



Amendment Report

Licence Number	L6465/1989/10
Licence Holder	Alcoa of Australia Limited
ACN	004 879 298
File Number:	DER2017/002150-1
Premises	Willowdale Mine Willowdale Road (via Wagerup Refinery Access Road) WAROONA WA 6215 Mineral Lease 1SA
Date of Report	5 May 2020
Decision	Licence amendment granted

1. Definitions and interpretation

Definitions

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

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
ASC NEPM	Assessment of Site Contamination – National Environment Pollution Measure
AS/NZS 3500.3	means the Australian/New Zealand Standard <i>National plumbing and drainage - Stormwater drainage - Performance requirements</i>
ANZECC/ARMCANZ 2000	Water Quality Guidelines
BoM	Bureau of Meteorology
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
DAF	Dissolved Air Flotation
Delegated Officer	an officer under section 20 of the EP Act
DEM	Dust Extinction Moisture
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
ENB	Environment Noise Branch

EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
Licence Holder	Alcoa of Australia Limited
Km	Kilometres
km/h	Kilometres per hour
Minister	the Minister responsible for the EP Act and associated regulations
mm	Millimetres
MS	Ministerial Statement
mtpa	million tonnes per annum
NEPM	National Environmental Protection Measure
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
PDWSA	Public Drinking Water Source Area
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>

2. Amendment

This amendment report sets out an amendment to licence L6465/1989/10. The licence document has been updated accordingly to reflect this amendment. This amendment is limited to an amendment of the premises boundary to reflect the relocation of an ore crusher and development of associated mine infrastructure and the construction and operation of a new conveyor.

This amendment has been informed by the Department of Water and Environmental Regulation's (DWER) Regulatory Framework which is available at <https://www.der.wa.gov.au/our-work/regulatory-framework>.

3. Amendment description

Alcoa of Australia Limited (licence holder) submitted an application for a licence amendment on 30 July 2019. The application relates to a proposed extension of the premises boundary and relocation of a rock crusher from the Orion mine region to the Lagero mine region, refer to Figures 1 and 2 below. A new direct overland conveying system between the Lagero mine region and Willowdale mine Arundel site is necessary for the relocation of the crusher. In addition to the new conveyor system, the licence holder also intends to develop associated mine infrastructure including wastewater treatment and storage. The proposed changes and additions to infrastructure is outlined in Table 2 below.

4. Decision

The Delegated Officer (DO) considers that the relocation of the existing crusher and the construction of the associated infrastructure should be granted. Also, the DO has determined that the requested prescribed premises boundary extension is acceptable and should be granted.

4.1. Biomax sewage treatment plants

The three Biomax sewage treatment plants outlined in Table 2 below are excluded from the scope of this assessment. The total combined capacity of the three sewage plants is 19.4 m³ per day. The total volume treatment capacity (per day) does not meet or exceed the Category 85 Sewage Facility threshold (more than 20 but less than 100m³ per day). In accordance with the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974*, an Application to Construct or Install an Apparatus for the Treatment of Sewage must be lodged to the Local Government Authority (LGA).

4.2. Dangerous goods storage and handling

The bulk storage of fuel and or hydrocarbons are excluded from the scope of this assessment. Larego mining area will have a fuel farm which will be used to store bulk fuel/hydrocarbons. The premises holds a Dangerous Goods Storage Licence (Licence Number DGS009279) issued by the Department of Mines, Industrial Regulations and Safety (DMIRS).

Table 2: Proposed infrastructure and equipment

Proposed Infrastructure	Proposed Activity	Description
360 Crusher	Relocation	The existing 360 crusher will be relocated from the Orion mine region to the Larego mine region and associated infrastructure at the Larego mining facility includes crusher retaining wall, tip circle, and stockpile area will be constructed.
374 Conveyor	Installation	A 374 conveyor, approximately 8.4km long, will be installed between the Willowdale mine Arundel site and the proposed Larego crusher site. The conveyor will utilise a 1060mm wide belt.
Arundel 371/374 Transfer Station	Installation	A transfer station will be installed to connect the existing 371 conveyor to the proposed 374 conveyor
Dissolved Air Flotation (DAF) Water Treatment	Installation	A DAF treatment facility and, associated pre and post treatment sumps and drying beds will be installed. Collected wastewater from the Larego Site will be treated to the currently authorised water quality parameters as in L6465/1989/10 (Refer Figure 3).
Wastewater storage Ponds	Construction	Two HDPE lined ponds namely 1.1 ML Oily water Pond and a 2.6 ML DAF Holding Sump to be constructed (Refer Figure 3). Oily water pond consists with a permanent Disc Skimmer. This pond underflows to the DAF Feed Sump.

Proposed Infrastructure	Proposed Activity	Description
Water storage reservoir	Construction	A 47ML HDPE lined water reservoir will be constructed to store captured rainwater and treated wastewater from proposed DAF plant at Larego site. Water will also be added with water piped from the existing Samson Dam Structure. Water to be used for all the onsite activities. (Refer Figure 2 in Schedule 1 of the licence document)
Biomax	Installation	Three Biomax sewage treatment plants will be installed to treat a total capacity of 19.4m ³ per day (Note: Not assessed as part of this amendment, see section 4.1)
Access roads	Construction	Heavy Vehicle and light vehicle access roads will be constructed

5. Amendment History

Table 3 provides the licence amendment history for L6465/1989/10.

Table 3: Licence amendments

Instrument	Issued	Amendment
L6465/1989/10	5 May 2020	Extension of the premises boundary to reflect the relocation of an ore crusher from Orion Mining area to Larego Mining Area. Development of associated mine infrastructure and the construction and operation of a new conveyor.



Figure 1: Lay out of the Crushing Facility – old crusher location at Orion Mining area and new location of the crusher at Larego mining area (Image provided by licence holder with additions by licensing officer)

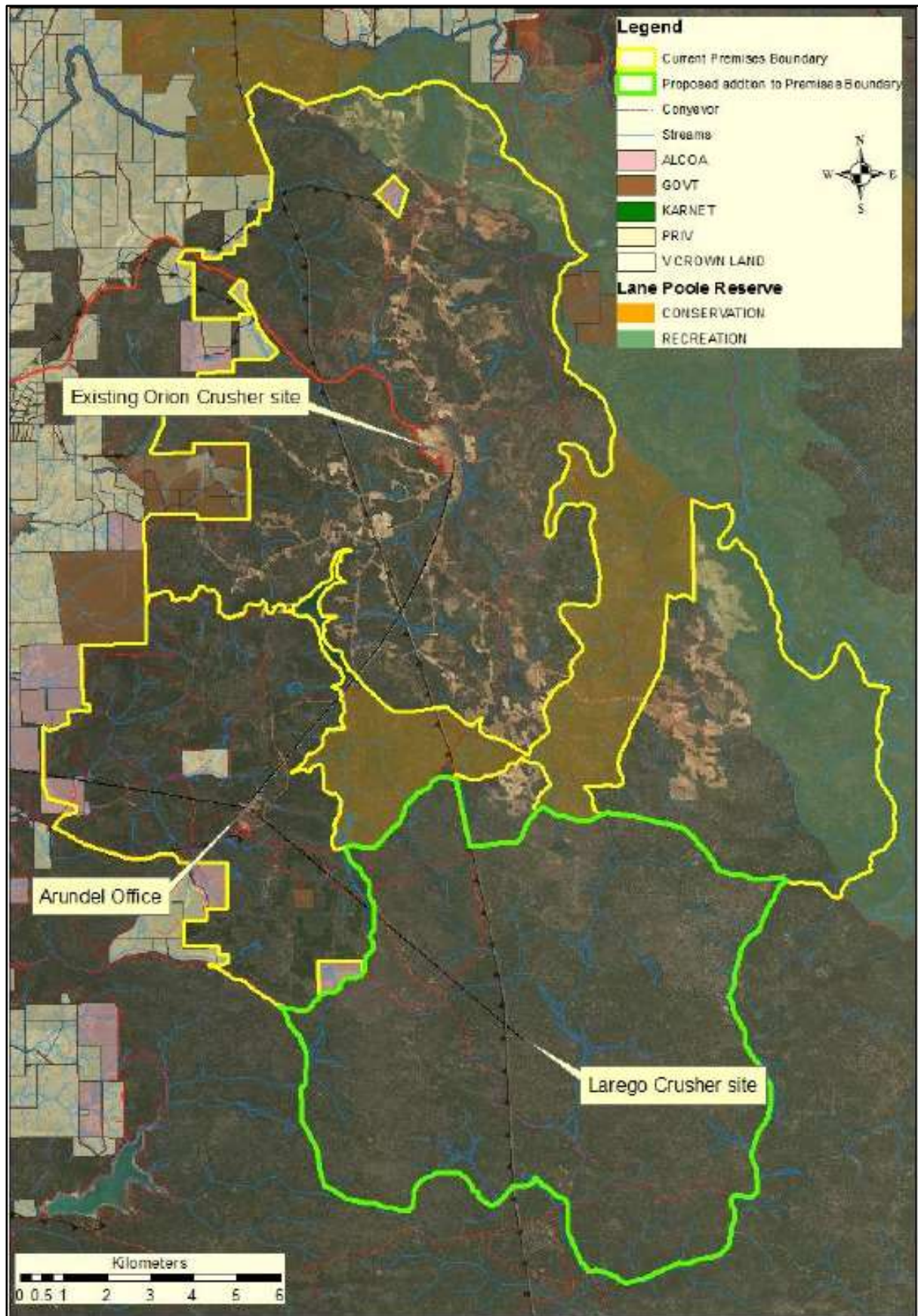


Figure 2: Proposed amendment to the existing Prescribed Premises Boundary and location of new crusher at Larego (Image provided by licence holder)

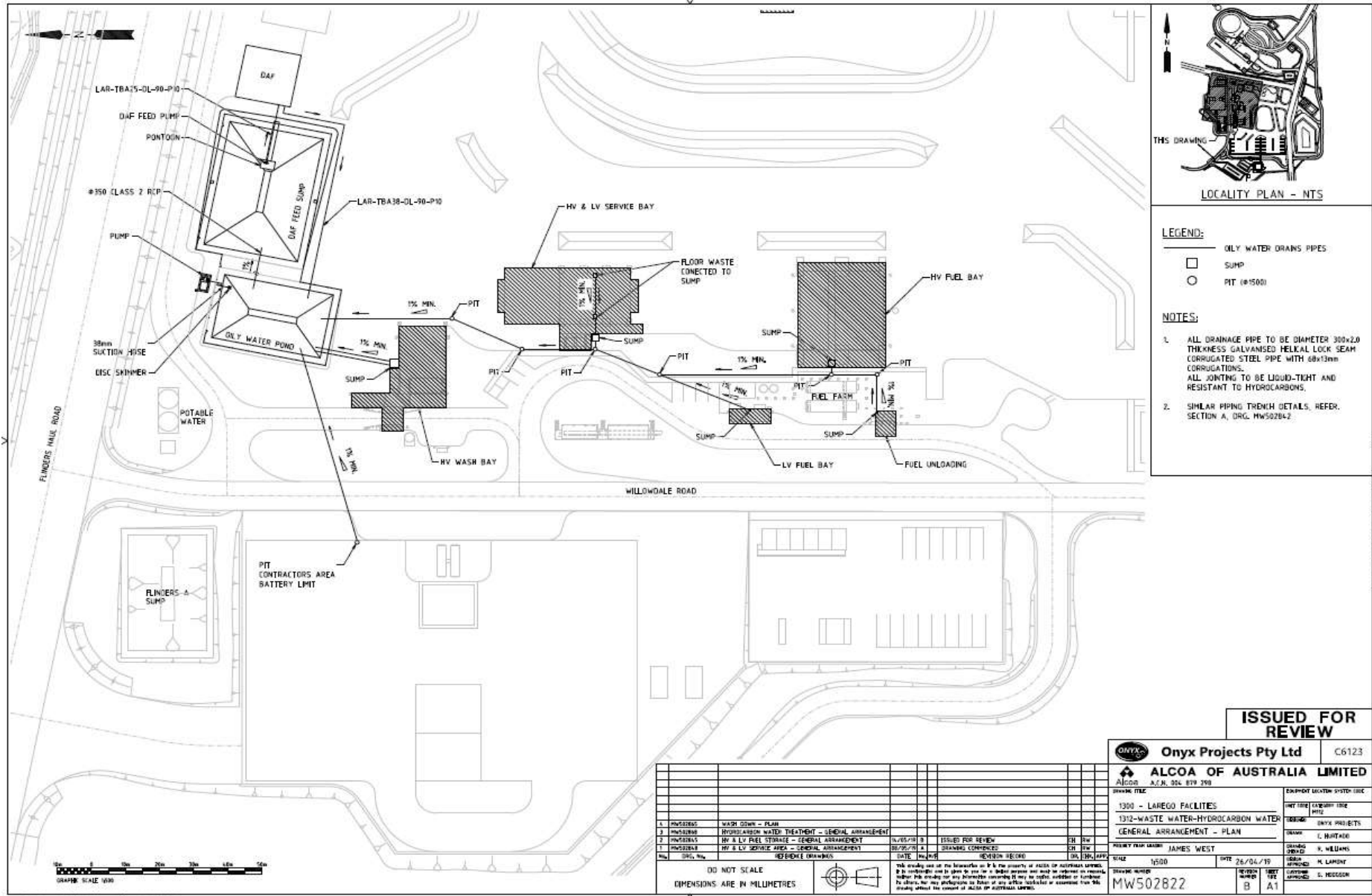


Figure 3: General arrangement for Wastewater - Hydrocarbon Water Treatment at Larego Mining Area
 Licence: L6465/1989/10

6. Other approvals

The licence holder has provided the following information relating to other approvals as outlined in Table 4.

Table 4: Other relevant approvals

Instrument	Number	Approval
<i>Environmental Protection Act 1986 (Part IV)</i>	MS 728	Wagerup Alumina Refinery - Production to a maximum capacity of 4.7 million tonnes per annum and associated bauxite mining
<i>Environmental Protection Act 1986 (Part V)</i>	L6465/1989/10	Operating Licence
<i>Rights in Water and Irrigation Act 1914</i>	SWL61024(3)	Department of Water and Environmental Regulation
<i>Alumina Refinery (Wagerup) Agreement and Amendment Acts 1987</i>	N/A	Establishment of an Alumina Refinery at Wagerup , to amend the Alumina Refinery Agreement 1961 and the <i>Alumina Refinery Agreement Act 1969</i> and for related purposes
<i>Dangerous Goods Storage Licence</i>	DGS009279	Storage of Hydrocarbons Department of Mines, Industry Regulations and Safety

7. Location and receptors

The Larego mining area is surrounded by different sensitive receptors namely, the Murray River to the east, private property, and the Arundel and Orion mining regions to the west, and nature reserve to the south.

7.1 Residential and Sensitive premises

Table 5 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment. Figure 4 illustrates the residential and other sensitive premises (considered in the noise assessment of the proposed project) neighboring the prescribed premises.

Table 5: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Users of South Western Highway	Approximately 15 km to the west
Residential Premises (R1-R5, R7,R8)	Approximately 9 km – 15 km between north-west and south-west from the new crusher location area (Larego mining area) based on the noise sensitive receptors

Camping grounds and Tourists Park (R6 and R9)	Approximately 5 km and 9 km to the south from the new crusher location
Department of Biodiversity, Conservation and Attractions (DBCA) managed lands	Prescribed Premises is located within the DBCA managed State Forests

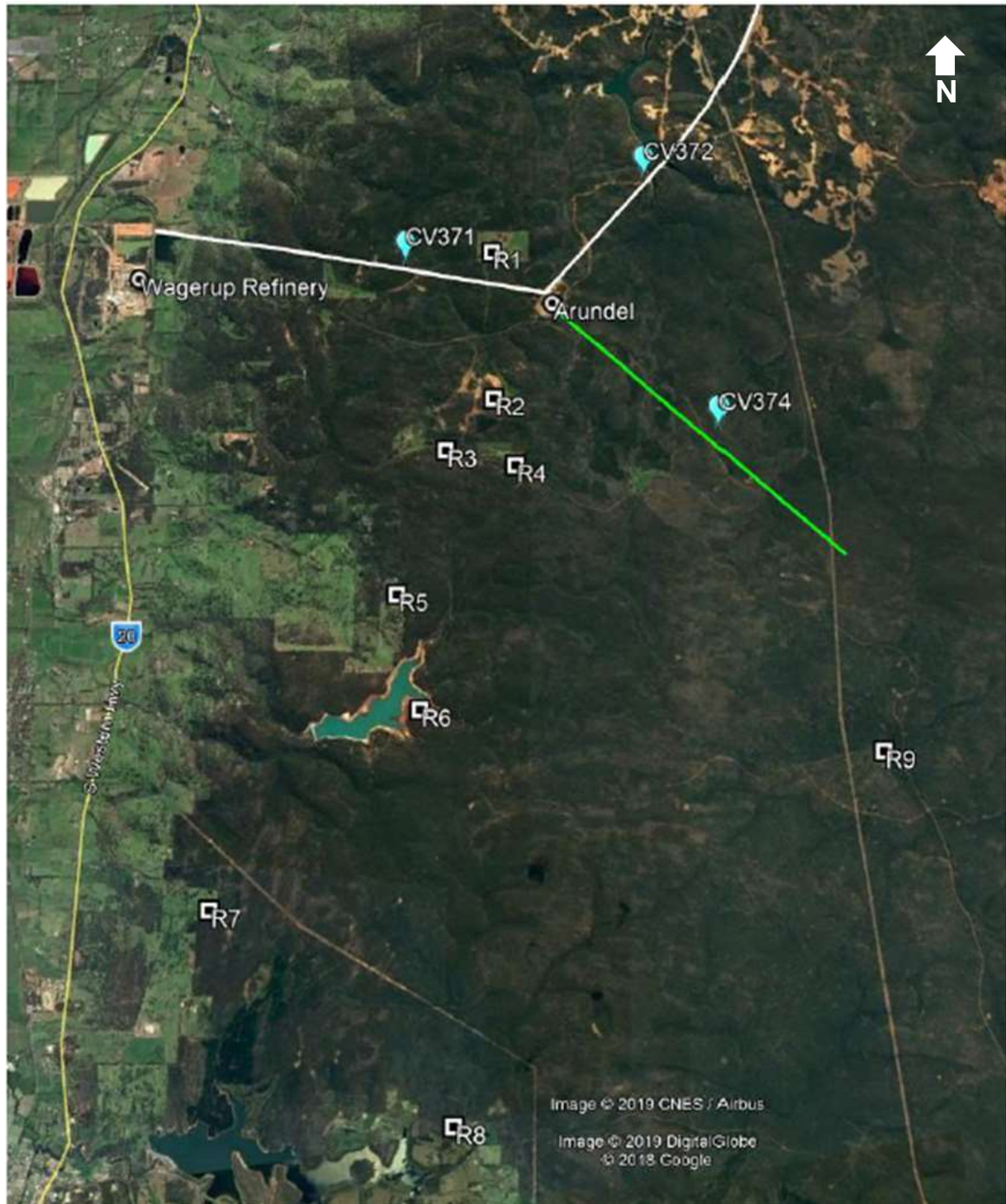


Figure 4: Residential and sensitive premises around prescribed premises

7.2 Specified Ecosystems and Environmental Receptors

Table 6 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 6: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Geomorphic Wetlands – Swan Coastal Plain	Approximately 6.5 km to the west from the prescribed premises boundary
Dwellingup State Forest (State Forest 14 – DBCA managed Lands)	Prescribed Premises is located within the state forest
Peel Harvey Environmental Protection Area	Approximately 7.5 km to the west from the prescribed premises boundary
Biological Components	Distance from Prescribed Premises
Priority Flora <i>Hemigenia rigida</i> (Priority 1)	Located within premises boundary
Threatened Fauna Priority 5, Priority 4, Endangered and Vulnerable mammal species	Located within premises boundary
Western Australian Herbarium Species P3, P4 and P5 species	Located within premises boundary
Water and Groundwater Sources	
Groundwater	Approximately 20 m below ground level
Drinking water source areas Samson Brook Catchment Area, Stirling Dam Catchment Area (Priority 1)	Prescribed Premises intersects 2 drinking water source areas
Hydrography WA 250K – Surface Waterbodies Lake Kabbamup	located approximately 8 km North west to the proposed project area
Hydrography WA 250K – Surface Water Lines	Prescribed Premises intersects few surface waterlines
RIWI Act Surface Water areas and Irrigation Districts Waroona Irrigation district, Harvey Irrigation Districts and Murray river system (Priority 1)	Prescribed Premises intersects these 3 surface water sources

7.3 Meteorology

The nearest Bureau of Meteorology weather monitoring stations is located at Dwellingup (009538). Mean annual rainfall in Dwellingup is 1228.7 mm. higher rainfall is expected between May and September, where less rainfall is expected during December and March.

The mean maximum temperature in the area is ranging from 15.1 °C in July and 29.7 °C in January/February, and the mean minimum temperature is ranging from 5.5 °C in July/August and 14.6 °C in February.

The mean wind speed ranges from 7.7 km/h to 14.0 km/h during the day, as depicted in Figure 5. Wind direction in the area identified as East-South East in the mornings and North West – South West in the evenings (Figure 6).

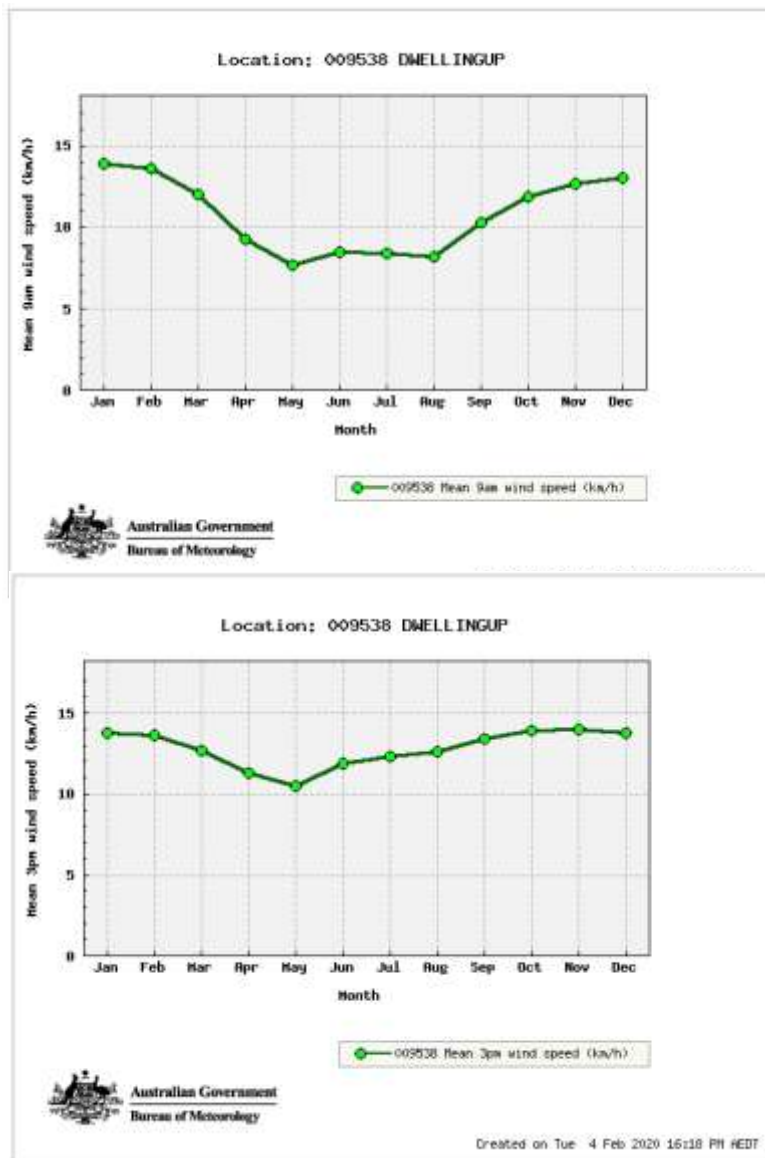


Figure 5: Mean Wind speed in the area (BoM station No: 009538 - Dwellingup)



Figure 6: Wind Direction versus Wind Speed in the Area (BoM station No: 009538 - Dwellingup)

7.4 Geology

The project area is located in the Yilgarn Craton geological province, approximately 300m above sea level. This is separated from the Perth Basin to the west by the Darling Fault. The Yilgarn Craton consists mainly of late Archaean granite with narrow strips of mafic volcanic rocks of the Saddleback greenstones. Weathering of these rocks resulted extensive deposits of bauxite, which occur as alumina-rich lenses (Dept of Water, 2012; Commonwealth Forests Taskforce, 1998).

7.5 Hydrology and Groundwater

Tributaries of Murray and Harvey Rivers and two gazetted Public Drinking Water Source Areas (PDWSA) are overlaying on the prescribed premises. The PDWSAs include Samson Brook Catchment Area and Stirling Dam Catchment Area, which are afforded greater protection because they are Priority 1 drinking water source protection areas. The site is located in surface water area and irrigation districts that are proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act), and include Waroona Irrigation District, Harvey Irrigation Districts and Murray River System.

Groundwater in the area is approximately 15-20m below the surface, with recharge ranging over the landscape from between one and nine percent of rainfall. In general, the capacity for groundwater recharge in the area is limited to the weathered layer of the soil profile (approximately 50m in depth). Groundwater salinity in the area is mainly ranges between 500-1000mg/L TDS (total dissolved solids) (Dept of Water, 2012; Commonwealth Forests Taskforce, 1998) which is considered to be marginal.

8. Risk assessment

8.1. Determination of emissions, pathways and receptors

Table 7 and Table 8 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 7: Risk assessment for proposed amendments during construction

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Cat 5 <i>Processing or beneficiation of metallic or non-metallic ore</i>	Mobilisation, and installation of the relocatable crusher, conveyor, and transfer station	Dust	Native vegetation – project area is within the state forest	Air / wind dispersion	Smothering of vegetation from dust emissions.	Slight	Rare	Low	The DO considers that, it is unlikely that there will be deposition of dust on the nearby vegetation, given the short term and the intermittent nature of the works related to crusher relocation and installation/construction of associated mining infrastructure. Therefore, adverse impacts are not anticipated.
		Dust and noise			Residential premises (R1-R5, R7, and R8). The closest camping ground (R9) is located approximately 5 km south to the proposed project area The nearest residential receptor (R4) is located approximately 8 km north west to the proposed project area Camping grounds (including Lake Brockman Camp ground & Tourist Park - R6 and Hoffman Mills seasonal camping ground - R9)	Impacts to amenity and health	Slight	Unlikely	Low

Table 8: Risk assessment for proposed amendments during operation

Risk Event					Consequence Rating	Likelihood Rating	Risk	Reasoning
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
<p>Cat 5 Processing or beneficiation of metallic or non-metallic ore</p>	Dust	<p>Operation of the Crusher at Lagero mine region , overland conveyor (CV 374) and transfer stations</p> <p>Loading, unloading and storage of processed ore</p> <p>Vehicle movements associated with handling of materials</p>	Air / wind dispersion	<p>Impacts to amenity and health</p>	Slight	Unlikely	Low	<p>Based on the wind direction in the local area, there's a possibility that the potential receptors R1-R7 (as shown in the Figure 4) may be affected from the dust emissions in the afternoons as the majority of the wind movements occur to NW-SW direction (Figure 6).</p> <p>However, Alcoa has identified that 5.5% Dust Extinction moisture (DEM) is required to generate dust from the bauxite ore. DEM sampling carried out at Alcoa Willowdale Mine showed that the average moisture content of the ore from the mine is 8%, which indicates a lower potential for significant dust generation.</p> <p>Also, the licence holder has indicated that the dust suppression controls currently in place for the Orion mine area will be incorporated for operations at new location at the Larego mine area. This includes:</p> <ul style="list-style-type: none"> • An integrated spray bars within the tip hopper in the crusher, which operate whenever a truck load is deposited • Transfer station between the crusher and overland conveyor consists a wide arc (spray) water cannon directed into the transfer chute • Water cannons also included in additional transfer chutes on ore handling system, spray rails on the stacker boom conveyor etc • A water cart will be used on the haul roads to and from the crusher. <p>The DO has considered the operator controls and distance to receptors to be adequate to manage dust emissions. Thus, licence holder proposed controls are expected to be sufficient and will be formalised through conditions of the licence.</p> <p>The DO considers it unlikely a Risk Event for dust emissions to occur, as such, the DO does not consider the risk to be significant enough to warrant further assessment.</p>
		<p>Native vegetation – project area is within the state forest</p>		<p>Smothering of vegetation</p>				Slight

Risk Event					Consequence Rating	Likelihood Rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Cat 5 <i>Processing or beneficiation of metallic or non-metallic ore</i>	Operation of the Crusher at Lagero mine region , overland conveyor (CV 374) and transfer stations Loading, unloading and storage of processed ore Vehicle movements associated with handling of materials	Noise	Camping grounds (including Lake Brockman Camp ground & Tourist Park - R6 and Hoffman Mills seasonal camping ground - R9) The closest camping ground (R9) is located approximately 5 km south to the proposed project area Residential premises (R1-R5, R7, and R8). The nearest residential receptor (R4) is located approximately 8 km North west to the proposed project area	Air / wind dispersion	Impacts to amenity and health	Minor	Unlikely	Medium	Refer to section 8.4
		Contaminated runoff containing traces of metals and metalloids from the crushing plant	Surface water contamination (minor tributaries located inside the prescribed premises) Groundwater with beneficial use (Project area is located in a P1 PDWSA)	Overland flow Land – Seepage	Contamination of surface water bodies Land and groundwater contamination	Slight	Unlikely	Low	Refer to section 8.5
	Wastewater Overflows	Wastewater overflow from the pretreatment wastewater storage sumps	Surface water contamination (minor tributaries located inside the prescribed premises) Groundwater with beneficial use (Project area is located in a P1 PDWSA)	Surface Runoff Land – Seepage	Contamination of Surface water bodies Land and groundwater contamination	Slight	Unlikely	Low	Refer to section 8.5

Risk Event					Consequence Rating	Likelihood Rating	Risk	Reasoning	
Source/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts					
Cat 5 <i>Processing or beneficiation of metallic or non-metallic ore</i>	Sludge drying beds at DAF	Hydrocarbon contaminated sludge	Land/Soil Groundwater	Direct discharge Infiltration to groundwater	Land and/or groundwater contamination	Minor	Unlikely	Medium	<p>The sludge beds are constructed of reinforced concrete, which is sealed against leakages so that it prevents any contamination of soil or groundwater from hydrocarbon contaminated sludge. Also, the sludge drying beds are enclosed in a building to avoid any rainwater inflow.</p> <p>In any circumstance which results an overflow of sludge drying beds, the water will be directed to the DAF sumps and then will be pumped back to the DAF Feed ponds and prevent any contamination of land in the surrounding area.</p> <p>The groundwater level in the proposed project area is anticipated to be 20m below the ground level, where any contamination of groundwater from an event of drying beds overflow is unlikely.</p> <p>The dried hydrocarbon contaminated sludge from the wastewater treatment processes and associated sumps are removed from front-end loaders and disposed at the Wagerup Refinery's Residue Disposal Area (RDA) in accordance with the licence condition S1(a) of the licence L6217/1983/15.</p> <p>The licence holder controls and method of disposal are deemed adequate to control any possible contamination during the handling of sludge in the operation phase.</p>

8.2. Consequence and Likelihood of risk event

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 10 below.

Table 9: Risk rating matrix

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

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 11 below.

Table 10: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event 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	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> 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

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event 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	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite 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 	<ul style="list-style-type: none"> 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
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

"onsite" means within the Prescribed Premises boundary.

8.3. Consequence and Likelihood of risk event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment table 11 below:

Table 11: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may 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. Assessment of noise impacts from the relocation project

8.4.1. Description of the risk event

Noise emissions generated during operations causing environmental nuisance at sensitive receptors.

8.4.2. Identification of the characteristics of the emission

Noise sources of the project can be identified as crushing facility, overland conveyor and transfer station. The crushing facility includes crushing plant together with transfer chute, sizer and conveyors; haul trucks, a front-end loader and a water cart. The project includes an overland conveyor which will extend approximately 8.4 km and link the crusher and a transfer station at Arundel.

Sound power levels at abovementioned noise sources were determined using equipment and infrastructure with similar specification currently operating at Alcoa's Myara mine site or has determined based on measurements recorded in a previous monitoring event. A summary of the sound power levels are depicted in the Table 12 below.

Table 12: Project equipment sound power levels

Area	Name	Total Sound Power Level decibel (dB)
Crusher	Primary Crusher	118.0
Crusher	Transfer Chute / Sizer	118.3
Crusher	Haul Trucks (2)	120.2
Crusher	Front End Loader (1)	111.6
Crusher	Water Cart (1)	116.9
Overland Conveyor	CV374 (@ 6.5m/s)	83.7
Overland Conveyor	CV374 (@ 4.8m/s)	78.7
Transfer Station	Partially Enclosed Transfer Station	114.7
Transfer Station	Fully Enclosed Transfer Station	101.1
Transfer Station	CV374 Drive Motor	109.0

8.4.3. Description of potential adverse impact from the emission

Noise emissions could lead to negative impacts on the quality of life of people located in residences and nearby holiday accommodation and camping grounds. Annoyance or discomfort experienced may vary depending on the frequency, type, timing and duration of noise emissions.

8.4.4. Criteria for assessment

Environmental Protection (Noise) Regulations 1997

8.4.5. Licence holder controls

- Specifications of noise reduction during design and procurement of noise equipment, where practicable.
- Noise monitoring to validate noise model on completion of works, and use of predictive noise model to plan mining operations within impact to sensitive receptors.
- In accordance with Alcoa's Mining and Management Plans, Hoffman Mill (R9 in Figure 4) will be closed as a camping ground (thus, it will no longer be a receptor) and the camping facility will be relocated in another appropriate location (in consultation of DBCA) for the life of mine.
- Use of low-noise idlers for the new conveyors, the full enclosure of transfer station and conveyor drivers, as well as reduction of Conveyor CV374 speed to 4.8 m/s.

8.4.6. Key findings

The DO has reviewed the information regarding the impact of noise emissions due the relocation project and has found:

1. The project noise objectives used by the licence holder for designing noise controls and assessing the noise compliance do not seem correct. Because, the licence holder's project noise objectives are to ensure the noise emissions associated with new and modified equipment be at least 5 dB below the assigned noise levels at the closest noise sensitive premises, making them not to contribute to exceedances of the assigned noise levels, as specified under regulation 7 of the noise regulations. With these noise objectives, the licence holder excluded noise emissions from the existing mining infrastructure that is not modified by the proposed project, as well as the in-pit mining activities, from the noise modelling and assessment.
2. It should be noted that the 'significantly contribute to' clause under regulation 7 applies to the noise emitters from separate premises, not to the noise sources within the same premises. In the case with this proposed relocation project, all facilities associated with the proposed project are parts of Willowdale Mine. The licence holder needs to demonstrate that, together with the proposed relocation project, the overall noise emission levels from Willowdale Mine will still comply with the assigned noise levels at all neighbouring noise sensitive premises. While it is acceptable to model and assess the noise emissions from the facilities associated with the proposed relocation project only, the overall noise emissions from the mine site, together with the proposed relocation project, must also be modelled and assessed.

8.4.7. Consequence

Based upon the distances to the closest sensitive receptors, the DO has determined that the impact of noise emissions on amenity could lead to low-level amenity impacts. Therefore, the DO considers the consequence to be **Minor**.

8.4.8. Likelihood of Risk event

Considering the licence holders proposed controls and distance to receptors the DO considers that the likelihood of noise emissions occurring and impacting upon sensitive land uses would likely not occur in most circumstances and is therefore **Unlikely**.

8.4.9. Overall evaluation of noise impacts from the relocation project

The DO has compared the consequence and likelihood ratings described above for the Risk Criteria (Table 10) and determined that the overall rating for the risk of noise emission impacts on sensitive receptors during operation is **Medium**.

The DO has considered noise advice from the environmental noise branch at DWER as outlined in key findings above. The noise assessment presented by the licence holder has not satisfactorily demonstrated that the relocation project will be able to be managed to comply with the noise regulations. The licence holder will need to demonstrate that overall noise emission levels from Willowdale Mine together with the proposed relocation project will still comply with the assigned noise levels at all neighbouring noise sensitive premises. A licence condition requiring the validation of noise emissions through the submission of a report for the overall noise emissions including the proposed relocation project, within 60 days of operations commencing at Larego has been included in the licence.

8.5. Assessment of impacts from wastewater and potentially contaminated storm water

8.5.1. Description of the risk event

Failure of containment, treatment or transfer infrastructure causing the release of contaminated waters resulting in possible surface water and/or groundwater contamination leading to reduced ecosystem health and degradation of a PDWSA.

8.5.2. Identification and general characterisation of emission

Contaminated wastewater and potentially contaminated storm water from the workshops, fuel bays and vehicle wash down facilities.

Wastewater and/or potentially contaminated storm water containing hydrocarbons, detergents and/or sediment. The licence holder expects during dry periods that storm water will contain increased hydrocarbons and in wet weather, increased sediment volumes. The detergents used will be quick break varieties. Thus, these detergents form unstable emulsions of oil and water, and after a short time (10 minutes to 1 hour) the emulsion breaks. The oil then coalesces and rises to the water surface, where it can be simply separated via oily water separation during the wastewater treatment process.

8.5.3. Description potential adverse impact from the emission

Impacts to the surface water and associated ecosystems

Discharges of wastewater and/or potentially contaminated stormwater to land could flow overland to the minor non perennial surface watercourses and cause surface water contamination impacting on the health of the riverine ecosystem and associated riparian vegetation.

Impacts to the groundwater and associated ecosystems

Discharges of wastewater and/or potentially contaminated stormwater to land could infiltrate through soil causing groundwater contamination.

8.5.4. Criteria for assessment

ANZECC & ARMCANZ (2000) Australian Water Quality Guidelines for Fresh and Marine Water Quality for fresh waters, NHMRC & ARMCANZ (2011) Australian Drinking Water *Guidelines* for drinking water and *National Environment Protection (Assessment of Site Contamination) Measure 1999* for soils and groundwater.

8.5.5. Licence holder controls

This assessment has reviewed the licence holder controls set out below:

- Drainage at the site is sized based on a 5 minute 100 year average recurrence interval (ARI) storm in accordance with AS/NZS 3500.3.
- Onsite stormwater containment is based on a 72 hour 1% Annual Exceedance Probability (AEP). This is equivalent to a 1 in 100 year storm over a 72 hour duration.
- Oily wastewater will be captured in separate sumps, which contain a sediment trap and a hydrocarbon trap. These sumps will also have the capability for mounting a belt skimmer allowing removal of free surface hydrocarbons.
- HumeCeptor hydrodynamic separators will be used to remove hydrocarbon and sediments entrained in the stormwater runoff.
- Two wastewater storage ponds will be constructed (specifically Oily water pond and DAF feed sump) with permanent disc skimmers, of which the combined capacity is sufficient to contain a 72 hour 100 year ARI storm or the resident capacity of a failed treated water test.
- 0.5 m³ capacity belt skimmer containers will be installed on a concrete surface and therefore any spillage will be drained back to the sumps. The disc skimmer skid vessel will be bunded and will be facilitated to a 5 m³ capacity.
- Wastewater storage service area will be concrete or hotmix paved and any spillage will be transfer back into the oily water pond.
- Water from treated oily water pond and DAF feed sump will be sent through a Dissolved Air Floatation treatment facility for further treatment.
- DAF treatment facility will purify the wastewater up to the criteria stipulated in the existing licence L6465/1989/10. Following a water quality testing, successful results allow to empty the holding sump in to clean water sump and then pump in to the water storage dam. A failed results will empty the holding pump again to the DAF feed sump.
- The design of the reservoir incorporates a rock pitched emergency spill way above the maximum level, which ensures integrity is maintained in the event that the 1 in 100 year storm capacity is ever exceeded.

8.5.6. Consequence

The DO considers that failure of containment could result in spills that may lead to minimal onsite impacts. Therefore, the consequence is **Slight**.

8.5.7. Likelihood of Risk event

Based upon the controls proposed by the licence holder to manage wastewater and/or contaminated storm water, distance to surface water, and the depth to groundwater, the DO has determined that the likelihood of minimal onsite impacts is **Unlikely**.

8.5.8. Overall rating of contaminated stormwater runoff

The DO has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 10) and determined that the overall rating for the risk of contaminated storm water runoff /wastewater overflows on sensitive receptors during operation is **Low**.

9. Consultation

Table 13: Summary of Consultation

Method	Comments received	DWER response
Licence holder referred draft documents (DRAFT)	17 April 2020	Amended where required

10. Summary of amendments

A summary of the proposed amendments as below. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 14: Summary of amendments

Amendment	Description
Definitions	Update of the department's new address Addition of definitions for Dissolved Air Flotation and standard definitions including those for DWER, department, relevant legislation, licence and licence holder.
Table Numbers	The table numbers in the current licence has changed due to the insertion of new tables and therefore the table numbers have been amended in the new amended licence
Attachment 2 of the Current licence has removed	The template for Annual Audit Compliance Report is now available on DWER's website.
Insertion of new licence conditions	New set of conditions related to design, construction, and operation of the mining related Infrastructure is included in the amended licence C1 – C5, S1 and E1
Noise validation – Condition number N1 to N4	This report is required to verify that noise emissions comply with the noise regulations. Conditions have been added to the amended licence
Removal of Monitoring Condition number W2(b) in of the current licence	This monitoring condition has removed from the licence as there will be no wastewater discharges to the environment in the new Larego mining area. Some condition numbers in the current licence have been amended due to the deletion of the condition.
Changes in sampling locations	Amended in the tables titled "Wastewater Sample Requirements" and "Wastewater Discharge Limits" Amended in Condition W3(b) Amended in table titled "Licence limits for re-use water from Orion Sump No.3" in the current licence
Condition W3(a), W3(c)	Removal of irrelevant phrases from the conditions and insertion of the phrases where needed

Attachment 1	Amended as Schedule 1 in the amended licence
Attachment 2	Amended as Schedule 2 in the amended licence
Schedule 3	New schedule has added as Schedule 3 to include Prescribed Premises categories

11. Conclusion

Based on the assessment in this amendment report, the Delegated Officer has determined that the amendment to the works approval will be granted, subject to the changes outlined in Table 14 above.

These conditions reflect the controls determined to be and necessary for emissions management.

Lauren Fox
A/MANAGER RESOURCE INDUSTRIES
INDUSTRY REGULATION

An officer delegated by the CEO under section 20 of the EP Act

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L6465/1989/10 – Alcoa Willowdale Mine	L6465/1989/10	accessed at www.dwer.wa.gov.au
2	Ministerial Statement 728	MS 728	accessed at www.epa.wa.gov.au/
3	Murray groundwater area: subarea reference sheets	Dept of Water, 2012	accessed at www.water.wa.gov.au/
4	Assessment of Mineral and Hydrocarbon Resources in the South-West Forest Region of Western Australia	Commonwealth Forests Taskforce, 1998	accessed at www.agriculture.gov.au/
5	DER, July 2015. <i>Guidance Statement: Regulatory principles.</i> Department of Environment Regulation, Perth.	N/A	accessed at www.dwer.wa.gov.au
6	DER, October 2015. <i>Guidance Statement: Setting conditions.</i> Department of Environment Regulation, Perth.	N/A	
7	DER, August 2016. <i>Guidance Statement: Licence duration.</i> Department of Environment Regulation, Perth.	N/A	
8	DER, November 2016. <i>Guidance Statement: Risk Assessments.</i> Department of Environment Regulation, Perth.	N/A	
9	DER, November 2016. <i>Guidance Statement: Decision Making.</i> Department of Environment Regulation, Perth.	N/A	
10	L6465 - Alcoa of Australia Ltd - Willowdale Mine Waroona - Application to Amend	N/A	DWER Record DWERDT184120

Appendix 2: Summary of Licence Holder comments

The licence holder was provided with the draft Amendment Notice on 18 March 2020 for review and comment. The licence holder responded on 17 April 2020

Description	Summary of licence holder comment	DWER response
Definition table	Premises – Larego site infrastructure is located at both Orion and Larego sites	Noted and amended
Condition G1 and all over the licence	The phrase “Licensee” has changed into “Licence Holder”	Noted and amended where required
Condition G2 (f)	Typographical error – licenced	Noted and amended
Condition G2 (g)	addition of the phrase “of the preceding year” instead of “in that same year”	Noted and amended
Condition C2 and C5	Deletion of phrase “Column 2 of”	Column 2 of the Table 2 contains the Design and construction requirement / installation requirement for the particular infrastructure. “Column 2” phrase in the condition stipulate the exact location of the specific requirements. Therefore, this phrase has remained in the licence.
Table 2, Column 2	Deletion of the phrase “will drain to the Dissolved Air Flotation (DAF)” and inserted “will be directed to humeceptors prior to reporting to the water storage reservoir” in the 360 crusher installation requirements.	Amended as proposed
	374 conveyor – Conveyor belt width changed from 1060mm to 1050mm	Noted and amended
	Wastewater Storage Ponds: <ul style="list-style-type: none"> Oily water pond capacity changed from 1.1. ML to 100KL DAF Feed pond to be constructed at a capacity of 2.6 ML Floating surface skimmer will be installed not a permanent disc skimmer Three HDPE lined treated water ponds to be constructed, each with a capacity of 1 ML Wastewater service area to be constructed on a 	Noted and amended as proposed

Description	Summary of licence holder comment	DWER response
	concrete or hotmix paved area	
	Dissolved Air Flootation (DAF) Water Treatment - UV Stabilised polyethylene tank, designed to AS4766 will be installed instead of “Permanent Steel containers” to capture oil from surface skimmer not the belt skimmer	Amended as proposed
	Storm Water Management – relocated the clause “HumeCeptor hydrodynamic separators to be installed to remove hydrocarbon and sediments entrained in the stormwater runoff”	Noted and amended
Table 2, Column 4	Timeframe – changed from 31 March 2021 to 30 September, 2021	Amended as proposed
Condition C6	Typographical error – Condition C6 has named as C5	Noted and amended
Table 3 – Operational Requirement	Ore moisture generally above DEM level. Crusher and transfer station dust suppression systems are selectively applied by operators when required.	Amended as proposed
	Operational requirement for 360 crusher and transfer station amended: “to be utilised as required, when operating conditions generate excessive dust”.	
	DAF – Successfully treated water will be released into the clean water sump	Noted and amended
Condition N1	Clerical changes and rewording	Noted and amended
Condition N3	Insertion of “the final report” instead of “it’	Amended as proposed
Condition W1	Amended the condition in relation to the areas of wastewater collection and the receiving treatment plant	Amended as proposed
	“The licence holder shall ensure that all contaminated or potentially contaminated wastewaters collected at the premises hardstand areas are directed to either ‘Arundel’, ‘Orion’ or ‘Larego’ for treatment prior to discharge to the environment or re-use on the premises”	
Condition W2 (b)	Required to retain the condition as it was in the existing licence (Monitoring requirement for Orion wastewater discharge point)	Amended as proposed

Description	Summary of licence holder comment	DWER response
Condition W2 (c)	Condition W2 (b) in the draft amended licence has changed as Condition W2 (c)	Noted and amended
Table 5	Required to retain the sampling locations as in the existing licence and only required to add "Larego DAF Sump 1,2 and 3" under discharge locations	Amended as proposed
Condition W2 (d)	Condition W2 (c) in the draft amended licence has changed as Condition W2 (d)	Noted and amended
Condition W3 (a)	Alcoa has amended the condition to include all the wastewater discharge locations at the Willowdale mine	Amended as proposed
Table 6	Column "Source" has amended to include all the wastewater discharge locations	Amended as proposed
Condition W3 (b) and Condition W3 (d)	Deletion of location "Water Storage Reservoir at Larego" Alcoa confirmed that treated water is only discharged to the reservoir once it already meets specified criteria. Water contained in the reservoir should only contain water from clean sources.	Noted and amended as proposed
Table 7	Has amended the caption to be expressive	Noted and amended as proposed
Schedule 1	Premises Map – Alcoa has provided a clear premises map with geo-referencing	Accepted and amended
	Larego Site Layout Plan - Alcoa has provided the final drawing of the layout plan	Accepted and amended
Schedule 2	Table 8 – reworded the work specification of the water reservoir to depict it's volume, which will be a minimum 47ML	Amended as proposed
Schedule 3	Table 9 amended to demonstrate the EPA approved premises production capacity	Amended as proposed
Schedule 4	Premises map in Schedule 1 has been updated to include georeferences. Request removal of Schedule 4.	Amended as proposed