Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 3

Licence Number	L5271/1983/14
Licence Holder	Alcoa of Australia Ltd
ACN	004 879 298
File Number	DEC643
Premises	Pinjarra Refinery Lot 19 on Diagram 44739, Part of Lot 109 on Diagram 60089, Part of Lot 151 on Plan 10914, Lot 221 on Plan 302632, Lot 222 on Plan 302638, Part of Lot 251 on Plan 35963 and Lot 252 on Plan 35963
Date of amendment	28 July 2017

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 28 July 2017

Jonathan Bailes

A/Senior Manager Industry Regulation (Process Industries)

Regulatory Services (Environment)

an officer delegated under section 20 of the Environmental Protection Act 1986 (WA)

Amendment Notice

This notice is issued under section 59 of the *Environmental Protection Act* 1986 (EP Act) to amend the licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

Amendment Description

Alcoa of Australia Limited (Licence Holder) holds Licence L5271/1983/14 pursuant to Part V, Division 3 of the EP Act in respect of its Pinjarra Refinery. The Licence Holder lodged an application for licence amendment (Application) on 22 November 2016 for works associated with a residue filtration project that will alter the way the residue mud component of residue slurry is processed, handled and deposited. This Amendment Notice is accompanied by a Decision Report in Attachment 1.

The Amendment Notice provides for the following amendments to Licence L5271/1983/14:

- The insertion of conditions relating to the construction and operation of proposed works in the Application; and
- The insertion of conditions relating to the clearing of native vegetation.

Decision

The Application has been determined by amending the conditions of Licence L5271/1983/14 as set out below. The Decision Report in Attachment 1 of this notice sets out the Delegated Officer's assessment of the Application in accordance with DER's *Guidance Statement: Risk Assessments* and decision making in accordance with DER's *Guidance Statement: Decision Making*.

Amendment History

Instrument	Issued	Amendment
L5271/1983/14	28/07/2017	Amendment Notice 3 Licence Holder initiated amendments to construct and operate a residue filtration project.
L5271/1983/14	28/97/2016	Amendment Notice 2 Amendments to conditions S1(a) and S1(b)
L5271/1983/14	29/04/2016	Amendment Notice 1 Extension of licence expiry date to 16/06/2025

Amendment

1. The definition of *"CEO for the purposes of correspondence means"* is amended from the definition below:

   Manager, Licensing (Greater Swan)
   Department of Environment Regulation
   Locked Bag 33
   CLOISTERS SQUARE WA 6850
   Telephone: (08) 9333 7510
   Facsimile: (08) 9333 7550;
   swanindustryreg@der.wa.gov.au

   to the new definition below:

   Chief Executive Officer
   Department Div.3 Pt. 5 EP Act
   Locked Bay 33 Cloisters Square
   Perth WA 6850
   info-der@dwer.wa.gov.au

2. The licence is amended by the insertion of the following definitions:

   "ASTM D5641" means the American Society for Testing and Materials method D5641 /D5641M – 16: Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.

   "ASTM D6392" means the American Society for Testing and Materials method D6392 - 12: Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

   "ft" means foot

   "FTB" means film tearing bond.

   "GRI-GM6" means GRI Test Method GM6. Standard Practice for Pressurized Air Channel Test of Dual Seamed Geomembranes, Geosynthetic Research Institute, Folsom, Pennsylvania, USA.

   "HDPE" means high-density polyethylene.

   "*kN" means kilonewtons*

   "lbs" means pounds.

3. The licence is amended by the insertion of the following schedules to the licence as attached to this Amendment Notice:

   Schedule 1: Works
   Schedule 2: Site Plan
   Schedule 3: Plan 7410/1
   Schedule 4: Liner Installation Validation Requirements

4. The licence is amended by the insertion of the following conditions R1 to R7:

WORKS CONDITIONS

LOCATION OF WORKS

R1 The licensee must locate the Works generally in accordance with the Site Plan in Schedule 2 to this licence.

INFRASTRUCTURE DESIGN AND CONSTRUCTION REQUIREMENTS

R2 The licensee must carry out the Works within the Premises in accordance with the requirements set out in Schedule 1 to this Licence.

R3 Subject to condition R4, on completion of the Works, the licensee must provide to the CEO engineering or building certification from a suitably qualified professional confirming each item of infrastructure or component of infrastructure specified in column 1 with the requirements specified in column 2, as set out in the Works Infrastructure Requirements Table below have been constructed with no material defects.

R4 The licensee must not depart from the requirements specified in column 2 of the Works Infrastructure Requirements Table except:
(a) where such departure is minor in nature and does not materially change or affect the infrastructure; or
(b) where such departure improves the functionality of the infrastructure and does not increase risks to public health, public amenity or the environment;
and all other aspects of conditions R1 to R5 in this Licence are still satisfied.

R5 If condition R4 applies, then the licensee must provide the CEO with a list of departures which are certified as complying with condition R4 at the same times, and from the same professional, as the certification under required under condition R3.

Works Infrastructure Requirements Table	
Column 1	***Column2***
Infrastructure	***Requirements (design and construction)***
Filtration facility	(a) *The filtration facility must have secondary containment that:* *(i) is not less than 110% of the capacity of the largest container, tank or vessel within the filtration building;* *(ii) directs all runoff and drainage into existing process water systems for reuse;* *(iii) is constructed of materials that are substantially immune to attack by any corrosive substance it may contain;* *(iv) is sufficiently impervious to retain and enable the recovery of any spillage.* (b) *All tanks must include high-level alarms.*

Works Infrastructure Requirements Table	
Column 1	***Column2***
Infrastructure	***Requirements (design and construction)***
Emergency containment pond	(a) *The pond must be adjoined to the filtration building by a minimum 1.5 mm thickness HDPE lined spillway to form part of secondary containment for the filtration building.* (b) *The pond must have embankments designed and constructed to prevent erosion as a result of stormwater runoff and divert stormwater away from the pond.* (c) *The pond must be constructed with a minimum single layer of HDPE liner and must ensure no detectable leakage from the pond.* (d) *The HDPE liner must meet the following specification:* *(i) Be a minimum of 1.5 mm thickness;* *(ii) Have a permeability of less than 1 x 10^{-9} m/s; and* *(iii) Be durable to maintain permeability for the working life of the pond.* (e) *The pond and spillway HDPE liner installations must be tested and validation in accordance with the requirements specified in Schedule 4.* (f) *The pond and spillway HDPE liners must be certified by a suitably qualified professional engineer.*

CLEARING OF NATIVE VEGETATION REQUIREMENTS

R6 The licensee must not clear more than 0.164 hectares of native vegetation within the area cross-hatched yellow on attached Plan 7410 in Schedule 3.

OPERATIONAL REQUIREMENTS

R7 On completion of the Works specified in condition R2 and submission of the engineering or building certification required by condition R3, the licensee shall ensure the infrastructure specified in column 1 of the Operation of Infrastructure Requirements Table is maintained and operated in accordance with the requirements in columns 2 and 3 of that table.

Operation of Infrastructure Requirements Table		
Column 1	***Column 2***	***Column 3***
Infrastructure	***Description***	***Operational requirements***
Filtration facility	*Tanks fitted with high-level alarm systems.* *Secondary containment incorporating a HDPE lined emergency containment pond adjoined to the building by a HDPE lined spill way*	*Runoff, drainage or spillage is contained and directed into process water systems for reuse.* *The emergency containment pond is used for the purposes of emergency secondary containment of residue mud or filtrate from the filtration building.* *A minimum capacity of 110% of the largest tank or vessel within the filtration facility is maintained except where the pond is providing emergency containment.*

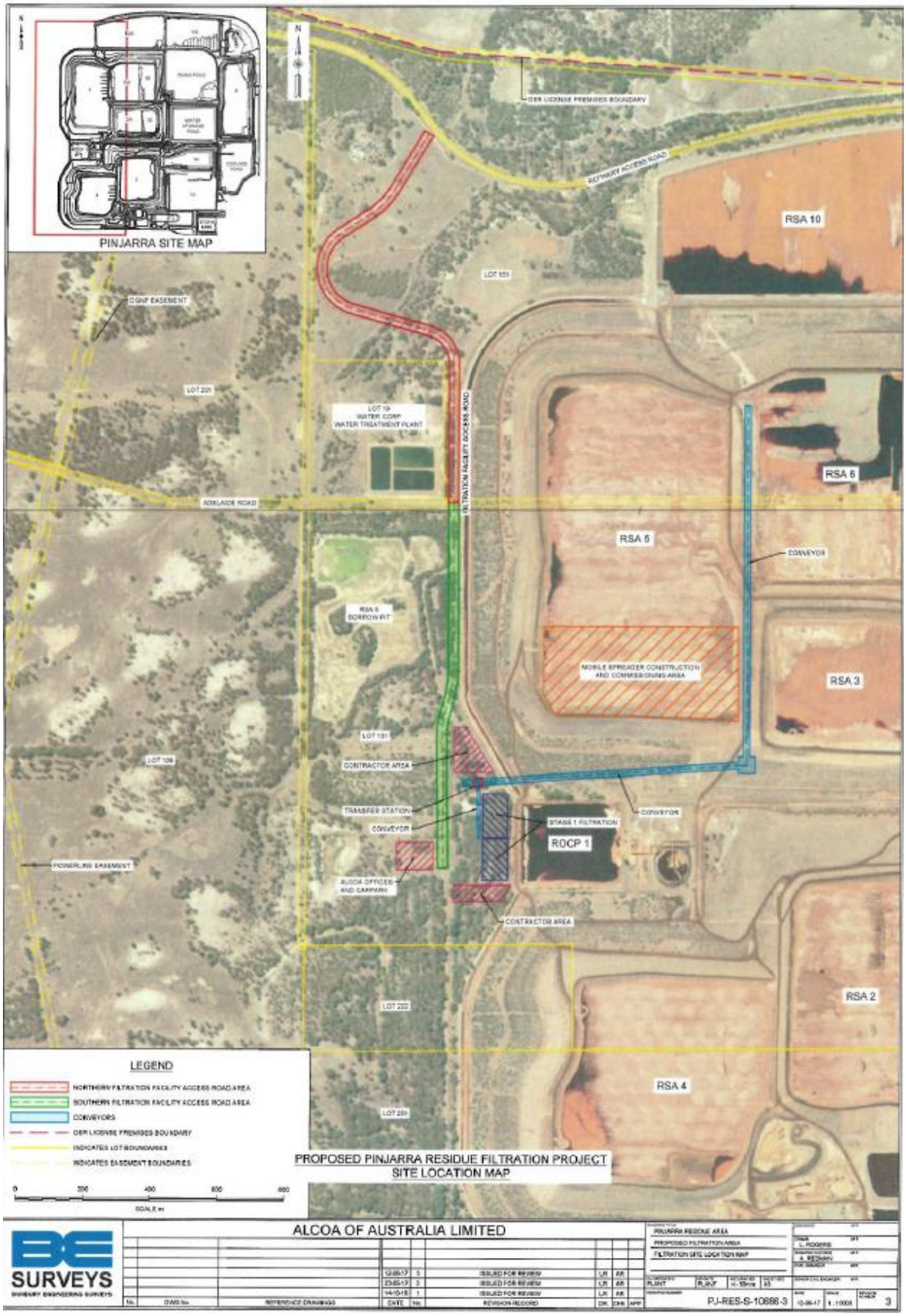
Schedule 1: Works

The Works to be carried out on the Premises are specified in the table below:

Item	Works	Specifications/Drawings
1	Filtration facility	• Filter presses and associated infrastructure • Input – Residue Mud handling and storage system which typically incorporates pumps, feed tank, compressed air system, power and piping infrastructure and gantry crane. • Output – Filtrate Handling and storage system which incorporates tanks, pumps, piping, power and associated infrastructure. • Output – Filter Cake conveying system and associated infrastructure. • Storage tanks including: - residue feed tank(s); - filtrate tanks(s); and - optional smaller cloth wash tank(s)
2	Emergency containment pond	Lined emergency containment pond that forms part of the secondary containment for the filtration facility and is connected by a lined spill way.
3	Pumping and piping infrastructure	Transportation of residue mud, filtrate and unfiltered residue to and from the tankage or to other RSA locations.
4	Conveyance system	Main transport conveyor systems to deliver filter cake to the mobile spreader or bypass system.
5	Mobile spreader unit	Variable length mobile spreader or bypass operating within existing residue area(s).
6	Earthmoving equipment	Heavy vehicles used for final filter cake placement

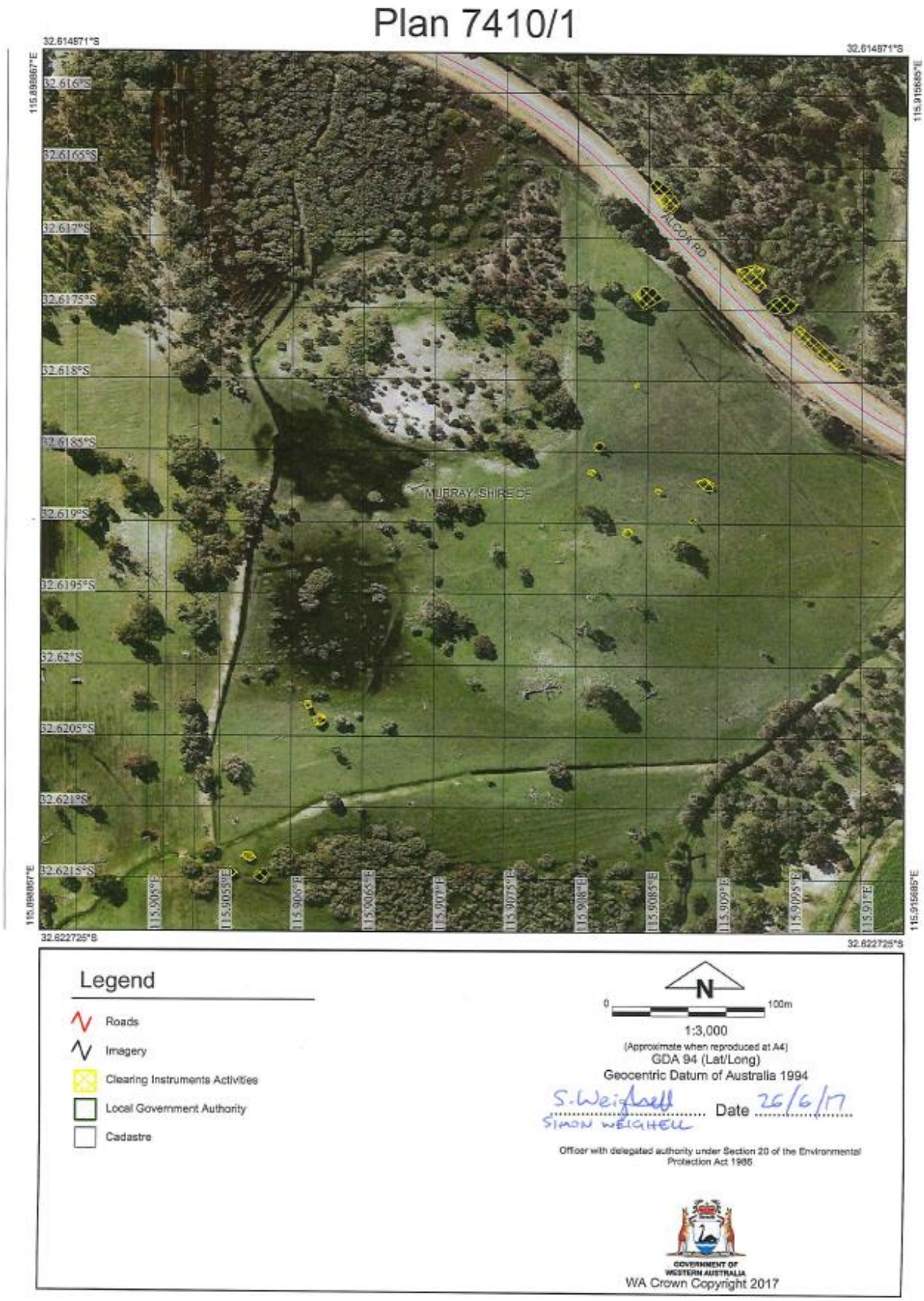
Schedule 2: Site Plan

The Site Plan is shown in the following plan.



Schedule 3: Plan 7410/1

The authorised clearing is shown in the following Plan 7410/1.



Schedule 4: Liner Installation Validation Requirements

The requirements for quality assurance / quality control methodology and validation testing during installation of the emergency containment pond liner are shown in the table below.

Test	Requirements	Specified Value
Trial Seams (Note 1) Peel and Shear (ASTM D6392)	2 tests per 8-hour work shift / seamer (while seaming is taking place) plus after seaming equipment has been turned off for more than 30 minutes	Peel (fusion): 0.41 kN per 2.54 cm width (91 lbs per inch width) and FTB (Note 2) Peel (extrusion): 0.35 kN per 2.54 cm width (78 lbs per inch width) and FTB (Note 2)
Air Pressure (GRI-GM6)	Every lineal foot of Hot Wedge seam produced	207 kPa (30 psi) minimum for 5 minutes with < 34.5 kPa (5 psi) drop
Vacuum (ASTM D5641)	Every lineal foot of Extrusion Fillet seam produced	207 kPa (30 psi) minimum for 15 seconds with no visible bubbles
Destructive Testing of Seams Peel and Shear (ASTM D6392)	1 test per 305 m (1,000 ft) of seam produced	Peel: 0.44 kN per 2.54 cm width (98 lbs per inch width) and FTB (Note 2) Shear: 0.54 kN per 2.54 cm width (121 lbs per inch width) and FTB (Note 2) A minimum of 5 specimens per sample 4 of 5 specimens must pass seam strength, FTB, and separation requirements

Notes:

Field testing of trial welds shall be done on a minimum 2 specimens or “bones” in peel from each end of the trial weld samples and 1 “bone” in selected across the trial weld sample. On double-tracked fusion welds, both sides of the seam shall be tested. An acceptable trial weld is obtained when all “bones” meet seam strength, FTB, and seam separation requirements. Failed trial welds shall be followed by two passing trial weld samples.

For fusion welded seams (single or double-tracked welds), no more than 10% of seam width shall separate at any point. For extrusion welded seams no more than 3.2 mm (1/8-inch) seam separation from seam edge at any point.

Attachment 1: Decision Report

Decision Report

Application for Licence Amendment

Division 3, Part V *Environmental Protection Act 1986*

Applicant:	Alcoa of Australia Limited
ACN:	004 879 298
Licence Number:	L5271/1983/14
File Number:	DEC643
Premises:	Pinjarra Refinery Lot 19 on Diagram 44739, Part of Lot 109 on Diagram 60089, Part of Lot 151 on Plan 10914, Lot 221 on Plan 302632, Lot 222 on Plan 302638, Part of Lot 251 on Plan 35963 and Lot 252 on Plan 35963
Date of Report:	Friday, 28 July 2017
Status of Report:	Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
AER	Annual Environment Report
Category/Categories (Cat.)	categories of prescribed premises as set out in Schedule 1 of the EP Regulations
CS Act	*Contaminated Sites Act 2003* (WA)
DER	Department of Environment Regulation (A predecessor of DWER – refer to the DWER definition)
Decision Report	this document
Delegated Officer	An officer under section 20 of the EP Act.
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation.
EPA	Environmental Protection Authority (A predecessor of DWER – refer to the DWER definition)
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	The licence issued under Part V, Division 3 of the EP Act and in force prior the assessment of the licence amendment Application
Licence Holder	Alcoa of Australia Limited
2012 LTRMS	*Long Term Residue Management Strategy, Pinjarra 2011*, Alcoa of Australia, 17 February 2012 as published on the Licence Holder's website at www.alcoa.com.au.
mbgl	metres below ground level
m^3	cubic metres
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
Mtpa	million tonnes per annum
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
NOx	Oxides of nitrogen

Term	Definition
Occupier	is defined in the EP Act to mean a person who is in occupation or control of a premises, or part of a premises, whether or not that person is the owner of the premises or part of the premises.
PM	Particulate Matter
PM_{10}	Used to describe particulate matter that is small than 10 microns (µm) in diameter
Peel-Harvey EPP area	means the Peel Harvey Catchment Area as defined in Schedule 1 of the *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992*
Premises	is defined on page i of this Decision Report
Prescribed Premises	Premises prescribed under Schedule 1 to the EP Regulations
Primary Activities	are defined in DWER's *Guidance Statement: Risk Assessments* to include the primary activities which fall within the description of the category of prescribed premises in Schedule 1 to the EP Regulations.
prescribed premises	premises prescribed under Schedule 1 to the EP Regulations.
RSA	Residue Storage Area
µg/m^3	micrograms per cubic metre
µg/L	micrograms per litre

2. Purpose and scope of assessment

This assessment was initiated by Alcoa of Australia Ltd (the Licence Holder) who lodged an application for licence amendment (Application) to amend Licence L5271/1983/14 (Existing Licence) relating to the Pinjarra Refinery (the Premises). The Licence Holder proposes works associated with a residue filtration project that will alter the way a nominal 2.5 Million tonnes per annum (Mtpa) or approximately 50% of the red mud component of residue slurry is processed, handled and deposited.

This Decision Report details the Delegated Officer's assessment of risks arising from the construction and operation of residue filtration works and includes an assessment of proposed clearing of native vegetation relating to the construction of an access road.

The scope of assessment does not include:

- The remaining nominal 50% of residue mud that will continue to be subject to existing residue processing, handling and deposition practices.
- The existing RSA infrastructure that is not proposed to be materially altered in terms of its design or structural components.

The Delegated Officer has given effect to determined conditions for the construction and operation stages through an Amendment Notice to which this Decision Report is attached.

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted by the Licence Holder during the assessment process

Document/information description	Date received	Text reference
Application for licence amendment including: 1. Application Form dated 27/11/2016; 2. Attachment 2 – Pinjarra Filtration Site Location; 3. Attachment 3A – Description of Proposed Activities; 4. Attachment 3B – Clearing Figure; 5. Attachment 4 – Approvals List; 6. Attachment 6 – Public Health and Environmental Risks; 7. Attachment 10 – Fee Table; 8. Part 1 – Attachment 9 Additional Information; and 9. Part 2 – Attachment 9 Additional Information.	22/11/2016	Application
Email entitled 'Alcoa of Australia Limited – Pinjarra Alumina refinery – L5271/1983/14 – Response to DER's draft Licence Amendment Notice' including attached letter.	12/06/2017	Alcoa, June 2017
Email entitled '*Pinjarra Alumina Refinery Residue Filtration Project – Response to Matters raised during DWER and Alcoa Meeting on 23 June 2017*' including the following attachments: 1. Alcoa letter dated 04/07/2017 titled*: Pinjarra Alumina Refinery Residue Filtration Project – Licence L5271/1983/14 – Response to Draft Licence Amendment Documentation'*; 2. Attachment 1 – Copy of the draft Amendment Notice with Licence	04/07/2017	Alcoa, July 2017

Document/information description	Date received	Text reference
Holder edits/markups to the Works Infrastructure Requirements Table; 3. Attachment 2 – Copy of Schedule 1 of the draft Amendment Notice with Licence Holder edits/markups; 4. Attachment 3 – An uncontrolled version of the Licence Holder's submission on the Draft Amendment Notice and Decision Report.		

3. Background

The Premises is a bauxite refinery approximately 90 km south of Perth and 5km east-south-east of the Pinjarra township. The Premises uses the Bayer process to refine bauxite ore conveyed overland from the Licence Holder's nearby licensed ore crushing and processing operation at its Huntly Mine site in order to produce aluminium oxide, commonly known as alumina. The Premises has operated since 1972.

The Existing Licence relates to activities at the Premises for the Prescribed Premises categories under the *Environmental Protection Regulations 1987* (EP Regulations) as listed in Table 3. The Application relates to the Category 46 Primary Activity.

Table 3: Prescribed Premises Categories

Classification of Premises	Description	***Approved premises production or design capacity or throughput***
Category 46	Bauxite refinery: premises (other than premises within paragraph (b) of category 6) on which alumina is produced from bauxite refining.	5 Mtpa
Category 52	Electric power generation: premises (other than premises within category 53 or an emergency or standby power generating plant) on which electrical power is generated using a fuel.	Not applicable to the Application or this assessment
Category 64	Class II or III putrescible landfill site: premises on which waste (as determined by reference to the waste type set out in the document entitled "Landfill Waste Classification and Waste Definitions 1996" published by the Chief Executive Officer and as amended from time to time) is accepted for burial.	
Category 67	Fuel burning: premises on which gaseous, liquid or solid fuel is burnt in a boiler for the supply of steam or in power generation equipment.	

The Licence Holder also operates two other licensed bauxite refineries (Wagerup Alumina Refinery and Kwinana Alumina Refinery), two licensed bauxite ore crushing and processing facilities (Willowdale Mine and Huntly Mine), and a licensed power generation facility (Wagerup Co-generation Plant) in Western Australia.

The Premises can be delineated into two core components, being the refinery and the residue storage area (RSA). The RSA consists of containment mud lakes for residue waste, ponds for cooling water and runoff collection water, oxalate storage, and a landfill. The Application relates to the processing, handling, and deposition of the red mud component of residue slurry with infrastructure and equipment to be located within the existing RSA. The Licence Holder has not proposed any changes to the production or design capacities shown in Table 3 in the Application. The Licence Holder will utilise existing RSA mud lakes for depositing filtered red

mud and has not proposed any alterations to the design or layout of existing infrastructure.

4. Overview of residue filtration project

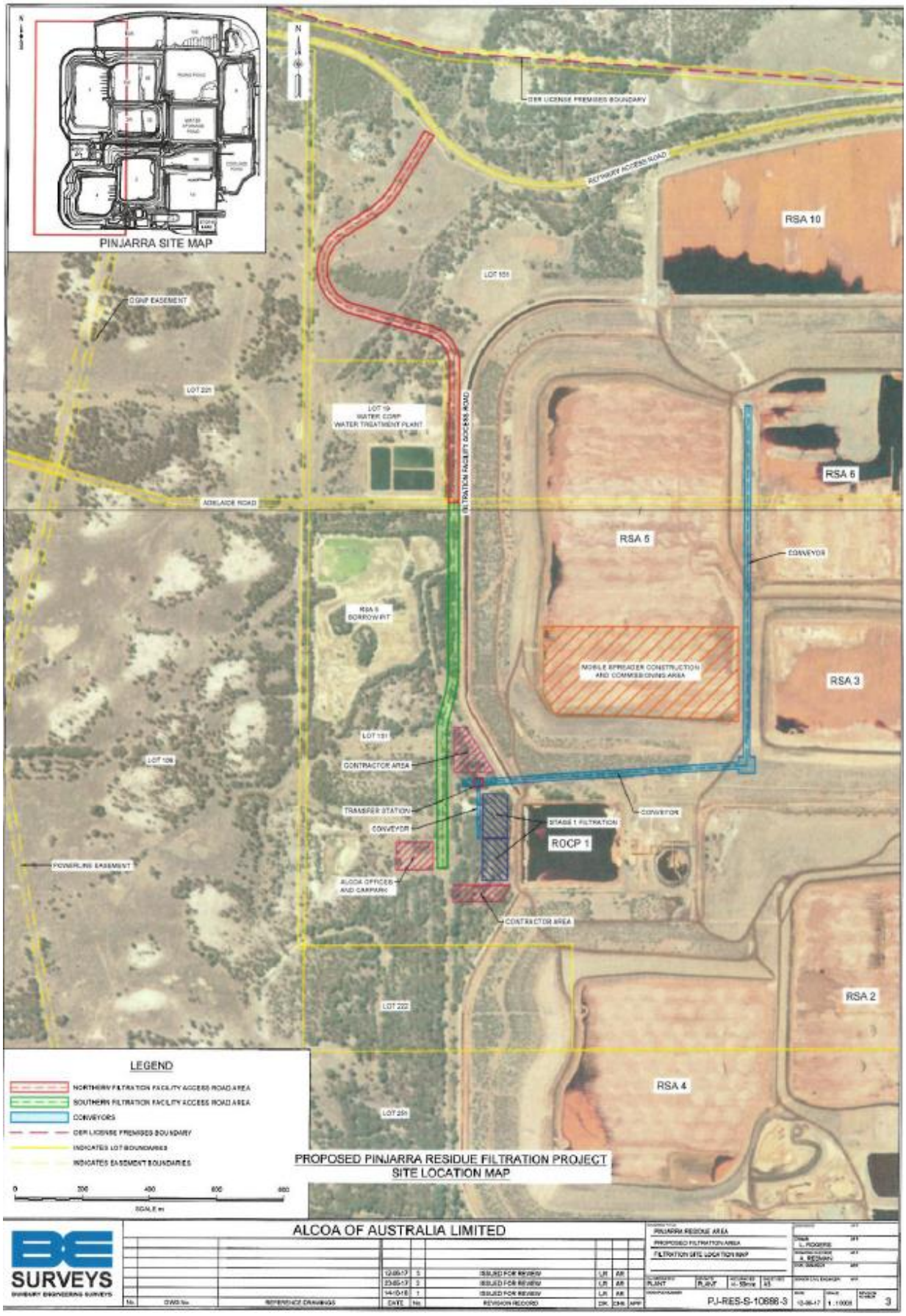
4.1 Infrastructure and equipment

The proposed residue filtration project infrastructure and equipment as it relates to Category 46 activities undertaken at the Premises are detailed in Table 4.

Table 4: Proposed infrastructure and equipment

	Infrastructure	**Reference to Site Plan**
	Prescribed Activity Category 46	
Bauxite ore is refined using the Bayer process to produce alumina. The ore is milled and digested in concentrated caustic soda to form a slurry and dissolve available alumina. Sand and clay (red mud) are settled out to leave a rich 'green' liquor with the sand and mud washed and pumped out the RSA. The Application relates to this part of the existing process where the settled mud fraction is sent to the RSA for thickening, solar drying and storage in dedicated RSA mud lakes. A nominal 2.5 Mtpa of residue mud (approx. 50%) will be de-liquored to form a filter cake and then deposited in the existing RSAs, while the remaining residue mud will be processed, handled and deposited via existing means. The green liquor is cooled and seeded with alumina hydrate to cause alumina hydrate to crystallise. The liquor and hydrate are separated, the crystals are sized and suitably sized crystals are removed. Sized hydrate is washed, dried and calcined to drive off chemically bonded water to leave alumina which is transported by rail to the Bunbury Port for export. Refer to Figure 2 for a process schematic diagram.		
1	Filtration facility/building •Filter presses and associated infrastructure. •Mud handling and storage system – pumps, feed tank, compressed air system, power and piping infrastructure and gantry crane. •Filtrate handling and storage system – tanks, pumps piping, power and associated infrastructure. •Filter cake conveyance system and associated infrastructure. Tanks in the building include residue feed tank(s), filtrate tank(s) and may include smaller cloth wash tank(s)	Figure 1
2	Emergency containment pond Lined emergency containment pond that forms part of the secondary containment for the filtration facility and is connected to the facility by a lined spill way.	Not shown
3	Conveyor systems for transportation of filter cake: • from filtration building to the materials handling system; and • to the mobile spreader.	Figure 1
4	Mobile spreader unit (distribution of filter cake to the RSA's)	
5	Earthmoving equipment (final filter cake placement)	Not shown

Figure 1 depicts the location of the proposed filtration facility (hatched blue) which is to be located in the western margin of the RSA within the currently licensed Premises boundary. New proposed infrastructure such as some pipelines and conveyors will not necessarily be located within the hatched area. The mobile spreader unit and earthmoving equipment will be located within existing RSA mud lakes.

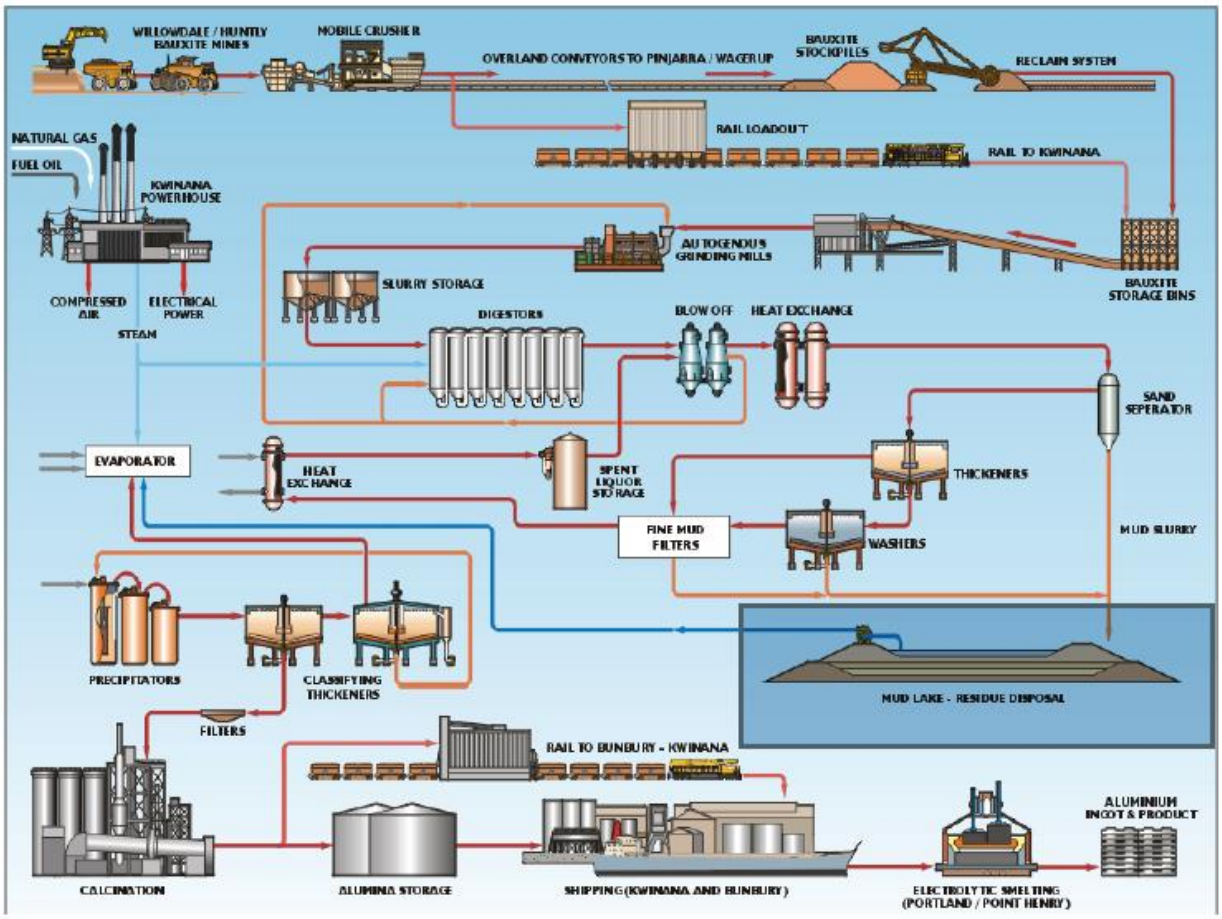


(Source: Alcoa, June 2017)

Figure 1: Proposed filtration facility location

4.2 Operational aspects

An overall schematic diagram of the bauxite refining process summarised in Table 4 is depicted in Figure 2 as taken from the Licence Holder's published *Long Term Residue Management Strategy, Pinjarra 2011*, Alcoa of Australia, 17 February 2012 (2012 LTRMS). The Application relates to the highlighted 'Mud Lake – Residue Disposal' part of the process.



(Source: Figure 3-1 of the LTRMS)

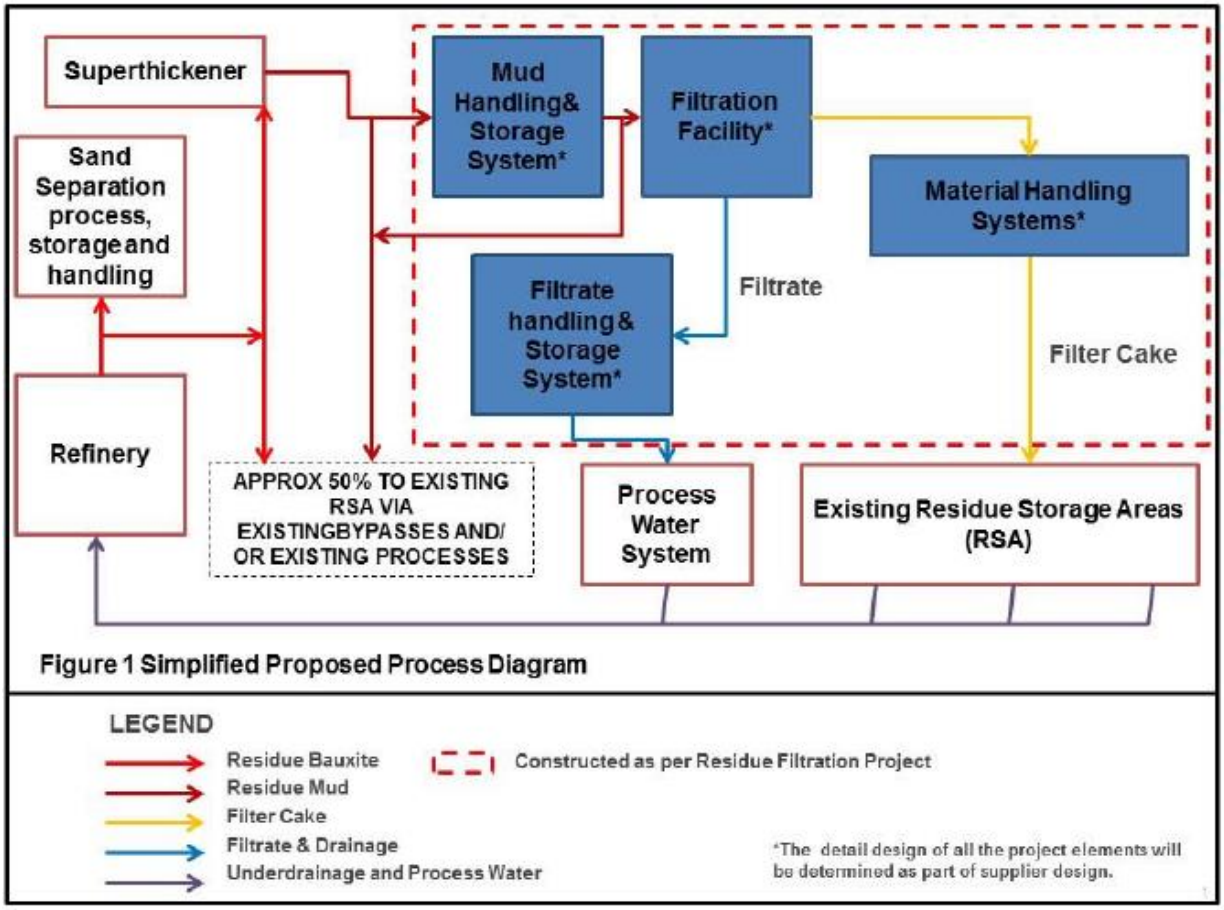
Figure 2: Premises alumina production schematic diagram

Section 3.1.6 of the 2012 LTRMS contains the following general description of 'residue':

> *"The residue consists of a coarse sand fraction (often termed "red sand") and a fine silt fraction (often termed "red mud"). The mud and sand streams are pumped together to the residue area and separated in the sand separation building located at the residue area. Approximately 55% of the residue stream is sand and 45% is mud. The mud density is increased at the residue area by thickening prior to its final discharge into RSAs. The sand is used for internal construction activities at the RSA."*

There will be no change to processing of the residue sand component that will continue to be separated from the residue stream. All residue mud will continue to be thickened in the existing superthickener which occurs prior to proposed filtration. A nominal 2.5 Mtpa will be subject to the new filtration, handling and deposition processes with the remainder subject to existing deposition processes.

A process diagram for the proposed residue filtration process was provided in the Application and is shown in Figure 3 below.



(Source: Application, Attachment 3A – Figure 1)

Figure 3: Proposed residue filtration process

The filtration facility and materials handling system will be designed to operate 24 hours a day, seven days a week with a peak design capacity of 351 dry tonnes per hour of residue mud and a nominal production rate of 292 dry tonnes per hour.

With reference to proposed infrastructure and equipment in Table 4, the filtration facility comprises a number of batch filters that have a continuously varying demand for mud supply from the superthickener, and the mud handling and storage system provides a buffering storage system. The mud handling and storage system directs mud to the filtration facility that presses the mud to squeeze out a filtrate stream and produce a low moisture filter cake that can be conveyed to the materials handling system. Filtrate and filter wash water is piped to the filtrate handling and storage system. Filtrate is returned to the refinery process water circuit for reuse. An emergency containment pond allows short-term emergency storage of filtrate. The materials handling system involves directing filter cake to a mobile spreader in RSA mud lakes RSA3, RSA5 or RSA6 where it is deposited. Heavy earthmoving equipment is used to distribute, spread and compact the material on the RSA mud lake active surface.

5. Legislative context

5.1 Part IV of the EP Act

5.1.1 Background

Ministerial Statement (MS) 646 was granted by the Minister for Environment on 3 March 2004 for the Pinjarra Refinery Efficiency Upgrade (PREU). The statement states the proposal is for "*the construction and operation of an upgraded seed filtration facility and associated plant in order to increase the alumina production at the Pinjarra Refinery, South West Highway,*

Pinjarra to approximately 4.2 million tonnes per annum."

MS 646 was last amended on 21 September 2015 which included an increase in the alumina production capacity to 5 million tonnes per annum.

5.1.2 EPA Bulletin 1122

EPA Bulletin 1122 informed the Minister's decision that the proposal may be implemented, subject to the conditions of MS 646.

The EPA's assessment identified key environmental factors of:

- air quality including odours and dust;
- greenhouse gas emissions;
- noise; and
- water supply.

5.1.3 Ministerial Statement 646

MS 646 was published on 3 March 2004 and has since undergone two amendments pursuant to section 45C of the EP Act on 1 July 2008 and 21 September 2015.

The first amendment changed a key proposal characteristic in the Schedule 1 of MS 646. The approved refinery NOx output was increased from 640 tonnes per annum (tpa) to 780 tpa. Schedule 1 of MS646 was superseded by Attachment 2 as part of the second amendment and resulted in the following alterations:

- increased production, bauxite residue generation, emissions of NOx, CO and greenhouse gases key proposal characteristics in Schedule 1;
- updated the description of the proposal including the 'Development Envelope;
- corrected a unit error; and
- removed elements that were not key proposal characteristics relevant to the environment, managed under other legislation, completed, or not relevant to the proposal in the Schedule 1 key proposal characteristics.

Condition 2-1 requires the proponent to implement is environmental management commitments in Schedule 2 of MS 646. These commitments include:

- installation of pollution control equipment to achieve specified air emissions reductions;
- implementation on a Dust Management System for the RSA including upgrades to the existing sprinkler system and review of operational controls;
- Long-term residue management including revision of the LTRMS and review of options for residue volume reduction, alternatives for disposal, dust management, monitoring and impacts on visual amenity and associated land use;
- Preparation and implementation of a Noise Management Plan with monitoring at the nearest receptor locations to the north and south of the refinery and noise controls to be incorporated in the efficiency upgrade design;
- implementation of an Alternative Water Supply Plan to optimise alternative water sources for the refinery and reduce usage of surface and groundwater resources.

Conditions 6-1 to 6-3 require the proponent to prepare and implement an Air Quality Management Plan for the monitoring and management of point source emissions, area source emissions and ambient air quality. Area source emissions apply to particulate and metal emissions from the RSA and stockpile area.

Conditions 7-1 to 7-3 require the proponent to develop and implement an Emissions

Reduction Program relating to:

- emissions likely to increase as a result of the upgrade;
- mercury, arsenic and $NO_{x;}$ and
- practicable methods of reducing formaldehyde emissions from the refinery.

Conditions 8-1 to 8-4 relate to validation and refining of the proponents air dispersion model predictions for the upgraded plant using actual ambient air quality and emissions source monitoring data. This includes validation/revision of the proponents Health Risk Assessment (HRA) and expert peer review of both the model and HRA.

Conditions 9-1 to 9-3 require the proponent to prepare and implement a Greenhouse Gas Emissions Management Plan.

The Delegated Officer notes the Application does not propose a change to the maximum volume of residue output specified in Schedule 1 of MS 646.

Key Finding: The Delegated Officer considers that:

- point source emissions to air;
- fugitive emissions (including particulate emissions) from the RSA and stockpiles;
- odour emissions
- potential impacts to ambient air quality; and
- noise emissions

are regulated through Part IV of the EP Act.

5.2 Contaminated sites

The Delegated Officer noted the Premises (including the proposed filtration facility area depicted in Figure 1) has an existing classification of 'Possibly contaminated – investigation required' under the *Contaminated Sites Act 2004* (CS Act). Construction and operation of the proposed residue filtration project is not expected to impact ongoing processes under the CS Act.

5.3 Other relevant approvals

5.3.1 Planning approvals

The Licence Holder stated in the Application it does not require planning approval.

5.3.2 Department of Water

The Application states that a S11/17/21A Permit to Interfere with Bed and Banks approval may be required from the Department of Water. This relates to ground disturbance associated with the filtration facility footprint and the proposed access road as works may interfere with ephemeral streams due to culvert installation.

5.3.3 Department of State Development

The *Alumina Refinery (Pinjarra) Agreement Act 1969* and *Alumina Refinery Agreements (Alcoa) Amendment Act 1987* apply to the Premises. These agreement acts do not impact on the Licence Holder's ability to implement the proposal, subject to other approvals.

5.4 Part V of the EP Act

5.4.1 Amendment Notices

Licence Amendment Notices were issued on 29 April 2016 and 28 July 2016 to extend the licence duration and alter condition S1 (landfill waste acceptance) respectively.

5.4.2 Compliance history

The Premises was last inspected by the former DER on 22 January 2016; no breaches or compliance matters were identified. The inspection was closed by DER on 26 July 2016.

Prior to this, the Premises were inspected on 16 March 2015. No compliance matters were identified; however, the Licence Holder reported a noncompliance with condition A11 in the 2014/2015 Annual Audit Compliance Report. No further actions were undertaken. The inspection was closed by DER on 20 April 2015.

There were no material records of substantiated complaints or breaches identified from a search of DWER's incident and complaints management system (ICMS).

5.4.3 Noise Impact Assessment

The Licence Holder included the report *Alcoa Pinjarra Filtration Plant Environment Noise Impact Assessment – Phase 1*, SVT Engineering Consultants, 18 November 2016 (the NIA) as part of the Application. The Delegated Officer reviewed the NIA and identified the following:

- The calculated influencing factors (and hence assigned levels) calculated for the receiving premises in the NIA were accepted, while noting potential limitations with some assigned noise levels referenced from a 2010 noise report.
- The sound power levels (SWLs) of the existing and proposed fixed and mobile equipment were accepted. SWLs for 'light vehicles' were potentially underestimated but were not expected to be a key noise source.
- There were no modelling results presented for the proposed filtration plant project in isolation.
- Modelling of existing operations indicate non-compliance with the Noise Regulations by +2 dB and +2.7 dB during night time at receivers R1 and R2 (refer to Figure 4 in section 7.2) located to the south and north of the refinery respectively
- The NIA indicated the possibility of a current exceedance of the assigned levels at R1 and R2 that are in the range of 3.5 dB at R1 and 4.1 at R2, with the exceedance at R2 including a +5 dB penalty for the presence of tonal characteristics.
- The combination of modelled and measured data offers a good indication that existing operations are currently not complying with the Noise Regulations at R1 and R2.
- Octave spectral level data as presented in the NIA does not enable conclusive identification of the source(s) that may be the cause of the tone(s). Similarly the presentation only of cumulative spectral results does not enable identification of whether or not the tonality is due to the proposed project or is already a characteristic of the existing operations.
- While the assumption of tonality based on the predicted one-third octave spectral levels at the receivers is a conservative approach, the tones apparent in the results may be a modelling artefact and may warrant further investigation.
- Barring the presence of tonal characteristics, the assigned levels are likely to be met at receivers R3 to R5 (refer to Figure 4 in section 7.2) for night time operation with the filtration building fully clad.

- Modelling indicates that full cladding of the filtration building is required for the cumulative emissions from the existing operations and the proposed filtration project to meet the assigned levels. The modelling shows potential tones for cumulative emissions at locations R1, R3, R4 and R5. These are not the same frequencies as those identified in a 2010 noise report and hence are more likely to be associated with the new proposal. Investigations into the source of tonality may be required during the construction stage.
- Given the overall transmission loss of the proposed cladding of the filtration building is dependent on installation, monitoring may be required to verify the modelling assumptions have been achieved.

5.4.4 Clearing of native vegetation

Clearing of native vegetation in Western Australia requires a permit from DWER unless exemptions apply. As part of the Application, the Licence Holder proposed to clear native vegetation for the construction of an access road to the construction site. The Licence Holder initially proposed to clear 13 trees, two of which were located within an environmentally sensitive area (ESA). The Licence Holder lodged amended clearing information on 29 March 2017 that included clearing of 15 trees for an access road, eight trees for a slip lane, and eight trees for a construction access area.

The proposed clearing of nine of the 15 trees for the purpose of constructing a vehicular access track was found to be exempt pursuant to Regulation 5, Item 12 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, provided the clearing is undertaken in accordance with the exemption requirements. The remaining six trees are within an ESA and subject to assessment. The exemption does not apply to clearing for the slip lane or construction access area; therefore, an assessment for the proposed clearing of 22 trees was carried out.

The environmental impacts of clearing the remaining 22 trees were assessed in accordance with DWER's Regulatory Principles taking into consideration the clearing principles contained in Schedule 5 of the EP Act. In response to Licence Holder comments on the draft Amendment Notice and Decision Report (refer to section 12), the clearing assessment was amended to be for the clearing of an area (0.164 hectares) of native vegetation, rather than individual trees. A Clearing Assessment Report is contained in Appendix 3 to this Decision Report.

Section 62(1) of the EP Act provides for conditions to be placed on a licence to mitigate environmental harm. Section 4 of the Clearing Assessment Report outlined the finding that proposed clearing is unlikely to cause environmental harm and recommended a licence condition for the authorisation of clearing as follows:

"The licensee shall not clear more than 0.164 hectares of native vegetation within the areas cross hatched yellow on attached Plan 7410/1."

Plan 7410/1 is included with the Clearing Assessment Report in Appendix 3 of this Decision Report.

6. Consultation

The Application was sent to the Shire of Murray for comment as a direct interest stakeholder. No response was received.

7. Location and siting

7.1 Siting context

The Premises is located in the Shire of Murray and is zoned 'Industry' within the Town Planning Scheme with predominantly rural surrounding areas. Water Corporation operates the licensed (L5973/1992/11) Pinjarra Wastewater Treatment Plant that is adjacent to the RSA

on the western side. The Premises is within the *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992* (Peel–Harvey EPP) area.

7.2 Residential and sensitive premises

The distances to residential and sensitive receptors are provided in Table 5. A reference map depicting the locations is shown in Figure 4.

Table 5: Receptors and distances from the filtration facility

Sensitive Land Uses	Distance from filtration facility	
Rural residences (R1, R2, R4 and R5 on Figure 4) Residential residences (R3 on Figure 4)	As measured from the boundary of the proposed filtration facility depicted in Figure 1: R1 – Approx. 6.2 km south east R2 – Approx. 6 km north east R3 – Approx. 3 km north west R4 – Approx. 2.85 km north west R5 – Approx. 2.6 km west	As measured from the RSA activity boundary: R1 – Approx. 4.2 km south east R2 – Approx. 2.8 km north east R3 – Approx. 2.3 km north west R4 – Approx. 2.8 km north west R5 – Approx. 2.7 km west
Pinjarra Townsite	Approx. 3km west	

(Source: Figure 3-1 in Attachment 9 of the Application)

Figure 4: Location of sensitive premises

7.3 Specified ecosystems

The distances to specified ecosystems, as defined by *the Guidance Statement: Environmental Siting* are shown in Table 6 .

Table 6: Specified ecosystems

Specified ecosystems	Distance from the filtration facility
Threatened and Priority Flora	Approx. 4.3 km north east
Waterways Conservation Act 1976 - Peel Inlet Management Area	Approx. 2.8 km west

Specified ecosystems	Distance from the filtration facility
Geomorphic Wetlands Swan Coastal Plain (management) – Conservation category	Approx.1.2 km north west (measured from the boundary of the proposed filtration facility depicted in Figure 1) 2.3 km north east (measured from the boundary of the proposed filtration facility depicted in Figure 1).
Geomorphic Wetlands Swan Coastal Plain (management) – Resource Enhancement category	Approx. 2.5-3 km north east (measured from the boundary of the proposed filtration facility depicted in Figure 1)
Geomorphic Wetlands Swan Coastal Plain (management) – Multiple Use category	Within premises boundary and surrounding the premises to the north, west and south
Waterways Conservation Act 1976 waterways conservation area – Peel Inlet Management Area	Approx. 2.8 km west
Peel-Harvey EPP	The Peel-Harvey EPP area incorporates all parts of the Premises and surrounding areas.
Threatened (Declared Rare) Flora	Approx. 2 – 2.8 km north-north-west to north-north-east Approx. 2.4 km west Approx. 4.2 km east Approx. 5.6 0 5.9 km south east
Priority Flora	Approx. 6.5 km north east Approx. 4.4 – 6.7 km south east
Priority 1 Public Drinking Water Source Area PDWSA) – South Dandalup Pipehead Dam Catchment Area	Approx. 6 km east

7.4 Groundwater and water sources

Section 6.3.2 of the 2012 LTRMS summaries surface hydrology in proximity to the Premises. The Murray River is a major drainage pathway for the region, and is fed by sub-catchments draining the foothills. The Murray River ultimately drains into the Peel-Harvey Estuary. The Oakley Brook to the south and Barritt Brook to the north are creek lines directly associated with the refinery and residue area. Overflow from Barritt Brook is redirected into Lake Kulinup, an artificial body of water to the west of RSA5 formed from a clay borrow area. An overview of the surface water hydrology in proximity to the RSA including the location of Oakley Brook and Barritt Brook is depicted in Figure 5. The depicted 'Artificial water body' on Figure 5 is the wastewater treatment lagoons for the Water Corporation's Pinjarra Wastewater Treatment Plant (as shown on Figure 1).

The Premises lies within the Perth Basin that extends from north of Geraldton to the lower south-west of Western Australia. The Perth Basin comprises a number of aquifers. Beneath the RSA the shallow aquifers include the superficial formations and Leederville aquifer.

Table 7 provides a description of groundwater and water sources.

Table 7: Groundwater and water sources

Groundwater and water sources	Distance from filtration facility	Environmental Value
Murray River	Approx. 3km west of filtration facility	Within the Peel-Harvey EPP area and discharges into the Peel Estuary
South Dandalup River	Approx. 4.6 km north of filtration facility	With the Peel-Harvey EPP area and discharges into the Murray River north west of the Premises
Major tributary – Tate Gully	Approx. 1.3 km north west filtration facility	Tributary of the Murray River.
Major Tributary – Oakley Brook	Approx. 1.8 km south of filtration facility	Tributary of the Murray River. Lower Oakley Pumpback and Oakley Brook Detention Dam are sources for the refinery process water supply. Oakley Brook also provides some stock water on private land downstream of the refinery.
Major Tributary - Barritt Brook	Approx. 3.3 km east of filtration facility	Barrit Brook Detention Dam is a source for refinery process water supply. Barritt Brook also provides some stock water on private land downstream of the refinery.
Drains	Adjacent and approximately 500 m west	A major drain is adjacent to the Filtration facility which may discharge to the RSA5 clay borrow pit. The borrow pit has potential surface water linkages to the Murray River via drains and Tate Gully. A major drain < 500 m south west of the filtration facility appears to ultimately discharge to the Murray River via a minor perennial watercourse and Tate Gully.
Groundwater	Typically <5 m BGL (superficial aquifer). Superficial Aquifer: 0-15 m BGL Leederville Aquifer: 10-120 m BGL Cattamara Aquifer 3-120 m BGL.	Localised elevated concentrations of alkaline salts have been detected within the RSA in the upper and lower superficial formations since the 1980s, relating to historical construction and operational practices and engineering standards at that time. Cattamarra aquifer: Primary source of the process water and potable water supplies. Contains groundwater resources that may be accessed by other users in the region for domestic, stock, irrigation and industrial water supplies. Leederville aquifer: Source for local and regional water supplies for potential domestic , stock, irrigation and industrial purposes. Superficial aquifer: Source for local and regional water supplies for potential domestic, stock and irrigation purposes. (Refer to Figure 7 in Appendix 4 for a hydrogeological cross-section)

(*Source: Figure 6-2 in the 2012 LTRMS)*

Figure 5: Surface water map

7.5 Other site characteristics

The locations of other receptors are shown in Table 8.

Table 8: Other landscape features, relevant factors or receptors

Other receptors or areas of concern	Location
Peel-Harvey EPP	The Peel-Harvey EPP policy area incorporates all parts of the Premises.

7.6 Soil type

The geological context of the premises is shown in Figure 6 of Appendix 4 which depicts a geological cross-section. With reference to Section 6.2 of the Licence Holder's LTRMS, the shallow superficial formation comprises clay, clayey sand and sand (Guildford Clay and Yoganup Formation most dominant) up to 20 m thick. The Leederville Formation is encountered at 20 to 30 m and extends to approximately 120 m beneath the RSA. The upper Leederville Formation is composed of silts, clays, siltstones and silty or clayey sands. The deeper Cattamarra Coal Measures are characterised by sandstone, siltstone, shale and some minor coal.

7.7 Meteorology

Section 6 of the LTRMS provides a summary information on climate and weather for the localised Pinjarra area. Pinjarra has a Mediterranean type climate characterised by warm dry summers and mild wet winters with temperatures similar to those recorded in Perth. Rainfall through the Peel Region is seasonal with the majority of rainfall received during the winter

months (June to August). The long-term average annual rainfall at the Pinjarra Post Office (90 years of data) is 944 mm.

The winds at Pinjarra are controlled by synoptic weather patterns and local features such as the topography and sea and land breezes. The location of the Premises as the base of the Darling escarpment impacts on larger scale winds creating effects such as strong easterly 'foothill' winds, wind reversal, and wind channelling.

8. Risk assessment

8.1 Confirmation of potential impacts

Identification of key potential emissions, pathways, receptors and confirmation of potential impacts are set out in Table 9 and Table 10 below. Table 9 and Table 10 also identify which potential emissions will be progressed to a full risk assessment. Some potential emissions/impacts may not receive a full risk assessment where a potential receptor or pathway cannot be identified or where the emission/impacts are regulated under a Ministerial Statement.

Table 9: Identification of key emissions and the potential for impacts during construction

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
Source (see Section 4.1 for infrastructure references)	**Construction, mobilisation and positioning of infrastructure**	Vehicle movements on unsealed access roads in RSA	Noise	Closest residence is 2.6 km west of filtration facility location. Pinjarra townsite approx. 3 km west.	Air / wind dispersion	Amenity impacts	No	Noise emissions are regulated through Part IV of the EP Act.
			Fugitive dust			Amenity and health impacts	No	Fugitive dust emissions from RSA are regulated through Part IV of the EP Act.
		Construction of new buildings, plant and infrastructure	Noise	Closest residence is 2.6 km west of filtration facility location. Pinjarra townsite approx. 3 km west.	Air / wind dispersion	Amenity impacts	No	Noise emissions are regulated through Part IV of the EP Act.
			Fugitive dust			Amenity and health impacts	No	Fugitive dust emissions from RSA are regulated through Part IV of the EP Act.

Table 10: Identification of key emissions and the potential for impacts during operation

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
Source (see Section 4.1 for infrastructure references)	**Mud Handling & Storage**	Residue mud holding tanks	Overtopping and loss of containment causing discharge to land	Geomorphic wetlands and surface water resources (see section 7.4)	Direct discharge	Alkaline material entering surface water system impacting surface water ecosystem and beneficial use	Yes	Refer to section 8.5
				Groundwater. Superficial aquifer from 0 – 15 mbgl across the Premises.	Land infiltration to groundwater	Alkaline material entering superficial aquifer impacting beneficial use	Yes	Refer to section 8.4
			Odour	Closest residence is 2.6 km west of filtration facility location. Pinjarra townsite approx. 3 km west.	Air / wind dispersion	Amenity impacts	No	Odour emissions are regulated through Part IV of the EP Act.
		Residue mud pipelines	Rupture of pipeline causing discharge to land	Geomorphic wetlands and surface water resources (see section 7.4)	Direct discharge	Alkaline material entering surface water system impacting surface water ecosystem and beneficial use	Yes	Refer to section 8.5
				Groundwater. Superficial aquifer from 0 – 15 mbgl across the Premises.	Land infiltration to groundwater	Alkaline material entering superficial aquifer impacting beneficial use	Yes	Refer to section 8.4
	Filtration Facility	Processing of residue mud	Noise	Closest residence is 2.6 km west of filtration facility location. Pinjarra townsite approx. 3 km west.	Air / wind dispersion	Amenity impacts	No	Noise emissions are regulated through Part IV of the EP Act.
		Conveyance of filter cake to materials handling systems	Noise	Closest residence is 2.6 km west of filtration facility location. Pinjarra townsite approx. 3 km west.	Air / wind dispersion	Amenity impacts	No	Noise emissions are regulated through Part IV of the EP Act.

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
			Fugitive dust	Closest residence is 2.6 km west of filtration facility location. Pinjarra townsite approx. 3 km west.	Air / wind dispersion	Amenity impacts	No	Fugitive dust emissions from RSA are regulated through Part IV of the EP Act.
		Filtrate emergency containment pond	Overtopping and loss of containment causing discharge to land	Geomorphic wetlands and surface water resources (see section 7.4)	Direct discharge	Alkaline material entering surface water system impacting surface water ecosystem and beneficial use	Yes	Refer to section 8.5
				Groundwater. Superficial aquifer from 0 – 15 mbgl across the Premises.	Land infiltration to groundwater	Alkaline material entering superficial aquifer impact on beneficial use	Yes	Refer to section 8.4
			Pond seepage	Groundwater. Superficial aquifer from 0 – 15 mbgl across the Premises.	Land infiltration to groundwater	Alkaline material entering superficial aquifer impacting beneficial use	Yes	Refer to section 8.4
	Filtrate Handling & Storage System	Filtrate holding tanks	Overtopping and loss of containment causing discharge to land	Geomorphic wetlands and surface water tributaries (see section 7.4)	Direct discharge	Alkaline material entering surface water system impacting surface water ecosystem and beneficial use	Yes	Refer to section 8.5
				Groundwater. Superficial aquifer from 0 – 15 mbgl across the Premises.	Land infiltration to groundwater	Alkaline material entering superficial aquifer impacting beneficial use	Yes	Refer to section 8.4
		Filtrate pipelines	Rupture of pipeline causing discharge to land	Geomorphic wetlands and surface water tributaries (see section 7.4)	Direct discharge	Alkaline material entering surface water system impacting surface water ecosystem and beneficial use	Yes	Refer to section 8.5
				Groundwater. Superficial aquifer from 0 – 15 mbgl across the Premises.	Land infiltration to groundwater	Alkaline material entering superficial aquifer impacting beneficial use	Yes	Refer to section 8.4

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
	Material Handling Systems	Filter cake handling using a mobile spreader	Noise	Closest residence is 2.3 km north west of the RSA activity boundary.	Air / wind dispersion	Amenity impacts	No	Noise emissions are regulated through Part IV of the EP Act.
			Fugitive dust	Closest residence is 2.3 km north west of the RSA activity boundary.	Air / wind dispersion	Amenity and health impacts	No	Fugitive dust emissions from RSA are regulated through Part IV of the EP Act.
		Mechanical distribution, spreading and compaction of filter cake within RSA	Noise	Closest residence is 2.3 km north west of the RSA activity boundary.	Air / wind dispersion	Amenity impacts	No	Noise emissions are regulated through Part IV of the EP Act.
			Fugitive dust	Closest residence is 2.3 km north west of the RSA activity boundary.	Air / wind dispersion	Amenity and health impacts	No	Fugitive dust emissions from RSA are regulated through Part IV of the EP Act.

8.2 Risk Criteria

During the assessment the risk criteria in Table 10 below will be applied to determine a risk rating set out in this section 8.

Table 11: Risk Criteria

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the risk / opportunity occurring.		The following criteria has been used to determine the consequences of a risk occurring:		
			Environment	Public Health* and Amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **on-site impacts**: catastrophic • **off-site impacts local scale**: high level or above • **off-site impacts wider scale:** mid level or above • Mid to long term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **on-site impacts**: high level • **off-site impacts local scale**: mid level • **off-site impacts wider scale**: low level • Short term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **on-site impacts**: mid level • **off-site impacts local scale**: low level • **off-site impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **on-site impacts**: low level • **off-site impacts local scale**: minimal • **off-site impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **on-site impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

8.3 Risk Treatment

DWER will treat risks in accordance with the Risk Treatment Matrix in Table 12 below:

Table 12: Risk Treatment

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk event will not be tolerated. DWER may refuse application.
High	Acceptable subject to multiple regulatory controls.	Risk event will be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled	Risk event is acceptable and will generally not be subject to regulatory controls.

8.4 Risk Assessment – Discharges to Land and Seepage

8.4.1 General hazard characterisation and impact

Residue mud contains entrained alkaline solution caused by the process of extracting alumina using caustic soda solution and lime. According to section 4.2 of the 2012 LTRMS, the solution entrained with the residue typically has a total alkalinity of between 20 and 30 g/L expressed as sodium carbonate, and a pH of 13. Residue mud is the fine fraction of residue (as opposed to the coarser red sand fraction) and is silt to clay sized material with a specific gravity of 3.2 which settles slowly. Filtrate is the liquor produced after filter pressing of the residue mud, therefore has similar caustic characteristics with less solids fraction. Flushings, drainage and wash waters generated in the filtration building will be cross contaminated with caustic waste materials.

No direct discharge of these waste materials is proposed and discharge outside of containment is not expected during normal operations. Foreseeable risk events may involve loss of containment from infrastructure, overtopping, ruptures and pond seepage. Residue mud, filtrate or contaminated wash waters would be directly discharged from infrastructure, a portion of which may infiltrate into soil and potentially reach the superficial aquifer. These types of events could also contaminate stormwater.

A loss of containment event would be expected to be localised in terms of surface area impact and be of short duration. This includes pond seepage due to it being an emergency containment pond and not used for day to day storage of wastes.

As outlined in Table 7, the RSA has localised elevated concentrations of alkaline salts in the upper and lower superficial formations that have been detected since the 1980's and relate to historical construction and engineering practices and standards at that time. Beyond the premises, there may be beneficial use of superficial groundwater for domestic stock watering and irrigation purposes. The shallow soil type near the RSA is dominated by Guildford Clay which is likely to provide a type of natural barrier to vertical and horizontal groundwater flows. The superficial aquifer may also act as base flow to localised surface drainage.

8.4.2 Criteria for assessment

The ANZECC Guidelines are considered appropriate assessment criteria to assess the potential impact on groundwater quality. As outlined in section 7.4, Superficial and Leederville aquifers are broader sources of local and regional water supplies for potential domestic, stock, irrigation and industrial purposes.

8.4.3 Licence Holder controls

The Licence Holder's controls for discharges to land and seepage are derived from the Application.

Table 13: Licence Holder controls for discharges to land and seepage

Infrastructure		Controls
Engineering	Filtration building and storage tanks	Construction of secondary containment bunding for filtration building and storage tanks. Secondary containment incorporates a HDPE lined emergency containment pond adjoining the filtration building by a HDPE spill way. Tanks will have surge volume Residual materials generated from line flushing, draining, and floor washing is returned to the residue process via the sump system and/or via the filtrate return system.
	Filter cake material handling	Occurs within existing RSA3, RSA5 or RSA6 initially but mobile spreader can be operated in any existing RSA. No changes to design of RSAs.
Procedures / management	All	Maintenance of bunds and sealed areas. Provision of spill clean-up resources. Ongoing use of waste and spill management procedures (Application did not specify any details of the procedures). Ongoing use of spill management procedures.

8.4.4 Key findings

Key Findings: The Delegated Officer considers that:

- The Licence Holder's controls (refer to Table 13) are based on the containment and capture of potentially contaminated materials.
- The Licence Holder has provided general descriptions of these controls with no specific design specifications or detail.

8.4.5 Consequence

If a loss of containment risk event occurs, the Delegated Officer has determined that the impact on the beneficial use of the superficial aquifer will be limited to low-level on-site impacts and minimal local off-site impacts. Therefore, the Delegated Officer considers the consequence of loss of containment impacting on the beneficial aquifer to be **Minor**.

8.4.6 Likelihood of consequence

The Licence Holder proposed controls including secondary containment incorporating an emergency containment pond. The Licence Holder has provided general detail regarding these controls. Therefore, the Delegated Officer considered impact to the superficial aquifer

could occur at some time and considers the consequence to be **Possible**.

8.4.7 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 11) and determined that the overall rating for the risk of land infiltration to groundwater on sensitive receptors during operation is **Medium**.

8.5 Risk Assessment – Discharges to Surface Water

8.5.1 General hazard characterisation and impact

Refer to section 8.4 for the general hazard characterisation of residue mud and filtrate.

Considering the caustic nature of these materials, there is a likelihood of impacts and stress to riparian vegetation and the freshwater ecosystems. The suspended solids may cause physical smothering of vegetation and sedimentation of the freshwater ecosystems. Discharged residue mud or filtrate from the filtration facility or associated infrastructure would generally be confined to the localised area around the infrastructure.

8.5.2 Criteria for assessment

The ANZECC Guidelines are considered appropriate assessment criteria to assess the potential impact on surface water quality. As outlined in section 7.4, the beneficial use of localised watercourses (aside from the Licence Holders use for process water that occurs upstream) is likely to be limited to stock watering. The ANZECC Guidelines also provide livestock drinking water quality guidelines.

8.5.3 Licence Holder controls

Table 14: Licence Holder controls for discharges to surface water

Infrastructure		**Controls**
Engineering	Filtration building and storage tanks	Construction of secondary containment bunding for filtration building and storage tanks. Secondary containment incorporates a HDPE lined emergency containment pond adjoining the filtration building by a HDPE spill way. Tanks will have adequate surge volume Residual materials generated from line flushing, draining, and floor washing is returned to the residue process via the sump system and/or via the filtrate return system.
	Filter cake material handling	Occurs within existing RSA3, RSA5 or RSA6 initially but mobile spreader can be operated in any existing RSA. No changes to design of RSAs.
Procedures / management	All	Maintenance of bunds and sealed areas. Provision of spill clean-up resources. Ongoing use of waste and spill management procedures Stormwater contained within residue area and directed to existing process water streams for reuse.

8.5.4 Key findings

Key Finding: The Delegated Officer considers that:

- The Licence Holder's controls (refer to Table 12) are based on the containment and capture of potentially contaminated materials.
- The Licence Holder has provided general descriptions of these controls with no specific design specifications or detail.

8.5.5 Consequence

If a loss of containment risk event occurs, the Delegated Officer has determined that the impact on surface water ecosystems to be minimal on-site due to the absence of surface water ecosystems of value. A risk event for the filtration facility is expected to be generally confined to the localised area around the infrastructure through containment and scale/duration of the event. The Delegated Officer therefore determined there would be low-level off-site impacts local scale and minimal off-site impacts wider scale. There is risk of ANZECC Guidelines not being met in relation to freshwater ecosystem guidelines and livestock drinking water values. Therefore, the Delegated Officer considers the consequence of loss of containment impacting on the beneficial aquifer to be **Moderate**.

8.5.6 Likelihood of consequence

The Licence Holder proposed controls including secondary containment incorporating an emergency containment pond. The Licence Holder has provided general detail regarding these controls. However, a loss of containment event would not be expected to result in residue materials or wastes accessing a surface water body given the expected scale and duration of such an event and the distance to surface water receptors. Therefore, the Delegated Officer considers the consequence to be **Unlikely**.

8.5.7 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 11) and determined that the overall rating for the risk of discharges to surface water impacting on receptors during operation is **Medium**.

8.6 Summary of risk assessment and acceptability

A summary of the risk assessment and the acceptability of the risks with treatments are set out in Table 15 below. Controls are described further in section 9.

Table 15: Risk assessment summary

	Emission		Pathway and Receptor	Licence Holder controls	Impact	Risk Rating	Acceptability with treatment (conditions on instrument)
	Type	**Source**					
1.	Infiltration to groundwater from contaminated stormwater, material spills and seepage	Infrastructure and equipment	Direct from infrastructure.	Infrastructure and procedures / management controls	Impacts on the beneficial use of groundwater in the superficial aquifer	Minor consequence Possible **Medium risk**	Acceptable subject to Licence Holder controls and regulatory controls
2.	Discharges to surface water from contaminated stormwater and material spills	Infrastructure and equipment	Direct from infrastructure	Infrastructure and procedures / management controls	Impacts on surface water ecosystems	Moderate consequence Unlikely **Medium risk**	Acceptable subject to Licence Holder controls and regulatory controls

9. Determined Regulatory Controls

A summary of the risks with corresponding controls are set out in Table 13. The risks are set out in the assessment in section 8 and the controls are detailed in this section 9. Controls will form the basis of conditions in an Amendment Notice.

Table 16: Summary of regulatory controls to be applied

		Controls		
		9.1 Infrastructure Design or Construction Requirements	**9.2 Operation of Infrastructure Requirements**	**8.3 Clearing of native vegetation requirements**
Risk Items (see risk analysis in section 8)	**Discharge to land and seepage**	●	●	
	Discharge to surface water	●		
	Clearing of native vegetation			●

9.1 Infrastructure Design or Construction Requirements

The Licence Holder must construct the works in accordance with the requirements in the Infrastructure Requirements Table below.

Infrastructure Requirements Table	
Infrastructure	**Requirements (design and construction)**
Filtration facility	(a) The filtration facility must have secondary containment that: (i) is not less than 110% of the capacity of the largest container, tank or vessel within the filtration building; (ii) directs all runoff and drainage into existing process water systems for reuse; (iii) is constructed of materials that are substantially immune to attack by any corrosive substance it may contain; (iv) is sufficiently impervious and able to retain and enable the recovery of any spillage. (b) All tanks must include high-level alarms.
Emergency containment pond	(a) The pond must be adjoined to the filtration building by a minimum 1.5 mm thickness HDPE lined spillway to form part of secondary containment for the filtration building. (b) The pond must have embankments designed and constructed to prevent erosion as a result of stormwater runoff and divert stormwater away from the pond. (c) The pond must be constructed with a single layer of HDPE liner and

Infrastructure Requirements Table	
Infrastructure	**Requirements (design and construction)**
	must ensure no detectable leakage from the pond. (d) The HDPE liner must meet the following specification: (i) be minimum of 1.5 mm thickness; (ii) have a permeability of less than 1 x 10^{-9} m/s; and (iii) be durable to maintain permeability for the working life of the pond. (e) The HDPE liner installation must be tested and validated in accordance with the requirements specified in Schedule 4. (f) The HDPE liner must be certified by a suitably qualified professional engineer.

Notes: Secondary bunding and containment infrastructure requirements are adapted from Australian Standard AS 3780: *The storage and handling of corrosive substances*. Emergency containment pond construction and liner specification are adapted from the Department of Water's Water Quality Protection Note No. 26 *Guidance on liners for containing pollutants using synthetic membranes*, and the South Australian Environmental Protection Authority's Guideline: *Wastewater lagoon construction* (November 2014). Liner installation validation requirements are Licence Holder controls.

Grounds: The Licence Holder proposed controls for discharges to land and seepage are in the form of primary and secondary containment that incorporates an emergency containment pond. In the absence of design and specification detail in the Licence Holder's Application, the Delegated Officer has specified DWER requirements regarding this infrastructure.

9.2 Operation of Infrastructure Requirements

On completion of the works and submission of engineering or building certifications, the Licence Holder must ensure that the infrastructure and equipment specified in Table 17 are maintained and operated in accordance with requirements in Table 17.

Table 17: Operation of infrastructure and equipment requirements

Infrastructure	Description	Operational requirements
Filtration facility	Tanks fitted with high-level alarm systems. Secondary containment incorporating a HDPE lined emergency containment pond adjoined to the building by a HDPE lined spill way.	Runoff, drainage or spillage is contained and directed into process water systems for reuse. The emergency containment pond is used for the purposes of emergency secondary containment of residue mud or filtrate from the filtration building. A minimum capacity of 110% of the largest tank or vessel within the filtration facility is maintained except where the pond is providing emergency containment.

Note: Requirements are derived from the Licence Holder's controls and the Infrastructure Requirements Table in section 9.1. The requirements do not commence until the Licence Holder has completed specified works and submitted engineering or building certification for the emergency containment pond.

9.3 Clearing of Native Vegetation Requirements

The Licence Holder must not clear more than 0.164 hectares of native vegetation within the area cross-hatched yellow on attached Plan 7410/1.

Note: Requirement is derived from the DWER Clearing Assessment Report in Appendix 3 of this Decision Report.

10. Setting Conditions

10.1 Construction Phase

The conditions in the Amendment Notice have been determined in accordance with DWER's *Guidance Statement: Setting Conditions*.

DWER's *Guidance Statement on Licence Duration* has previously been applied and the existing expiry date will not be altered.

Condition Ref	Grounds
Location of Works Condition R1	This condition is valid, risk-based and consistent with the EP Act.
Infrastructure Design or Construction Conditions R2, R3, R4 and R5	These conditions are valid, risk-based and contain appropriate controls (see section 9).
Clearing of Native Vegetation Condition R6	This condition is valid and an appropriate control to mitigate environmental harm (see section 5.4.4)
Operation of Infrastructure and Equipment Requirements Condition R7	This condition is valid and an appropriate control to mitigate environmental harm (see section 9)

The Delegated Officer notes that DWER may review the appropriateness and adequacy of controls at any time, and that following a review, DWER may initiate amendments to the licence under the EP Act.

11. Post-construction Conditions

The Amendment Notice authorises works associated with the Application. The Amendment Notice also imposes controls for operation of works associated with the Application, which take effect upon the Licence Holder completing the works and submitting specified certifications.

12. Applicant's comments

The Licence Holder was provided with a draft Decision Report and Amendment Notice on 1 May 2017. The Licence Holder provided comments (Alcoa, June 2017) and subsequently met with the Delegated Officer on 23 June 2017. Follow up information and comments (Alcoa, July 2017) were provided by the Licence Holder subsequent to the meeting. Table 18 in Appendix 2 contains the Licence Holder's submission points along with the Delegated Officer's consideration and determinations.

The Delegated Officer provided the Licence Holder was provided with revised copies of the draft Amendment Notice and Decision Report on 18 July 2017 due to the extent of proposed alterations. The Licence Holder provided the follow additional comments on 20 July 2017 that were considered by the Delegated Officer as also outlined in Table 18 in Appendix 2.

13. Conclusion

This assessment of the risks of activities on the premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this decision report (summarised in Appendix 1).

Based on this assessment, it has been determined that an Amendment Notice will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Jonathan Bailes
A/Senior Manager, Industry Regulation (Process Industries)

Delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key Documents

	Document Title	Document reference	Availability
1	ANZECC 2000, *National Water Quality Management Strategy – Paper No. 4: Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines.*	ANZECC Guidelines	Accessed at: www.evironment.gov.au
2	Application to amend licence L5271/1983/14 received by the then DER on 22/11/2016	Application	DWER records (A1329942, A1329943 and A13229944)
3	Australian Standard 3780: *The storage and handling of corrosive substances*, Standards Australia, 2008	AS 3780	Accessed at: www.saiglobal.com
4	DWER *Guidance Statement: Regulatory principles*	N/A	Accessed at: www.der.wa.gov.au
5	DWER *Guidance Statement: Setting conditions*		
6	DWER *Guidance Statement: Licence duration*		
7	DWER *Guidance Statement: Risk Assessments*		
8	DWER *Guidance Statement: Decision Making*		
9	DWER *Guidance Statement: Siting*		
10	Existing Licence L5271/1983/14 and associated Amendment Notices	Existing Licence	Accessed at http://www.der.wa.gov.au
11	Licence Holder comments on draft Amendment Notice and Decision Report, email received 12 June 2017	Alcoa, June 2017	DWER records (A1449445)
12	Licence Holder additional comments and information , email received 4 July 2017	Alcoa, July 2017	DWER records (A1465526)
13	*Long Term Residue Management Strategy, Pinjarra 2011*, Alcoa of Australia, 17 February 2012	2012 LTRMS	Accessed at: www.alcoa.com.au
14	Ministerial Statement 646	MS 646	Accessed at

	Document Title	Document reference	Availability
15	*Pinjarra Refinery Efficiency Upgrade, Alcoa World Alumina Australia*, Report and recommendations of the Environmental Protection Authority, Bulletin 1122, EPA, December 2003	EPA Bulletin 1122	http://www.epa.wa.gov.au/
16	Wastewater Guidelines: *Wastewater lagoon construction*, EPA South Australian, November 2014	EPA (SA) 2014	Accessed at: www.epa.sa.gov.au
17	Water Quality Protection Note 26: *Liners for containing pollutants, using synthetic membranes*, Department of Water (W.A.), August 2013	WQPN 26	Accessed at: www.water.wa.gov.au

Appendix 2: Summary of Licence Holder's Comments on Risk Assessment and Draft Conditions

Table 18: Licence Holder comments on draft Amendment Notice and Delegated Officer consideration

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
	Draft Amendment Notice		
1	Amendment, Item 2, Pg. 3	Australian Standards and American Society for Testing Materials methods should include a reference date. Where applicable, Alcoa would undertake design and testing in accordance to the relevant standard or method at the time of issue of the Licence Amendment.	The Delegated Officer notes that referenced standards and methods are for the purpose of point in time works for pond liner installation and therefore does not object to including the specific reference dates. **Outcome:** Version date included in any definition references for methods or standards.
2	Works Conditions, Item 4, Pg. 4	Text incorrect – Alcoa recommends modification to the text to incorporate the eight (8) conditions in the draft Licence Amendment R1 to R8.	Redundant due to the decision to delete proposed condition R8 in response to Licence Holder comment 11. **Outcome:** No change.

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
3	Works Conditions, Item 4, Condition R2, Pg. 4	Condition prescribes that Alcoa must carry out works in accordance with Schedule 1: Works. Alcoa believes that Schedule 1 as presented is too prescriptive and detailed, and notes that infrastructure referenced in Schedule 1 may be modified during the detailed design phase of the project. For example, noise control measures other than/or including cladding may be implemented as necessary. Where design modifications are required for operability and maintainability of the infrastructure, and do not increase risks to either public health, amenity or the environment, as presented in the licence amendment application, Alcoa requests the flexibility to undertake appropriate reviews and modifications during the detailed design phase of the project. This would eliminate the need to seek additional amendments to the Licence.	The Delegated Officer had regard to the Licence Holder's comments received on 12 June 2017 and follow up information and comments received on 4 July 2017. The Licence Holder supplied a revised version of Schedule 1: Works in the draft Amendment Notice. The Delegated Officer accepted the majority of Licence Holder revisions which provided sufficient clarity on a scope of works whilst maintaining some flexibility for the Licence Holder in detailed design. The Delegated Officer revised the reference to specific numbers for the residue tank and filtrate tank and referred to "*tank(s)*." Determined secondary containment controls adequately address risks to groundwater and surface water regardless of the number of tanks constructed. The Delegated Officer also deleted the reference to Dangerous Goods legislation in the Emergency Pond specification. For the purposes of the Amendment Notice, the secondary containment must meet the requirements of the *Works Infrastructure Regulations Table*. The Delegated Officer is satisfied the revised Schedule 1 provides adequate flexibility for the Licence Holder, whilst also specifying the key components of works upon which the risk assessment is based. The Delegated Officer therefore disagreed with linking Schedule 1 with condition R4. The Licence Holder maintains the ability to depart from specific requirements in the Works Infrastructure Requirements Table, subject to conditions R4 and R5. **Outcome:** Schedule 1: Works replaced with a version provided by the Licence Holder including minor variations by the Delegated Officer to the Filtration Building and Emergency Containment Pond specifications.

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
4	Works Conditions, Item 4, Condition R3, Pg. 4	The Works Infrastructure Requirements Table specifies requirements which are legislated under the *Dangerous Goods Safety Act 2004* and the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007.* Pinjarra Refinery has an existing Dangerous Goods licence (DGS004246). The project design will be risk assessed and the existing Dangerous Goods Licence amended prior to operation of the facility. Alcoa requests the removal of all requirements that are legislated under relevant Dangerous Goods legislation. Alcoa has identified a potential misinterpretation in regards to the *filtration building, filtrate storage tanks and emergency containment pond*. Alcoa intends that the emergency containment pond form part of the secondary containment provided for the filtration facility to meet relevant Dangerous Goods legislation containment volume requirements. Alcoa does not intend to construct tertiary containment for the facility. The area hatched blue in Schedule 2: Site Plans is not a residue storage area (RSA), nor is the construction of a residue storage area (RSA) proposed. The area will be utilised to construct the filtration facility and associated infrastructure. Potentially contaminated stormwater from the facility and associated infrastructure will be captured and directed to the existing refinery process water circuit. It is not intended that the stormwater will be directed to one storage location. Alcoa does not intend to capture all stormwater generated from the entire blue hatched area, as represented in Schedule 2: Site Plans, as the entire area may not be utilised for the project.	(a) The Delegated Officer assessed the risk of surface water and groundwater impacts, taking into consideration detail provided on the proposed design, specifications and Licence Holder controls in the Application. The Delegated Officer determined controls that were partly adapted from AS3780 which provided a nationally recognised standard for containing corrosive substances. The controls are to address risk to surface water and groundwater, rather than ensure compliance with Dangerous Goods requirements. The Delegated Officer is satisfied the determined containment controls are consistent with the *Guidance Statement: Setting conditions*. The controls are risk-based, enforceable and necessary and convenient for the purposes of the EP Act relating to the prevention, control, abatement or mitigation of pollution or environmental harm. However, the secondary containment controls have been revised on consideration of : (i) the Licence Holder's recommended Schedule 1 changes; (ii) the Licence Holder's recommended Works Infrastructure Requirements Table changes; (iii) clarification that the emergency containment pond forms part of secondary containment, as opposed to tertiary containment. (b) The Assessment was based on the Licence Holder's Application that made reference to the emergency pond being "*constructed for emergency containment (tertiary containment).*" The Delegated notes the clarification and has updated the Decision Report and Amendment Notice as necessary. (c) The Assessment was based on information and maps supplied in the Application. The Delegated Officer noted the clarification on site layout (including the revised map) and stormwater. Requirements for the Filtrate Building in the Works Infrastructure Requirements Table already specifies that secondary containment directs runoff and drainage into existing process water systems therefore is a duplicative requirement. **Outcome:**

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
5	Works Conditions, Item 4, Condition R4, Pg. 4	Alcoa requests that this condition reference the supporting information provided as part of the licence amendment application. Detailed design has yet to be completed for the project. Where design modifications are required, and do not increase risks to either public health, amenity or the environment, Alcoa seeks the flexibility to undertake appropriate reviews and modification during the project without the need to require further licence amendments.	The Delegated Officer disagrees that referencing parts of the Application in the Amendment Notice provides the flexibility requested by the Licence Holder. As per the Delegated Officer consideration in comment 3, a revised Schedule 1: Works has been included. **Outcome:** No change.
6	Works Infrastructure Table – Filtration Building and Filtrate Storage Tanks, Row 1, Column 2, Pg,5	As stated above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation.	Refer to comment 4.
7	Works Infrastructure Table – Emergency Containment Pond, Row 2, Column 2, Pg,5	As stated above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation. Alcoa reiterates that the emergency containment pond is intended for emergency use only. • The pond is part of the secondary containment and not a tertiary containment control. As such, the requirement for freeboard is not appropriate. • The intended temporary storage nature of this pond should not require defined embankment design and separation distance restrictions. This pond is intended for emergency use only. • The embankment design of 1:3 is flatter than Alcoa is likely to build the pond, considering the intended use of the pond as emergency storage only. • The separation of 2m from the base of the liner to the highest wet season water table, if prescribed, will result in increase in the required area and footprint for the pond. Consideration of the likely wet season water table will be made during detailed design and appropriate design considerations implemented. • The pond embankments will be lined so internal erosion should not be an issue. No prescription is required.	Refer to comment 4 in relation to Dangerous Goods matters. The Delegated Officer noted the Licence Holder's comments and additional information on the emergency containment pond and revised requirements in the Works Infrastructure Requirements Table. **Outcome:** Emergency containment pond controls revised.
8	Works Infrastructure Table – All, Row 3, Column 2, Pg,6	As stated above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation	Refer to comment 4.

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
9	Clearing of Native Vegetation Requirements, Condition R6, Pg. 6	Alcoa considers that approval as an area permit for the overall assessed area would be more suitable than reference to individual trees.	The Delegated Officer agreed with the Licence Holder's requested change. The Clearing Assessment Report was updated to apply to 0.164 hectares of native vegetation rather than 22 individual trees. Proposed condition R6 was also updated. **Outcome:** Clearing Assessment Report, Decision Report and Amendment Notice updated to relate to the clearing of an area (0.164 hectares) rather than individual trees.
10	Clearing of Native Vegetation Requirements, Condition R7, Pg. 6	The condition appears to be in the incorrect section of the Draft Amendment Notice. As stated above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation.	Corrected by moving R7 to be under the 'Operational Requirements' heading. Refer to comment 4 in relation to Dangerous Goods matters. **Outcome:** Proposed condition R7 relocated.
11	Operational Requirements, Condition R8, Pg. 6	The condition requirement to maintain infrastructure *"in good working order"* is broad and subject to interpretation. It would be difficult for Alcoa to determine what constitutes compliance. Alcoa recommends that the condition is removed.	The Delegated Officer agreed with the Licence Holder's recommendation on the basis that R8 is duplicative and is adequately addressed by condition R7. **Outcome:** Proposed condition R8 deleted.
12	Operation of Infrastructure Requirements Table, Row 1, Column 3, Pg. 7	As stated in above in Comment Number 4, no tertiary containment is proposed for the facility. Secondary containment, including the emergency containment pond, will be constructed in accordance with relevant Dangerous Goods legislation. Alcoa reiterates that the emergency containment pond is intended for emergency use only. In the event that the pond is required to be utilised, the maximum holding period will include the period to safely empty the pond. Alcoa does not believe that a period needs to be specified in the Licence Amendment. A freeboard provision is generally intended to accommodate wave action in permanent residue storage areas within a storage facility. Alcoa considers that this requirement is not necessary for the emergency containment pond because the pond is intended for emergency use only.	Refer to comment 4 in relation to Dangerous Goods matters.

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
13	Operation of Infrastructure Requirements Table, Row 2, Column 2/3, Pg. 7	As clarified above in Comment Number 4, Alcoa advises that no tertiary containment has been proposed for the facility. Secondary containment, which includes the emergency containment pond, will be constructed in accordance with relevant Dangerous Goods legislation.	Refer to comments 4 and 7.
14	Schedule 1: Works, Item 1, Pg.8	As noted above in Comment Number 3 Alcoa requests that equipment referenced in this table represent the main components required to operate the facility. Where design modifications are required for operability and maintainability of the infrastructure, and do not increase risks to either public health, amenity or the environment, Alcoa requests the flexibility to undertake appropriate reviews and modification during the project. This would eliminate the need to seek additional amendments to the Licence. Alcoa requests that the reference to "radial arms" is removed from Item 6 – Conveyance Systems. A separate radial arm system is not proposed for Pinjarra, as approximately 50% of existing dry stacking will remain in operation.	Refer to comment 3 in relation to Schedule 1 matters. Noted request regarding reference to radial arms. **Outcome:** References to radial arms deleted.
15	Schedule 1: Works, Item 6, Pg.8	As noted in Comment 14, Alcoa requests the removal of reference to *"radial arms"* from Item 6 – Conveyance Systems.	Refer to comment 14.
16	Schedule 1: Works, Item 7, Pg.8	Alcoa notes that the length of the mobile spreader is incorrect due to a progression in design. The spreader length is anticipated to increase to approximately 550m – 600m, with the final length to be confirmed during detailed design. The length of the mobile spreader is determined based on the operating width of the residue storage area in which spreading is occurring, therefore the length of the mobile spreader will vary during the operational phase of the project. As noted in Comment 14, Alcoa requests the removal of the reference to *"radial arms"* from Item 7 – Mobile Spreader Unit.	The Delegated Officer does not expect the length of the mobile spreader to adversely impact of the risk of emissions and discharges and agreed with revised wording provided by the Licence Holder that it will be variable length. Refer to comment 14 in relation to 'radial arm' references. **Outcome:** References to the specific length of mobile spreader deleted and replaced by wording to reflect the spreader will be variable length.
17	Schedule 1: Works, Item 9, Pg.8	Alcoa request that Item 9 is no longer included in Schedule 1: Works.	Noted. **Outcome:** Deleted row in table specifying a secondary/bypass system.
	Draft Decision Report		

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
18	Purpose and Scope of Assessment, Item 2, Pg.1-2	Background - Table 1: Alcoa notes that MS646 approves 5Mtpa alumina production and 10Mtpa bauxite residue. Other category capacities listed in Table 1 are not relevant to the licence amendment application, nor are they required by legislation. Alcoa requests that the Table is amended accordingly.	Noted error referencing MS646 approved production capacity. The text is clear that the table reflects all categories on the Existing Licence and that the Application relates to the Category 46 Primary Activity. However, the Delegated Officer will include the wording "*Not applicable to the Application or this assessment*" for categories other than category 46 in the production/design capacity column. **Outcome:** Corrected the alumina production capacity to 5 Mtpa. Production/design capacities not specified for categories other than category 46.
19	Purpose and Scope of Assessment, Item 3, Subsection 3.1, Pg.2-5	Alcoa requests that the DER considers comments as stated in above in Comment Number 3 and the information provided in Table 2: Proposed infrastructure and equipment. As previously stated detailed design will confirm the proposed infrastructure and equipment and identify site and building layout.	Refer to comment 3.
20	Infrastructure and Equipment, Item 3, Subsection 3.2, Pg.7	As noted in Comment 14, Alcoa requests the removal of reference to *"radial arms"*.	Refer to comment 14.
21	Part IV of the EP Act, Item 4.1, Pg.8-9	Alcoa notes that EPA have approved amendments to MS646. Alumina production is now approved to 5Mtpa. Schedule 1 is no longer relevant. Reference should be made to Attachment 2 of MS 646.	Refer to comment 18.
22	Part IV of the EP Act, Item 4.3, Pg.9-11	Alcoa notes Comments Number 3 and Number 9.	Refer to Delegated Officer consideration of comments 3 and 9.
23	Location and Siting, Item 6, Pg.8	Alcoa notes that Figure 6 labelling is incorrect. What is designated in the figure as an artificial water body is the Water Corporation's Pinjarra waste water treatment plant.	Figure 6 was sourced from the Licence Holder's 2012 LTRMS as referenced. The Delegated Officer is aware the artificial body is the licensed Pinjarra WWTP and did not consider the impact of surface or groundwater Risk Events on the WWTP lagoons in the assessment. **Outcome:** Text inserted to clarify that the depicted water body is the Pinjarra WWTP.

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
24	Licence Holder Controls, Item 7.5.3 Row 2, Filtration building and storage tanks, Pg.	As noted above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation.	Refer to comment 4.
25	Licence Holder Controls, Item 7.5.3, Row 3, Filtrate Handling & Storage, Pg.21	As noted above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation.	
26	Licence Holder Controls, Item 7.5.3, Row 4, Filter cake and storage, Pg.21	Alcoa notes that operation of the mobile spreader will initially be undertaken in residue storage areas RSA3, RSA5 and RSA6, but the spreader can be operated in any existing residue area.	Noted. **Outcome:** Updated consistent with Licence Holder's advice.
27	Infrastructure Design or Construction Requirements, Item 8.1, Pg.23-24	As noted above in Comment Number 4, Alcoa requests the removal of all requirements that are legislated under Dangerous Goods legislation.	Refer to comment 4.
	Addendum comments on revised draft Amendment Notice		
	Page 3, item 2	"GRI-GM6" has no definition associated with it.	Typographical error. Definition inserted.
	Works Infrastructure Requirement Table (page 4) and the Operation of Infrastructure Requirement Table (page 7)	Alcoa requests that the phrase "Filtration building and filtrate storage tanks" be replaced with "Filtration facility". This then links to a similar phrase used in Schedule 1.	No objection. Aligned with Licence Holder wording. Section 9 of the Decision Report also updated.
	Page 5, Works Infrastructure Requirements Table, Filtration building and final filtrate storage tanks, Column2, Requirement (a)(iv)	Alcoa requests the insertion of the word 'sufficiently' so that (iv) reads "*sufficiently impervious to retain and enable the recovery of any spillage*". This change would align the requirements with relevant Australian Standards and Code of Practice	No objection. Aligned with Code of Practice wording as requested by the Licence Holder. Section 9 of the Decision Report also updated.
	Page 5, Works Infrastructure Requirements Table, Emergency containment pond, Column2, Requirement (d)(i)	Alcoa's standards require a HDPE liner specification of 1.5 mm rather than 2 mm. Alcoa requests the DWER to consider an amendment to 1.5 mm	No objection. Updated to 1.5 mm specification. The Delegated Officer also altered wording to ensure this specification applies to the spillway HDPE liner also. Section 9 of the Decision Report also updated.

No.	Section / Page / Condition Number	Licence Holder comment	Delegated Officer consideration
	Page 8, Schedule 1: Works, Item 1, Specifications/Drawings	Alcoa requests that the word 'typically' is retained in "*Output – Filtrate Handling and storage system which typically incorporates tanks, pipes…*"	The Delegated Officer noted that the revised draft wording had provided additional flexibility; but that the use of the word 'typically' causes the specification to become uncertain and unclear regarding the basic scope of works. The Delegated Officer has retained the original wording.
	Page 8, Schedule 1: Works, Item 1, Specifications/Drawings	Alcoa notes that 'associate' could be amended to 'associated' in "*Filter presses and <u>associate</u> infrastructure*"	Typographical error. Corrected.
	Page 9, Figure 1	Alcoa notes that the Figure shown in Schedule 2 is not the most up to date figure provided. Figure 1 in the draft Decision Report is the current figure	Corrected to updated map.

Appendix 3: DWER Clearing Assessment Report

Government of Western Australia
Department of Environment Regulation

Clearing Assessment Report

1. Application details

1.1. Application details

CPS No.:	7410/1
Application type:	Licence (L5271/1983/14)

1.2. Applicant details

Applicant's name(s):	Alcoa of Australia Ltd

1.3. Property details

Property:	LOT 151 ON PLAN 10914, OAKLEY
Locality:	OAKLEY
Local Government Authority:	Shire of Murray

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
0.164	0	Mechanical Removal	Creating an access road

2. Background

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
The application area is mapped as Beard vegetation association 968 which is described as 'Medium woodland; jarrah, marri & wandoo' (Shepherd et al., 2001) and Heddle Vegetation Guildford Complex which is described as a mixture of open forest to tall open forest of Corymbia calophylla (Marri) - Eucalyptus wandoo (Wandoo) - Eucalyptus marginata (Jarrah) and woodland of Eucalyptus wandoo (Wandoo) (with rare occurrences of Eucalyptus lane-poolei (Salmon White Gum)). Minor components include Eucalyptus rudis (Flooded Gum) - Melaleuca rhaphiophylla (Swamp Paperbark). (Heddle et al., 1980).	The proposed clearing of 0.164 hectares of native vegetation within Lot 151 on Plan 10914, Oakley is for the purpose of creating an access road for the Alcoa Pinjarra Filtration Site within the Pinjarra Refinery premises.	Completely Degraded; The structure of the vegetation is no longer intact and the area is completely or almost completely without native species (Keighery, 1994).	The vegetation condition was determined based on a flora survey undertaken by Mattiske (2012) and a site visit undertaken by the DER (2017).

3. Assessment of application against clearing principles

Comments

The proposed clearing of up to 0.164 hectares of native vegetation for the purpose of creating an access road for the Alcoa Pinjarra Filtration Site within the Pinjarra Refinery premises is considered unlikely to have any significant environmental impacts.

The vegetation proposed to be cleared consists predominately of trees over paddock and was determined to be in a completely degraded (Keighery, 1994) condition. A portion of the application area is located on the edge of a patch of vegetation that was determined to be in a good (Keighery, 1994) condition during the 2012 Mattiske survey. This area is located adjacent to the road and a site inspection undertaken by DER in April 2017 determined that the vegetation within this area is in a completely degraded (Keighery, 1994) condition (DER 2017). Based on the size of the trees within the application area, it is unlikely the vegetation would be considered breeding habitat for the black cockatoo species.

The vegetation under application occurs within a multiple use wetland and three trees occur within approximately 5 metres of a conservation category wetland. Given the completely degraded (Keighery, 1994) condition and the small area of vegetation to be cleared, the proposed clearing is not likely to have a significant impact on the values of these wetlands.

The local area (10 kilometre radius) retains approximately 21 per cent native vegetation cover (6909 hectares). The proposed clearing of 0.164 hectares represents 0.002 per cent of native vegetation in the local area. The vegetation within the application area is mapped as Beard vegetation association 968 and Heddle Vegetation

Guildford Complex which retain 6.58 and 5.37 per cent respectively of their pre-European extents (Government of Western Australia, 2016; Department of Parks and Wildlife, 2015). Although the vegetation associations are extensively cleared, given the completely degraded (Keighery 1994) condition of the vegetation within the application area, the vegetation is not consistent with the mapped vegetation association. Given this and the relatively small amount of vegetation to be cleared, it is unlikely that the native vegetation within the application area is significant as a remnant of native vegetation in an extensively cleared area.

Given the completely degraded (Keighery, 1994) condition of the vegetation, the lack of understorey and the relatively small size of the application area, the proposed clearing is not likely to impact on rare or priority flora, a priority or threatened ecological community, conservation reserves within the local area or significant fauna habitat. The proposed clearing is unlikely to contribute to or cause land degradation, deteriorate the quality of ground water or surface water and is not likely to cause or exacerbate flooding.

Given the above, the vegetation within the application area is at variance to Principle (f) and is not likely to be at variance to the remaining clearing principles.

Methodology

References:
Department of Parks and Wildlife (2015)
DER (2017)
Government of Western Australia (2016)
Heddle et al. (1980)
Keighery (1994)
Mattiske (2012)
Shepherd et al. (2001)

GIS Databases:
-Hydrography, linear
-RAMSAR Sites
-Parks and Wildlife Managed Lands
-Pre-European Vegetation
-SAC Bio datasets (04 January 2017)
-Virtual mosaic

Planning instruments and other relevant matters.

Comments

The Pinjarra Refinery is a prescribed premises regulated by the Department of Environment Regulation (DER) under Part V Division 3 of the *Environmental Protection Act 1986* (EP Act). The proposed clearing is being assessed as part of a licence amendment application (L5271/1983/14) made under section 59 of the EP Act. In the event the licence amendment is granted, conditions permitting the clearing of native vegetation may be included. In accordance with Schedule 6 clause 2(c) of the EP Act, any clearing that is done in accordance with a licence would not require a clearing permit.

4. Recommendation

Recommendation

An assessment of the environmental impacts of the proposed clearing has been undertaken in accordance with DER's Regulatory Principles, taking into consideration the clearing principles contained in Schedule 5 of the EP Act. Section 62(1) of the EP Act provides for conditions to be placed on a licence to mitigate environmental harm. Clearing Regulation considers that the proposed clearing is unlikely to cause environmental harm. Recommended conditions are as follows:

1. Clearing authorised

The Licensee must not clear more than 0.164 hectares within the area cross hatched yellow on attached Plan 7410/1.

S. Weighell

Simon Weighell
A/MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

26 June 2017

5. References

Department of Environment Regulation (2017) Site Inspection Report for Clearing Permit Application 7410/1. Site Inspection undertaken 05 April 2017.

Department of Parks and Wildlife (2015) 2015 South West Forest and Swan Coastal Plain Vegetation Complex Statistics: a report prepared for the Department of Environment Regulation. Current as of March 2015. Department of Parks and Wildlife, Perth, Western Australia.

Government of Western Australia (2016). 2016 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of October 2016. WA Department of Parks and Wildlife, Perth.

Heddle, E. M., Loneragan, O. W., and Havel, J. J. (1980) Vegetation Complexes of the Darling System, Western Australia. In Department of Conservation and Environment, Atlas of Natural Resources, Darling System, Western Australia.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Mattiske (2012) Flora and Vegetation Assessment Pinjarra Farmlands, December 2012, Prepared for Alcoa World Alumina Australia. DER Ref: A1334353

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Plan 7410/1

Legend

- Roads
- Imagery
- Clearing Instruments Activities
- Local Government Authority
- Cadastre

N

0 100m

1:3,000

(Approximate when reproduced at A4)

GDA 94 (Lat/Long)

Geocentric Datum of Australia 1994

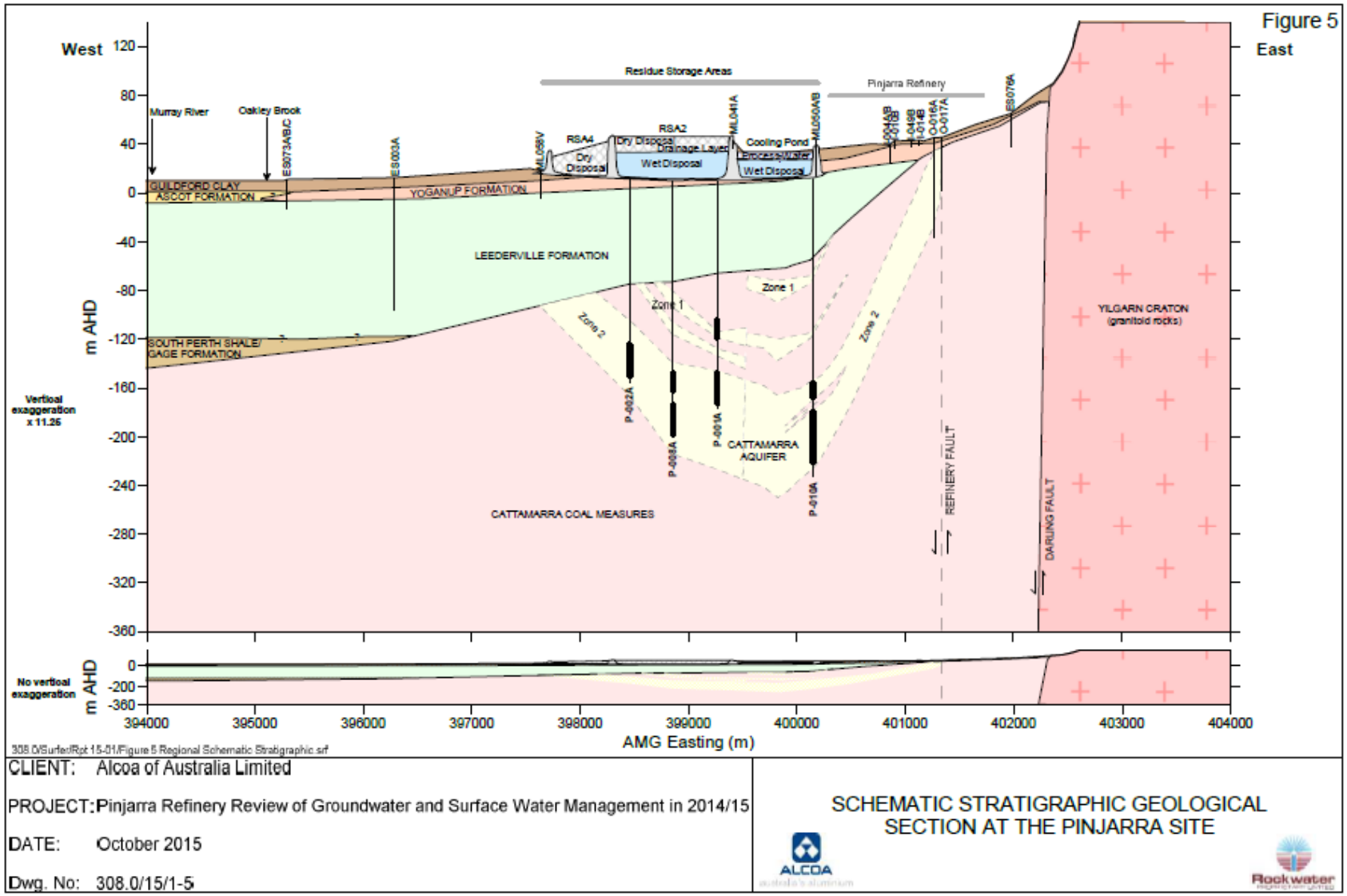
S. Weichell Date 26/6/17

SIMON WEICHELL

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

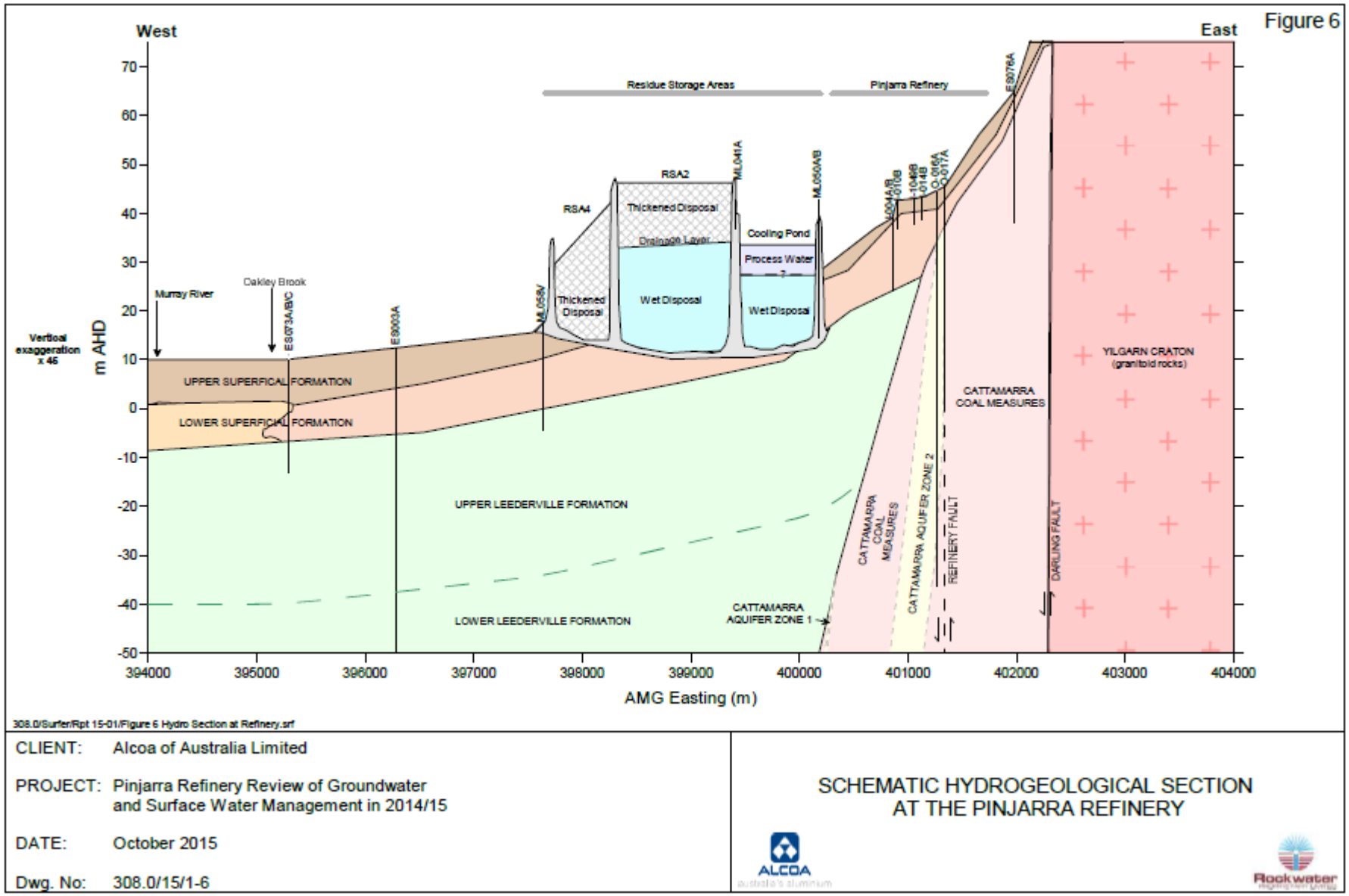
GOVERNMENT OF WESTERN AUSTRALIA

Appendix 4: Geological and Hydrogeological Schematics



Source: Pinjarra Refinery, Review of Groundwater and Surface Water Management from July 2014 to June 2015, Volume 1 Text and Figures, Rockwater, October 2015 (Figure 5)

Figure 6: Geological cross-section of the premises



Source: Pinjarra Refinery, Review of Groundwater and Surface Water Management from July 2014 to June 2015, Volume 1 Text and Figures, Rockwater, October 2015 (Figure 6)

Figure 7: Hydrogeological cross-section of the premises