Alcoa of Australia Limited

Works Approval Application Supporting Information

Alcoa Wagerup Alumina Refinery Residue Storage Area 10

October 2025

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Abbreviations

Term	Definition
AHD	Australian Height Datum
AS 1289.5.2.1	Australian Standard AS 1289.5.2.1-2003 Methods of testing soils for engineering purposes
ASI	Application Supporting Information (this document)
ASIC	Australian Securities and Investments Commission
ASS	Acid Sulfate Soils
BGL	Below Ground Level
BoM	Bureau of Meteorology
CS Act	Contaminated Sites Act 2003
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DJTSI	Department of Jobs, Tourism, Science and Innovation
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety
DMPE	Department of Mines, Petroleum and Exploration
DPLH	Department of Planning, Lands and Heritage
DWER	Department of Water and Environmental Regulation
DWER Application Form	DWER Application form: Works Approval/Licence Amendment/Renewal/Amendment/ Registration, v16 August 2022
DWER TSF Checklist	DWER Region Application form annex: Category checklist (tailings storage facilities), v1 February 2023
EC	Electrical conductivity
EPA	Environmental Protection Authority of Western Australia
EP Act	*Environmental Protection Act 1986*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
ESA	Environmentally Sensitive Areas
GDE	Groundwater Dependent Ecosystem
HDPE	High Density Polyethylene
IBRA	Interim Biogeographic Regionalisation of Australia
LTRMS	Long Term Residue Management Strategy
MMDD	Maximum Modified Dry Density
Mtpa	Million tonnes per Annum
NMP	Noise Management Plan
Noise Regulations	Environmental Protection (Noise) Regulations 1997
PDWSA	Public Drinking Water Source Atea
PEC	Priority Ecological Community
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 µm or less.
PM_{10}	Particulate matter with an aerodynamic diameter of 10 µm or less.
Refinery	Alcoa's Wagerup Alumina Refinery
RSA	Residue Storage Area
TEC	Threatened Ecological Communities
TEOM's	Tapered Element Oscillating Microbalance air monitors.
TSF	Tailings Storage Facilities
TSP	Total Suspended Particulates

1 Background

Alcoa of Australia Ltd (Alcoa) operates the Wagerup Alumina Refinery (the Refinery) located approximately 120 km south-east of Perth within the Shire of Waroona.

The Refinery produces alumina through the Bayer process and generates approximately two (2) dry tonnes of bauxite residue per tonne of alumina produced. Residue mud is currently stored in multiple existing Residue Storage Areas (RSAs). Existing stacking and storage limitations have resulted in a current shortfall of approximately 7 ha of storage area per year. To address this shortfall, Alcoa proposes to construct a new RSA (referred to as RSA 10) on the north-western corner of the existing residue management area.

Alcoa will require a Works Approval under Part V of the *Environmental Protection Act 1986* (EP Act) to construct and operate RSA 10. This document constitutes the Application Supporting Information (ASI) for the works approval application. This ASI has been prepared to align with the sections and attachments of the Department of Water and Environmental Regulation's (DWER) Region Application form annex: Category checklist (tailings storage facilities) (TSF Checklist). It has also been prepared to address the requirements of DWER's Application form: Works Approval/Licence Amendment/Renewal/Amendment/Registration (Application Form). References to the TSF Checklist and Application Form are included in document headings for ease of reference.

1.1 Premises Details

Application Form: Part 3.3 and Part 9.2.

Alcoa owns and operates the Refinery in accordance with DWER Licence L6217/1983/15, issued under Part V of the EP Act. Licence L6217/1983/15 allows for Category 46, 52, 64 and 67 operations, with Category 46 bauxite refining being the main activity conducted at the site. The expiry date is currently 2035.

L6217/1983/15 also allows for the production, processing, storage and burial of waste onsite. Waste is also approved to be accepted at the site from Alcoa's other facilities at the Willowdale Minesite, Bunbury Rail Terminal and Port Loading Facility and the Alinta Wagerup Cogeneration Power Plant.

This ASI relates to Category 46 bauxite refining. No changes are required to the categories for the construction or operation of RSA 10.

The proposed activities are wholly located within the Licence's Prescribed Premises boundary (Figure 1) on Alcoa owned land within Lot 206 on Deposited Plan 424949 (Certificate of Title Volume 4040 Folio 258).

The location of the proposed RSA 10 site boundary is shown in Figure 1 and GPS coordinates are provided in Table 1.

Figure 1: Wagerup Alumina Refinery RSA 10 Location.

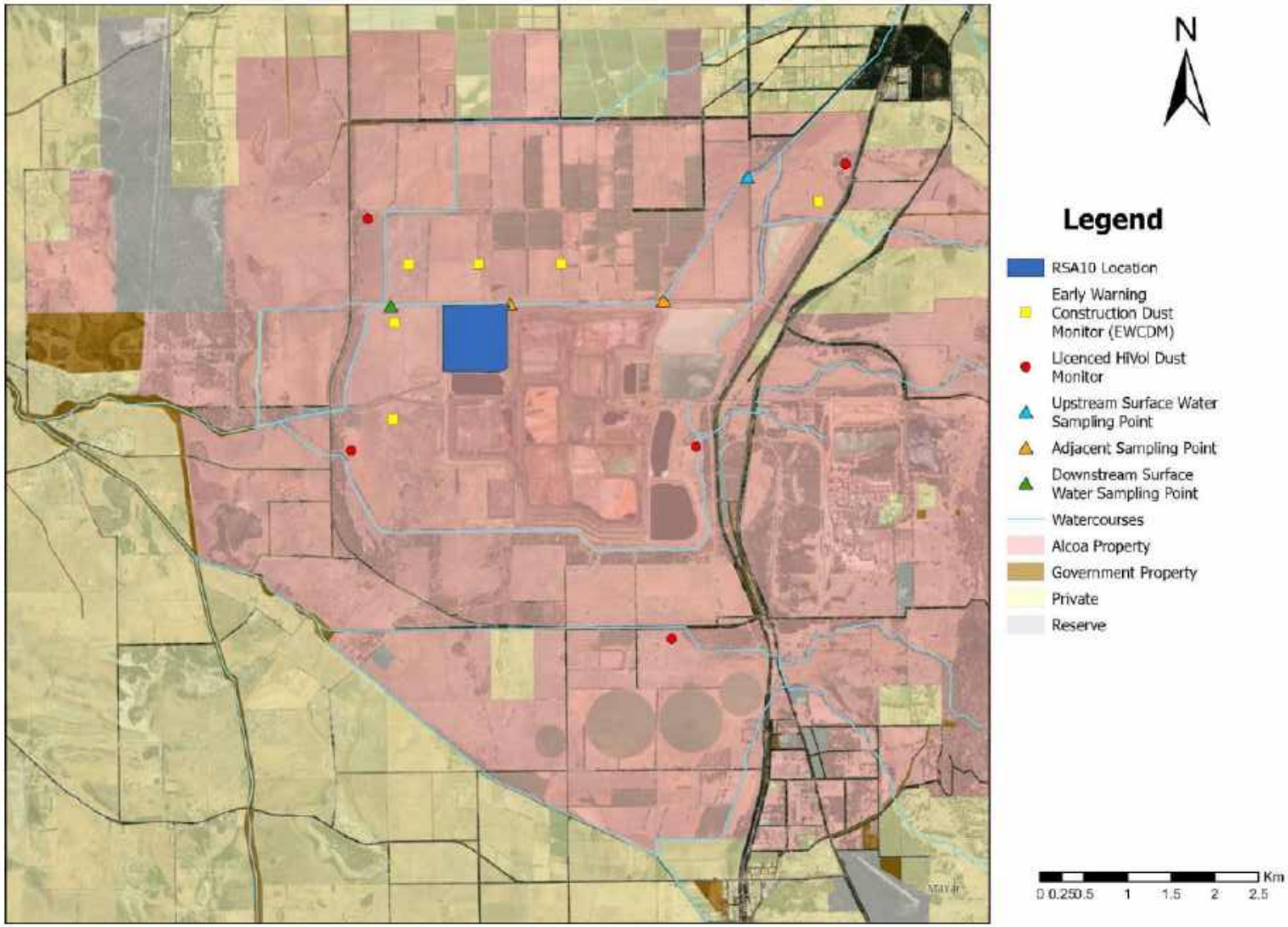


Table 1: Approximate Coordinates of RSA 10 Footprint

Corner	Easting (m)	Northing (m)
	GDA 2020 Zone 50	
North-west	393739	6359861
North-east	394505	6359876
South-west	393739	6359111
South-east	394464	6359144

Alcoa's proof of occupier status (certificate of title) and ASIC company extract are provided in Attachment 1A and Attachment 1B respectively.

A letter of authorisation to act as a representative of the occupier is included as Attachment 1C. This letter states that the Wagerup Refinery Manager has legal authority to sign the Works Approval application form on behalf of Alcoa.

1.2 Scope of Works Approval

Alcoa will require a Works Approval under Part V of the EP Act to construct and operate RSA 10. The Works Approval application seeks approval only for the activities related to the Prescribed Premises Category 46 Bauxite Refining:

Embankment Wall Construction

1) Construction of new RSA 10 starter embankment walls.
2) Construction of new RSA 10 access and crest roadways.

Composite Liner System Installation

3) Construction of a low permeability soil liner equivalent to at least a 0.5m-thick layer of moisture conditioned mechanically compacted clay or manufactured geosynthetic clay liner (GCL), with a permeability coefficient not greater than 1×10^{-9} m/s.
4) Installation of a new 1.5mm HDPE liner to create a composite liner.
5) Excavation to expose the Runoff Collection Pond 3 (ROCP 3) and RSA 5, 7 and 7N existing composite liners.

Above Liner Underdrainage System Installation

6) Haulage and placement of a new sand underdrainage layer over the HDPE lining.
7) Sand to be harvested from stockpiles within the residue management area.
8) Construction of a new underdrainage system, inclusive of drain collector and header systems into the new pumping station.

Temporary Decant System Installation

9) Construction of a new temporary decant system within the RSA 10 footprint to collect alkaline surface water and transfer to the existing ROCP3.

Dust Control System (Sprinklers) Installation

10) Construction of new and/or extension of the existing sprinkler ring main and new RSA 10 dust control sprinkler infrastructure inclusive of laterals and risers within the new RSA floor.

Mud Distribution System Installation

11) Construction of a new temporary mud header. The new RSA 10 header will be located on the existing ROCP3 or RSA 7 embankment wall, and the new RSA 10 western and northern embankment wall. This will include mud droppers, embankment erosion protection, sleepers and road crossing as required.

The Works Approval Application ***excludes*** the following pre-construction activities:

Foundation Work

- Installation of new groundwater monitoring bores.
- Decommissioning of existing groundwater monitoring and depressurising bores and other infrastructure within the RSA 10 footprint.
- Clearing and grubbing of approximately 60 hectares.
- Progressive removal of topsoil from RSA 10 footprint to stockpile area.
- Foundation earthworks to achieve desired ground level prior to composite liner works.

Farmlands Interface Works

- Realignment of the farmlands road to the north to allow for construction of the haul road and current planned topsoil stockpile location.
- Redirection of the farmlands drainage channels.
- Development of a narrow section of the farmlands road to facilitate stock movement and bulk fill haulage.

Haul Road and Borrow Pit

- Expansion of the existing borrow pit, to enable extraction of bulk fill and clay.
- Rework and repair of approximately 4.5 km of existing haul road.
- Construction of new haul roads to go around RSA 10 footprint.
- Construction of a haul road crossing over Samson South Drain (Diverted Section).
- Development of a potential borrow pit to the west of the existing borrow pit to provide additional fill if required.

Construction Surface Water Catchment Network

- Construction of a surface runoff catchment network consisting of sumps, windrows, pumps and transfer pipes to capture all runoff from the construction site and transfer this back to Detention Pond 1 (DP1) and Detention Pond 2 (DP2).

Construction Freshwater Supply to Support Dust Control and Conditioning

- Installation of a new freshwater supply pipeline and multiple reservoir tanks direct from DP1 so only freshwater is used on the RSA 10 construction site/unlined areas. This will include installation of truck fill points for dust suppression for construction works.

1.3 Other Approvals

TSF Checklist: Part 1; Application Form: Parts 6 & 7.

The following regulatory approvals, licences and permits are required for the construction and operation of RSA 10:

- Works Approval under Part V of the EP Act, as described in this application supporting information (ASI) document;
- Future amendment to L6217/1983/15 to include any RSA 10operating conditions under Part V of the EP Act;
- Clearing permit under Part V of the EP Act for clearing of native vegetation associated with the construction of RSA 10, if required; and
- Bed and banks permit under Section 17 of the *Rights in Water and Irrigation Act 1914* to install culverts within Samson South Drain to construct access road crossing points.

1.3.1 State Agreement Act

TSF Checklist: Part 1.1; Application Form: Part 7.2.

Construction and operation of RSA 10 is subject to the *Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978* (State Agreement Act).

The State Agreement Act allows for the establishment and operation of an alumina refinery at, or near, Wagerup and related facilities for the production of alumina from bauxite.

Alcoa's plans to construct RSA 10 were included in the 2017 Alcoa Long Term Residue Management Strategy (LTRMS) (Attachment 16), which was developed in consultation with a Stakeholder Reference Group (SRG) that included representatives from the DWER, Department of Jobs, Tourism, Science and Innovation (DJTSI), and Department of Planning, Lands and Heritage (DPLH) (see Section 1.4.2.1).

Decommissioning and rehabilitation of RSA 10 is not included in this works approval application. Closure of RSA 10 is likely to occur as part of the closure of the residue management area and the Refinery, which has State Agreement Act approval to operate to 2045 with an option to extend beyond this date. This will be undertaken in accordance with the LTRMS.

1.3.2 Mining Act 1978 Approvals

TSF Checklist: Part 1.2.

RSA 10 is not located on *Mining Act 1978* tenure due to the abovementioned State Agreement Act. Alcoa is therefore exempt from compliance with the *Mining Act 1978* (except with respect to health and safety requirements) and a Mining Proposal is not required for the construction or operation of RSA 10.

1.3.3 Environmental Protection Act 1986 Approvals

1.3.3.1 Part IV

TSF Checklist: Part 1.3; Application Form: Part 6.2.

The current approved production capacity for the Refinery is 3.3 million tonnes per annum (Mtpa) of bauxite which was approved via Ministerial Statement 728 and 1157 under Part IV of the EP Act. No changes are proposed to the production capacity and no Part IV EP Act approvals are required for the construction or operation of RSA 10.

1.3.3.2 Native Vegetation Clearing Permit under Part V

Application Form: Part 4.13-4.19 & 6.3.

Native vegetation is proposed to be cleared for the construction of RSA 10 and widening of an existing access road. A clearing permit may be required under Part V of the EP Act. Following a detailed scoping meeting with DWER, Alcoa was advised that any clearing permit will be assessed by the Department of Mines, Petroleum and Exploration (DMPE) under delegated authority as the clearing will be undertaken on land subject to a State Agreement Act.

1.3.4 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

TSF Checklist: Part 1.4; Application Form: Part 7.4.

No impacts to matters of national environmental significance are anticipated as a result of construction or operation of RSA 10.

Alcoa commissioned flora and fauna assessments to determine the potential for impacts to matters of national environmental significance protected under the EPBC Act (refer to Section 4.4.3). A targeted survey was conducted for the EPBC Act listed Carter's Freshwater Mussel (CFM) (refer to Section 4.4.3.2 and Attachments 13 and 14). Populations of CFM were identified both up and downstream but not adjacent to the Refinery or the RSA 10 project footprint.

Alcoa completed a self-assessment to determine whether the RSA 10 project should be referred to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC Act. The assessment indicated that significant impacts to CFM could be avoided with the implementation of appropriate water management controls. On this basis, Alcoa has not referred RSA 10 under the EPBC Act. Alcoa has not consulted with DCCEEW regarding RSA 10.

1.3.5 Planning and Development Approvals

Application Form: Part 7.5.

No planning, development or building approvals are required for the construction or operation of RSA 10.

Alcoa's State Agreement Act overrides any approval requirements under the *Planning and Development Act 2005*. Section 3 of the *Government Agreements Act 1979* states that State Agreements prevail over any other Act or law to the extent that the proponent is undertaking activities pursuant to the rights of its State Agreement.

1.3.6 Water Licences and Permits

Application Form: Part 6.4 & 6.5.

A bed and banks permit will be required under Section 17 of the *Rights in Water and Irrigation Act 1914*. Alcoa proposes to construct new, and upgrade existing, access roads to facilitate the construction and operation of RSA 10. Culverts are proposed to be installed within Samson South Drain to construct access road crossing points.

Alcoa manages its water requirements at the Refinery in accordance with the DWER approved Groundwater and Surface Water Licences Operating Strategy (Alcoa, 2020).

Water is sourced from surface water and groundwater sources and authorised by five DWER licences as listed in Table 2.

Alcoa proposes to abstract water from the existing borrow pit to allow extraction of clay. Water abstraction from the borrow pit is approved via the existing licences and operating strategy. Alcoa is currently calculating

the volume of water abstraction required for the extraction of clay associated with RSA 10 and may require an increase in the approved water abstraction volumes. Should Alcoa require additional abstraction volumes then Alcoa will apply to amend its abstraction licences. Any abstracted water will be used for construction and operational purposes, such as dust control and soil compaction and conditioning.

Table 2: Wagerup Alumina Refinery Water Licences

Licence Number	Expiry Date
SWL97472(6)	01 August 2023 (applications to extend currently with DWER for assessment)
SWL99246(5)	
SWL151027(4)	
GWL160881(3)	12 August 2026
GWL102669(3)	16 May 2023 (application to extend currently with DWER for assessment)

1.3.7 Environmental Protection (Noise) Regulations 1997

Alcoa proposes to construct RSA 10 during standard working hours. Should out of hours works be required, Alcoa will prepare a Noise Management Plan for approval by DWER in accordance with Regulation 13 of the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations).

In 2002, Alcoa applied for a variation to the assigned noise levels specified in the Noise Regulations associated with the operation of the Refinery. The *Environmental Protection (Wagerup Alumina Refinery Noise Emissions) Approval* (as amended in 2013 and 2014) defines L_{A10} and L_{A1} dB(A) noise limits at eight locations surrounding the Refinery, with L_{Amax} limits unchanged from the Noise Regulations.

Alcoa's noise objective for RSA 10 is to demonstrate no net increase to noise levels at sensitive receivers as a result of construction or operation of RSA 10. A noise assessment has been completed and is discussed in Section 4.4.1.2 and included as Attachment 19.

1.3.8 Contaminated Sites Act 2003

Alcoa reported the Refinery and residue management area to DWER in 2007 under the *Contaminated Sites Act 2003* (CS Act). DWER classified the reported site as 'Contaminated – remediation required' due to elevated concentrations of alkalinity, total dissolved solids, metals and chloride in surface water and groundwater. Alcoa is committed to implementing the requirements of the CS Act and guidelines and provides regular updates to DWER on the progress of action. The most recent update was provided in March 2024. Alcoa is preparing a Contaminated Site Management Plan and will work with DWER and other stakeholders to prepare and implement the plan.

Alcoa also implements a comprehensive surface and groundwater monitoring programme and reports the findings to DWER annually in accordance with its prescribed premises and water licences.

1.4 Stakeholder and Community Consultation

1.4.1 DWER Consultation

Application Form: Part 6.1.

Alcoa held a detailed scoping meeting with DWER on 30 November 2023. Alcoa presented the proposed activities associated with the construction of RSA 10 and the following feedback was provided:

- Activities to be undertaken outside of the L6217/1983/1 prescribed premises category would not be assessed by DWER as part of this works approval application (See Section 1.2).

- Vegetation clearing will be assessed by DEMIRS under delegated authority as the clearing will be undertaken on land subject to a State Agreement Act.
- Alcoa should contact the DWER Water Division for advice on acid sulfate soils management associated with extraction of borrow material, should acid sulfate soils management be required (see Section 6.1.4 for details of acid sulfate soils).

1.4.2 Community Consultation

Application Form: Part 7.8.

1.4.2.1 Long Term Residue Management Strategy Stakeholder Reference Group

Alcoa publishes a Long Term Residue Management Strategy (LTRMS) document which is designed to inform both the local and state government and the community of Wagerup Refinery's long term residue management and associated commitments (Attachment 16). The contents of this document provide information on the issues requiring consideration in the management of bauxite residue and Alcoa's strategies in relation to future residue facilities. The 2017 LTRMS was informed by a reference group of key stakeholders including community members, local and state government and Alcoa representatives. The 2017 LTRMS and associated Stakeholder Reference Group consultation included plans to develop RSA 10 in the proposed location.

1.4.2.2 Community Consultative Network

Wagerup Refinery has a well-established Community Consultative Network (CCN) to facilitate dialogue on key social, economic and environmental issues with the local community. Alcoa has regularly presented information on the RSA 10 proposal to the CCN. The CCN will provide a continuing forum to address stakeholder concerns throughout the construction and operation of RSA 10. Based on recent feedback from the CCN, the key issues of concern are likely to be noise and dust from construction and operation of RSA 10.

1.4.3 Traditional Owners

Application Form: Part 7.8.

The Refinery is located within the Gnaala Karla Booja (GKB) Indigenous Land Use Agreement area. In 2021, Alcoa consulted with the South West Aboriginal Land and Sea Council who nominated GKB representatives to participate in surveys associated with RSA 10 and other areas around the residue management area.

An archaeological and ethnographic heritage survey of the project and surrounding areas was completed in 2022 (Attachment 18). The survey report identified five registered heritage sites and places which are located outside of the RSA 10 footprint. No new heritage sites or places were identified by the survey. No impacts are anticipated to these sites and therefore no approval will be sought under the *Aboriginal Heritage Act 1972*.

Alcoa has established regular consultation meetings with the Gnaala Karla Booja Regional Corporation to discuss Alcoa's activities, including those at Wagerup Refinery.

2 Conceptual Site Model (CSM)

TSF Checklist: Part 2 & Appendix 1; Application Form: Part 9.1 & 9.2

A Conceptual Site Model (CSM) table has been developed in accordance with the TSF Checklist Part 2 and Appendix 1 to address the construction and operational phases of RSA 10. The CSM and associated consequence, likelihood and risk rating tables are included as Attachment 2.

The CSM table summarises all potential emissions and source-pathway-receptor linkages associated with the proposed activities. Controls to manage potential emissions and residual risk ratings are also included. The risk assessment methodology has been based on the DWER Guideline for Risk Assessments ((DWER, 2017) and Alcoa's risk assessment procedures.

For activities identified as having a 'Medium' risk rating or higher a more detailed risk assessment has been undertaken. The RSA 10 risk assessment indicated that the majority of risks were 'Low' with four deemed to be 'Medium'.

The 'Medium' risks were:

- Stormwater runoff during construction;
- Stormwater runoff during operations;
- Dust during construction; and
- Dust during operations.

To inform the assessment of the noise and odour risks, detailed assessments were undertaken and are included as Attachments 19 and 20. The noise and odour assessments determined that no additional controls were required to keep these emissions within reasonable levels. Further detail regarding dust, odour and noise are included in Section 4.4.1.

Stormwater management is discussed in Section 6.2 and dust management is discussed in Section 7.1.

All controls identified within the CSM have been incorporated into the design, construction and operational plans for RSA 10.

3 RSA 10 Design

TSF Checklist: Part 3; Application Form: Part 4.1.

Alcoa proposes to construct and operate a new residue storage area, referred to as RSA 10, to store residue tailings generated from the Refinery. RSA 10 will be constructed in the north-west corner of the existing residue management area north of the existing ROCP 3, west of RSA 7 and south of the Samson South Drain.

Figure 2 shows the proposed infrastructure concept plan for this proposal in relation to existing infrastructure.

Figure 3 is a process flowchart summarising the movement of materials associated with the proposal.

RSA 10 has been designed as a single ring dyke dam consisting of four embankment walls creating a rectangle shaped drying area of approximately 49 ha (Figure 4). The concept design includes the following key features:

- The RSA 10 floor will be designed to accommodate an above liner gravity fed under-drainage collector system;
- Low permeability soil liner equivalent to at least a 0.5m-thick layer of moisture conditioned, mechanically compacted clay or manufactured geosynthetic clay liner (GCL), with a permeability coefficient not greater than 1×10^{-9} m/s. A residue sand drainage layer of a minimum thickness 500 mm of residue sand layer overlying the composite liner;
- Installation of under-drainage pipelines for collection and conveyance of filtrate within the sand layer above the composite liner;
- Placement of topsoil on the northern and western starter external embankment walls at a minimum slope of 1 Vertical : 4 Horizontal;
- Extension to the existing residue mud delivery system with installation of a pipeline along the internal crest of the embankment with evenly spaced spigots to deliver residue mud into RSA 10;
- Extension to the existing sprinkler network with sprinklers to be installed in a 60 m by 60 m triangular arrangement within the residue sand layer to minimise dust generation from residue mud stored within RSA 10;
- Decant flows will be pumped or gravity fed into ROCP 3;
- Under-drainage collector system will be pumped via pipeline into the existing Run Off Water Storage (ROWS) and Cooling Ponds by tying into an existing common header pipeline; and
- The design also allows for the potential future storage of filtered residue mud, also known as filter cake.

A summary of the infrastructure to be constructed is provided in Table 3.

An RSA 10 civil concept design drawing is included as Attachment 4.

Figure 2: Proposed RSA 10 Infrastructure Concept Plan

Figure 3: RSA 10 Process Flowchart

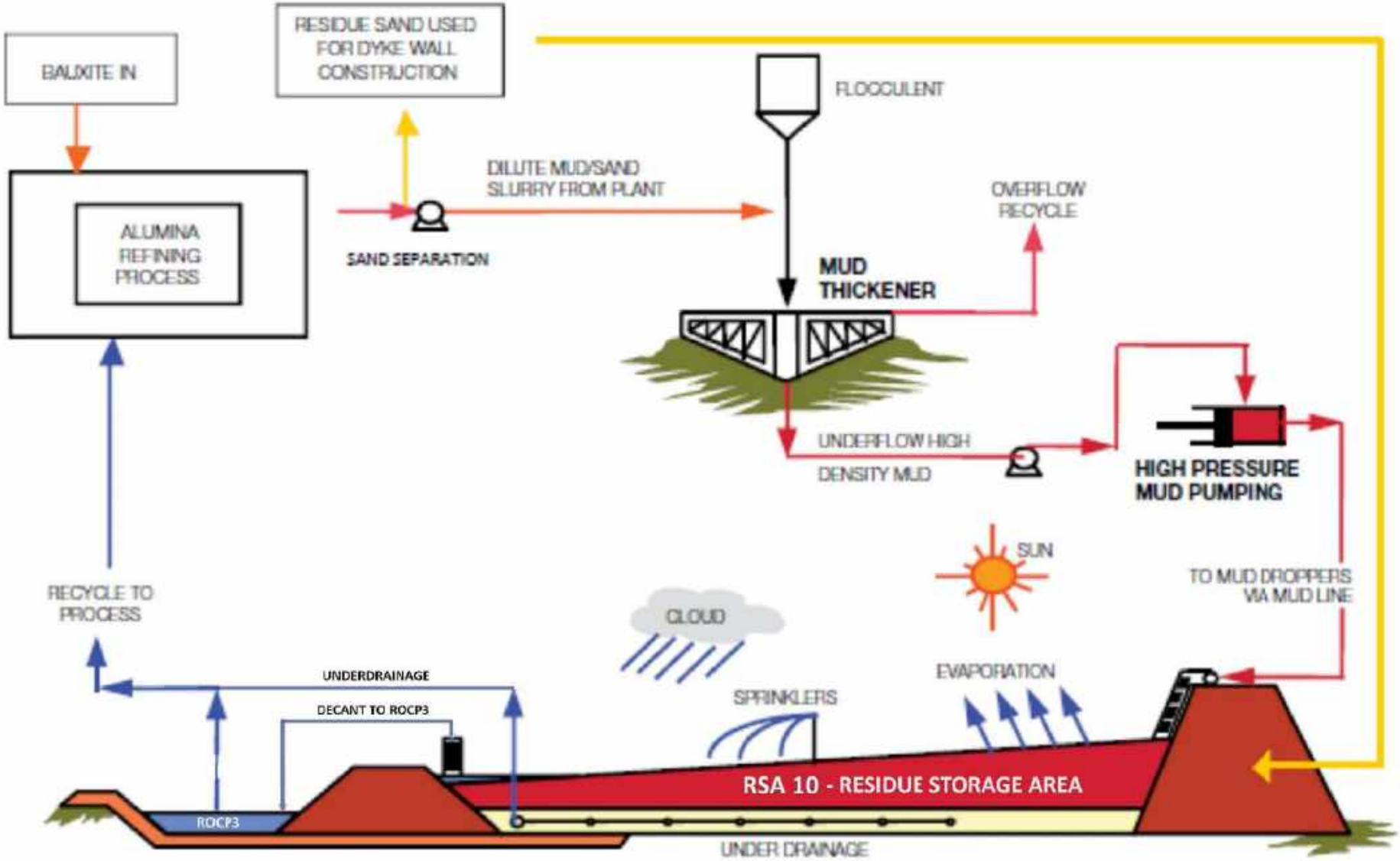
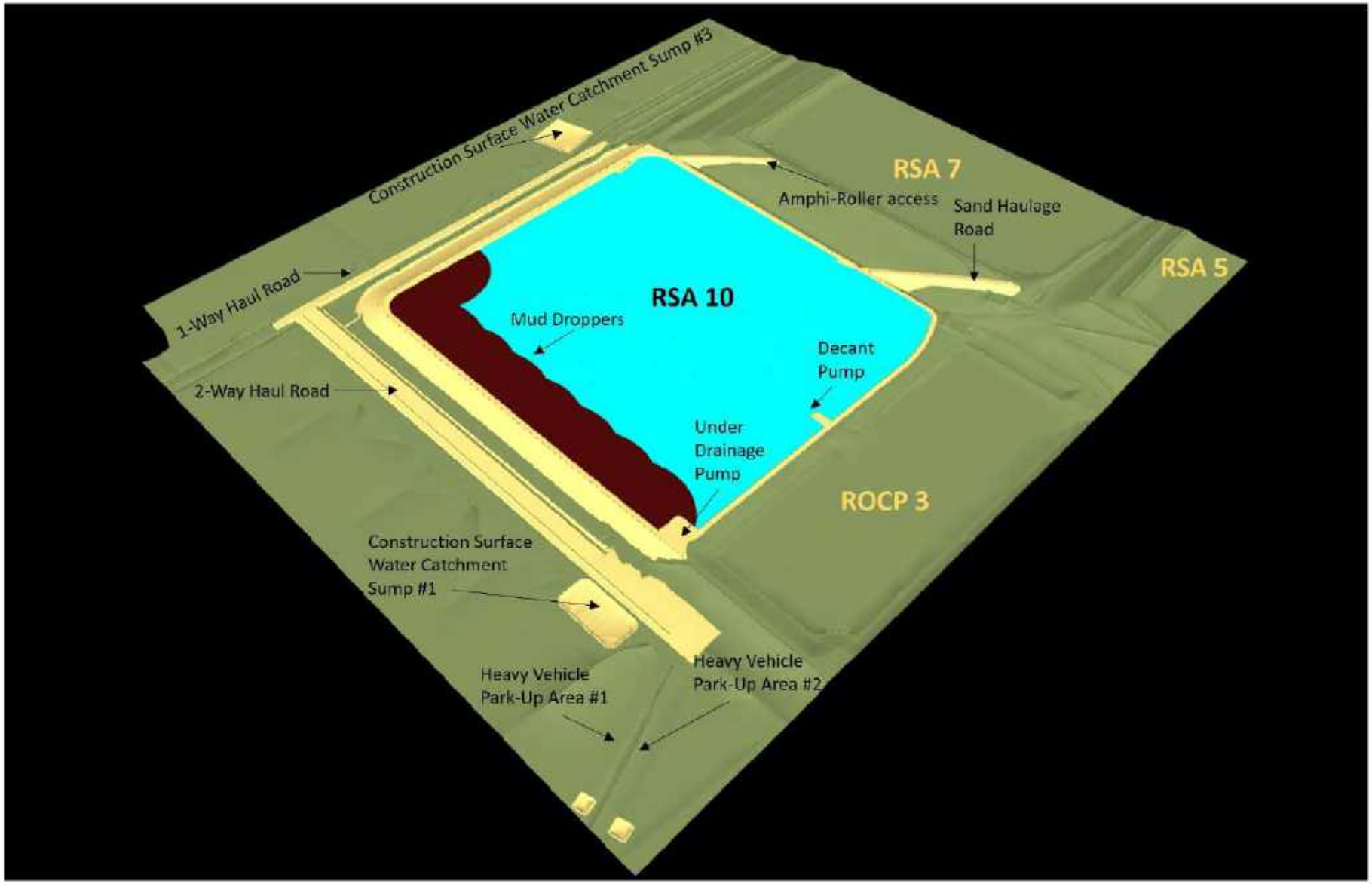


Table 3: Key Infrastructure and Attributes of RSA 10 Proposal

Infrastructure/Equipment	Design and Construction Attributes
Critical Containment Infrastructure	
RSA 10 Starter Embankments	• Starter embankment walls to be built up to approximately 8 m above average natural ground level (22 m AHD). • Starter embankment walls must have sufficient storm surge capacity to contain a 72 hour, 1:100 Annual Recurrence Interval (ARI) rainfall event. • Constructed using clayey general fill engineered and compacted to Alcoa's impoundment standards. • New outer embankment slopes will be shaped to approximately 1 Vertical : 4 Horizontal. • New inner embankment slopes will be shaped to approximately 1 Vertical : 3 Horizontal. • Embankment crests to be constructed with a minimum 2% fall inwards.
RSA 10 Composite Liner	• Composite liner composed of: o A low permeability soil liner equivalent to at least a 0.5 m thick layer of moisture conditioned and mechanically compacted clay or manufactured geosynthetic clay liner (GCL), with a permeability coefficient not greater than 1×10^{-9} m/s; and o High-Density Polyethylene (HDPE) line with a core thicknesses of 1.5 mm. • Composite liner to be tied into the existing RSA 7 and ROCP 3 clay and HDPE liners.
Other Infrastructure	
Under-drainage Collection System	• Minimum of 500 mm residue sand underdrainage layer overlying the HDPE liner. • Under-drainage collection system consisting of drain coil and collector pipes located in the layer of residue sand. • Collector pipe drainage will be pumped to the Cooling Pond and Run Off Water Storage (ROWS) Pond.
Stormwater Management Infrastructure	• The RSA 10 design will accommodate a 1 in 100 annual recurrence interval (ARI) 72-hour rainfall event. • Stormwater run-off from the RSA 10 external embankment walls will be diverted away from the Samson South Drain to drain into Alcoa's farmlands to the west of RSA 10. There will be no direct discharge to Samson South Drain from the RSA 10 embankments.
Decant pipeline	• Decant will be pumped via pipeline or gravity fed into ROCP 3.
Residue mud delivery system	• The existing residue mud delivery system will be extended to deliver residue mud into RSA 10. • Residue mud will be delivered via evenly spaced spigots to be installed along the embankment crest of RSA 10.
Sprinkler System	• A sprinkler system has been included in the RSA 10 design to minimise dust generation. Sprinklers will be installed in a 60 m by 60 m triangular arrangement on the floor of RSA 10.
RSA 10 Embankment Raises	• RSA 10 has been designed to accommodate upstream embankment raises to 66 m above average natural ground level (80 m AHD) to enhance confidence in geotechnical stability, however Alcoa will develop the residue stack in accordance with the commitments in the LTRMS which is currently 60 m above average natural ground level (74 m AHD).

Figure 4: RSA 10 Concept Layout – Starter Embankments Only



3.1 Design Overview

TSF Checklist: Part 3.1.

Alcoa's design objectives for RSAs include:

- Safeguard the RSA, site personnel and the environment; and
- Ensure the RSA is constructed, operated, maintained, rehabilitated, monitored and closed according to the approved design.

RSA 10 has been designed in accordance with the following standards:

- Alcoa Standards;
- Australian Codes and Standards;
- Australian National Committee on Large Dams (ANCOLD) Guidelines on Tailings Dams (July, 2019);
- Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) Guide to the preparation of a design report for tailings storage facilities (Department of Mines and Petroleum - August, 2015);
- International Council on Mining and Metals (ICMM) Guidelines;
- Mining Association of Canada (MAC) Guidelines; and
- Global Industry Standard on Tailings Management (GISTM) (August, 2020).

In the case of inconsistencies with any of the above referenced standards, the most stringent requirement will be adopted as per Alcoa's Global Impoundment Policy (2020).

The civil design of RSA 10 and associated access roads and infrastructure has been informed by geotechnical investigations and a Hypothetical Dam Breach and Consequence Category Assessment (HDBCCA) (Attachments 25, 26 and 27).

The design provides for construction of initial starter embankment walls followed by staged residue mud deposition using the upstream embankment raise method. Residue mud pours and embankment raises have been designed to accommodate upstream embankment raises to 66 m above average natural ground level (80 m AHD), however Alcoa will initially develop the residue stack in accordance with the commitments in the LTRMS, which is currently 60 m above average natural ground level (74 m AHD) (Alcoa, 2017), providing a total cumulative storage area of approximately 26 million m^3 of residue mud and sand.

3.1.1 Hypothetical Dam Breach and Consequence Category Assessment

The design of RSA 10 has been completed by expert engineers commissioned by Alcoa and included preparation of a Hypothetical Dam Breach and Consequence Category Assessment (HDBCCA) and review by an independent expert engineering team to provide additional quality assurance.

The HDBCCA identifies how a dam breach could occur and what the potential impacts of a breach would be on people, buildings and the environment. The purpose of a hypothetical dam breach assessment is to inform

key design criteria and ensure that the dam is designed and will operate in a safe way with controls in place to reduce the likelihood and consequence of a breach occurring, even under extreme conditions.

The HDBCCA highlights two scenarios with the potential to cause the release of bauxite residue from RSA10 into the environment:

- a dam wall becomes unstable and slumps as a result of external loads; and/or
- a large amount of rainwater enters the dam and causes flooding over the top of the dam wall.

Numerical simulation software was used to assess the potential impact from a breach. The model simulated a hypothetical case of how much residue and potentially rainwater mixed with residue would be released and the distance it could spread. The model was based on rainfall records; rainfall estimates considering climate change; existing rivers and streams; ground levels and residue flow characteristics. The model also considered international best practice guidelines and records from tailings dam failures.

The worst-case modelled scenario assumed:

- RSA 10 has been constructed to its maximum height of approximately 66 m above average natural ground level (reached after approximately 50 years of continuous operations);
- RSA 10 has been filled with its maximum capacity of approximately 26 million m^3 of residue mud; and
- A 1 in 100 year storm event over a 24 hour period or 165 mm of rain falls in the catchment area.

Under this scenario residue would:

- Flow up to 700 m from RSA 10, but would be wholly contained within Alcoa's property boundaries;
- Enter the Samson South Drain within Alcoa's property boundaries; and
- Impact Alcoa internal roads.

Alcoa office buildings, workshops and public roads would not be impacted by the residue flow.

Under this scenario, rainwater mixed with residue would:

- Flow up to 20 km beyond Alcoa's property boundaries;
- Reach public roads, private landholdings and private sheds/warehouses;
- Reach an area within Samson South Drain known to contain Carter's Freshwater Mussels; and
- Reach Buller Nature Reserve (2.5 km downstream of RSA 10) and other informal recreational areas along Harvey River (1 km downstream of RSA 10).

3.1.2 Dam Breach Controls and Emergency Response

Alcoa has an extensive monitoring and management system in place to minimise the likelihood and consequence of a dam breach occurring. This includes:

- Real time monitoring equipment installed in dam walls to detect any movement which may indicate instability;
- Daily visual inspections of dam walls and other infrastructure to check for signs of potential instability such as erosion or cracks;
- Real time monitoring of residue and rainwater levels inside the dam;
- Annual audits of dam wall stability by independent third party experts; and
- Pumps to remove rainwater from inside the dam if levels get too high.

Site emergency management plans are in place at each of Alcoa's Western Australian Refineries. The Wagerup RSA Emergency Response Plan (ERP) has been developed to reduce the risk of impacts to people,

property and the environment during unplanned or emergency events arising from an RSA breach. The Wagerup RSA ERP identifies the emergency conditions that provide a warning of increased risk for uncontrolled release of an RSA requiring immediate action.

An emergency response is required for major loss of containment scenarios including:

- Overtopping of a pond event due to rain / storm event;
- Embankment breach (seismic event or overtopping); or
- Pump (electrical) failure.

In the event of an emergency, the Wagerup RSA ERP provides direction to Refinery personnel through a set of procedures to follow to facilitate the coordination and mobilisation of personnel and equipment in a timely manner. This includes the engagement of Emergency Services to activate early warning and evacuation procedures for the protection and security of personnel and neighbours.

Implementation of the Wagerup RSA ERP is supported by the Wagerup Refinery Emergency Response Manual and the Wagerup Residue Operating Manual, which provide further information relevant to planning and dealing with RSA emergencies.

3.2 Staging and Storage Capacity

TSF Checklist: Part 3.2; Application Form: Part 4.2 – 4.5.

RSA 10 has been designed to provide capacity for storage of approximately 26 million m^3 of residue mud and sand produced from the Refinery, within its current approved production capacity.

Alcoa proposes to construct and operate RSA 10 in two stages, as outlined in Table 4 and summarised below:

- Stage 1 consists of construction of the starter embankment walls, underdrainage, surface drainage, access roads and residue mud distribution system (Figure 5).
- Stage 2 consists of deposition of residue and upstream embankment lifts until RSA 10 reaches its ultimate design height.

The operational life of RSA 10 is currently estimated to be approximately 50 years, noting that the Wagerup Refinery is currently approved under its State Agreement Act until 2045, however the operation of RSA 10 may vary depending on operational needs.

Decommissioning and rehabilitation of RSA 10 is not included in this works approval application. Closure of RSA 10 is likely to occur as part of the closure of the residue management area and the Refinery. This will be undertaken in accordance with the Wagerup LTRMS (Attachment 16). It is anticipated that RSA 10 will be incorporated into the broader residue area landform at closure, as indicated in Figure 6.

The LTRMS addresses the management of contaminated stormwater, leachate and final land use. The closure objectives for the decommissioned residue management area are that it should:

- Have the capability to be used for productive community benefit;
- Be safe and self-sustaining in the long term; and
- Allow for future access to residue for alternate uses.

Rehabilitation of RSA 10 perimeter embankments will be ongoing during the operating life of the Refinery. The embankments will be rehabilitated as the height of the internal residue mud grows. Final capping and revegetation will occur after RSA 10 reaches its final elevation. At this stage one of the following closure options may be implemented:

- Encapsulation of any leachable alkali remaining in the deposit at the time of closure. A surface capping layer with low permeability characteristics is placed over the residue mud stack and the drainage system is switched off. The capping layer would exclude rainfall infiltration to prevent re-saturation of the residue mud stack.
- Continued Leaching: this option assumes that leaching of the residue mud stack would continue beyond the operating life of the Refinery. Leachate within RSA 10 would be collected and treated to agreed water quality levels prior to discharge to the environment

Figure 5: RSA 10 Stage 1 - Construction of RSA 10 Floor and Starter Embankment Walls

Figure 6: RSA 10 Indicative Closure Landform

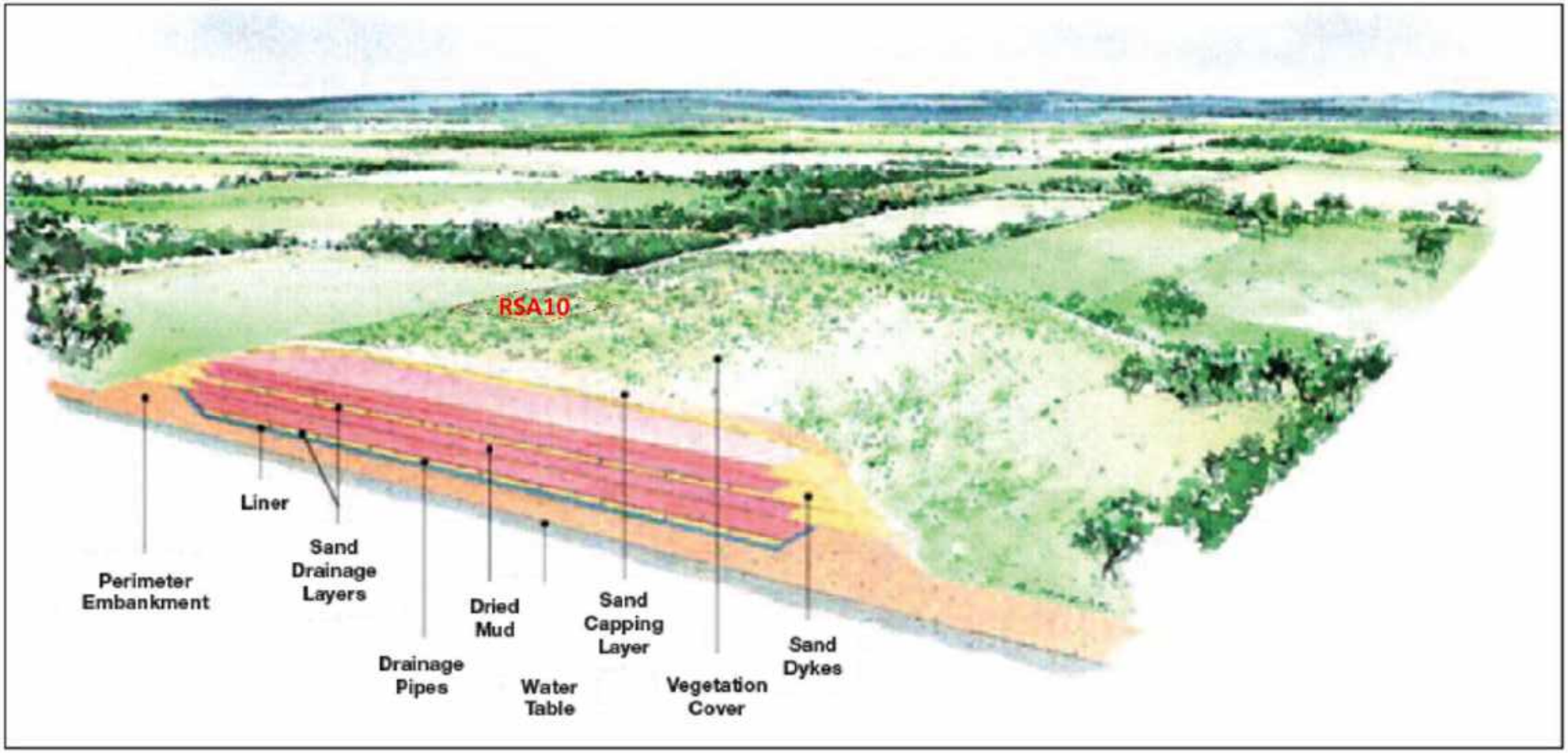
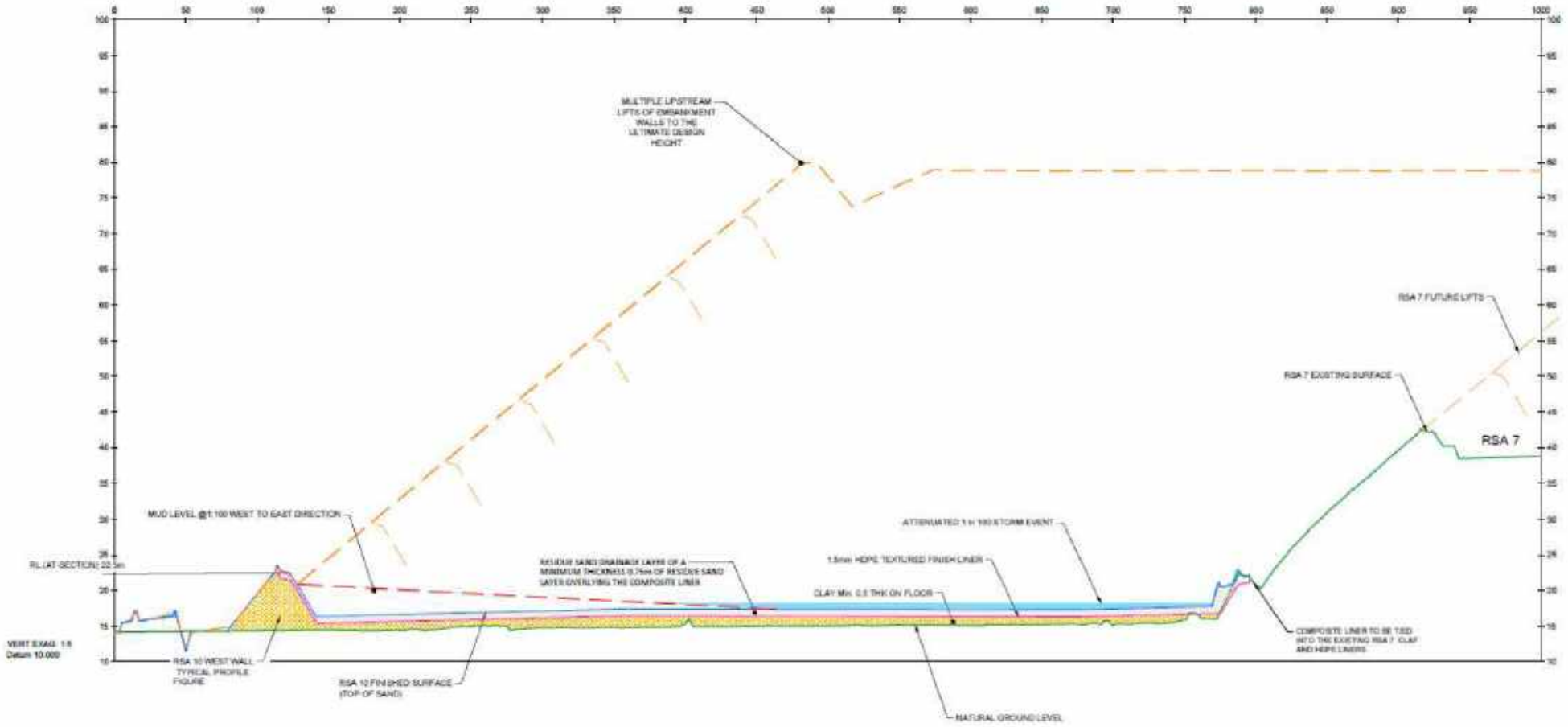


Table 4: RSA 10 Staging and Timing

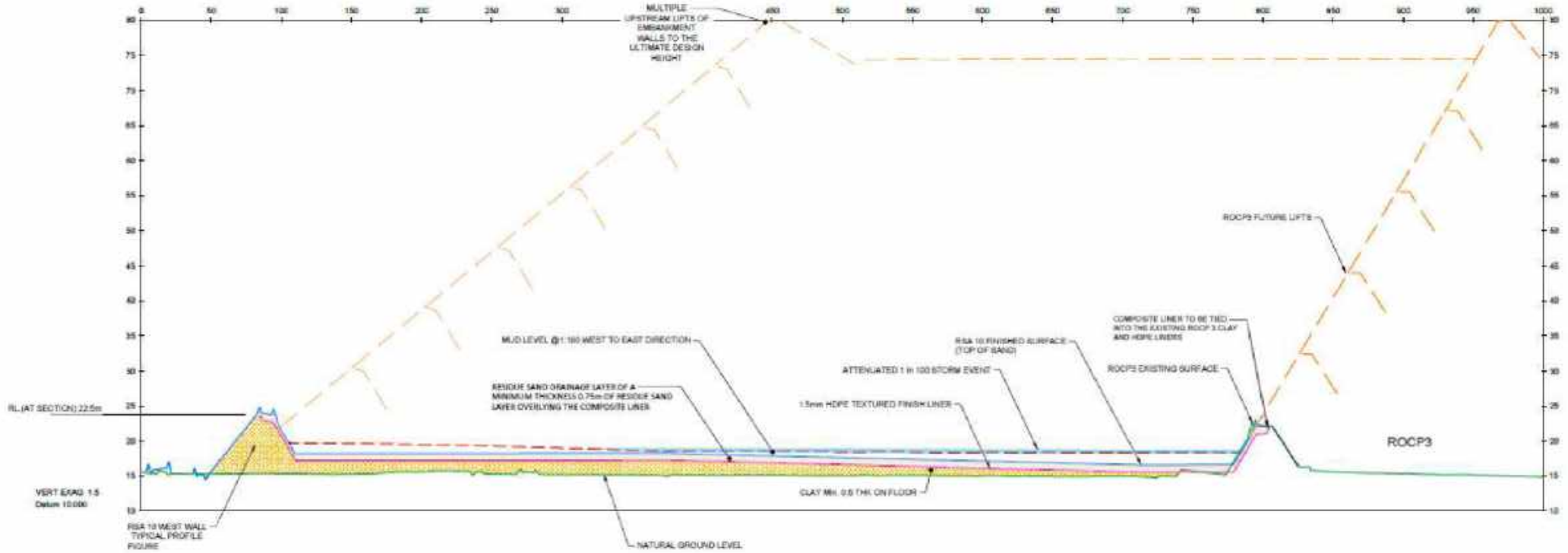
Stage	Scope	Crest Elevation	Storage Area (m^2)	Storage Volume (m^3)	Cumulative Storage Volume (m^3)	Timing
Pre-Construction	*See Section 1.2 for pre-construction activities scope that is excluded from the works approval application.*					Planned for Q4 2025
1	• Construction of clay embankment walls of RSA 10. • Installation of composite liner over inner embankment walls and floor. • Installation of alkaline containment transfer systems. • Installation of residue mud delivery system. • Installation of sprinkler system.	22 m AHD (8 m above average natural ground level)	Approximately 490,000	2 million	2 million	Q2 2026 – Q4 2028
2	• Pouring of residue mud (and potentially filter cake in the future) into RSA 10. • Multiple upstream lifts of embankment walls to the ultimate design height (Figure 7).	RSA 10 has been designed to accommodate upstream embankment raises to 80 m AHD (66 m above average natural ground level), however Alcoa will initially develop the residue stack in accordance with the commitments in the LTRMS which is currently 74 m AHD (60 m above average natural ground level).	Approximately 340,000	24 million	26 million	Approximately 2078 (based on a 50 year operating life of RSA 10 and subject to continued operation of Wagerup Refinery beyond the current Part V licence approval date of 2035 and renewal of Alcoa's State Agreement Act beyond 2045.

Figure 7: RSA 10 Stage 2 – Design Height of Approximately 80 m AHD (Planned Height: 74m AHD)

West to East Long Section



North to South Long Section



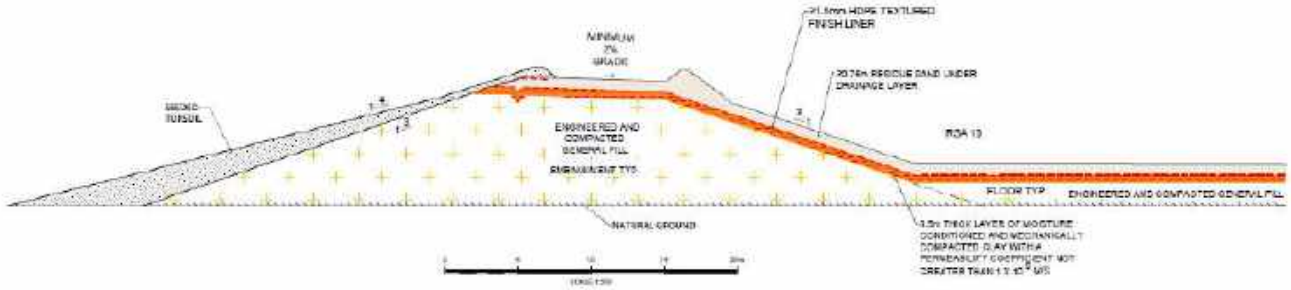
3.3 Starter Embankment Walls and Raises

TSF Checklist: Part 3.3.

The RSA 10 starter embankment walls will be constructed to an approximate height of 22 m AHD. The embankment walls will be constructed using engineered general fill to provide adequate bearing capacity in accordance with Alcoa's Global Impoundment Design Standards. Topsoil will be laid over the outer batters of the embankment walls and seeded to promote vegetation growth and limit erosion. The internal batter of the embankment will be constructed at an approximate 1V : 3H slope with a composite liner comprising a minimum 500 mm thick clay layer or manufactured geosynthetic clay liner (GCL) and a 1.5 mm thick HDPE geomembrane (Figure 8). The HDPE liner will be capped with a minimum 500 mm thick layer of residue sand.

The embankment has been designed with an external safety berm along the outer edges and a crossfall to ensure any stormwater runoff that may have been in contact with residue is contained within RSA 10.

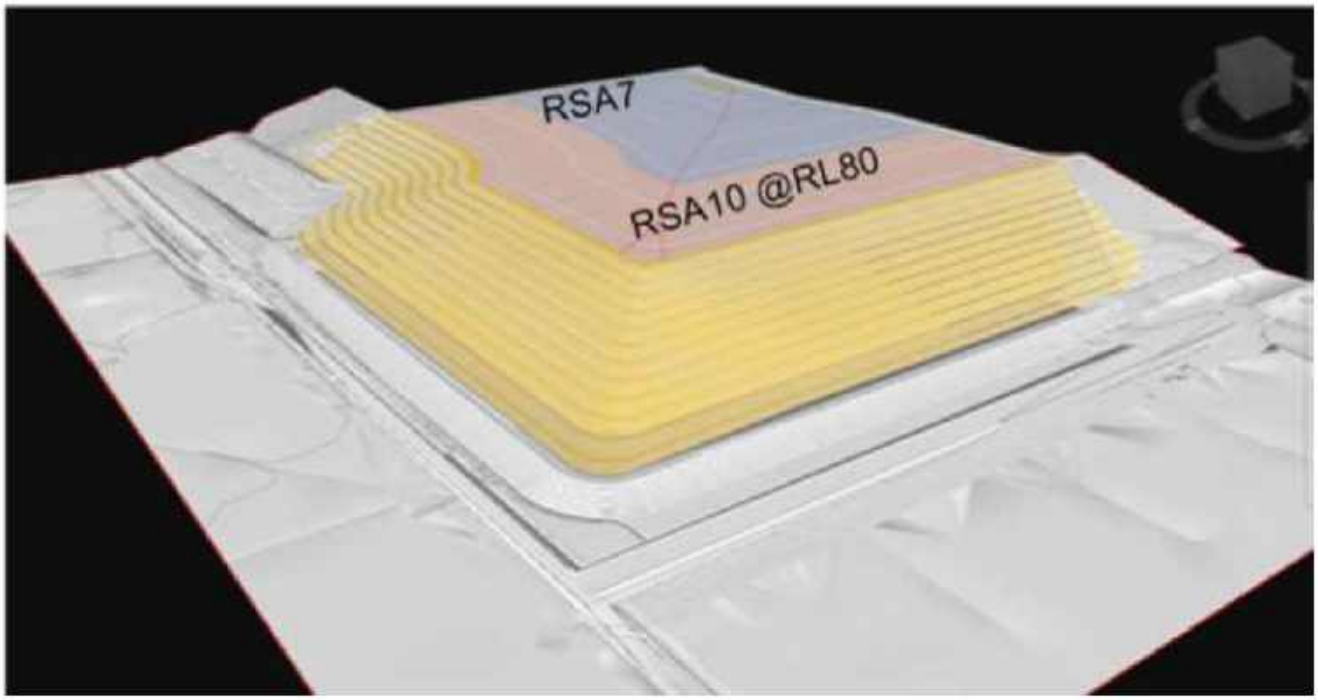
Figure 8: RSA 10 Embankment Wall and Floor Typical Cross Section



Embankment walls will be lifted periodically as the height of the stored residue increases over time. The embankment lifts will be via the upstream stacking method. The lift heights may vary depending on safety and geotechnical conditions of RSA 10 at the time of the proposed wall lift. The sprinklers and residue mud systems will be modified if required to accommodate embankment wall lifts to ensure continued operation.

Figure 9: RSA 10 Upstream Stacking Concept

Note: RSA 10 has been designed to accommodate upstream embankment raises to 80 m AHD, however Alcoa will initially develop the residue stack in accordance with the commitments in the LTRMS which is currently 74 m AHD (60 m above average natural ground level).

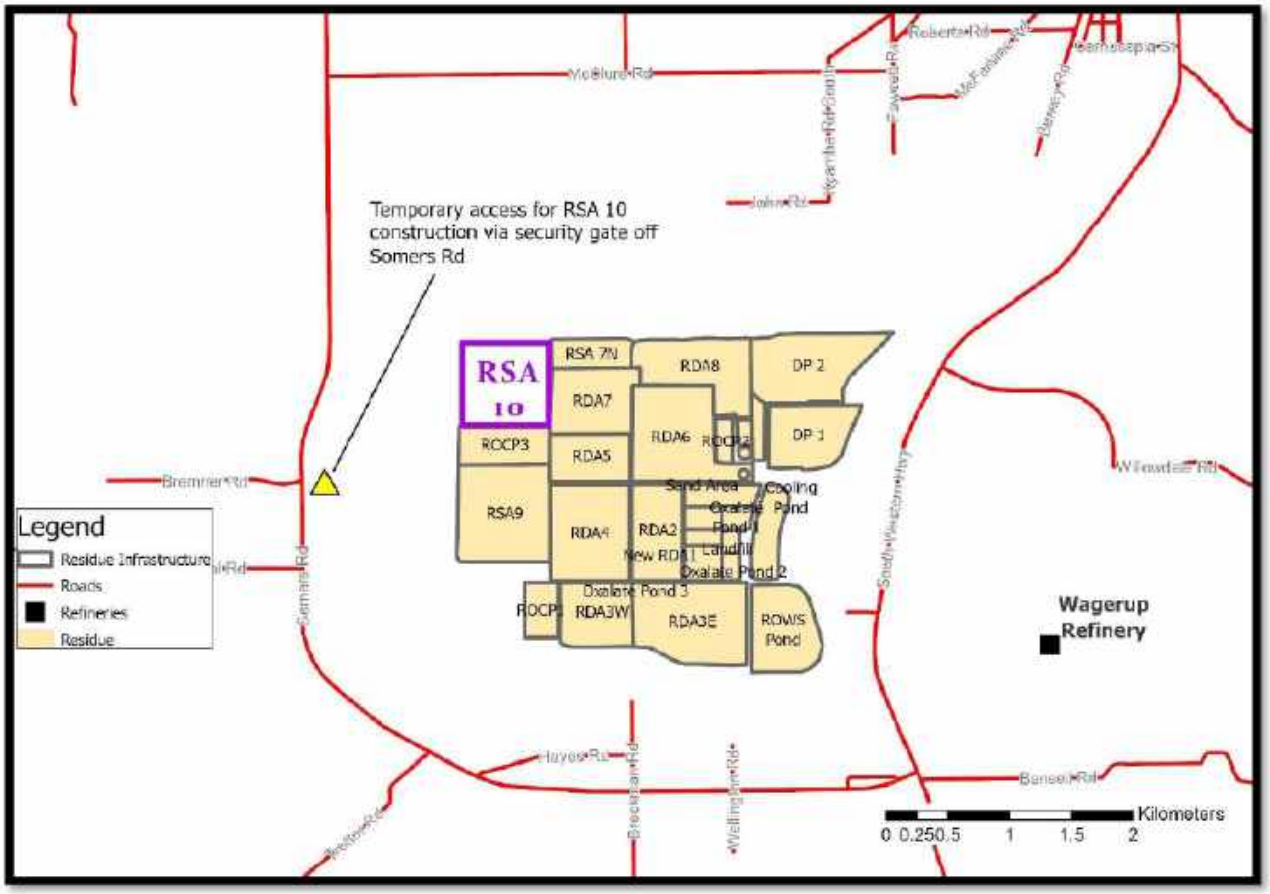


4 Construction Overview

4.1 Site Access

During construction, heavy and light vehicle access will be via an existing access point off Somers Road (Figure 10).

Figure 10: RSA 10 Construction Access Arrangements



4.2 Site Preparation Works

TSF Checklist: Part 4.1; Application Form: Part 4.2.

RSA 10 will be constructed using industry standard methods during standard work hours between 7am and 7pm Monday to Saturday (excluding public holidays).

The proposed RSA 10 footprint is located within highly disturbed former agricultural land (Figure 11). The following site preparation works will be required prior to construction of RSA 10, and are excluded from the Works Approval application (see Section 1.2 for more details):

- Clearing and removal of native and non-native vegetation within the RSA 10 footprint;
- Decommissioning of existing groundwater bores, an access track and other infrastructure within the RSA 10 footprint;
- Removal of topsoil and earthworks to meet engineering design levels;
- Stockpiling of topsoil adjacent to the RSA 10 footprint for re-use; and
- Upgrade of the existing access road between Alcoa's borrow pit and the RSA 10 footprint to allow heavy vehicle access to transport clay and sand material for construction of RSA 10.

The existing and proposed borrow pits are located on Alcoa owned land. DWER advised in the scoping meeting of November 2023 that activities associated with road upgrades and extractive activities in the clay borrow pit and potential clay borrow pit will not be assessed as part of the works approval application as these activities are not part of the licenced prescribed premises categories.

Figure 11: Proposed RSA 10 Footprint

4.3 Infrastructure Construction

TSF Checklist: 4.1.

Following site preparation works infrastructure construction will commence in the following indicative sequence:

- Construct starter embankment walls;
- Install composite liner system;
- Install sand drainage layer;
- Install decant and under-drainage collector system;
- Extend the existing sprinkler system to RSA 10; and
- Extend the residue mud delivery system to RSA 10.

Standard construction equipment is anticipated to be used such as: concrete pump trucks, agitators, telehandlers, franna cranes and general earth moving equipment (i.e. loaders, excavators, rollers, articulated dump trucks etc).

Construction materials will be stored within the existing materials laydown areas.

Construction will be undertaken in two stages, as described in Table 4.

Quality assurance and control activities will be completed during the construction and commissioning phases of RSA 10, in accordance with Alcoa standards.

4.4 Environmental Management Measures

TSF Checklist: 4.1; Application Form: Part 9.1 & Part 9.2, Part 10.1 – 10.3.

4.4.1 Emissions and Discharges

Application Form: Part 9.1.

Emissions and discharges associated with the construction and operation of RSA 10 are summarised in Table 5. There will be no change to the type or volume of emissions or discharges approved under Licence L6217/1983/15.

Project specific odour, noise and air quality assessments were undertaken to assess potential impacts to sensitive receptors as a result of construction and operation of RSA 10.

4.4.1.1 Odour

An Odour Risk Assessment was prepared to consider potential odour impacts during the operation of RSA 10 (Attachment 20). The risk assessment was conducted in accordance with the DWER Guideline: Odour emissions (DWER, 2019a) using the DWER Odour Detailed Analysis for Existing Premises template. The risk assessment included an operational analysis, location review, complaint analysis, field assessment and a comparative odour impact footprint.

The risk assessment determined that the risk of odour impact to sensitive receivers from RSA 10 is low due to following reasons:

- No change to the type of odour emissions;

- The odour footprint is projected to increase by up to 350 m however there are few sensitive receptors within this footprint; and
- Odour complaints have decreased significantly over the last several years with one single complainant responsible for almost all complaints. The number of odour complaints received by the Refinery in the last three years was:
  - 2021 – 23;
  - 2022 – 9; and
  - 2023 – 4.

On this basis, Alcoa does not propose any additional odour controls for RSA 10.

4.4.1.2 Noise

A noise assessment was conducted for the construction and operation of RSA 10 (Attachment 19). The Wagerup Refinery baseline operational noise model was updated to include new noise sources associated with the operation of RSA 10. The addition of RSA 10 operations did not result in any increase in noise levels received at sensitive receptors.

Construction noise from RSA 10 was modelled in isolation of existing noise emissions from the Refinery and residue management area. The predicted construction noise levels at sensitive receptors were lower than the existing noise levels from the Refinery and residue management area, except at locations L1 and L3 during the daytime period. Compliance with Regulation 13 of the Noise Regulations can be achieved provided that:

- The works are carried out in accordance with Section 6 of AS 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites"; and
- The equipment used is the quietest reasonably available.

The noise assessment concluded that Alcoa's objective of no net increase in noise emissions at sensitive receivers can be achieved with no additional noise controls.

4.4.1.3 Air Quality

Alcoa recently completed a three-year program to update the Wagerup Refinery and residue management area operational air model, incorporating updated meteorological and air emissions monitoring data. Model predictions were compared to monitoring data to evaluate the accuracy of the model, which was deemed to provide a very good level of correlation.

RSA 10 was added to the air model to predict changes to air emissions at sensitive receptors during operations (Attachment 15). Predicted air emissions were also compared to Alcoa adopted air quality assessment criteria based on:

- Draft Guideline: Air Emissions (DWER, 2019b);
- National Environmental Protection (Ambient Air Quality) Measure (NEPC, 2021);
- Draft Guideline: Dust Emissions (DWER, 2021); and
- Other international sources where there is no relevant Australian guideline.

The air quality modelling results indicated that RSA 10 operations would result in relatively minor increases in the following air emissions:

- Particulates (TSP, PM_{10} and $PM_{2.5}$) – 8%;

- Volatile Organic Compounds – < 1%;
- Trace metals – <5%; and
- Chromium VI – 11.6%.

The modelling results also indicated that the operation of RSA 10 would not exceed the adopted air quality criteria, except for the maximum 24-hour PM_{10} concentration predicted at one sensitive receptor. The affected sensitive receptor is located 3 km west of RSA 10 and is downwind of the residue management area during the summer period's dominant easterly wind pattern. The drier summer months cause an increase in the potential for the generation of fugitive dust emissions from the dried residue mud stored in the RSAs.

Alcoa has incorporated a sprinkler system into the design of RSA 10 to minimise dust generation from dried residue mud. The adopted design is based on Alcoa's decades of managing dust at its Kwinana, Pinjarra and Wagerup residue management areas. Dust during operations will be managed in accordance with the Wagerup residue management area standard dust operating procedures.

Dust during construction will be managed in accordance with the project specific Construction Dust Management Plan (Attachment 23).

Table 5: Emissions and Discharges

Source of Emission or Discharge	Emission or Discharge Type	Volume and Frequency	Proposed Controls	Location
Construction of RSA 10				
Vegetation clearing and stockpiling (pre-construction activities excluded from Work Approval Application), earthworks, and material movement.	Dust	Dust emissions are dependent on the following factors, which will vary: ▪ Number of vehicles operating – to be determined following engagement of construction contractor; ▪ Size and type of vehicles; ▪ Vehicle operation; ▪ Weather; ▪ Route the vehicle takes on site; ▪ Volume of material cut and filled; ▪ Distance material is moved on site; and ▪ Stockpiling.	▪ A project specific construction dust management plan has been prepared and is included as Attachment 23. ▪ Temporary construction dust monitors will be installed near the RSA 10 footprint to monitor dust emissions in real time to provide feedback to construction operators and facilitate the implementation of immediate adaptive dust control measures. Dust monitoring locations are shown in Attachment 8. ▪ In addition to the temporary construction dust monitors, dust will continue to be monitored at the existing L6217/1983/15 permanent monitoring locations (Attachment 8) and managed in accordance with the following conditions, including (but not limited to): ▪ *"A20: The licence holder shall operate a dust monitoring program to measure dust levels generated from the RDA's* [RSAs]. *The dust monitoring program will incorporate the following features:* *(i) use TEOM's, or high-volume samplers that meet AS/NZS 3580.9.3:2003;* *(ii) have monitors of the following designations, located at the following locations - BRW, RE, RW, RNE and RNW in positions identified in .Appendix B;* *(iii) have monitors located in accordance with AS/NZS 3580.1.1:2007;* *(iv) run continuously (with a response level of 95% availability for each calendar year for each monitor); and* *(v) where high volume samplers are used, renew filter papers daily.* ▪ *A21: The licence holder shall have analysed, the filter paper from at least one of the high-volume samplers from the dust monitoring program (located downwind at the time of sampling), that can be demonstrated to be representative of dust emissions from the RDA's* [RSAs] *in accordance with Table 12 of Appendix A."* ▪ Dust will be managed in accordance with Alcoa's existing standard operating procedures and dust suppression methods. Watercarts, or similar, will be made available onsite to dampen roads, tracks, and stockpiles during construction to minimise dust lift off.	RSA 10 footprint shown on Figure 1.

Source of Emission or Discharge	Emission or Discharge Type	Volume and Frequency	Proposed Controls	Location
Operation of heavy vehicles, light vehicles, mobile equipment and machinery	Exhaust emissions (e.g. CO_2, CO, NO_x, SO_2, hydrocarbons, particulates, etc.)	Exhaust emissions are dependent on the following factors, which will vary: ▪ Number of vehicles / equipment operating; ▪ Size and type of the vehicle/equipment; ▪ Vehicle speed; and ▪ Vehicle / equipment operation.	▪ In accordance with Alcoa's existing procurement and operational controls vehicles, mobile machinery and equipment will be installed with standard emission control devices. ▪ All heavy and light vehicles, mobile machinery and mobile equipment will be maintained in accordance with manufacturers' specifications and maintenance records kept.	RSA 10 footprint shown on Figure 1.
	Noise	Noise emissions are dependent on the following factors, which will vary: ▪ Number of vehicles / equipment operating; ▪ Size and type of the vehicle/equipment; ▪ Vehicle speed; ▪ Vehicle / equipment operation; ▪ Weather conditions (i.e., high winds); and ▪ Total operational time.	▪ Noise generating construction works will be conducted between the hours of 0700 and 1900 Monday to Saturday, excluding public holidays. Should out of hours works be required, a Noise Management Plan will be submitted to DWER for approval in accordance with Regulation 13 of the Noise Regulations. ▪ Works will be carried out in accordance with Section 6 of AS 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites". ▪ The quietest reasonably available equipment will be used when working near sensitive receptors. All heavy and light vehicles, mobile machinery and mobile equipment will be maintained in accordance with manufacturers' specifications and all maintenance records kept.	RSA 10 footprint shown on Figure 1.
	Dust	Dust emissions are dependent on the following factors, which will vary: ▪ Number of vehicles operating – to be determined following engagement of construction contractor; ▪ Size and type of vehicles; ▪ Vehicle speed; ▪ Vehicle operation; ▪ Weather; ▪ Route the vehicle takes on site; ▪ Volume of material cut and filled; ▪ Distance material is moved on	▪ A project specific construction dust management plan has been prepared and is included as Attachment 23. ▪ Temporary dust monitors will be installed near the RSA 10 footprint to monitor dust emissions in real time to facilitate the implementation of immediate dust control measures. Dust monitoring locations are shown in Attachment 8. ▪ Dust will be monitored at the existing L6217/1983/15 permanent monitoring locations (Attachment 8) and managed in accordance with the following conditions, including (but not limited to): ▪ *"A20: The licence holder shall operate a dust monitoring program to measure dust levels generated from the RDA's [RSAs]. The dust monitoring program will incorporate the following features:* *(i) use TEOM's, or high-volume samplers that meet AS/NZS 3580.9.3:2003;*	RSA 10 footprint shown on Figure 1.

Source of Emission or Discharge	Emission or Discharge Type	Volume and Frequency	Proposed Controls	Location
		site; and ▪ Stockpiling.	*(ii) have monitors of the following designations, located at the following locations - BRW, RE, RW, RNE and RNW in positions identified in Appendix B;* *(iii) have monitors located in accordance with AS/NZS 3580.1.1:2007;* *(iv) run continuously (with a response level of 95% availability for each calendar year for each monitor); and* *(v) where high volume samplers are used, renew filter papers daily.* ▪ *A21: The licence holder shall have analysed, the filter paper from at least one of the high-volume samplers from the dust monitoring program (located downwind at the time of sampling), that can be demonstrated to be representative of dust emissions from the RDA's [RSAs] in accordance with Table 12 of Appendix A."* ▪ Dust will be managed in accordance with Alcoa's existing standard operating procedures and dust suppression methods. Watercarts, or similar, will be made available onsite to dampen roads, tracks, and stockpiles during construction to minimise dust lift off.	
Rainfall or storm events from the construction footprint	Stormwater, potentially containing contaminants, sediments etc.	Stormwater volume is dependent on: ▪ Storm / rainfall event and duration; ▪ Rainfall volume; ▪ Runoff / infiltration rate; and ▪ Stormwater flow and direction. Stormwater frequency is dependent on: ▪ Seasons (rainfall events more likely to occur in winter and spring compared to summer and autumn).	▪ A project specific surface water management plan has been developed for construction of RSA10 (Attachment 24). ▪ Stormwater from RSA 10 will be contained onsite and collected for re-use, with no direct stormwater discharge to Samson South Drain from RSA 10 construction activities. ▪ Uncontaminated runoff will be directed to temporary unlined surface water catchment sumps designed to attenuate flows from 1 in 5 year (20%) AEP rainfall events (24 hours) and transferred to existing detention ponds, with emergency overflows to Alcoa farmlands. Runoff from the construction laydown and heavy vehicle park up areas that may contain contaminants, including hydrocarbons, will be directed to a series of lined sumps and transferred to ROCP3. ▪ Inspections will be undertaken of site drainage and stormwater management systems to assess and maintain integrity and operation. ▪ A surface water quality assessment was completed as part of the aquatic fauna assessment (Attachment 13). Surface water quality monitoring will be undertaken within Samson South Drain during construction of RSA 10 (Attachment 24).	RSA 10 footprint shown on Figure 1.

Source of Emission or Discharge	Emission or Discharge Type	Volume and Frequency	Proposed Controls	Location
Operation of RSA 10				
RSA 10 footprint Vehicle operations (loading of trucks) Wind erosion	Dust	Dust emissions are dependent on the following factors, which will vary: ▪ Number of vehicles operating – to be determined following engagement of construction contractor; ▪ Size and type of vehicles; ▪ Vehicle operation; ▪ Weather; ▪ Route the vehicle takes on site; ▪ Volume of material cut and filled; ▪ Distance material is moved on site; and ▪ Stockpiling.	▪ Dust will be monitored at the existing L6217/1983/15 permanent monitoring locations (Attachment 8) and managed in accordance with the following conditions, including (but not limited to): ▪ *"A20: The licence holder shall operate a dust monitoring program to measure dust levels generated from the RDA's [RSAs]. The dust monitoring program will incorporate the following features:* *(i) use TEOM's, or high-volume samplers that meet AS/NZS 3580.9.3:2003;* *(ii) have monitors of the following designations, located at the following locations - BRW, RE, RW, RNE and RNW in positions identified in Appendix B;* *(iii) have monitors located in accordance with AS/NZS 3580.1.1:2007;* *(iv) run continuously (with a response level of 95% availability for each calendar year for each monitor); and* *(v) where high volume samplers are used, renew filter papers daily.* ▪ *A21: The licence holder shall have analysed, the filter paper from at least one of the high-volume samplers from the dust monitoring program (located downwind at the time of sampling), that can be demonstrated to be representative of dust emissions from the RDA's [RSAs] in accordance with Table 12 of Appendix A."* ▪ The RSA 10 sprinkler system will be used to spray water over stored residue mud to minimise dust generation. ▪ Dust will be managed in accordance with Alcoa's existing standard operating procedures and dust suppression methods. ▪ Watercarts, or similar, will be made available onsite to dampen roads, tracks, and stockpiles during construction to minimise dust lift off. ▪ Speed limits will be implemented on site to minimise dust generation from vehicle movements.	RSA 10 footprint shown on Figure 1.
Operation of heavy vehicles, light vehicles, mobile equipment and machinery	Exhaust emissions (i.e., CO_2, CO, NO_x, SO_2, hydrocarbons,	Exhaust emissions are dependent on the following factors, which will vary: ▪ Number of vehicles / equipment operating; ▪ Size and type of the	▪ In accordance with Alcoa's existing procurement and operational controls vehicles, mobile machinery and equipment will be installed with standard emission control devices. ▪ All heavy and light vehicles, mobile machinery and mobile equipment will be maintained in accordance with manufacturers' specifications and all maintenance records kept.	RSA 10 footprint shown on Figure 1.

Source of Emission or Discharge	Emission or Discharge Type	Volume and Frequency	Proposed Controls	Location
	particulates, etc.)	vehicle/equipment; ▪ Vehicle speed; and ▪ Vehicle / equipment operation.		
Rainfall or storm events	Stormwater, potentially containing contaminants, sediments etc.	Stormwater and sediment volume is dependent on: ▪ Storm/rainfall events; ▪ Rainfall volume; ▪ Runoff/infiltration rate; and ▪ Stormwater flow and direction.	▪ Stormwater drainage within the RSA 10 footprint has been designed to be captured and fed into the existing RSA drainage and recovery network (Attachment 7). No drainage from Alcoa infrastructure will be allowed to drain directly into Samson South Drain. ▪ Stormwater will be managed in accordance with Alcoa's existing procedures and operating strategies for the residue management area. ▪ The residue management area has been designed to contain rainfall runoff from operational areas through a drainage system and surge ponds. This enables the stormwater to be captured and re-used. ▪ Inspections will be undertaken of site drainage and stormwater management systems to assess and maintain integrity and operation.	RSA 10 footprint shown on Figure 1.
Operation of pumps associated with the RSA 10 residue distribution and drainage systems. Operation of HVs, LVs, and mobile equipment	Noise	A noise assessment was conducted for the operation of RSA 10 (refer Attachment 19) which demonstrates that noise levels associated with the operation of RSA 10 will be between 25 and 40 dB(A) below existing refinery noise emissions.	▪ Operational noise monitoring will continue in accordance with Licence L6217/1983/15. ▪ No truck movements are planned to be undertaken at night. Should night trucking be considered in the future a noise assessment will be undertaken prior and no night trucking will be permitted unless the objective of no net increase in noise emissions can be demonstrated. ▪ All heavy and light vehicles, mobile machinery and mobile equipment will be maintained in accordance with manufacturers' specifications and all records kept. ▪ Speed limits will be implemented onsite to reduce engine noise emissions.	RSA 10 footprint shown on Figure 1.
Residue mud	Odour from evaporation of liquor from residue mud which contains volatile organic compounds.	Odour emissions are dependent on the following factors, which will vary: ▪ Volume of residue mud within RSA 10; and ▪ Weather conditions (i.e. temperature, evaporation rate, wind, rain).	▪ The odour risk assessment determined that the risk of odour impact to sensitive receivers from RSA 10 is low, therefore no specific controls are proposed.	RSA 10 footprint shown on Figure 1.

4.4.2 Waste Types

Application Form: Part 9.2.

No changes to the waste types or volumes approved under Licence L6217/1983/15 will occur as a result of the construction or operation of RSA 10. Wastes generated during the construction and operation will be disposed of at Alcoa's onsite landfill or taken offsite by an appropriately licenced waste carrier to an appropriately licenced waste facility.

4.4.3 Environmentally Sensitive Areas and Receptors

Application Form: Part 4.13 – 4.17; 10.1 & 10.2.

4.4.3.1 Flora and Vegetation

A flora and vegetation assessment was completed for the RSA 10 project (Attachment 11). The RSA 10 footprint contains degraded to completed degraded vegetation containing *Juncus pallidus* low rushland over non-native species and one patch of *Melaleuca rhaphiophylla* mid shrubland (Figure 12).

No threatened ecological communities (TECs) or priority ecological communities (PECs) were identified within the RSA 10 footprint. Two TECs and zero PECs were identified as potentially occurring within Alcoa's Wagerup landholdings.

Two TECs are located near the RSA 10 footprint:

- *Corymbia calophylla – Kingia australis* woodlands on heavy soils of the Swan Coastal Plain: listed as endangered under the EPBC Act and threatened under the *Biodiversity Conservation Act 2016* (BC Act). Located approximately 3 km east and 3.5 km north-east of RSA 10.
- *Corymbia calophylla – Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain: listed as vulnerable under the EPBC Act and threatened under BC Act. Located approximately 3 km east of RSA 10.

No TECs or PECs are located within the RSA 10 footprint.

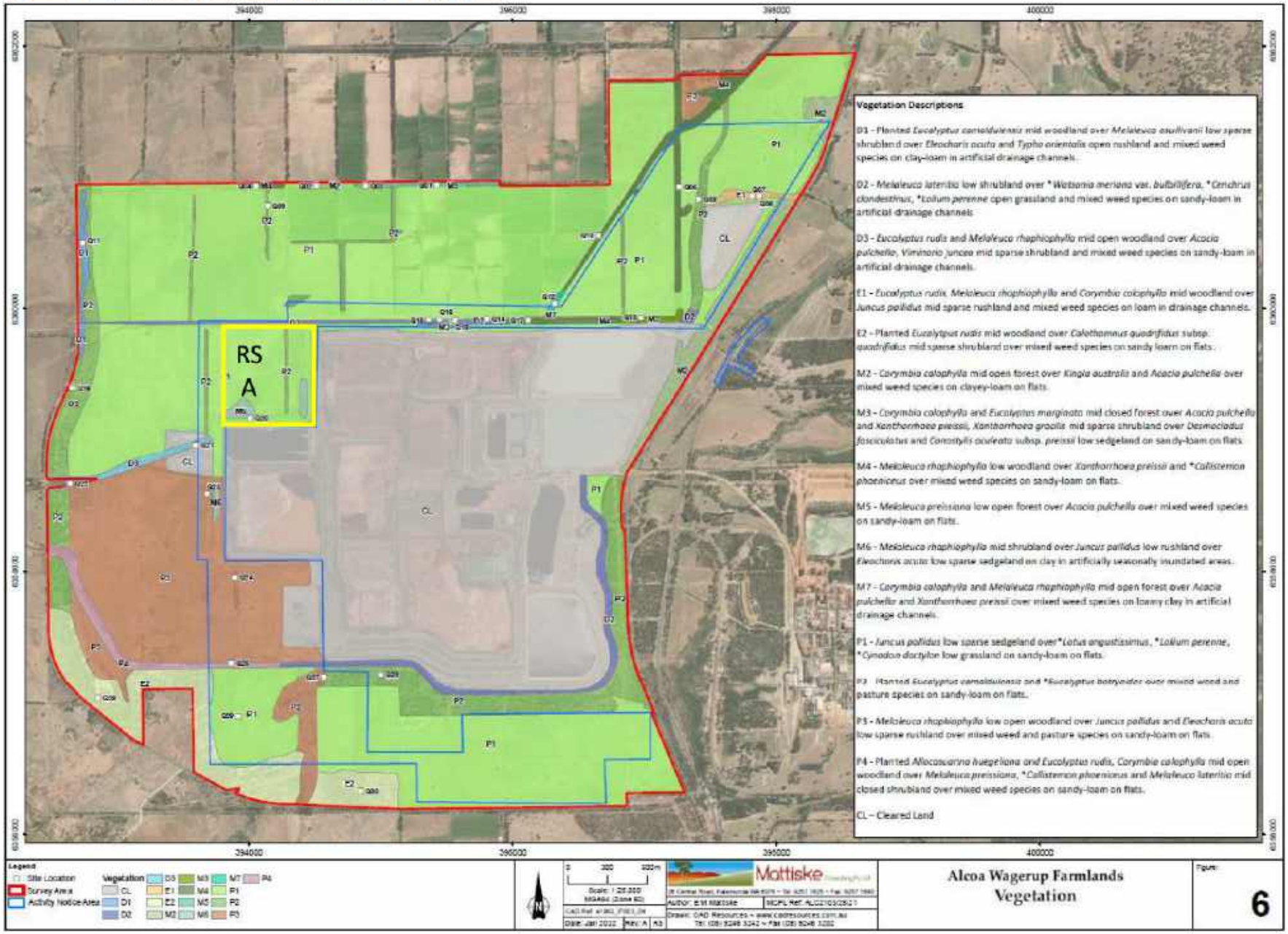
Fourteen conservation significant flora species were identified as having the potential to occur within Alcoa's Wagerup landholdings. Eleven species were deemed to have a low likelihood of occurrence. Four species had a medium likelihood of occurrence:

- *Synaphea* sp. Pinjarra Plain – Endangered under the EPBC Act and Threatened under the BC Act;
- *Synaphea* sp. Serpentine – Critically Endangered under the EPBC Act and Threatened under the BC Act;
- *Synaphea stenoloba* – Endangered under the EPBC Act and Threatened under the BC Act; and
- *Tetraria australiensis/Morelotia australiensis* – Vulnerable under the EPBC Act and Threatened under the BC Act.

No species had a high likelihood of occurrence due to a lack of suitable undisturbed vegetation types in the area.

No threatened or priority flora species were identified within the RSA 10 footprint.

Figure 12: Vegetation Mapping in the vicinity of RSA 10



4.4.3.2 Fauna

The following fauna assessments were completed for the RSA 10 project:

- Terrestrial fauna (Attachment 12);
- Aquatic fauna (Attachment 13); and
- Targeted survey for Carter's Freshwater Mussel (Attachment 14).

The terrestrial fauna assessment included a survey of fauna habitats and targeted searches for conservation significant species(Attachment 12). The targeted searches included:

- Identification of black cockatoo actual and potential foraging, breeding, nesting and roosting trees;
- Deployment of motion-sensitive cameras to detect nocturnal animals;
- Deployment of audio recorders to detect bats;
- Daytime searches of preferred habitats for conservation significant species; and
- Opportunistic fauna observations.

No threatened or priority fauna species have been recorded within the RSA 10 footprint as there is limited vegetation present and it does not provide appropriate habitat for conservation significant species. No adverse impacts to fauna are expected to occur as a result of the construction or operation of RSA 10.

Thirty-four threatened and priority terrestrial fauna species have the potential to occur within Alcoa's Wagerup landholdings. Most are likely to be irregular visitors or vagrants with eight expected to be residents or regular visitors:

- Coastal Plains Skink *Ctenotus ora* – Priority 3 species according to the Department of Biodiversity, Conservation and Attractions (DBCA);
- Carnaby's Cockatoo *Calyptorhynchus latirostris* - Endangered under the EPBC Act and Endangered under the BC Act;
- Baudin's Cockatoo *Calyptorhynchus baudinii* - Vulnerable under the EPBC Act and Endangered under the BC Act
- Forest Red-tailed Black Cockatoo *Calyptorhynchus banskii naso* - Vulnerable under the EPBC Act and Endangered under the BC Act
- Peregrine Falcon *Falco peregrinus* - Schedule 7 listing (other specially protected fauna) under the BC Act;
- Brush-tailed Phascogale *Phascogale tapoatafa* – Schedule 6 listing (conservation dependent fauna) under the BC Act;
- Quenda *Isodoon fusciventer* – Priority 4 species according to DBCA; and
- Rakali *Hydromys chrysogaster* - Priority 4 species according to DBCA.

Quenda and Brush-tailed Phascogale may inhabit vegetation associated with waterways adjacent to RSA 10. Several black cockatoo potential nesting and breeding trees were identified along the existing access road and waterways. No potential nesting or breeding trees were identified within the RSA 10 footprint.

There is a possibility that the Peregrine Falcon *Falco peregrinus* breeds in the survey area. A single bird was observed perched in a large tree on the northern edge of the RSA 10 footprint during the fauna assessment in 2022 (Attachment 12). Records indicate a pair of Peregrine Falcons were observed in 2016 near the southwestern corner of the residue management area. It is possible these 2016 and 2022 observations represent a resident pair which may breed in the general area.

The aquatic fauna assessment was conducted of Samson South Drain, Black Tom Brook and other waterways downstream of the RSA 10 footprint (Attachment 13). The assessment included:

- Water quality sampling;
- Survey for aquatic fauna including microinvertebrates, macroinvertebrates, fish and crayfish;
- Targeted survey for conservation significant aquatic/semi-aquatic fauna species including:
  - Carter's Freshwater Mussel (CFM) *Westralunio carteri* - Vulnerable under the EPBC Act; and
  - Black-striped minnow *Galaxiella nigrostriata* – Endangered under the EPBC Act.

No aquatic fauna species of conservation significance were identified with the exception of Carter's Freshwater Mussel (CFM).

CFM is listed as Vulnerable under the EPBC Act and therefore Alcoa commissioned SLR to conduct a follow up targeted survey for CFM (Attachment 14). The targeted survey identified CFM populations up and downstream of the RSA 10 footprint. No CFM were identified adjacent to the RSA 10 footprint, possibly due to the presence of thick in-stream vegetation (*Typha* species) growing within Samson South Drain at this location.

SLR concluded that appropriate management of stormwater runoff from RSA 10 and retention of the in-stream vegetation along the Samson South Drain should provide adequate protection to the downstream CFM population. Minimal disturbance is proposed to the in-stream vegetation at two locations to install culverts as part of upgrading the existing access road. Clearing of this vegetation is outside of the scope of this works approval application.

4.4.3.3 Aboriginal and Other Heritage Sites

An archaeological and ethnographic heritage survey of the project and surrounding areas was completed in 2022 (Attachment 18). No heritage sites were identified within the RSA 10 footprint. The nearest registered Aboriginal heritage sites and places are:

- 3232 Wagerup 1 Artefacts/scatter, camp – Registered Site;
- 3235 Wagerup 4 Artefacts/scatter, camp – Registered Site;
- 3233 Wagerup 2 Artefacts/scatter, camp – Other Heritage Place;
- 3234 Wagerup 3 Artefacts/scatter - Other Heritage Place; and
- 3236 Wagerup 5 Artefacts/scatter, camp - Other Heritage Place.

There are no other historic heritage buildings or sites near Alcoa's Wagerup landholdings.

4.4.3.4 Public Drinking Water Source Areas

There are no Public Drinking Water Source Areas (PDWSAs) within the RSA 10 footprint. The nearest PDWSA is the Samson Catchment Area, which is located 9 km north-east, and upstream, of RSA 10. No impacts are anticipated to the PDWSA as a result of the construction or operation of RSA 10.

4.4.3.5 Wetlands

A surface water assessment was completed for RSA 10 (Attachment 17). Most of Alcoa's Wagerup landholdings, including the RSA 10 footprint, are mapped as a multiple use wetland, comprising a palusplain (seasonally waterlogged flat) that extends north-south along the Swan Coastal Plain. Downstream of the RSA 10 footprint, the lower extent of the Samson South Drain is mapped as a conservation wetland (floodplain flat), with two linear resource enhancement sumpland basins more than 2 km west (Figure 13).

Two wetland systems of conservation significance are located downstream of the RSA 10 footprint:

- The Peel Yalgorup System – Ramsar listed wetland and included in the Directory of Important Wetlands in Australia. The Samson South Drain discharges into the Harvey River which then discharges into the Peel Yalgorup System located approximately 25 km downstream of the RSA 10 footprint.
- The Yalgorup Lakes – Ramsar listed wetlands located approximately 14.5 km west of RSA 10. There is no direct surface water discharge from the RSA 10 footprint into the Yalgorup Lakes.

The Peel Inlet Management Area, a gazetted Water Ways Conservation Act (1976) Management Area, is located approximately 1 km west of the RSA 10 footprint.

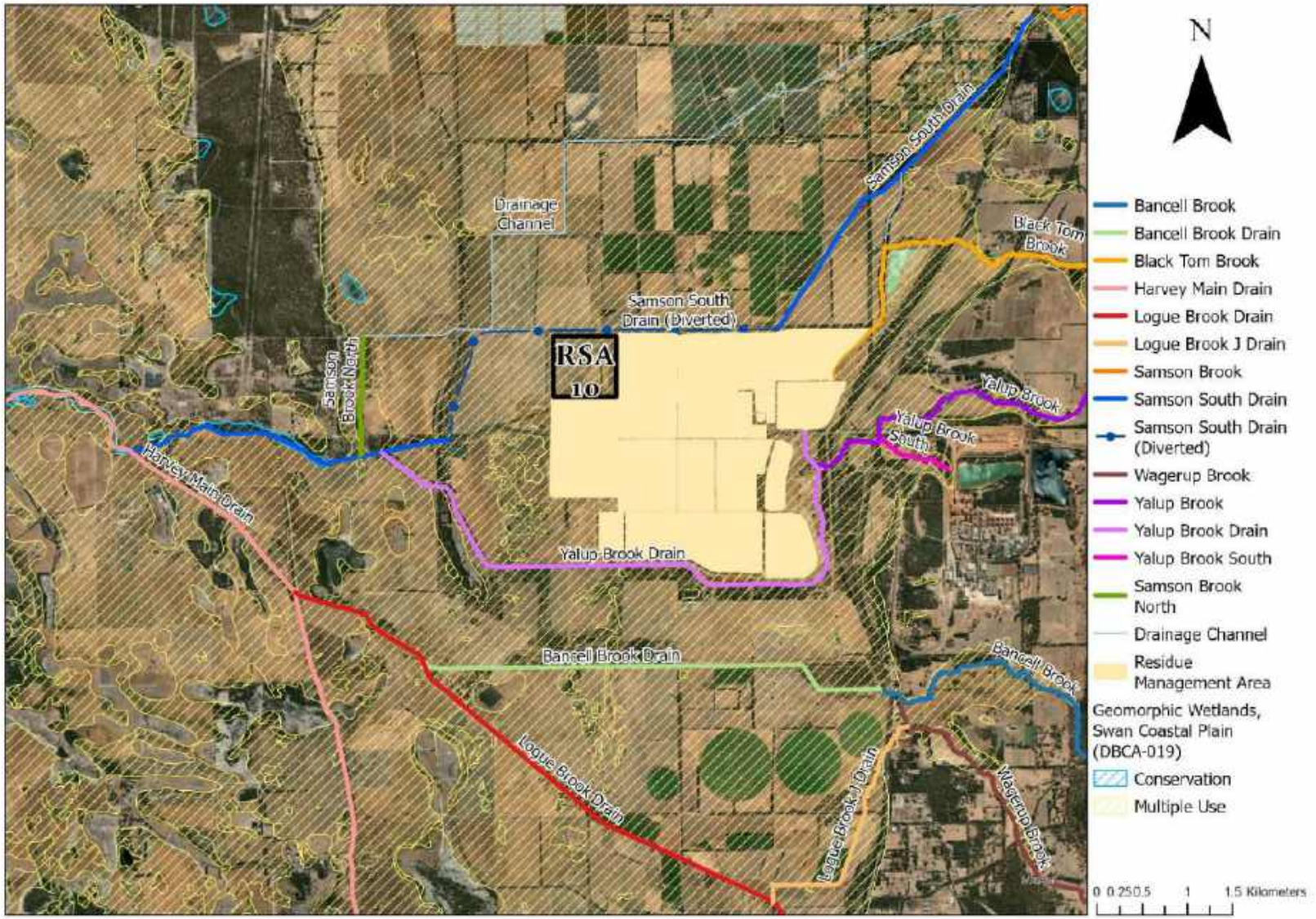
No Groundwater Dependent Ecosystems (GDEs) were identified in the flora and vegetation assessment (Attachment 11). The RSA 10 footprint is considered to be artificially seasonally inundated due to historically altered hydrology from agriculture and Alcoa's residue management area.

The surface water assessment identified the following potential groundwater dependent ecosystems within Alcoa's Wagerup landholdings:

- Riparian vegetation along streamlines and drainage lines that have a groundwater contribution to baseflow or where groundwater is within 10 m of the natural ground; and
- Isolated remnant vegetation stands across Alcoa's farmlands which include species that prefer seasonally waterlogged soils.

Native vegetation present within the RSA 10 footprint (to be cleared) may represent a groundwater dependent ecosystem.

Figure 13: Wetlands and Surface Water near the RSA 10 Footprint



4.4.3.6 Acid Sulfate Soils Mapping

The RSA 10 footprint is mapped as having a 'moderate to low' risk of acid sulfate soils (ASS) occurring within 3 m of the natural ground surface but 'high to moderate' risk of ASS beyond 3m of natural soil surface (GHD, 2023).

A detailed investigation was undertaken (Section 6.1.4 and Attachment 22) which indicates the near surface soils at the site, while slightly acidic are not Actual ASS (AASS), and they are also considered not to be potentially acid sulfate soils (PASS). Treatment of the soil is therefore not required.

4.4.3.7 Potential Impacts to Environmentally Sensitive Areas and Receptors

Figure 14 depicts the DWER mapped Environmentally Sensitive Areas (ESAs) within the vicinity of the RSA 10 footprint.

Figure 15 shows sensitive receptors near the RSA 10 footprint.

Table 6 summarises the potential impacts to environmentally sensitive areas and receptors and proposed controls to prevent or mitigate any potential adverse impacts.

Figure 14: Environmentally Sensitive Areas (DWER-046)

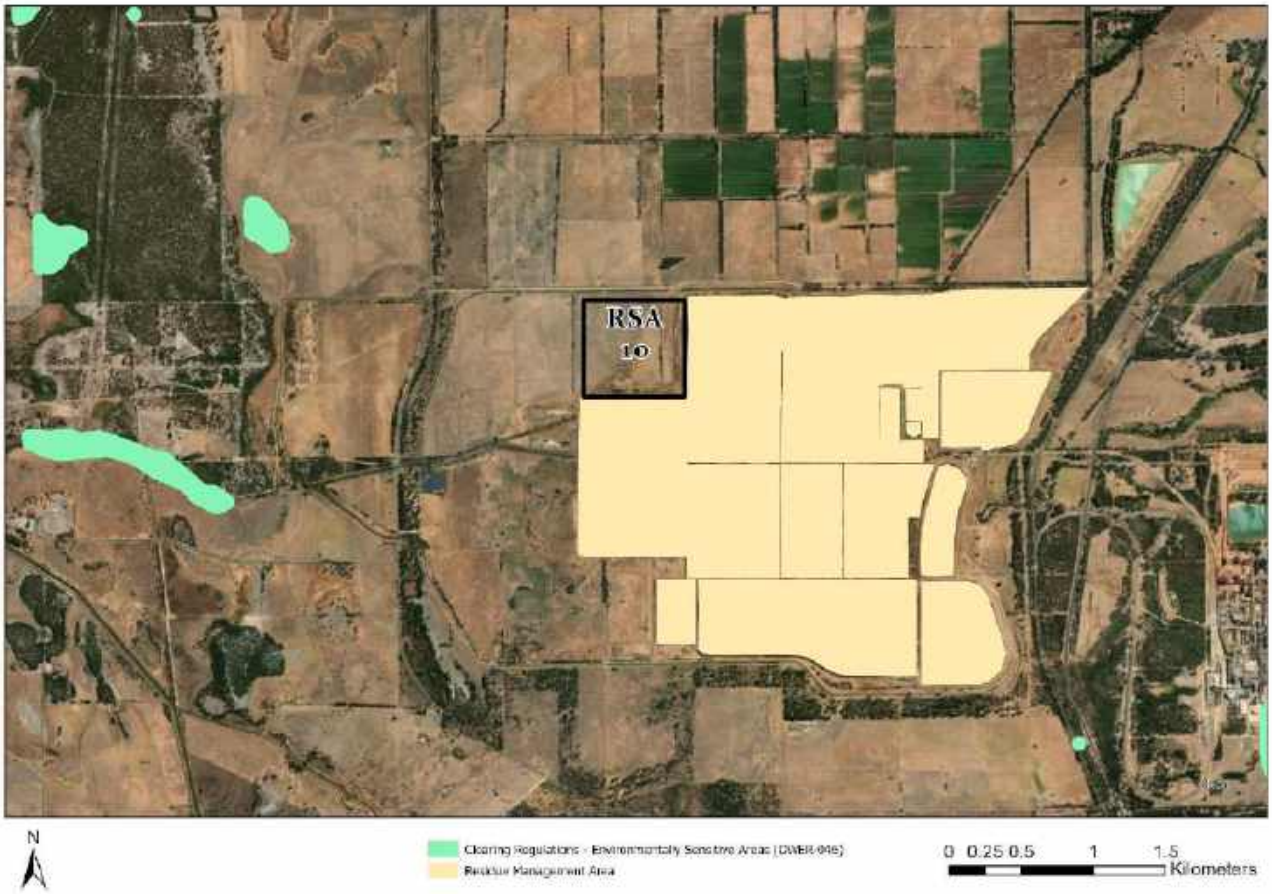


Figure 15: Discrete Sensitive Receptors Near RSA 10 (ETA, 2024)

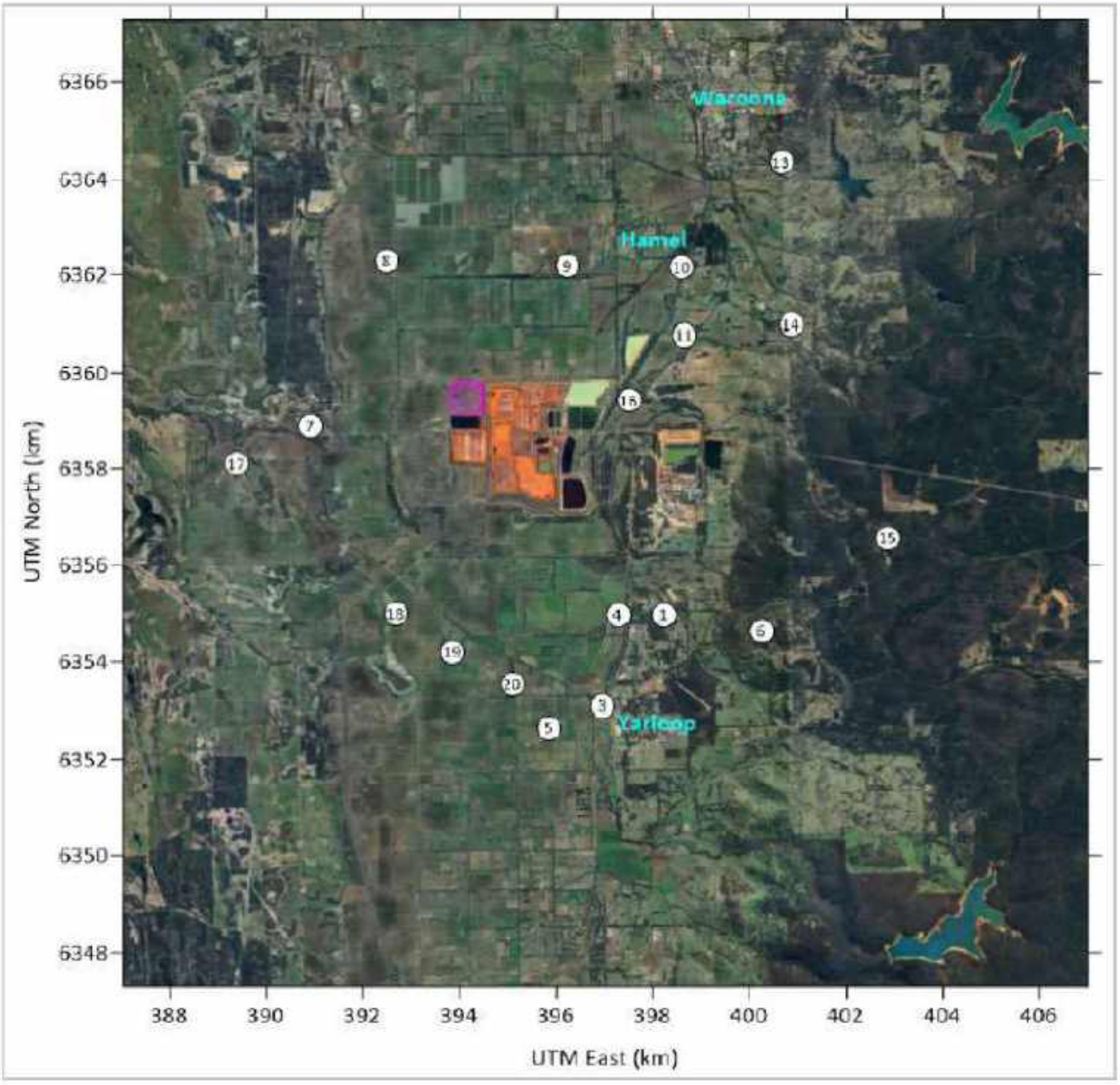


Table 6: Potential Impacts to Environmentally Sensitive Areas and Receptors

Sensitive Receptor	Description	Distance from RSA 10 Footprint	Proposed controls to prevent or mitigate adverse impacts (if applicable)
Sensitive Land uses / users	No sensitive land uses / users are expected to be impacted by the construction or operation of RSA 10 as it is located within a pre-existing prescribed premises boundary. The nearest sensitive land users to the RSA 10 footprint are located 3 km north-west and 3.5 km west.	The nearest residential properties are located approximately 3 km north-west (Figure 15).	Dust will be managed in accordance with a project specific construction dust management plan (Attachment 23). Temporary dust monitors will be installed near the RSA 10 footprint (Attachment 8) to monitor dust emissions in real time to facilitate the implementation of immediate dust control measures. Noise and odour emissions will be managed in accordance with Alcoa's existing standard operating procedures and L6217/1983/15.
Threatened Ecological Communities (TEC) and Priority Ecological Communities (PECs)	There are no TECs or PECs within the RSA 10 footprint.	No TECs or PECs occur within the RSA 10 footprint. The nearest threatened ecological community record is located 3 km east of the RSA 10 footprint.	No specific controls are proposed in this works approval application to minimise impacts to TECs.
Threatened and priority flora	No threatened or priority flora species have been identified within the RSA 10 footprint. No priority flora species are likely to occur within the RSA 10 footprint due to the lack of suitable vegetation types (Attachment 11).	No threatened or priority flora occur within the RSA 10 footprint. The nearest threatened flora species record is located 3.5 km south-east of the RSA 10 footprint.	No specific controls are proposed as no adverse impacts are expected. Dust emissions at the location of the nearest threatened flora species record are unlikely to impact vegetation health. Potential impacts to groundwater will be managed in accordance with the conditions outlined in the existing DWER Licence and the Wagerup Alumina Refinery Ground Water and Surface Water Licences Operating Strategy (Alcoa, 2020).

Sensitive Receptor	Description	Distance from RSA 10 Footprint	Proposed controls to prevent or mitigate adverse impacts (if applicable)
Threatened and priority fauna	There are no threatened or priority fauna records within the RSA 10 footprint as there is limited vegetation present. No foraging, nesting, or breeding trees suitable for black cockatoo species or suitable habitat for Quenda or Brush-tailed Phascogale is present within the RSA 10 footprint. Widening of the existing access road may require the clearing of potential black cockatoo foraging/nesting/breeding trees and riparian vegetation which may provide habitat for Quenda or Brush-tailed Phascogale. These potential impacts will be assessed as part of the clearing permit application, if required (Section 1.3). Carter's Freshwater Mussel (CFM) populations have been identified within the Samson South Drain at locations upstream and downstream but not adjacent to RSA 10.	The closest potential nesting tree for black cockatoos is located approximately 1.5 km east of the RSA 10 footprint. Vegetation communities mapped as M2 and M3 (refer Figure 12) represent potential Black Cockatoo nesting and foraging sites, and are located more than 1 km from the RSA 10 footprint. The nearest identified resident habitat for Quenda and Brush-tailed Phascogale is located approximately 2 km south-west of the RSA 10 footprint. Vegetation communities mapped as M2 and M3 (refer Figure 12) represent potential Phascogale habitat and/or movement corridors, and are located more than 1 km from the RSA 10 footprint. A CFM population has been identified 2.8 km downstream of the RSA 10 footprint.	Vegetation within the RSA 10 footprint will be checked by a fauna specialist prior to clearing activities commencing. Fauna relocation will be undertaken in accordance with existing standard operating procedures and Alcoa's Department of Biodiversity, Conservation and Attractions Fauna Taking (Relocation) Licence (No. FR28000390). A project specific surface water management plan has been developed for construction of RSA10 (Attachment 24). Stormwater from RSA 10 will be contained onsite and collected for re-use, with no direct stormwater discharge to Samson South Drain from RSA 10 construction activities. Uncontaminated runoff will be directed to temporary unlined surface water catchment sumps designed to attenuate flows from 1 in 5 year (20%) AEP rainfall events (24 hours) and transferred to existing detention ponds, with emergency overflows to Alcoa farmlands. Runoff from the construction laydown and heavy vehicle park up areas that may contain contaminants, including hydrocarbons, will be directed to a series of lined sumps and pumped to the ROCP3 for re-use. Inspections will be undertaken of site drainage and stormwater management systems to assess and maintain integrity and operation. A surface water quality assessment was completed as part of the aquatic fauna assessment (Attachment 13). Surface water quality monitoring will be undertaken within Samson South Drain during construction of RSA 10 (Attachment 8).

Sensitive Receptor	Description	Distance from RSA 10 Footprint	Proposed controls to prevent or mitigate adverse impacts (if applicable)
Aboriginal and other heritage sites	There are five archaeological artefact scatters within Alcoa's Wagerup landholdings, however these will not be impacted by the construction or operation of RSA 10. There are no sites of potential historic heritage significance near the RSA 10 footprint.	The nearest Aboriginal heritage site is located approximately 3 km north-east of the RSA 10 footprint.	No specific controls proposed because no adverse impacts are expected.
Public Drinking Water Source Area (PDWSA)	The RSA 10 footprint is not located in a PDWSA, with the nearest being the Samson Brook Catchment Area located 9 km north-east of RSA 10. Alcoa's facilities are downgradient from the PDWSA.	The nearest PDWSA is located approximately 9 km north-east of the RSA 10 footprint.	No controls are proposed because no adverse impacts are expected due to the significant distance between the RSA 10 footprint and the nearest PDWSA.

Sensitive Receptor	Description	Distance from RSA 10 Footprint	Proposed controls to prevent or mitigate adverse impacts (if applicable)
Rivers, lakes, oceans and other bodies of surface water, etc	The RSA 10 footprint is located within land mapped as a Multiple use wetland and is adjacent to the Samson South Drain.	The Samson Brook South Drain is located 12 m from the toe of the RSA 10 embankment.	A project specific surface water management plan has been developed for construction of RSA10 (Attachment 24). Stormwater from RSA 10 will be contained onsite and collected for re-use, with no direct stormwater discharge to Samson South Drain from RSA 10 construction activities. Uncontaminated runoff will be directed to temporary unlined surface water catchment sumps designed to attenuate flows from 20% AEP rainfall events (24 hours) and transferred to existing detention ponds, with emergency overflows to Alcoa farmlands. Runoff from the construction laydown and heavy vehicle park up areas that may contain contaminants, including hydrocarbons, will be directed to a series of lined sumps and pumped to the ROCP3 for re-use. Inspections will be undertaken of site drainage and stormwater management systems to assess and maintain integrity and operation. A surface water quality assessment was completed as part of the aquatic fauna assessment (Attachment 13). Surface water quality monitoring will be undertaken within Samson South Drain during construction of RSA 10 (Attachment 8).
Groundwater Dependent Ecosystems (GDEs)	The RSA 10 footprint does not contain any GDEs and its hydrology has been significantly altered due to agriculture and Alcoa's operations.	No GDEs have been mapped within close proximity to RSA 10.	No specific controls proposed because no adverse impacts are expected as a result of the construction and operation of RSA 10.
Acid Sulfate Soils (ASS)	The RSA 10 footprint is mapped as having a moderate to low risk of ASS occurring within 3 m of the natural ground surface but high to moderate risk of ASS beyond 3m of natural soil surface.	A detailed investigation has been undertaken which indicates the near surface soils at the site, while slightly acidic are not Actual ASS (AASS), and they are also considered not to be PASS (see Section 6.1.4).	No specific controls proposed as no AASS or PASS present.

5 Materials Characterisation

TSF Checklist: Part 5.

Alcoa's Wagerup Alumina Refinery produces alumina from bauxite ore using the Bayer process. Aluminium containing minerals within the bauxite ore are digested under pressure in a hot solution of caustic soda (NaOH). "Hydrate" (aluminium trihydroxide $Al(OH)_3$) is precipitated from the solution and is then calcined, driving water from its chemical structure and converting it to alumina (Al_2O_3).

This leaves an insoluble bauxite residue of mainly oxides which is settled and washed to recover caustic soda for re-use in the process. The remaining part of the bauxite residue, comprising mud and sand-sized particles, is transported as a slurry to the residue management area.

Water for processing is sourced via Alcoa's surface and groundwater extraction licences (refer Section1.3.6). Stormwater and process water is also captured across the Refinery and residue management area and re-used in the refinery processing.

The next step involves thickening of the residue slurry by separating the clay and sand fractions and reducing the water content to approximately 50%. The sand fraction is used for constructing RSA embankments, drainage layers within RSAs, and in the construction of roads. The residue mud is then deposited into RSAs. No blending is undertaken of the residue mud prior to storage.

Bauxite residue is composed primarily of iron and silica minerals. Residue from Darling Range bauxite is characterised by a high coarse fraction, due to silica in the bauxite. The coarse fraction can be considered as a fine to medium grained sand with a specific gravity of 2.9. This residue sand has proved to be an ideal material for embankment and road construction within the dry stacking operation, as a free draining material suitable for surface rehabilitation, and for the construction of drainage layers at the base of the RSAs (Alcoa, 1997). The fine fraction of the residue, commonly termed 'red mud', is silt to clay sized material with a specific gravity of 3.2. The higher specific gravity of the fine fraction results from the relatively high iron content. This fine fraction settles very slowly and has little strength unless dewatered or dried. When in slurry form, the fine fraction must be contained within approved engineered embankments (Attachment 16). Wagerup Refinery's residue properties for the are monitored quarterly.

Residue has a total alkalinity of between 20 and 30 grams per litre (g/L) expressed as sodium carbonate, and a pH of 13. It is the alkalinity of the residue that affects the mud drying rate and the dusting potential of the residue surface (Attachment 16).

Potential contaminants of concern associated with seepage from RSAs include electrical conductivity (EC), pH and alkalinity (measured as mg/L of $CaCO_3$). There is no risk of acidic or metalliferous drainage, fibrous minerals or erosive or dispersive materials.

Background radioactivity levels associated with the rocks and soils of the Darling Range are higher than those found on the Swan Coastal Plain. The refining process results in a concentration of these naturally radioactive elements therefore Alcoa's filter cake exhibits levels of radiation marginally above background levels. Alcoa has commissioned comprehensive monitoring of air, water and soil, and all levels have been demonstrated to be well within acceptable limits prescribed for both the workforce and the public. Immediately adjacent to the boundary of Alcoa's residue management area, the levels of radiation remain well below exposure standards and less than natural background levels in many local residential areas (Alcoa, 2017).

The residue deposition methodology is described in Sections 3.1 and 7.2.

6 Seepage and Water Management

TSF Checklist: Part 6.

6.1 Hydrogeology

TSF Checklist: Part 6.1; Application Form: Part 10.3.

6.1.1 Climate

The Wagerup area experiences a Mediterranean-type climate, with hot dry summers and cool wet winters. On average, rainfall occurs during every month of the year with most falling during winter and spring. Alcoa maintains a weather station on the eastern side of the Wagerup Alumina Refinery with data provided to the Bureau of Meteorology (Station No. 009894) (Rockwater, 2023).

The warmest months at Wagerup are January and February, when maximum temperatures average over 30 degrees and can exceed 40 degrees (Bureau of Meteorology, 2024). The coldest months are July and August, when the average maximum temperature is around 17 degrees. Humidity generally peaks in the early mornings and drops during the day and is higher in winter than summer (Alcoa, 2017).

Average monthly temperatures for the Wagerup refinery are not available. The nearest Bureau of Meteorology weather station which records temperatures is located at the Wokalup weather station which is located approximately 22 km away. A summary of monthly and annual temperatures is included in Table 7.

Table 7: Wokalup Mean Maximum and Minimum Monthly Temperatures (1991-2020)

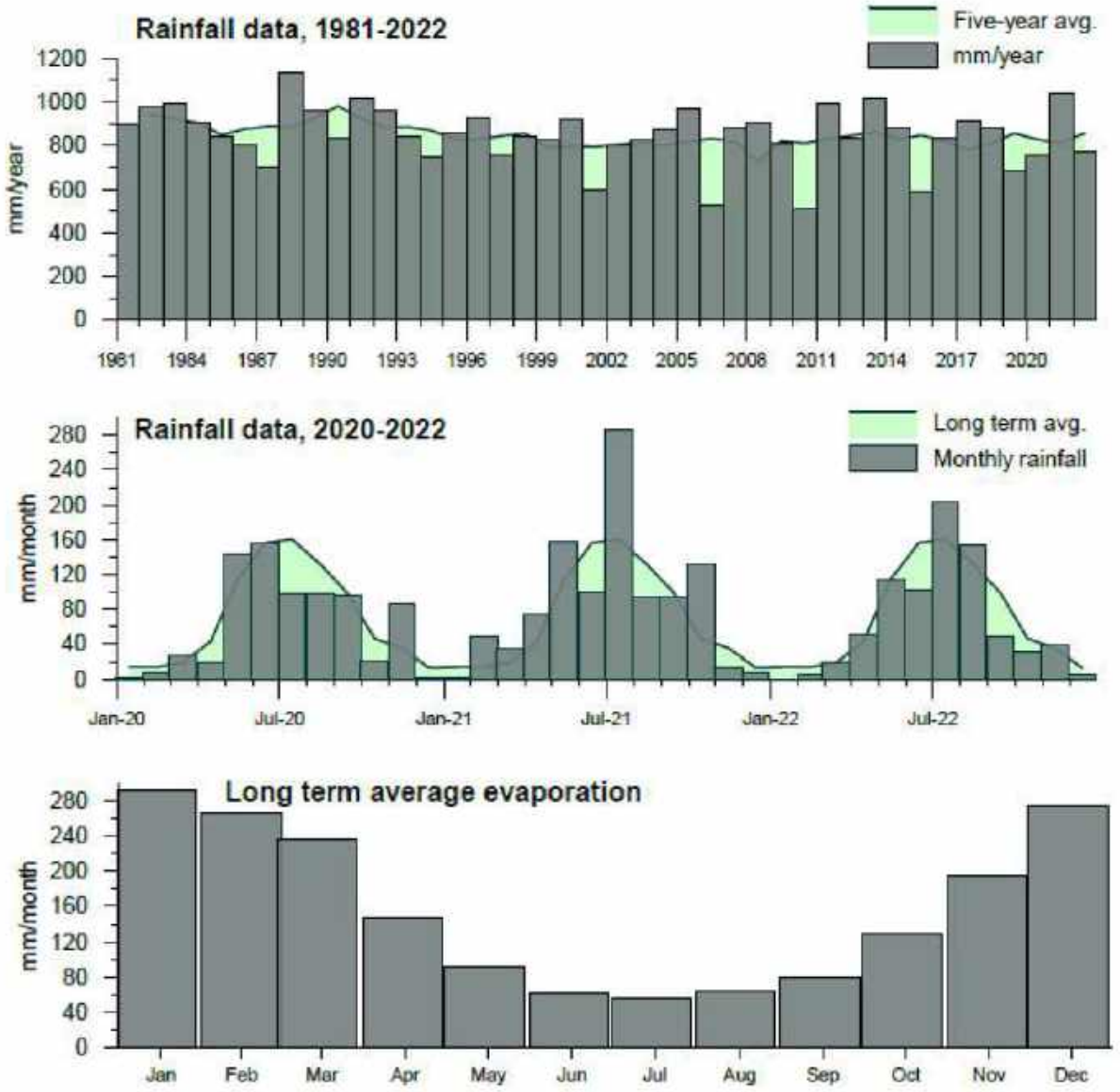
Temperature	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean maximum temperature (°C)	30.9	30.8	28.2	25.0	21.0	18.0	16.9	17.4	18.6	21.5	24.5	29.1	23.5
Mean minimum temperature (°C)	15.7	15.9	15.0	13.0	10.7	9.2	8.3	8.1	8.6	9.0	11.4	14.0	11.6

Mean annual rainfall is 841 mm with mean monthly rainfall ranging between 14 mm in February and 160 mm in July. Around 80% of annual rainfall generally occurs in the five-month period between May and September. There is a general trend of decreasing annual rainfall since the mid-1990s (Rockwater, 2023).

The mean annual evaporation rate is 2,059 mm with monthly average rates ranging between 73 mm in July and 310 mm in January and December. Evaporation exceeds rainfall on average for seven months of each year, between January to April, and October to December (Rockwater, 2023).

Over time, the climate is predicted to become hotter and drier as a result of climate change. It is expected that continual increases in air temperature, along with more extreme heat and fewer extreme cold events will typify the future long-term climate conditions within the region.

Figure 16: Mean Rainfall and Evaporation Summary for Wagerup Alumina Refinery (Rockwater, 2023).

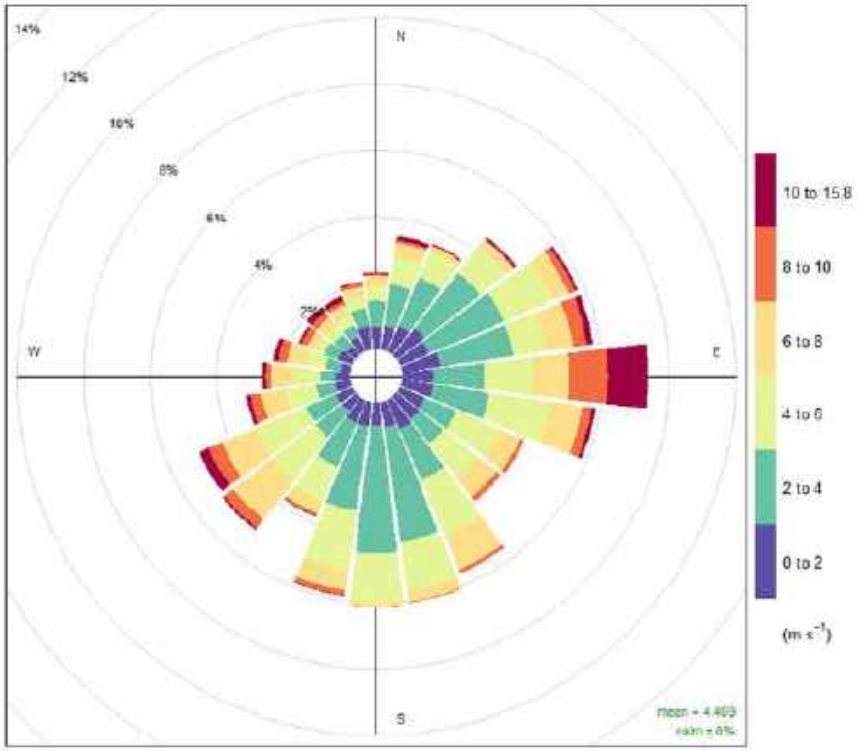


Winds at the Refinery are controlled by synoptic weather patterns, local features such as the topography, and sea and land breezes. Wagerup Refinery is located at the base of the Darling Scarp which influences wind patterns via:

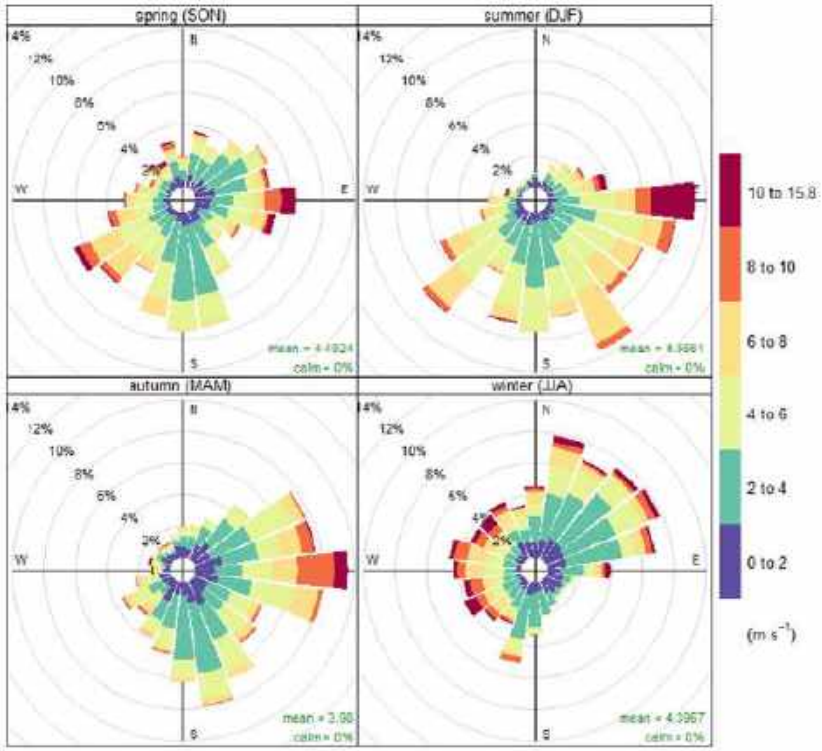
- Generation of very strong gully or foothill winds during summer, particularly at night and in the early morning;
- Creation of rotors or wind reversals near the foothills during easterly winds;
- Channelling or deflection of westerly winds up the escarpment; and
- Creation of katabatic wind flows down the escarpment.

During the summer months, easterly winds are generated from high pressure systems passing over the southwest corner of Western Australia. In winter, westerly winds are caused by cold fronts and low pressure systems. Mean wind speeds and directions for the residue management area are presented in Figure 17.

Figure 17: Annual and Seasonal Wind Roses – June 2021 to May 2022 (ETA, 2024)



Frequency of counts by wind direction (%)



Frequency of counts by wind direction (%)

6.1.2 IBRA Bioregions

The Interim Biogeographic Regionalisation for Australia (IBRA) classifies the Australian continent into regions or bioregions on the basis of similar geology, landform, vegetation, fauna, and climate characteristics. The RSA 10 project is located on the eastern edge of the Swan Coastal Plain IBRA subregion .

6.1.3 Land Systems and Soils

The Refinery is located on the eastern edge of the Swan Coastal Plain adjacent to the Darling Scarp. Much of the land on the coastal plain has been cleared for agricultural purposes.

The residue management area overlies sedimentary units of the Perth Basin and groundwater typically occurs at shallow depths of less than 5 m below ground level. A summary of the shallow stratigraphy in the area is shown in Figure 20. The stratigraphic sequence broadly consists of Cenozoic (late-Tertiary and Quaternary) deposits and underlying Mesozoic deposits. The deposits making up the superficial formations in the Wagerup area are the Guildford Formation, Yoganup Formation, and Ascot Formation. These formations unconformably overlie the Leederville Formation, and may overlie the older Cattamarra Coal Measures (Rockwater, 2023).

Based on DEMIRS published geology mapping the RSA 10 footprint is located on the following geological unit:

- – Ms2 – Sandy Silt: strong brown to mid-grey mottled blocky disseminated fine sand of alluvial origin.

The shallow stratigraphy in the RSA 10 footprint consists of Guildford Formation overlying the Ascot Formation, which is inferred to inter-finger with the Yoganup Formation to the east of the residue management area. The superficial formations unconformably overlie the Leederville Formation at about 15 m AHD. The Guildford Formation in the Wagerup area is typically a yellow- or grey-coloured clay, clayey sand, or clayey gravel which in some locations includes horizons of well-indurated ferricrete. The Guildford Formation occasionally contains thin layers of sand, which are inferred to be channel lag deposits. Geotechnical testing identified thin sheets of relatively permeable sand within the Guildford Formation at this location. The total thickness of Guildford Formation in the vicinity of the residue management area ranges between 5 m and 15 m, pinching out to the east beneath the Refinery. Perched water tables have developed in some locations in the Guildford Formation above layers having very low hydraulic conductivities (Rockwater, 2023).

The south-west region of Western Australia is subject to an apparent concentration of earthquakes, therefore the RSA 10 design criteria has considered earthquake risk and long-term stability.

6.1.4 Acid Sulfate Soils

Application Form: Part 10.

The RSA 10 footprint is mapped as having a moderate to low risk of acid sulfate soils (ASS) occurring within 3 m of the natural ground surface but 'high to moderate' risk of ASS beyond 3m of natural soil surface (GHD, 2023).

An ASS assessment (Attachment 22) was completed within the RSA 10 footprint in accordance with DWER's Guideline: Identification and Investigation of Acid Sulfate Soils and Acidic Landscapes (DER, 2015). The soils over the RSA 10 footprint and clay borrow pit areas are considered to have slightly acidic soils however the majority of soil samples and all samples below 2 m depth are assessed as non-sulfidic soils. The results of the investigation indicate the near surface soils at the site are slightly acidic and not Actual ASS (AASS). The soils were assessed for Potential ASS (PASS) using the results of the pH_{FOX} and S_{CR} analysis. The results of this analysis indicated that soils at the site were considered not to be PASS within the investigation extent. No AASS or PASS will be disturbed by the RSA 10 project, and therefore no treatment of the soil is required.

6.1.5 Hydrology

The Refinery is located within the lower Harvey River Catchment in the Harvey Estuary Environmental Protection Policy (1992) area. The purpose of this policy is to protect the Peel-Harvey estuarine system, maintain environmental quality objectives and to prevent environmental damage, primarily from nutrient pollution. The Peel Inlet Management Area, a gazetted Waterways Conservation Act management area, is located approximately 1 km west of the RSA 10 footprint. The Harvey River Main Drain (Figure 18) lies approximately 4 km to the west of the RSA 10 footprint and flows in a north-westerly direction discharging into the Harvey Estuary (GHD, 2023).

Existing drainage within the area has been significantly modified. Agricultural drains were constructed to drain low-lying farmlands of the coastal plain section that were winter water-logged, and modified sections of rivers and brooks have been renamed as drains. Surface water systems are also highly regulated with some of the upland forested streams dammed for water supply and surface flows diverted for district irrigation schemes (GHD, 2023).

Surface water drainage is directed around the north of the existing residue management area via the Samson South Drain which is fed by a small catchment to the north of the Refinery. A section of Samson South Drain was previously diverted around the long-term residue management area footprint (Alcoa, 2017). The Samson South Drain (diverted section) passes to the north of the proposed RSA 10 but south of the current planned topsoil stockpile and borrow pit areas. The RSA 10 footprint, haul road, laydown and construction office facilities are all located within the Samson South Drain catchment area.

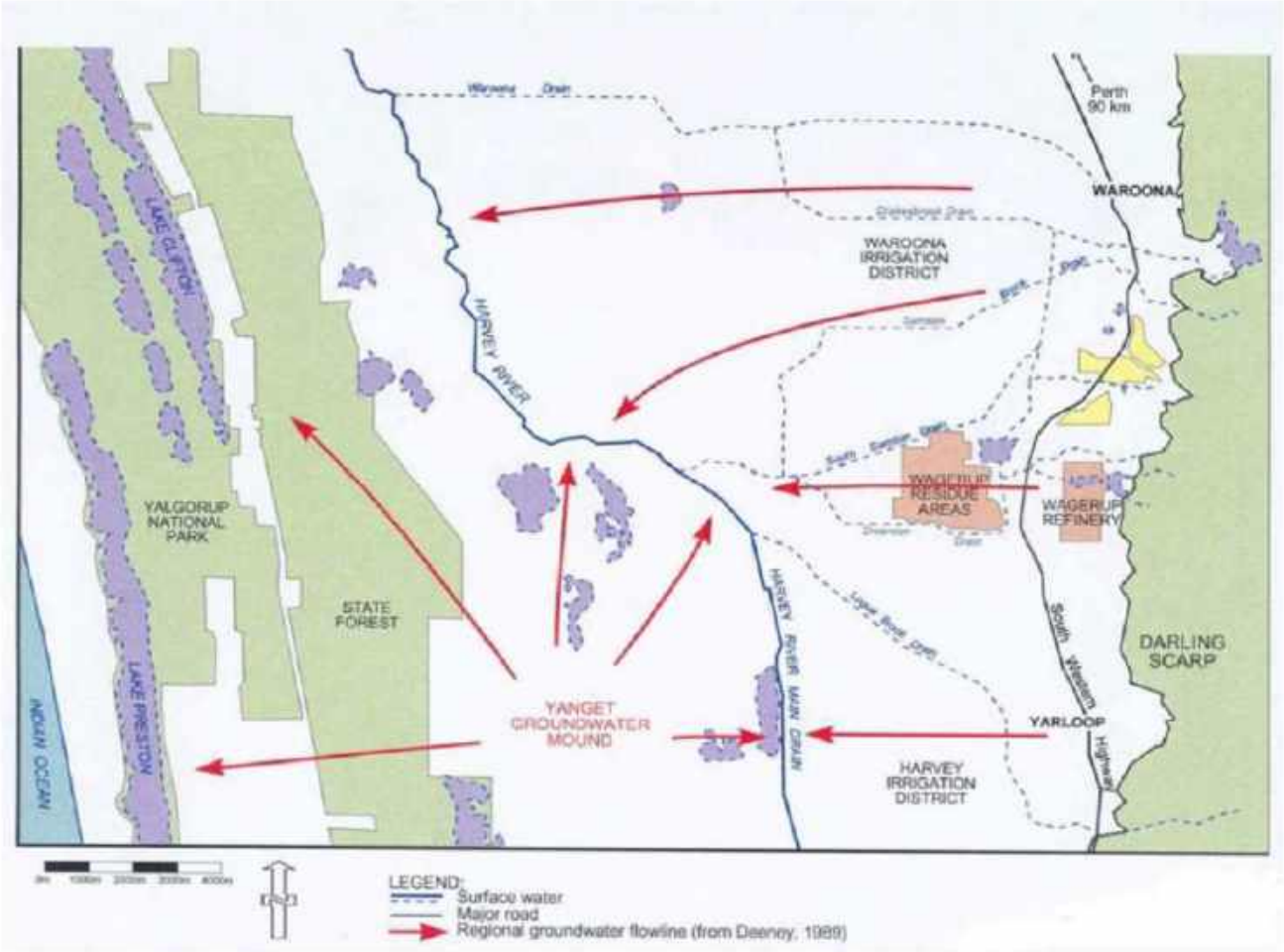
There are no Environmental Protection Policy (EPP) listed wetlands in the immediate vicinity of the Wagerup Refinery or residue area. There is one EPP listed wetland located approximately 1 km south of the residue management area, on the northern side of Bancell Road. This wetland, often referred to as Exelby Wetland is part of a low-lying swampland on Bancell creek, was traditionally an ephemeral wetland, however due to the inflow of excess irrigation water from surrounding farmland, it has become a permanent water body. Other nearby wetlands include four small wetlands near Yarloop (located approximately 3.5 km south of the

Refinery), and three small wetlands near Hamel (located approximately 4 km north of the Refinery) (Alcoa, 2017). The proposed RSA 10 footprint sits at the margins of seasonally wet palusplain dampland.

Surface water has been diverted around the residue management area by two channels – the Samson South Drain on the north side, and the South Samson Diversion Drain on the eastern and southern sides. Samson South Drain is fed mainly by a small catchment to the north of the Refinery. The South Samson Diversion Drain intercepts surface water from the catchments of North Yalup Brook, South Yalup Brook, the Refinery, residue management area and overflow from DP1 (Rockwater, 2023).

In 2019, Alcoa received approval from DWER to construct and operate a spillway structure to provide controlled discharge from the ROWS pond. The construction of this structure is a recommendation of the ANCOLD and ICOLD guidelines to manage flow in extreme weather events. The spillway was completed in 2019 and is only permitted to be activated in the event of a wet winter, in accordance with the conditions in Licence L6217/1983/15.

Figure 18: Surface Hydrology at Wagerup Alumina Refinery (Rockwater, 2023)



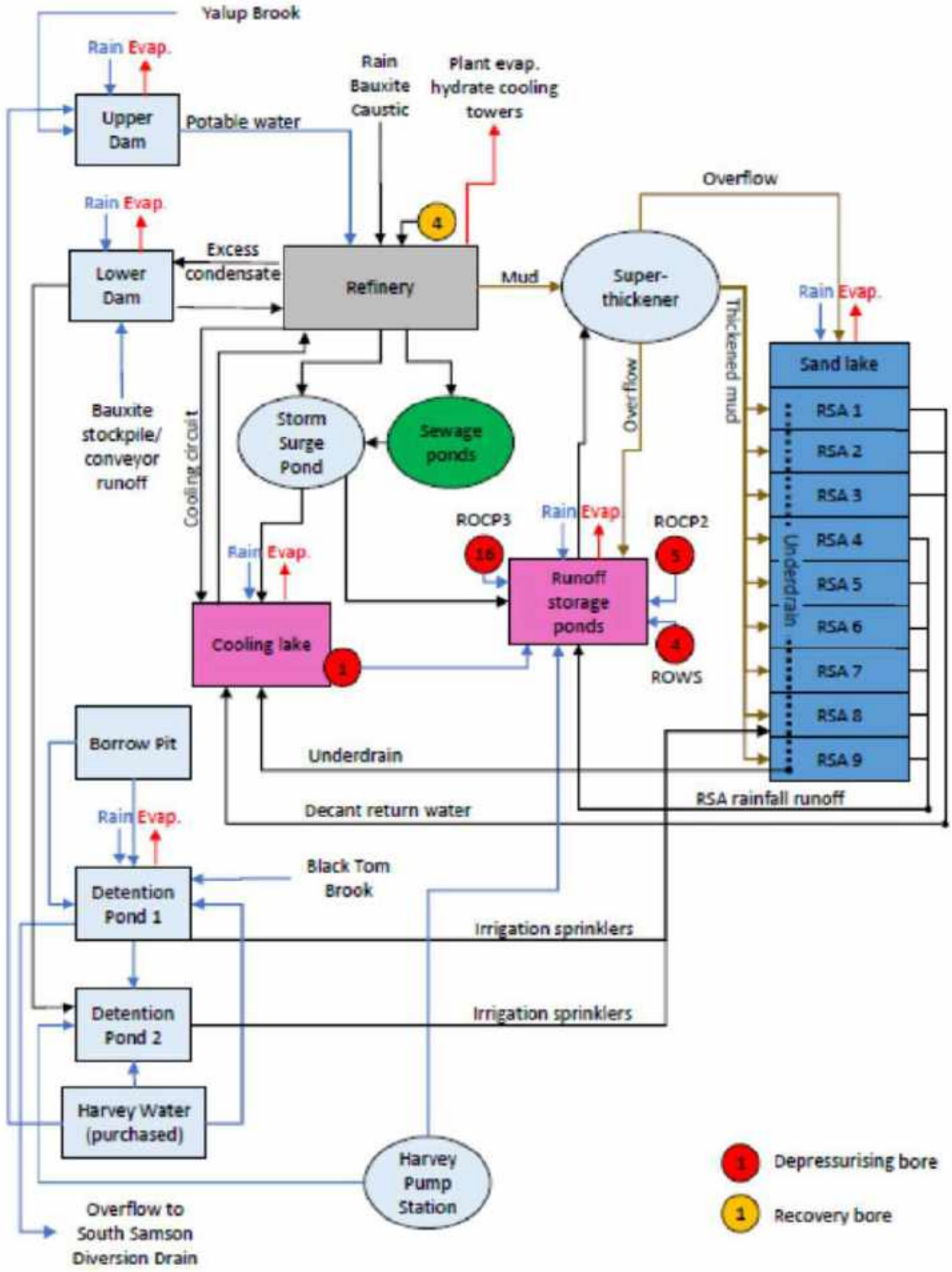
Process water for the Refinery is largely derived from stormwater runoff collected at the Refinery and residue management area, runoff from the Yalup Brook catchment, and pumping from the Harvey River Main Drain (Figure 19). The harvesting of surface water from the Yalup Brook catchment and the Harvey River is subject to DWER abstraction licences listed in Table 2. Small supplies of additional process water are obtained from:

- DWER licensed groundwater sources including depressurising bores;
- An underdrainage collection sump at the residue management area;
- Alkali recovery bores at the Refinery; and
- The borrow pit north-east of the RSA 10.

Discharge from the depressurising borefields is directed either to the adjacent water storage facility or DP 2. Groundwater produced by the four alkali recovery bores is directed into the Refinery process water circuit.

Alcoa also purchases irrigation water from Harvey Water which a privately owned irrigation cooperative (Rockwater, 2023).

Figure 19: Wagerup Alumina Refinery Site Water Balance (Rockwater, 2023)

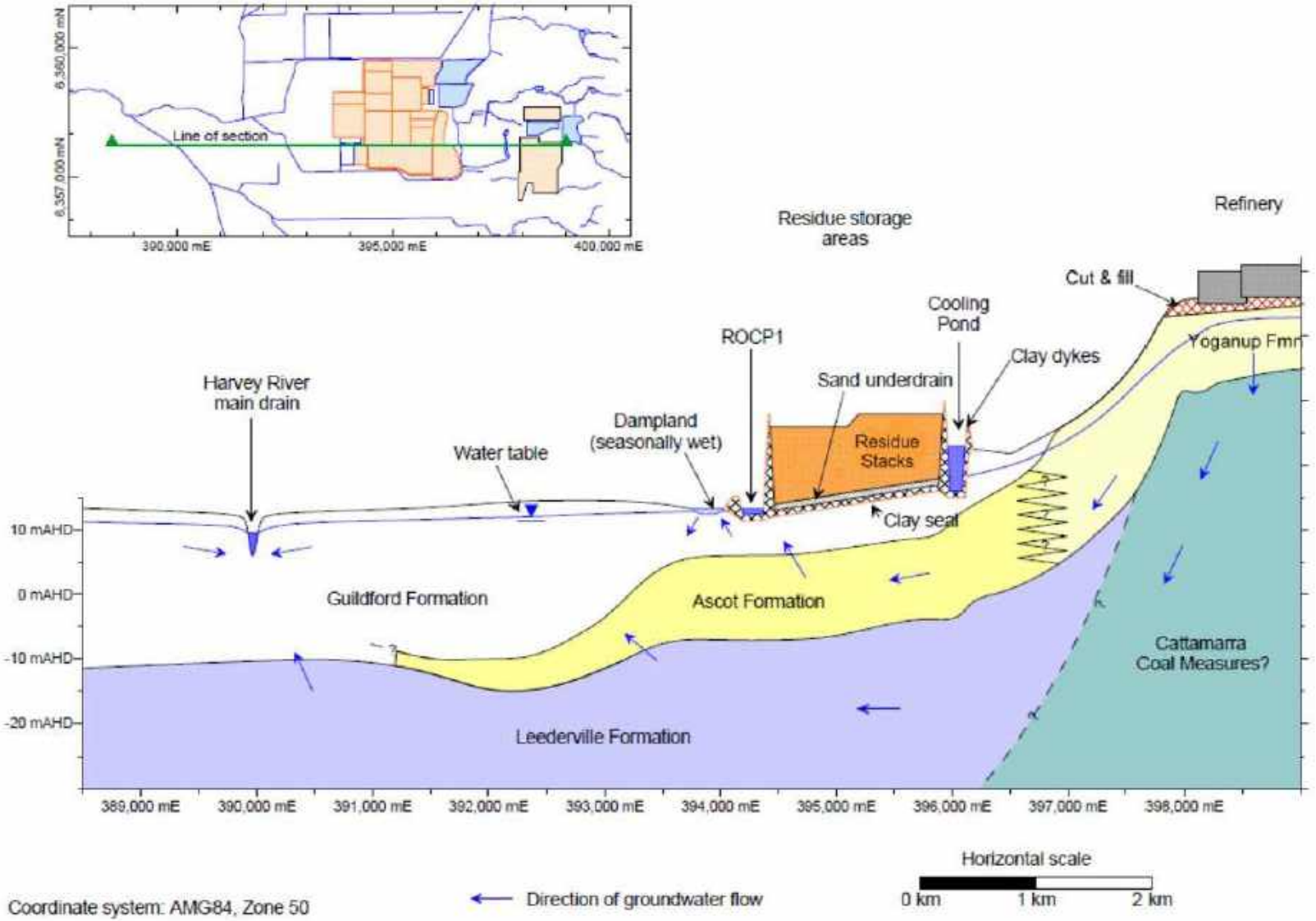


6.1.6 Hydrogeology

The superficial geological formations in the region are heterogeneous, comprising zones of very permeable clay, sandy clay, laterite and sand. Under the Refinery and residue management area, the superficial formations can generally be divided into an upper layer with low permeability and a lower layer with higher permeability (Alcoa, 2017).

Below the residue area, the low permeability clays and sandy clays of the Guilford Formation generally restrict vertical groundwater movement in the superficial aquifer. This is underlain by sands and clayey sands of the Yoganup and Ascot Formations. These sandy formations intercept and together form a regionally continuous aquifer, which is the main conduit for horizontal groundwater movement in the superficial formations. This aquifer is confined by the less permeable, overlying clayey materials of the Guildford Formation. The contact between the Leederville and Yoganup formations is generally identifiable due to a layer of carbonaceous or greenish-grey silty clay and shale. This layer restricts the vertical movement of groundwater between the superficial formations and the underlying Leederville Formation (Alcoa, 2017). The various geological formations are illustrated in Figure 20.

Figure 20: Wagerup Alumina Refinery Hydrogeology (Rockwater, 2023)



6.1.7 Groundwater Quality

The Refinery is located in the Murray Groundwater Area which is a proclaimed groundwater area under the *Rights in Water and Irrigation Act 1914* (GHD, 2023).

Alcoa has in place a comprehensive surface and groundwater monitoring programme to assess water quality and quantity and comply with DWER conditions on its prescribed premises and water licences.

In the residue management area groundwater pH in the superficial formations tends to be slightly acidic to circumneutral, ranging from 5.2 – 7.5 and generally increases from east to west in the lower superficial formations. The groundwater pH in the underlying Mesozoic formations tends to be circum-neutral to slightly alkaline, ranging from about 7.0 –7 .6. The values are consistent with the regional variation of groundwater pH in these units in the Wagerup area (Rockwater, 2023).

Groundwater salinity in the superficial formations of the residue management area generally ranges from fresh (<1,000 µS/cm) along the eastern edge to brackish (2,000 µS/cm to 5,000 µS/cm) in the rest of the area. There are some areas of elevated salinity (>5,000 µS/cm), particularly in the upper superficial formations along the northern perimeter of the residue management area. Another area of elevated salinity occurs immediately west in the upper superficial formations in an area subject to seasonal waterlogging. Groundwater salinity in the underlying Mesozoic formation tends to be slightly brackish (about 2,000– 4,000 µS/cm) (Rockwater, 2023).

Alkalinity values within the residue management area are generally between 20–250 mg/L, although higher alkalinity values (up to about 500 mg/L) occur to the south-west (near ROCP1) and the north-east. There are some localised areas of significantly elevated alkalinity (>500 mg/L) in the upper superficial formations in bores around the Sand Lake (including bore RS064S). Higher-alkalinity groundwater immediately west of the residue management area tends to have alkalinity increasing with depth likely due to the presence of older groundwater within the calcareous Ascot Formation. Groundwater alkalinity in the underlying Mesozoic Formation tends to range from about 180–250 mg/L (Rockwater, 2023). Existing Groundwater monitoring bores are shown in Figure 21.

Elevated salinity occurs to the north and north-west of the residue management area; however, there is no corresponding increase in alkalinity, suggesting the RSAs are not the source of the salinity. Localised areas of elevated salinity and possibly alkalinity occur to the south-west and west of the residue management area. (Rockwater, 2023).

Alcoa will continue its water monitoring programme to monitor potential contamination sources and potential impacts to sensitive surface or groundwater receptors.

6.1.8 Groundwater Levels

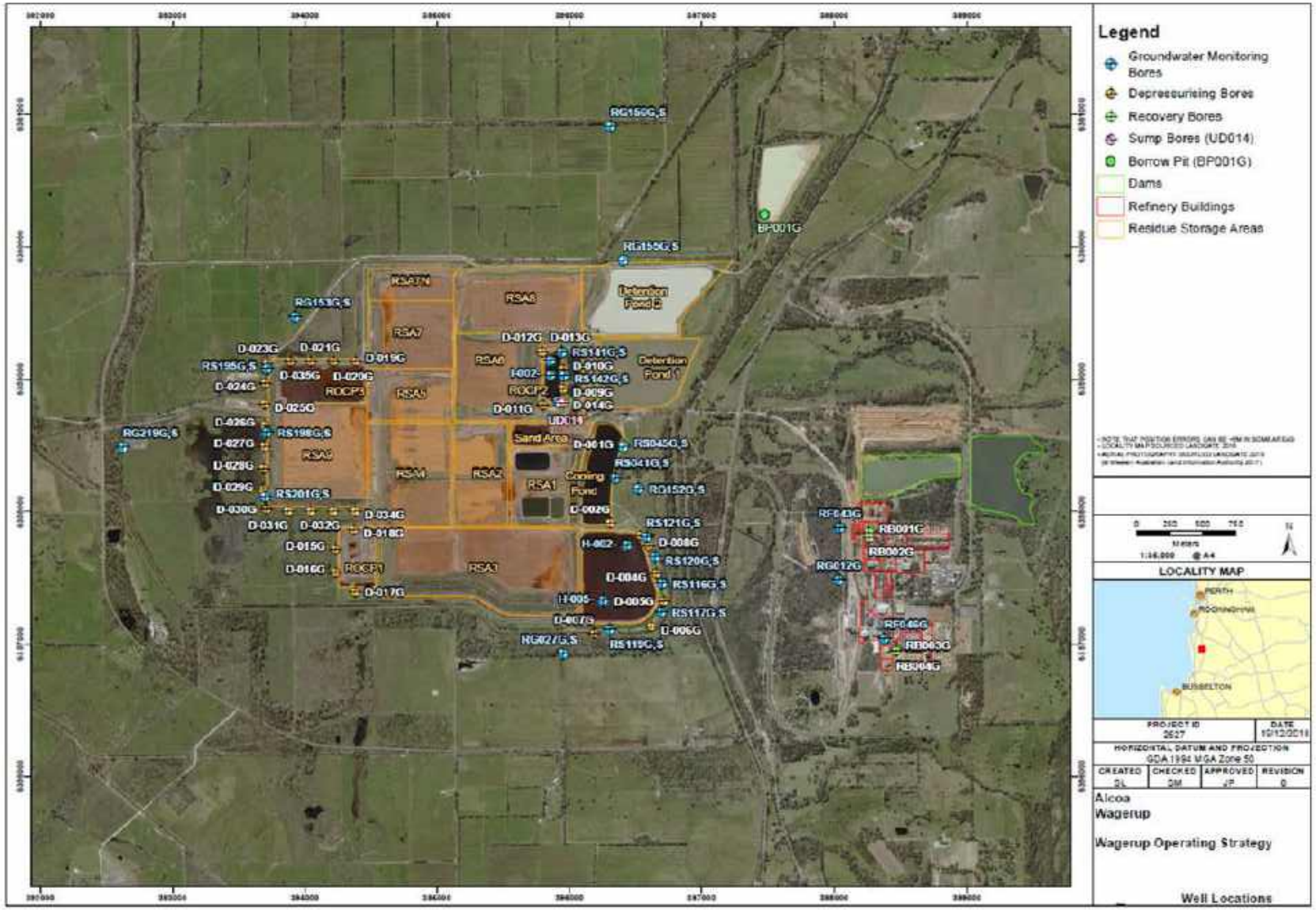
Groundwater flow at the Refinery and residue management area is predominantly westward with some potential for downward flow to the underlying Mesozoic Formations (Rockwater, 2023). Groundwater levels in the formations underlying the residue management area are controlled by five separate groundwater depressurising systems, or borefields, and an underdrain at ROCP2. All depressurising bores (Figure 21) and the underdrain draw groundwater from the lower superficial formations, comprising sandy units within the Yoganup and/or Ascot Formations, depending on the location.

DWER has issued a licence to take water, GWL102669(3), to Alcoa for the operation of the depressurising systems (Section 1.3.6).

The purpose of the depressurising systems is to manage groundwater levels beneath the residue management area and prevent upward pressures on the clay liners which could compromise liner integrity. Decisions on which bores to operate are based on groundwater and pond water levels. The general operating criterion is to keep the groundwater levels in the underlying formations below the fluid/mud surface levels of the ponds. The water pumped from the depressurising bores is re-used within the Refinery and residue management area (Rockwater, 2023).

Alcoa conducts its groundwater extraction in accordance with the Wagerup Alumina Refinery Groundwater and Surface Water Licences Operating Strategy (Alcoa, 2020) and prescribed premises licence conditions. Water for the construction and operation of RSA 10 will not exceed Alcoa's surface or groundwater licence allocations and no impacts are anticipated to groundwater levels as a result.

Figure 21: Existing Groundwater Bore Locations



6.2 Stormwater Management

TSF Checklist: Part 6.2.

6.2.1 Construction Phase

Surface water runoff from RSA 10 construction areas will be directed to drainage basins installed in selected catchment areas to enable collected stormwater to be pumped to existing water storage areas within the Wagerup refinery residue area. Drainage basins collecting uncontaminated runoff will be unlined and sized to attenuate flows from 1 in 5 year (20%) AEP rainfall events over 24 hours, with emergency overflows to Alcoa farmlands. Basin capacity will be routinely assessed, and sediment removed to maintain sump capacity as required.

Uncontaminated surface water collected from RSA10 catchment areas will be pumped to DP1 and DP2 so that it is available for reuse by the Refinery operations, including dust suppression within the residue sprinkler network. Runoff from the construction laydown and heavy vehicle park up area that may contain contaminants such as hydrocarbons will be directed to a to a series of lined sumps and pumped to the ROCP3 for re-use.

A concept layout for stormwater management during construction is included as Attachment 6.

6.2.2 Operational Phase

The operational site water management system at the residue management area is classified into two main categories based on water quality risk: contact and non-contact water. Contact water consists of rainwater, surface runoff or process water that has been in contact with residue mud or infrastructure and would require treatment if it were to be discharged into the environment. Alcoa does not discharge treated water to the environment at the Refinery or residue management area as it has a shortfall of water, and all contact water is collected for re-use as discussed in Section 6.1.5.

Rainwater which falls on the RSA 10 inner embankment walls and floor is considered contact water and will be contained by the HDPE liner and collected via the decant and underdrainage system which is discussed in further detail in Section 6.3. Contact water (or filtrate) collected via the decant and underdrainage system will be directed to ROCP3 for re-use as process water at the Refinery.

Non-contact water will be generated by rainwater and runoff that falls on the vegetated or mulched outer embankment walls of RSA 10. Non-contact water will be diverted away from the Samson South Drain to drain into Alcoa's farmlands to the west of RSA 10. There will be no direct discharge to Samson South Drain from the RSA 10 embankments.

Surface water management infrastructure will be constructed with erosion protection such as geofabric, blue metal, limestone, or other appropriate material as required to manage erosion risk.

6.3 Tailings Storage Facility Seepage and Water Management

TSF Checklist: Part 6.3.

RSA 10 has been designed with a composite liner system to prevent seepage of contaminated water into the groundwater. The composite liner consists of two parts:

- 500 mm minimum thickness clay layer. The clay material will be sourced from the RSA 10 footprint and borrow pits located on Alcoa land. Preliminary geotechnical testing of the RSA 10 footprint and borrow pits indicates that the clay material will be suitable for compaction and to meet the design criterion of a maximum saturated vertical hydraulic permeability of 1 x 10-9 m/s; and
- 1.5mm double-textured HDPE liner placed on top of the compacted clay layer. The HDPE liner will tie into the existing RSA 7 and ROCP 3 HDPE liners and extend across the RSA 10 floor to the top of the internal embankment walls.

Rainwater, stormwater runoff and liquid from the residue mud which collects on the surface of RSA 10 (collectively referred to as decant liquor) will initially be directed to a decant sump in the centre of the southern embankment wall. Liquor collected within the decant sump will be pumped via a pipeline to the existing silt trap at ROCP3 and re-used. The decant sump and pump will be decommissioned once the stored residue mud has reached sufficient height for the decant liquor to be gravity fed to ROCP3.

Any liquor which infiltrates through the stored residue mud (referred to as filtrate) will be collected via the underdrainage system, comprising:

- A series of geofabric covered slotted PVC pipes installed within the sand layer above the HDPE liner;
- Solid collector pipelines located in north-east to south-west valleys sloping to the south-western corner of RSA 10;
- An underdrainage sump in the south-western corner of RSA 10 to receive filtrate from the solid collector pipelines; and
- Filtrate collected in the sump will be pumped to the Cooling Pond or ROWS Pond via the existing underdrainage system.

The seepage prevention, liquor and filtrate management systems are shown in Attachment 7.

7 Other Operational and Management Requirements

TSF Checklist: Part 7.

Emissions and discharges during construction and operational activities are outlined in Table 5.

7.1 Dust Management

TSF Checklist: Part 7.1.

7.1.1 Construction Phase

The main sources of dust emissions during construction of RSA 10 are anticipated to be:

- Vehicle movements on unsealed access roads;
- Excavation and earthmoving activities; and
- Unsealed stockpiles of construction materials.

Dust controls will include:

- Training of construction employees;
- Specialised Dust Risk Weather Forecasts;
- Application of surface treatments; and
- Dust control planning.

Further detail regarding dust management during construction is provided in the RSA 10 Construction Dust Management Plan included as Attachment 23.

7.1.2 Operational Phase

The main sources of dust emissions during the operation of RSA 10 are anticipated to be:

- Vehicle movements on unsealed access roads; and
- Dust lift off from stored dried residue mud.

Internal residue roads are constructed from compacted sand.

A sprinkler system has been included in the RSA 10 design to minimise dust generation. Sprinklers will be installed in a 60 m by 60 m triangular arrangement within the sand layer. Sprinklers will be raised periodically as the height of stored residue mud increases and to accommodate embankment wall raises.

Water for RSA dust suppression sprinklers is sourced from DP1 and DP2 (see Figure 2). The sprinkler systems are used in conjunction with a daily weather and dust risk rating forecast to dampen down the RSAs prior to a forecasted weather condition which may generate dust.

The sprinkler system has various settings:

- **Damp Down Mode** which is a pre-wetting cycle that may be run to combat the expectations of high winds;
- **High Wind Mode** which is activated when the wind strength reaches the set point; and

- **Emergency Wet Down** cycle which allows the sprinklers to be directed to a selected RSA for an Emergency Wet Down to combat dust issues.

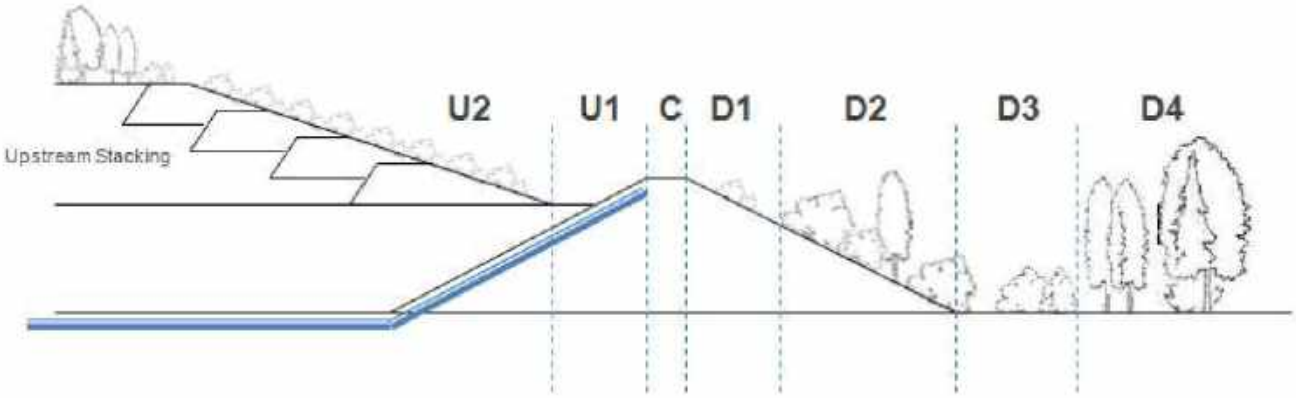
Alcoa has a well-established dust management system for operations which includes the following key controls:

- Weather and dust risk rating forecasts provided by a specialised meteorological service provider;
- Daily and weekly inspections of dust generation and assessment of effectiveness of controls;
- Weekly dust control meetings for the residue management area;
- Planning to reduce the area of unsealed ground or stockpiles;
- Surface treatments unsealed ground or stockpiles, such as:
- Spray on dust suppressants such as bitumen emulsion, waste oil on roads and other chemical reagents;
- Wood mulch, pasture or rock aggregate (e.g. blue metal);
- Water trucks using non-saline water sourced from water storage areas; and
- Dust monitoring using existing permanent licenced monitors and portable dust monitors for placement near active construction sites.

The RSA 10 starter embankment walls will be covered with topsoil and seeded or planted with appropriate vegetation to minimise erosion and dust generation. Appropriate vegetation types are based on geotechnical stability, safety and environmental factors. Appropriate vegetation types for RSA 10 are listed below with locations depicted in Figure 22:

- Upstream embankment walls (U2) – grasses, shrubs and small trees (<100 mm diameter) as larger tree roots can penetrate and damage embankment walls;
- Stored residue mud and inner embankment walls (U1) – no vegetation to avoid attracting birds and other animals;
- Embankment crest (C) – grasses only, no woody shrubs or trees as these can develop roots which can penetrate and damage embankment walls;
- Downstream embankment walls (D1 and D2) – grasses, shrubs and small trees (<100 mm diameter);
- Within 10 m of the toe of the embankment wall or perimeter drain (D3) – grasses, shrubs and small trees (<100 mm diameter); and
- Greater than 10 m from the toe of the embankment wall or perimeter drain (D4) – no restrictions with a preference for local native species.

Figure 22: Alcoa Acceptable Vegetation Planting near RSAs



7.2 Tailings Delivery and Return Water Pipelines

TSF Checklist: Part 7.2.

Residue mud will be delivered to RSA 10 via an extension to an existing residue mud pipeline at the north-western corner of RSA 9. The pipeline will be installed along the crest of the western embankment wall, and western part of the northern wall, and mud deposited by a series of spigots spaced at approximately 80 m from each other. Mud droppers will be attached to each spigot and designed to ensure that the decant liquor migrates towards the decant sump located in the centre of the southern embankment wall.

The tailings delivery system design is included in Attachment 7.

Return water pipelines will be installed to transport decant liquor and filtrate to ROCP3 for re-use, as described in Section 6.3.

Monitoring of pipelines will be included in the RSA 10 operational monitoring program, as described in Section 8.3. If a leak or rupture is detected it will be managed in accordance with Alcoa's Emergency Response Plan, depending on its severity. Alcoa has three levels of action:

- Level 1: Attention
  - Deploy pumps to recover water if required;
  - Undertake repairs of affected infrastructure;
  - Clean up and sample the area as soon as possible following repairs; and
  - Prepare an incident report to summarise clean up and identify causes and remedial actions to prevent recurrence.
- Level 2: Alert

  Potential to cause environmental damage or impacts on the integrity of the RSA wall.
  - Implement diversion procedures including road closures and evacuations;
  - Assess risks to people, equipment and environment;
  - Notify the Department of Fire and Emergency Services (DFES), DWER and the Shire of Waroona as required;
  - Deploy pumps to recover water if required;

- Geotechnical or Engineering specialists to conduct a thorough inspection to determine appropriate repairs;
- Undertake repairs of affected infrastructure;
- Clean up and sample the area as soon as possible following repairs; and
- Prepare an incident report to summarise clean up and identify causes and corrective actions to prevent recurrence.

- Level 3: Emergency

Imminent potential failure of RSA wall.

- Implement diversion procedures including road closures and evacuations;
- Assess risks to people, equipment and environment;
- Notify DFES, DWER and the Shire of Waroona as required;
- Deploy pumps to recover water if required;
- Geotechnical or Engineering specialists to conduct a thorough inspection to determine appropriate repairs;
- Undertake repairs of affected infrastructure;
- Clean up and sample the area as soon as possible following repairs; and
- Prepare an incident report to summarise clean up and identify causes and corrective actions to prevent recurrence.

Contingency measures in the case of pipeline leaks or ruptures include:

- Blocking of pipeline;
- Redirection of pipeline contents; and
- Pumping out of pipeline contents into an appropriate sump or truck as required.

8 Monitoring and Inspections

TSF Checklist: Part 8.

All incidents including fauna deaths, loss of containment of contaminated material, or community complaints will be reported and investigated. Corrective actions will be identified and implemented in accordance with Alcoa's procedures. Incidents will also be reported to external parties where required.

8.1 Groundwater, Surface Water and Seepage Monitoring

TSF Checklist: Part 8.1.

Vibrating wire piezometers (VWPs) will be installed below the RSA 10 floor composite liner system to detect any seepage. The VWPs will be connected to data loggers for continuous real-time monitoring.

Groundwater and surface water will continue to be monitored as part of Alcoa's existing monitoring program and reported to DWER as part of licence L6217/1983/15 conditions. Monitoring frequencies and parameters are detailed in the Groundwater and Surface Water Management Review 2020-2022 (Rockwater, 2023) included as Attachment 21.

New groundwater monitoring bores will be installed along the northern and western extents of the RSA 10 embankment walls for inclusion in Alcoa's existing monitoring program (the decommissioning of existing monitoring and depressurising bores, and the installation of the new monitoring bores are excluded from the scope of the works approval application – Section 1.2).

The proposed locations for the new groundwater monitoring bores and surface monitoring locations are shown in Attachment 8.

8.2 Dust Monitoring

TSF Checklist: Part 8.2.

Dust monitoring during construction will be undertaken using portable early warning construction dust monitors (EWCDMs) and as described in Section 7.1.1. The portable dust monitors are designed to operate continuously and include trigger levels and notifications to allow for immediate action to address dust emissions. Actions may include cessation of works, deployment of water trucks or application of dust suppressants.

During operations dust will be monitored as part of Alcoa's existing programme, via the existing permanent dust monitors. Actions to address exceedances of operational dust trigger levels will be implemented in accordance with Alcoa's standard operating procedures.

The proposed temporary construction dust monitoring and existing permanent dust monitoring locations are shown in Attachment 8.

8.3 Tailings Storage Facility Inspections

TSF Checklist: Part 8.3.

Wagerup Refinery has a well established operations surveillance system for its residue management area which will include RSA 10 operations once commissioned.

An RSA 10 geotechnical monitoring system will be installed to monitor embankment stability in accordance with GISTM requirements.

Visual monitoring of RSA 10 and associated infrastructure will include the following:

- Daily inspections of:
    - Roadways;
    - Underdrains/decants/perimeter drains – function, safe access;
    - Pumps/piping/general infrastructure;
    - Residue mud deposition and freeboard;
    - Security – fences/gates etc; and
    - Embankment abnormalities – cracking, displacement, vegetation growth, seepage, spillage, external wet spots.
- Freeboard monitoring;
- Storm reports;
- Annual third-party integrity reviews; and
- Rehabilitation health.

Should monitoring identify items of concern, these will be addressed as part of the ongoing maintenance program or in accordance with the site's Emergency Response Plan as required.

9 References

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National Environment Protection Council (NEPC) (2021). National Environmental Protection (Ambient Air Quality) Measure.

Environmental Technologies and Analytics (ETA) (2024). Wagerup Alumina Refinery Residue Storage Area RSA10 North Air Quality Assessment.

GHD (2023). Surface Water Study Alcoa Wagerup RSA10.

Rockwater (2023). Wagerup Refinery and Bunbury Caustic Loading Facility Groundwater and Surface water Management Review, 2020-2022.

Attachment 1A: Proof of Occupier Status

Application Form: Attachment 1A.

Attachment 1B: ASIC Company Extract

Application Form: Attachment 1B

Attachment 1C: Authorisation to Act as Representative of the Occupier

Application Form: Attachment 1C

Attachment 2: Conceptual Site Model Table

TSF Checklist: Attachment 2; Application Form: Part 9.1

Attachment 3: Prescribed Premises Map

Attachment 4: Civil Design Drawing

TSF Checklist: Attachment 4

Attachment 5: Topography Drawing

TSF Checklist: Attachment 5

Attachment 6: Construction Stormwater Management System Drawing

Attachment 7: Tailings Delivery, Seepage and Dust Management Sprinkler System Drawing

Attachment 8: Monitoring Locations Map

TSF Checklist: Attachment 9.

Attachment 9: Category checklist (Tailings Storage Facilities)

Application Form: Attachment 9.

Attachment 10: Proposed Fees

Application Form: Attachment 10.

Attachment 11: Flora and Vegetation Assessment

Attachment 12: Terrestrial Fauna Assessment

Attachment 13: Aquatic Fauna Assessment

Attachment 14: Carter's Freshwater Mussel Survey

Attachment 15: Air Quality Assessment

Attachment 16: Long Term Residue Management Strategy Wagerup 2017

Attachment 17: Surface Water Assessment

Attachment 18: Aboriginal Heritage Assessment

Attachment 19: Noise Assessment

Attachment 20: Odour Assessment

Attachment 21: Groundwater and Surface Water Management Review

Attachment 22: Acid Sulfate Soils Report

Attachment 23: Construction Dust Management Plan

Attachment 24: Construction Surface Water Management Plan

Attachment 25: Wagerup RSA10 Hypothetical Dam Breach and Consequence Category Assessment

Attachment 26: Wagerup RSA10 Geotechnical Interpretive Report

Attachment 27: Wagerup RSA10 Slope Stability Analysis Report

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