making authorities

At this stage, the authorities listed in Table 5 have been identified as decision-making authorities (DMAs) for the Proposal. Additional DMAs may be identified during the course of the assessment.

Table 5 Decision-making authorities

Decision-making authorities	Relevant legislation
Minister for Environment	<i>Environmental Protection Act 1986</i> <i>Biodiversity Conservation Act 2016</i> <i>Conservation and Land Management Act 1984</i>
Minister for Water	<i>Rights in Water and Irrigation Act 1914</i>
Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>
Minister for State Development	<i>Alumina Refinery Agreement Act 1961</i> <i>Alumina Refinery (Pinjarra) Agreement Act 1969</i> <i>Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978</i>
Department of Mines, Industry Regulation and Safety	<i>Dangerous Goods Safety Act 2004</i> <i>Mines Safety and Inspection Act 1994</i>
Department of Water and Environmental Regulation	<i>Environmental Protection Act 1986</i> <i>Rights in Water and Irrigation Act 1914</i>
Commonwealth Department of Agriculture, Water and Environment	<i>Environment Protection and Biodiversity Conservation Act 1999</i>