Government of Western Australia
Department of Water and Environmental Regulation

Decision Report

Application for Works Approval

Part V Division 3 of the *Environmental Protection Act 1986*

Works Approval Number	W3175/2025/1
Applicant	Alcoa of Australia Limited
ACN	004 879 298
File number	INS-0003175 | APP-0032784
Premises	Wagerup Alumina Refinery – Gallium Plant Willowdale Road, Waroona, WA, 6215 Part of Lot 700 on Plan 59305, Certificate of Title Volume 2708 Folio 955 As defined by the premises map and coordinates attached to the issued works approval
Date of report	4 May 2026
Decision	Works approval granted

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W3175/2025/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at DWER Regulatory documents | Western Australian Government

2.2 Application summary

On 5 December 2025, Alcoa of Australia Limited (the applicant, Alcoa) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application proposes to undertake construction and time limited operation of a gallium plant on Lot 700 on Plan 59305 (the premises) at the Wagerup Alumina Refinery (the refinery), Willowdale Road, Waroona. The plant will be established within an area of approximately 3.1 ha which has historically been cleared, levelled and used as a carpark and laydown area. The gallium plant will comprise up to five processing trains which will extract gallium from spent bayer liquor diverted from the refinery, with an expected combined capacity of 100 tonnes of gallium production per year.

Extraction of gallium from spent bayer liquor is an additional process within the existing bauxite refining activity undertaken at the refinery therefore is considered prescribed under Category 46: bauxite refining. The category and design capacity for the premises are defined in works approval W3175/2025/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020a) are outlined in works approval W3175/2025/1.

2.3 Exclusions

The following matters are outside the scope of this assessment, which relates only to activities which will occur within the prescribed premises boundary, therefore have not been considered within the risk assessment detailed in this report or the conditions applied in the associated works approval.

- Disposal of wastes outside the premises boundary including but not limited to municipal waste, controlled waste and construction wastes (occur outside the premises boundary).
- Bauxite mining activities (occur outside the premises boundary).
- Operation of the existing refinery (subject to the conditions of existing licence L6217/1983/15).
- Water abstraction (subject to the requirements of surface water and groundwater licences issued under the *Rights in Water and Irrigation Act 1914*).
- Existing contaminated site, Wagerup alumina refinery and adjacent residue storage area are classified as *Contaminated – remediation required* (managed under requirements of the *Contaminated Sites Act 2003)*.
- Native vegetation clearing (clearing is not proposed in the application or authorised under the works approval).

- Non-process infrastructure including workshops, offices, laboratory and ablutions inclusive of an onsite septic system <20 m^3/day which is subject to authorisation under the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974.

Greenhouse gas (GHG) emissions are also excluded from this assessment. The department does not currently regulate GHG emissions under Part V Division 3 of the EP Act as it does not have a specific regulatory framework suitable for regulation of these emissions, and they are beyond the current scope of the department's risk-based regulatory framework for assessment and regulation under Part V Division 3 of the EP Act.

The applicant advised projected GHG scope 1 emissions for the gallium plant are less than 2,000 t CO_2-e per year (predicted 0.1% increase), while scope 2 emissions are conservatively estimated to remain below 10,000 t CO_2-e per year (predicted 50% increase). The gallium plant GHG emissions will be incorporated into the existing Wagerup Refinery Safeguard Mechanism reporting as an ancillary activity in accordance with requirements of the *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

3. Premises background and application overview

The applicant operates the Wagerup Alumina Refinery (the refinery) under existing licence L6217/1983/15 which authorises production of up to 2.9 million tonnes of alumina per annual period. The refinery is classified as prescribed under category 46 (Bauxite refining), category 52 (Electric power generation), category 64 (Class II or III putrescible landfill site), and category 67 (Fuel burning) of the Environmental Protection Regulations 1987 (EP Regulations). The refinery was established under the *Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978* and commenced operation in 1984.

The nearest townships to the refinery are Hamel (located approximately 3 km north) and Yarloop (located approximately 2.5 km south).

The refinery receives crushed bauxite delivered via overland conveyor from Alcoa's Willowdale Mine which is refined via the Bayer process to produce alumina. There are two distinct operational areas which are the refinery (inclusive of a bauxite storage and handling area just north of the refinery) and the residue storage area (RSA).

Gallium is a critical mineral found within bauxite. Bauxite processed at the refinery contains approximately 55-65 parts per million (ppm) of gallium. During refining, approximately 70 per cent of the gallium is leached from the bauxite into the caustic soda solution, while the remaining 30 per cent remains within residue. Gallium accumulates in the bayer liquor over time due to the continuous liquor recirculation and inventory, ultimately reaching to a concentration up to 100–300 mg/L.

The applicant proposes to construct and operate a five-train gallium plant immediately east of refinery within an existing cleared area historically used as a carpark and laydown. The plant will be connected to the refinery to receive an offtake of gallium enriched spent bayer liquor which will undergo ion exchange to extract gallium and produce a 99.99% pure gallium metal product. Remaining spent bayer liquor will be returned to the refinery for recirculation. Based on a liquor flow rate of 460 m^3/hr and an expected gallium concentration of ~205 mg/L, the plant is expected to produce up to 100 tonnes per annum (tpa) of gallium. A diagram illustrating where the gallium extraction process fits in relation to the existing bauxite refining activity is included in Figure 1.

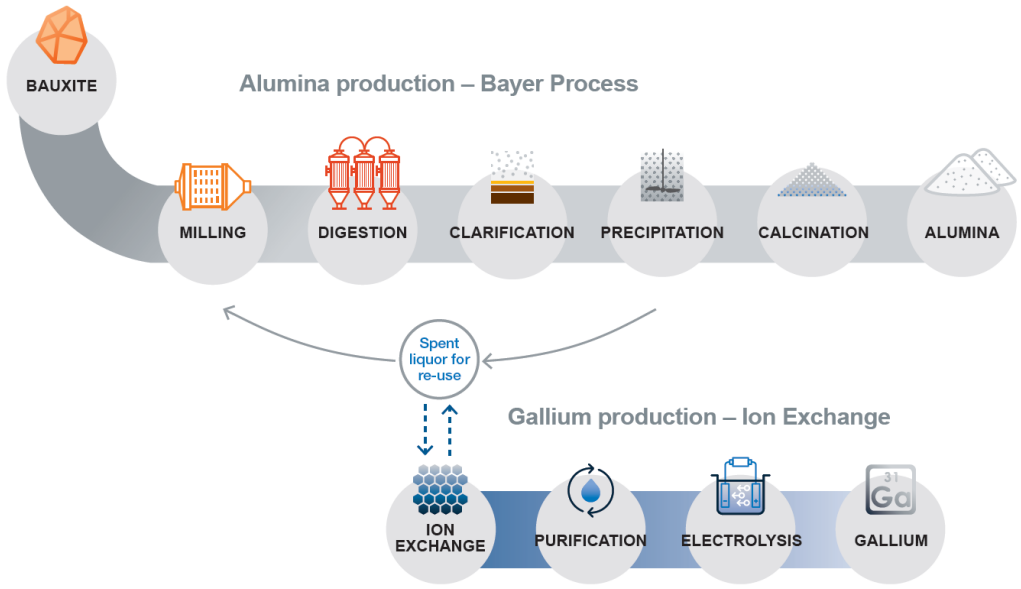

Figure 1: Illustration of gallium extraction within the bauxite refining process (Alcoa 2026)

Alcoa intends to commence construction of the first gallium train and all common infrastructure in early 2026 (subject to receipt of all relevant regulatory approvals) and expects these initial train 1 works to be completed in Q4 2026. Construction of trains 2-5, will commence in parallel to this as workforces become available. Alcoa anticipates all five trains will be operational by Q4 2027.

3.1 Proposed works

The gallium plant, comprising five gallium trains and common infrastructure, will be housed within a single enclosed shed-like structure (Figure 2). The shed will be equipped with extraction systems to remove water vapour, hydrogen and oxygen emissions generated by the ion exchange, neutralisation, purification and electrolysis processes. Each train will include the following components:

- ion exchange adsorption towers
- various process tanks for dilute acid and caustic, eluate and eluent, spent liquor, waste process chemicals and water, water, filter aid and electrolytic solution
- waste tanks for mixed metals precipitate
- extraction systems
- air receivers.

Common infrastructure will comprise a sulphate concentration circuit, a sulphate removal circuit (includes filtration), a spent liquor preparation circuit, electrowinning, water and spent liquor storage, and bulk chemical storage. A service access road will be established adjacent to facilitate delivery of reagents. Common infrastructure will include:

- heat exchangers
- various water storage tanks for brine, chilled water, fresh water, lake water and return water
- bunded storage tanks for reagents including strong acid, 98 per cent sulfuric acid and 50 per cent caustic soda
- flocculant mixing and storage tank
- spent liquor preparation circuit comprising tanks for gel precipitation, gel discharge, gel screen underflow, screen spray water and recirculation

- spent liquor feed tank (for transfer to trains) and spent liquor return tank (for return to refinery)
- sulphate concentration circuit comprising sulphate and permeate tanks, acidic wastewater tank and containerised water filtration units
- sulphate removal circuit comprising acid neutralisation tanks, lime storage silo with a screw feeder, filter wash water tank, sulphate filtrate tanks, a plate and frame filter press and a calcium sulphate storage bunker
- electrowinning circuit comprising, electrolytic cells (including standby) and electrolyte return tank. All twelve electrowinning cells will be grouped together for a common electrically hazardous zoned region for commonality of controls
- vent extraction systems.

Additional common process infrastructure will be established adjacent to the sheds. This includes a cooling plant comprising chillers and evaporative cooling towers, switch rooms and transformers, and a temperature-controlled ion exchange resin storage room.

Pipelines, pumps and control valves will be installed between the refinery and the gallium plant for transfer of spent liquor (intake and return) and water (intake and return). Liquor will be diverted from the refinery's spent liquor circuit via a common header at the base of the evaporators. The applicant proposes to undertake modifications within the existing refinery during a shutdown where possible.

Non-process infrastructure including a workshop, office, laboratory and ablutions (including an onsite septic system with a design capacity less than 20 m^3/day) will also be established at the gallium plant. Additional power line installation will also occur to connect the plant to the refinery's existing power supply.

Figure 2: Conceptual Model Elevation (SW to NE) (Alcoa 2025)

3.2 Process description

The gallium extraction process is described below as detailed in the application. A comprehensive process flow diagram is included in Figure 3 (from the application) which outlines the key stages, inputs and outputs in the process. The plant will be operated in a semi-batch manner, with operators and engineers performing ad-hoc tasks related to transferring and inspecting the quality of liquids and solids throughout the process.

Gallium rich liquor feed will be diverted from the existing refinery spent liquor circuit and transferred via a pipeline to the gallium plant.

Spent liquor preparation

Incoming liquor will be cooled via heat exchangers to precipitate and filter out a supersaturated spent liquor gel material. The gel-free liquor is re-heated then pumped to the gallium train ion exchange adsorption towers.

Ion exchange

The liquor passes through two ion exchange adsorption towers which contain resins that selectively recover gallium ions from the liquor. The resins are designed to target gallium whilst minimising contamination from other elements. Once the ion exchange resins are saturated the absorbed gallium ions are removed via an elution process. A dilute sulphuric acid solution is passed through the resin. The solution disrupts the bond between the gallium ions and the resin. Caustic is then added to the solution and gallium hydroxide ($Ga(OH)_3$) is precipitated out, forming a slurry.

Spent liquor return

The spent liquor that passes through the adsorption towers flows to a transfer tank, where it is combined with the previously separated gel material, and is returned via pipeline to the refinery liquor stream, downstream of the original take-off point.

Neutralisation

The $Ga(OH)_3$ slurry is transferred to a mud separator where flocculant is added. The slurry is repulped in water in the repulp tank and the remaining water from the mud separator is transferred to the water neutralisation tank. The slurry is returned to the eluate neutralisation tank where the process is repeated. The caustic gallium slurry is then transferred to the dissolution-enrichment tank where it is heated to over 100°C to generate a condensed gallate liquid.

Purification (vanadium and mixed metals removal)

Hydrogen peroxide and calcium oxide are added during the vanadium removal step to degrade flocculant used in the refining process and to precipitate vanadium. The resulting vanadium precipitate is reacted with Nitric acid to form a calcium vanadate slurry, which is then returned to the refinery Bayer liquor circuit via the spent liquor return tank.

Nickel chloride and sodium sulphide are then added to precipitate mixed metals from the condensed gallate. Mixed metals are precipitated from the condensed gallate liquid and collected in a skip bin or self-dumping tipping bin for temporary storage before transportation offsite by licensed vendors to a suitably classified landfill.

Electrolysis (electrowinning)

The purified gallium liquid is then transferred to the electrolyte tank in preparation for electrolysis. The electrolysis cell is heated up to ~70°C and operated up to 8,000 amps. At the end of electrolysis, liquid gallium metal is tapped out the bottom of the cell in batches into a plastic container. The gallium is washed with ultrapure sulfuric acid, dried and refrigerated to generate 99.99 per cent purity product.

The final gallium product will be decanted in up to 2.5 litre glass or polypropylene containers within the on-site laboratory. It will then be packaged into polystyrene foam ready for transport before storage in a refrigerated room maintained below the freezing point of gallium (29.7°C).

Sulphate concentration and sulphate removal

The use of a sulphuric acid solution to desorb the gallium ions will generate an acidic wastewater stream. The acidic wastewater will be heavily diluted due to the use of wash water in the adsorption/elution steps. Where possible, the acidic wastewater will be reintroduced directly into

the refinery process water circuit. The process water circuit is however only able to tolerate a finite sulphate level, therefore the acidic wastewater it will be treated with a sulphate concentration and removal step.

First the acidic wastewater will be concentrated in a water treatment facility. Clean process water from water treatment will be returned to the gallium plant acid/caustic dilution stage. The reject water from water treatment will then be partially de-sulphated with the addition of lime, resulting in a calcium sulphate precipitate. The partially de-sulphated slurry will then be passed through a plate and frame filter, where the precipitate is removed, and the remaining filtrate will be reintroduced to the refinery. The plate and frame filter will generate a spadable calcium sulphate filter cake that will be temporarily stored within a dedicated concrete bunker awaiting collection and disposal at a suitably licensed facility.

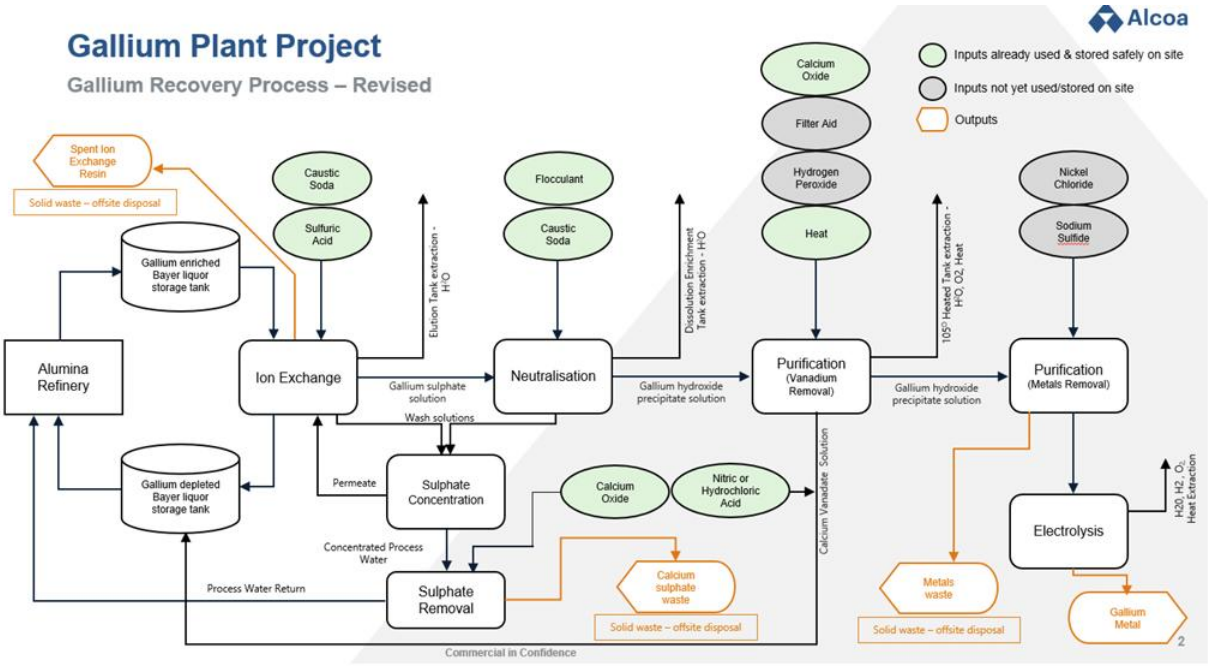

Figure 3: Gallium extraction process flow diagram (Alcoa 2025)

3.2.1 Process inputs and outputs

A summary of process inputs is included in Table 1 (from the application). The applicant advised that based on the nature of the proposed process inputs, the return of process water from the gallium plant is not expected to introduce new chemical species or additional pollutants into the existing refinery process circuit. Apart from nickel chloride, all reagents used in the process are currently used within the existing alumina refining process. Although nickel chloride is not presently used, both nickel and chloride compounds are already present within the refinery water and liquor circuits because of the alumina refining process.

Table 1: Gallium extraction process inputs

Process input	Description	Quantity
Water	At full production, water inputs are estimated to be up to 25kL/hour.	Up to 210,000 kL/annum
Bayer Liquor	This is the primary input, containing dissolved gallium. Bayer liquor is a recirculating stream of the alumina refining process from bauxite.	755,000 tpa
Ion-Exchange Resin	Specialised resins used to selectively bind and extract gallium from the liquor.	800 tpa

Process input	Description	Quantity
Sulfuric Acid	Acid utilised as the eluant liquid, for process water neutralisation, and Gallium metal purification.	8,000 tpa
Caustic Soda (Sodium Hydroxide)	Utilised to convert gallium sulphate to hydroxide and for water neutralisation	6,500 tpa
Flocculant	Utilised to flocculate gallium hydroxide mud	25 tpa
Lime (Calcium Oxide)	Utilised for vanadium precipitation and sulphate precipitation	3,690 tpa
Hydrogen Peroxide	Flocculant decomposition	100 tpa
Nickel Chloride	Precipitation accelerant	10 tpa
Sodium Sulphide	Utilised for precipitating metal sulfides	30 tpa
Nitric Acid	Reacted with vanadium precipitate to form a calcium vanadate solution that will be reintegrated into the Bayer liquor circuit.	Up to 50 m^3/annum

A summary of process outputs, including product and wastes is included in Table 2 (from the application). All waste products will either be returned to the refinery for further use in the alumina refining process or will be disposed at an off-site licenced facility, therefore no new waste types will be disposed on the premises.

The gallium extraction process will also not result in emission of any additional pollutants to air. Air emissions will be generated during the vanadium removal and electrolysis processes however they are limited to water vapour, oxygen and hydrogen. Condensers will be installed at the water vapour emission sources to cool the vapour back into liquid form, reducing the volume of water vapour emitted and the formation of visible plumes.

Table 2: Gallium extraction process outputs

Process output	Description	Quantity
Gallium (99.99 % pure)	Gallium product dried and refrigerated in 2 L containers, stored within the laboratory awaiting export.	Up to 100 tpa
Waste Ion-Exchange Resin	Spent resin generated in the ion exchange process will be disposed of at a suitably licenced facility. Solid controlled waste -Industrial waste treatment plant residues, expected to require disposal at a Class III or IV landfill.	Up to 850 tpa
Spent Liquor	Spent liquor exiting the ion exchange process will be returned to the alumina refinery process via a return pipeline. The spent liquor return stream will also include calcium vanadate slurry (<0.5%) from the purification process.	461 m^3 per day
Mixed metal precipitates	Mixed metal wastes generated from the gallium purification process will be collected in dedicated storage tanks and flow via gravity to a skip bin or self-dumping tipping bin awaiting collection by a licensed contractor and disposed of at suitably licensed facility. Initial laboratory tests undertaken by the applicant with the plant process design suggest that the mixed metal precipitate will contain the following ions (ordered from largest to smallest): sulphide, sodium, aluminium, iron,	Up to 24 tpa

Process output	Description	Quantity
	molybdenum, arsenic, tungsten. Based on this they are most likely to be classified as a dangerous good under UN 3077 “Environmentally hazardous substance, solid, n.o.s.”. The precipitates are expected to require disposal at a Class III or IV landfill facility.	
Return Process Water	All process water outputs from the gallium plant will be reused within the refinery water circuit. Return process water from the gallium plant will be directed to the refinery’s Mud to Lake Tank. This tank typically receives approximately 1,000 kL/hr of process inputs from existing refinery operations, including mud, spent acid, condensate and lake water. The gallium plant will contribute approximately 31 kL/hr (approximately 3.1 per cent of total inflow). Given the relatively small proportion of the return process water and its chemical compatibility with existing inputs, the return stream is not expected to alter the characteristics of the refinery circuit, or to changes existing emissions.	18 m^3 per hour
Calcium Sulphate Filter Cake	Calcium sulphate filter cake generated by the plate and frame filter will be temporarily stored within a concrete bunker awaiting collection and disposal at a suitably licensed facility. Initial laboratory tests by the applicant indicate filter cake will be in the form of gypsum or ettringite which are not classified as hazardous. The filter cake is expected to require disposal to a Class III landfill however this and whether it is a controlled waste will be confirmed through further testing prior to disposal.	Up to 19,000 tpa

A summary of containment infrastructure the applicant has proposed for the storage of waste prior to offsite disposal is included in Table 3 (from the application).

Table 3: Waste storage containment infrastructure

Waste	Storage location/infrastructure
Waste ion exchange resin (solid)	Each ion exchange tower will have a ~5.5 m^3 enclosed containment receptacle (basket/bin) made from ASTM A283 grade D steel with a stainless steel mesh screen which allows for gravity drainage of entrained liquid. Receptacles are stored within the bunded gallium plant building. Liquid is collected and returned to the process. Total storage capacity of ~55 m^3 at any one time.
Mixed metals precipitate (wet solid)	Gravity discharged from separating filters to a ~1-2 m^3 ASTM A283 steel skip bin or self-dumping tipping bin, beneath the mixed metal removal tank within the bunded gallium plant building. Total storage capacity of ~5 – 10 m^3 at any one time.
Calcium sulphate (wet solid)	Calcium sulphate wastes will be stored in a purpose-built concrete bunker located within the common infrastructure building beneath the plate and frame filter press. The bunker will be open to the outside on the eastern side of the building with a ramp for access via front-end loader and/or skid steer loader.

Waste	Storage location/infrastructure
	The bunker will be approximately 5.5 m long, 6.6 m wide and 4 m deep, and hold approximately 80-100 m^3 of calcium sulphate waste.

The applicant advised they are engaging with relevant waste disposal companies to determine the most appropriate disposal location and have been provided preliminary advice that the consulted companies are able to take the wastes anticipated to be produced by the gallium plant.

Potential for radioactive waste

Gallium itself is not a radioactive material. The bauxite ore processed at the refinery does however contain low levels of naturally occurring radioactive elements. Within the alumina refining process, the naturally occurring radionuclides, including uranium and thorium, predominantly report to the residue storage areas, remaining entrained within the red mud, rather than within the circulating bayer liquor.

Assays of bayer liquor sampled by the applicant in November and December 2025 reported uranium concentrations ranging between 2.5–3.5 mg/L (0.0003%). Previous analytical programs have recorded thorium concentrations below detection limits; therefore, thorium analysis was not undertaken. The gallium plant will utilise spent bayer liquor as its feedstock, and the proposed extraction and purification technology is not expected to result in the concentration or accumulation of radionuclides such as uranium or thorium present in the liquor.

The applicant advised further mass balance assessments and detailed assays of representative waste streams are currently being undertaken and will continue as materials become available during pilot trials and process design testing. This analytical program will determine whether uranium present in the bayer liquor feed partitions through the ion-exchange system into any waste streams at significant concentrations. Preliminary desktop assessments undertaken by the applicant indicate that the gallium plant is not expected to generate waste streams containing sufficient radionuclides to require regulation as radioactive substances.

The delegated officer noted that while radioactive elements are present within the gallium plant feed (bayer liquor), they are at low concentration and are not expected to concentrate into the gallium plant waste products, with further analysis planned to confirm this understanding prior to disposal of any waste products. If analysis identifies any gallium plant waste streams as radioactive substances, the applicant will be required to comply with all relevant legislative requirements, including (but not limited to) the Environmental Protection (Controlled Waste) Regulations 2004, the Radiation Safety (General) Regulations 1983, and the *Radiation Safety Act 1975*, and ensure disposal at an appropriately licensed facility.

4. Other approvals and legislation

4.1 Part IV of the EP Act

Construction and operation of the Wagerup Alumina Refinery has previously been referred to and assessed by the Environmental Protection Authority (EPA) as a significant proposal under Part IV of the EP Act and granted approval by the Minister for Environment.

The most recent approval, Ministerial Statement 728 (MS728) was published on 14 September 2006 for expansion of the refinery to 4.7 Mtpa alumina production (via a third processing unit). MS728 consolidated and superseded previous Ministerial Statements MS95, MS390 and MS564. MS728 has been subsequently amended by MS897, MS1069 and MS1157.

Condition 1 of MS728 requires the proponent (Alcoa) to implement the proposal as described in schedule 1 and previous assessment bulletins subject to the conditions and procedures of the statement. The proposal is described as "*the construction and operation of the Wagerup*

Alumina Refinery to a maximum production capacity of 4.7 million tonnes per annum and its associated bauxite mining, as documented in Schedule 1." Schedule 1 includes limits on key proposal characteristics including the refinery footprint, alumina production, bauxite mining rate, raw material inputs, and residue disposal.

The delegated officer considered the application in the context of the approved proposal and conditions of MS728 and noted the following.

- Gallium plant infrastructure will not increase the refinery foodprint as it will be located entirely within areas previously disturbed for the refinery.
- The gallium plant will not enable any increase to the rate of alumina production, which as per the Part V operating licence is not more than 2.9 million tonnes of alumina produced per year.
- The gallium plant does not require any increase to the rate or extent of bauxite mining as gallium will be extracted from spent bayer liquor which already circulates within the refinery.
- Operation of the gallium plant will not result in increase to the rate or extent of residue disposal as gallium will be refined from bayer liquor from which residue has previously been separated.
- The gallium plant will not significantly increase or introduce any new emissions or impacts which haven't previously been considered for the refinery.

On the basis of the above the delegated officer formed the view the application is not inconsistent with the assessed proposal or the conditions of MS728 (as amended).

The delegated officer also noted that a significant amendment to the approved proposal for MS728 under Part IV of the EP Act (section 40AA) is currently under assessment for Alcoa's mining operations (2022 to 2027) within the Huntly and Willowdale areas. As the scope of the application is limited to mining operations the gallium plant is not within the scope of this assessment.

4.2 State Agreement Acts

Alcoa's bauxite mining and refining activities in Western Australia are permitted under a series of State Agreements:

- *Alumina Refinery Agreement Act 1961*
- *Alumina Refinery (Pinjarra) Agreement Act 1969.*
- *Alumina Refinery (Wagerup) Agreement and Acts Amendment Act 1978* (State Agreement)
- *Alumina Refinery Agreements (Alcoa) Amendment Act 1987* (Amendment Act)

The gallium plant will be located wholly within the Wagerup refinery site boundary as prescribed within the State Agreement.

Gallium extraction is included in the set of permitted activities under clause 18(a) of the 1961 Agreement, as varied by clause 4(2)(h) of the 1987 Amendment Act, subject to the receipt of all other relevant regulatory approvals.

4.3 Environmental Protection (Wagerup Alumina Refinery Noise Emissions) Approval 2012

The applicant holds a Noise Approval for the refinery, being the Environmental Protection (Wagerup Alumina Refinery Noise Emissions) Approval 2012 (Noise Approval). The Noise Approval was granted by the Minister under regulation 17 of the Environmental Protection

(Noise) Regulations 1997 (Noise Regulations) and allows noise emissions from the refinery to exceed the Assigned Levels provided noise levels do not exceed Approved Levels (including L_{A10} and L_{A1}) at eight defined off-site locations around the refinery The locations are illustrated (1-8) in Figure 4 and the Approved Levels (L_{A10}) for these defined locations are summarised in Table 4.

The Noise Approval was valid until December 2015 but remains in effect if a further approval is lodged. Alcoa applied for further approval in 2015. The department is currently assessing the application therefore the requirements of the existing Noise Approval continue to have effect until the Minister grants or refuses to grant a further Noise Approval.

The Noise Approval also operates on the basis that there is no net increase in noise emissions from the refinery.

Table 4: Wagerup Refinery Noise Approval Approved Levels

Location	L_{A10} Approved Levels – dB	
	Day period	Night period
Location 1	49	47
Location 2	46	46
Location 3	45	45
Location 4	45	41
Location 5	45	41
Location 6	45	37
Location 7	45	37
Location 8	45	36
Hamel	45	35

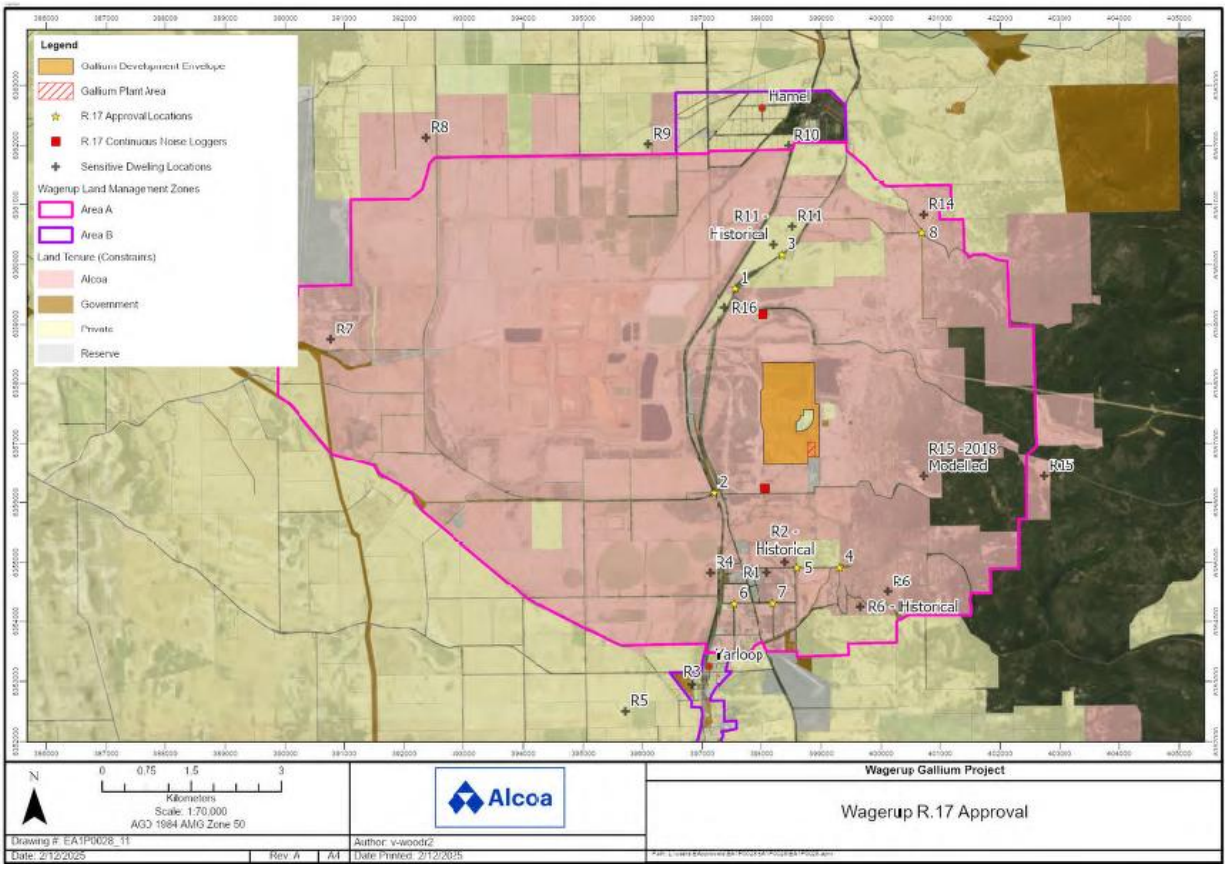

Figure 4: Environmental Protection (Wagerup Alumina Refinery Noise Emissions) Approval 2012 Locations (Alcoa 2025)

4.4 *Dangerous Goods Safety Act 2004*

The applicant holds a dangerous goods storage licence (DGS010738) for the refinery. An amendment to the existing licence will be required to include additional dangerous goods storage for the gallium plant.

4.5 *Rights in Water and Irrigation Act 1914*

The refinery operates an integrated water management system supported by a predominantly closed water circuit, with make-up water supplied to offset system losses. Primary make-up water sources comprise surface water runoff collected from the refinery site, the RSAs and the Yalup Brook catchment, as well as water abstracted from the Harvey River Main Drain. Supplementary volumes of process water are sourced from groundwater abstraction within the superficial aquifer via depressurising bores, alkali-recovery bores, an underdrainage sump at the RSAs, and a groundwater-connected borrow pit located north of the RSAs.

Surface water and groundwater abstraction for the refinery is permitted under the following licences in Table 5 issued under the *Rights in Water and Irrigation Act 1914* (RIWI Act) and must be undertaken in accordance with the approved *Wagerup Alumina Refinery, Groundwater and Surface Water Licenses Operating Strategy 2020*.

Table 5: Wagerup Operations Water Licences

Licence number	Source	Purpose	Amount (ML/annum)
SWL97472(6)	Yalup Brook	Water for industrial purposes	1,600
SWL99246(5)	Yalup Brook (incl Black Tim Brook)		2,500
SWL151027(4)	Harvey River Main Drain		3,000
GWL102669(3)	Superficial Aquifer		696.6

The applicant anticipates the gallium plant's estimated water demand of up to 25 kL/hour (approximately 220 ML per annum) will be met through process efficiencies and water supplied by Harvey Water in accordance with existing contractual arrangements. No amendment to the existing ground or surface water licences will be required to meet this demand.

5. Noise emissions

The applicant undertook a noise assessment for the gallium plant which was later updated to include cumulative noise associated with construction and operation of new residue storage area (RSA 10) which is planned to commence construction later in 2026.

- Alcoa Gallium Plant Environmental Noise Impact Assessment – Rpt01-AU03098-Rev1-9/2/2026.

Noise modelling for the assessment was undertaken using SOUNDPLAN software to predict changes in noise levels at the eight prescribed Noise Approval locations and Hamel under worst-case propagation conditions; and assess these noise levels against the Approved Levels.

5.1 Construction

Construction noise is managed under regulation 13 of the Noise Regulations which exempts noise from a construction site from the Assigned Levels for construction work carried out between 7 am and 7 pm on any day, excluding Sunday and public holidays, provided the following requirements are met.

- The construction work is carried out in accordance with control of noise practices set out

in section 6 of Australian Standard 2436-1981 "*Guide to Noise Control on Construction, Maintenance and Demolition Sites*"; and

- The equipment used for the construction is the quietest reasonably available.

If construction work will be undertaken outside these hours, and noise emissions are likely to exceed the assigned levels, a Noise Management Plan must be submitted to the department's CEO at least seven days before the work commences, and the plan must be approved.

A construction noise scenario was modelled for the civil works construction stage which is anticipated to be the most significant noise generating activity associated with construction of the gallium plant. The model predicted received noise levels could increase by up to 0.3 dB during the day and up to 0.1 dB during nighttime periods at the eight Noise Approval locations when this stage of works is being undertaken.

The applicant proposes to limit significant noise generating construction activities (such as civil works) to standard daytime hours and to seek approval from the CEO via a Noise Management plan if such activities need to occur outside these hours.

5.2 Operation

Three operational model scenarios were run for operation of the gallium plant:

- Scenario 1 – Baseline refinery operations plus gallium plant operation (no noise mitigation).
- Scenario 2 – Baseline refinery operations plus gallium plant operation with restricted gallium plant mobile equipment at night.
- Scenario 3 – Baseline refinery operations plus gallium plant operation with restricted gallium plant mobile equipment at night and selected noise offset project (enclosure of tray seed pumps 3 and 4).

The gallium plant noise model was based on sound power levels (SWL) defined in British standards for mobile equipment, SWL provided by the vendor for the cooling plant, and SWL calculated from acoustic texts for remaining equipment. Modelling was conducted for the night period as it is typically the most sensitive for noise sensitive receivers and has the most stringent Approved Levels. Model results for the gallium plant were compared against modelled baseline levels and the Approved Levels at the eight Noise Approval reference locations.

Model predicted noise levels from the gallium plant were logarithmically summed with modelled baseline noise levels to consider cumulative impact with existing refinery noise. The results of the above scenarios were also logarithmically summed with modelled noise levels for operation of RSA 10 to further consider cumulative noise. This assessment did not change the model predicted cumulative noise impact outcomes for the gallium plant.

Modelling results indicated that in isolation noise emissions from the gallium plant operation will be 13 to 23 dB below those from existing refinery operations at the assessed receiving locations and at least 15 dB below when mobile equipment is not operated at night. Contribution from the gallium plant during operation is however predicted to increase night-time noise levels by 0.1 to 0.2 dB at five of the Noise Approval reference locations with no mitigation.

An assessment of a range of noise offset projects was undertaken to determine suitable noise mitigation measures. This included noise mitigation for a range of existing refinery infrastructure such as buildings, pumps, fans and cooling towers, as well as acoustic treatment for the gallium plant building. Based on the assessment, the applicant has elected to implement the following two noise mitigation options, as they are considered the most effective in offsetting the predicted 0.2 dB noise level increase.

- Restrict mobile equipment operations at night.

- Retrofit two existing tray seed pumps (3 and 4) with acoustic enclosures to achieve a predicted 7 dB SWL reduction. The pumps are configured for duty/standby operation, with only one pump running at any given time, with tray seed pump 4 the standby pump.

Model scenarios 2 and 3 were developed to confirm the suitability of chosen noise mitigation to achieve no net increase to noise levels at the eight Noise Approval locations.

Table 6 includes a summary of the noise modelling outcomes for the gallium plant operation and demonstrates that with the proposed mitigation, operation of the gallium plant is not expected to increase received noise levels at the eight Noise Approval locations or the town of Hamel.

Table 6 Predicted night-time gallium plant operational noise levels

Noise Approval Location	Night-time Approved Level dB(A)	Predicted baseline night-time noise level dB(A)	Gallium plant – No mitigation	Predicted night cumulative noise levels dB(A)		
				Scenario 1 - No mitigation	Scenario 2 –restricted gallium mobile equipment	Scenario 3 – restricted gallium mobile equipment & tray seed pump enclosure
1	47	44.9	24.9	44.9	44.9	44.9
2	46	45.7	27.5	45.8 (+0.1)	45.7	45.7
3	45	42.9	21.7	42.9	42.9	42.9
4	41	40.4	27.3	40.6 (+0.2)	40.5 (+0.1)	40.4
5	41	40.9	25.3	41 (+0.1)	41 (+0.1)	40.9
6	37	34.9	20.4	35.1 (+0.2)	35 (+0.1)	34.9
7	37	37.1	21.9	37.2 (+0.1)	37.2 (+0.1)	37.1
8	36	35.2	15.8	35.2	35.2	35.2
Hamel	35	32.6	13.2	32.6	32.6	32.6

The applicant also undertook noise monitoring at a location immediately south-east of the proposed gallium plant footprint to establish baseline noise levels with the intention that monitoring will be conducted at the same location following commencement of operation of the gallium plant. The applicant proposes to compare results between the initial monitoring and monitoring completed after commencement of gallium plant operation to quantify if there is any change in noise levels and verify that noise levels don't exceed model predictions.

The applicant has proposed to undertake a noise model validation program to update the existing noise model to reflect as-constructed specifications and actual operational conditions. Model inputs (including sound power levels, attenuation factors, and other acoustic parameters) will be adjusted based on monitoring data collected during commissioning and time limited operation of the gallium trains to ensure that the noise model accurately represents real-world conditions and is capable of demonstrating compliance with the Approved Levels.

5.3 DWER technical review

The department undertook a technical review of the noise assessment and found the assessment followed the same methodology that the applicant has applied to the premises for many years. The calculation algorithm used and modelling assumptions were generally consistent with previous assessments, and the modelling was considered reasonable and

complete.

It was noted that the refinery and RSA10 were modelled in an older version of the prediction software SoundPlan (v.7.4) while the gallium plant model used a more recent version (v.9). While the same software and the same basic modelling inputs were used the implementation in software of the selected algorithm (CONCAWE) is not standardised, therefore may not provide comparable results between software versions.

In reviewing model inputs the delegated officer noted modelled noise sources were mostly aligned with the infrastructure proposed in the application however some inconsistencies were noted which may impact the conservatism of the modelling and model outcomes. Plans provided with the application indicate the cooling plant infrastructure will comprise three chillers, cooling towers and pumps which will be established outside the gallium plant building. The applicant advised the chillers will be housed within original equipment manufacturer supplied enclosures, specifically designed to mitigate noise. Comparatively, the noise model included only two cooling towers (outside the plant building) and two cooling water pumps and chiller units (inside sheds or the plant building).

Based on the modelled outcomes, noise levels generated by the proposed gallium plant are predicted to range between 15.8 and 27.5 dB(A) at the eight Noise Approval locations, which is significantly lower than the night-time Approved Levels (13.7 dB or more below). Based on this the delegated officer considers that noise from the proposed gallium plant is not expected to significantly contribute to the overall noise emission levels from the Wagerup refinery. The predicted 0.1-0.2 dB increase in noise levels at some locations is a modelled outcome only and is unlikely to be perceptible at receptors given that a change of approximately 1 dB is generally required for a difference in noise level to be noticeable. Notwithstanding this, where a Noise Approval has been granted it is expected that overall noise emissions from the relevant premises do not increase. Accordingly, noise mitigation is required to offset the modelled increase.

Based on the technical review the delegated officer considers that achieving no net increase to noise levels and compliance with the Approved Levels is dependent on actual noise emissions from the installed infrastructure aligning with model inputs, effective implementation of the proposed noise mitigation measures (restricting mobile equipment operation to daytime periods and enclosure of two tray seed pumps) and model accuracy. Post-installation noise validation will be required to confirm that the no net increase objective is met.

In reviewing the noise assessment, the delegated officer also noted that modelled baseline noise levels marginally exceed the Approved Levels at reference location 7 by 0.1 dB. Given the inherent uncertainty and margin of error associated with predictive noise modelling, the magnitude of this exceedance is considered negligible. The exceedance represents a modelled prediction, rather than a measured or verified result and will therefore be a matter for consideration by the department in its assessment of Alcoa’s application for further Noise Approval.

Key considerations for the risk assessment will be whether the gallium plant is expected to alter the risk profile of noise emissions for the refinery.

6. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the Guideline: Risk Assessments.

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

6.1 Source-pathways and receptors

6.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction / operation which have been considered in this decision report are detailed in Table 7 below. Table 7 also details the control measures the applicant has proposed to assist in controlling these emissions, where necessary.

Table 7: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Vehicle movements and construction activities	Air / windborne	• Minimise open areas to prevent dust occurrence. • Areas will not be disturbed until they are required. • Watercarts, or similar, will be maintained onsite to dampen trafficable and open area during construction to minimise dust lift off. • Speed limits will be implemented on site to minimise dust generation from vehicle movements.
Noise			• Equipment used will be the quietest reasonably available. • Significant noise-generating construction activities will be undertaken during standard daytime hours. • Construction works that generate significant noise and are scheduled to occur outside standard daytime hours will proceed in accordance with an approved noise management plan.
Hydrocarbons	Vehicles during refuelling	Direct discharge to ground	• Where practicable refuelling should occur on sealed surfaces such as fuel bays and workshops. • Spill kits provided for recovery and cleanup of spilt material. • Any spills will be controlled, contained and cleaned up in accordance with the applicant's internal procedures.
Spent bayer liquor	Installation of offtake from	Direct discharge to	• Modifications to existing refinery will be undertaken during a scheduled refinery shut

Emission	Sources	Potential pathways	Proposed controls
	spent liquor circuit	ground Infiltration to groundwater Overland flow	where possible. • In the unlikely event of a hot-tap, a temporary bund will be constructed if the tapping point is located outside of a bunded area. • Existing process liquor pipes impacted by the proposal will be bled and isolated prior to conducting any works unless a hot-tap is undertaken. • Transfer equipment located over concrete slabs with bunding that will contain spillage of process liquor.
Operations			

Noise	Operation of gallium plant	Air / windborne	• Common equipment (excluding the cooling plant) and gallium trains will be housed within an enclosed building.
			• The gallium plant building will incorporate delivery access points on the northern side and maintenance access points on the eastern and western sides which will all remain closed during normal operations.
			• Use of the following mobile equipment within the gallium plant area will be restricted to daytime hours:
			  ○ Forklift;
			  ○ CAT IT Wheel Loader;
			  ○ Franna Crane; and
			  ○ Semi-trailed Truck.
			• Noise offset projects to enclose precipitation tray seed pumps 3 and 4 will be undertaken as part of the gallium plant construction contract to ensure ‘no net increase’ in sound levels.
			• Noise monitoring and a noise model validation program as detailed in section 5.2 will be undertaken following commencement of time limited operation to ensure that the noise model accurately represents real-world conditions and no net increase in noise is achieved.

Process chemicals, liquor and contaminated wastewater	Operation of gallium plant including the storage and handling of chemicals, process liquors and wastewater	Direct discharge to ground Infiltration to groundwater Overland flow	• Common equipment (excluding the cooling plant) and gallium trains will be housed within an enclosed building constructed with bunded concrete floors. • Concrete bunded flooring within the gallium plant building will include a densifying admixture (e.g. Caltite) within the concrete to inhibit corrosion. • Bunded containment areas to have capacity to contain not less than 110% of the volume of the largest tank or 25% of the total volume stored in all tanks (whichever is greater) and include recovery sumps fitted with level sensors, alarms and automated pumps to return liquids

Emission	Sources	Potential pathways	Proposed controls
			to the process. • Bulk chemical storage tanks have independent bunded compounds meeting the above requirements. • The bulk acid storage bund will have an acid-resistant epoxy coating on all exposed concrete surfaces to provide additional protection from the corrosive properties of the acid storage. • Process and chemical storage tanks include primary and secondary containment measures in accordance with the requirements of AS3780. • A process monitoring system with level sensors, alarms and automated shut-offs will be used for real-time monitoring of the process to prevent damage and spill events. • The gallium plant employs batch-based operation with process tanks sized with capacity exceeding the maximum batch volume to minimise the risk of loss of containment. • Any spills will be controlled, contained and cleaned up in accordance with the applicant's internal procedures. • Spill kits provided for recovery and cleanup of spilt material within the plant area, store and laboratory. • Dangerous Goods containment infrastructure to be licenced in accordance with the Dangerous Goods regulations. • Minor quantities of packaged reagents (IBCs and 25 kg bags) will be stored on flexible bunds or within bunded areas.
Potentially contaminated surface water	Operation of gallium plant including storage and use of chemicals, process liquors and wastewater	Overland runoff Infiltration to groundwater	• Process equipment and chemical storage will be wholly located within enclosed sheds with bunded concrete floors. • Site road and paths will be constructed to divert stormwater towards culverts that convey stormwater away from operational areas. • Drainage infrastructure location and design to minimise interference and disruption of natural surface water flows and to avoid excessive ponding against structures and bunds.
Mixed metal precipitates	Operation of gallium plant including recovery and storage of mixed metal precipitates	Direct discharge to land	• Mixed metal wastes will be collected in dedicated storage tanks and flow via gravity to a skip bin or self-dumping tipping bin awaiting collection by a licensed contractor and disposed of at suitably licensed facility. • Skip bin or self-dumping tipping bin are located within the process shed on a concrete hardstand floor.
Calcium sulphate	Operation of gallium plant	Air / windborne	• Calcium sulphate wastes will be temporarily stored within a dedicated concrete bunker with

Emission	Sources	Potential pathways	Proposed controls
leachate or dust	including recovery and storage of calcium sulphate solid waste	Direct discharge to land Infiltration or runoff of surface water contaminated by dust	a solid panel roof with downward opening doors and three walls with an externally facing opening and ramp for mobile plant access. • Calcium sulphate precipitate retains a high moisture content reducing the likelihood of dust generation. • The surface of calcium sulphate is prone to developing a protective crust. Entrained moisture acts as a binder increasing conglomerate size. • Will be collected by a licenced waste carrier and disposed of at a suitably classified waste management facility. • Any material spilt during transfer, will be collected via mechanical means (i.e. vacuum) or gently swept back into the concrete bunker.
Process liquor and contaminated wastewater	Transfer of liquor and wastewater between refinery and gallium plant	Direct discharge to ground Infiltration to groundwater Overland flow	• Tie-in points and pipelines located within existing refinery pipe racks generally located over concrete slabs with bunding that will contain spillage of liquids. • Infrastructure and piping inspected daily. • Liquor and process water inflow and outflow rates will be continuously monitored within the gallium plant control room via pressure indicators and a programmable logic controller.
Chemicals/ reagents	Reagent unloading	Direct discharge to ground and infiltration to groundwater.	• Delivery area is covered to limit rain ingress. • Bunded hardstand floor, graded to direct all liquid spills to containment sumps. • Delivery trucks will be connected to the unloading pumps with stainless steel camlock fittings on either end. • Any spills will be controlled, contained and cleaned up in accordance with the applicant's internal procedures. • Spill kits provided for recovery and cleanup of spilt material. • Engineered overfill protection. Unloading pumps will be set to alarm at high and high-high level for the storage tanks, additionally the pump will be interlocked to shut-off in the event of the high-high level being reached
Hydrocarbons	Transformer operation	Direct discharge to ground and infiltration to groundwater	• None proposed

6.1.2 Receptors

In accordance with the Guideline: Risk Assessment, (DWER 2020a), the delegated officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection

of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

Table 8 and Figure 5 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020b)).

Table 8: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	**Distance from prescribed activity**
Residential Premises/ Homesteads Hamel – Shire of Waroona Wagerup and Yarloop – Shire of Harvey	Hamel is approximately 5.1 km to the north of the gallium plant. Wagerup and Yarloop – approximately 2.2 km south of the gallium plant boundary to northern edge of township. Private residence – approximately 2.6 km northwest of the gallium plant.
Environmental receptors	**Distance from prescribed activity**
Threatened fauna habit Potential black cockatoo nesting trees (DBH>500mm, do not contain hollows)	The gallium plant has been designed to ensure the two remnant jarrah trees (potential black cockatoo nesting trees) in proximity of the gallium plant area will be retained. The trees are located at the northeast and western boundary of the plant area, approximately 50 m from planned building.
Environmentally Sensitive Areas (ESA) Threatened Ecological Community (TEC) *Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain* (Swan Coastal Plain Floristic Community Type 3b), listed as an Endangered ecological community under the *Biodiversity Conservation Act 2016* *Banksia Woodlands of the Swan Coastal Plain* listed as a Priority 3 ecological community (PEC)	The plant area is mapped within an ESA associated with a buffer to two TEC (Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain and Banksia Woodlands of the Swan Coastal Plain) located within Crown Reserves 43703 and 11160 immediately south. The TEC are approximately 50 m south of the proposed gallium plant. Vegetation to the west of the existing refinery is also mapped as Banksia Woodlands of the Swan Coastal Plain PEC. The vegetation is approximately 200 m from planned pipeline routes for spent bayer liquor and return water.
Surface waters Proclaimed surface water area: Waroona Irrigation District Multiple use palusplain wetland	Bancell Brook located 850 m south of the proposed gallium plant. A large expanse to the west of the refinery is mapped as palusplain multiple use wetland. At its closest point the mapped wetland area is 450 m southwest of the gallium plant area. Multiple use wetlands are generally highly modified, degraded, or lacking significant environmental values)
Groundwater Underlying groundwater (irrigation and stock water use) Proclaimed groundwater area:	The premises is located within the proclaimed Yalup Brook Groundwater Area. Groundwater flow is predominantly westward and typically occurs at shallow depths of less than 5 m below ground level.

Yalup Brook Groundwater Area	
Acid Sulphate Soils Moderate to low risk	Soils within the premises are mapped as having a moderate to low risk of acid sulphate soils occurring within 3 m of natural soil surface therefore are no expected to be require further testing or management controls.
Cultural receptors	**Distance from prescribed activity**
Aboriginal heritage site Registered site 3235	430m northwest of proposed gallium plant. Minor works within the existing refinery footprint to establish pipelines occur within the bounds of the registered site. This heritage place has been mostly wholly disturbed by refinery construction through a previous Ministerial consent under section 18 of the *Aboriginal Heritage Act 1972*. The applicant advised the works are not expected to interact with any remnant cultural materials.

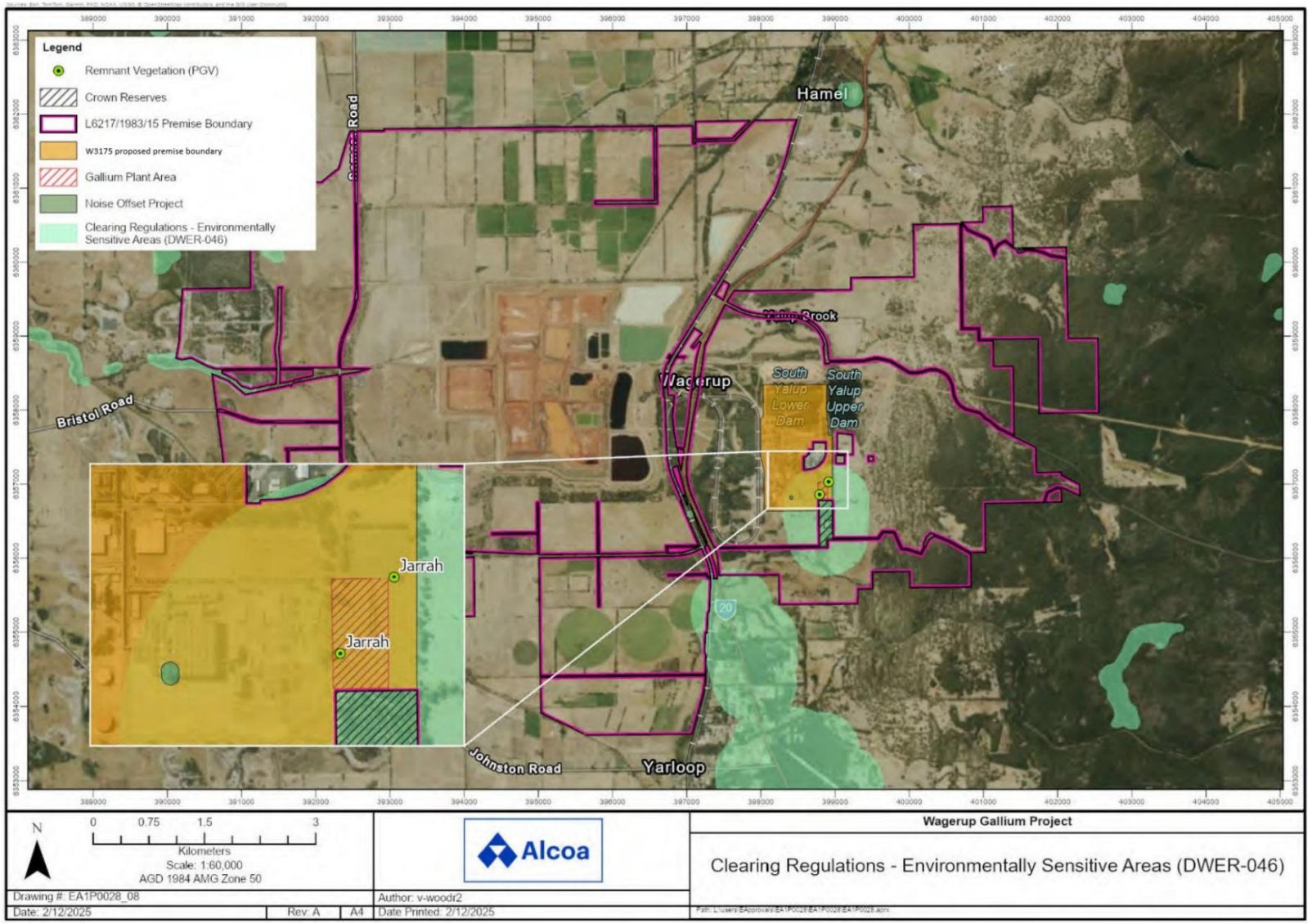

Figure 5: Environmentally sensitive areas

6.2 Risk ratings

Risk ratings have been assessed in accordance with the risk assessment guideline for each identified emission source and take into account potential source-pathway and receptor linkages as identified in Section 6.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 6.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 9.

Works approval W3175/2025/1 that accompanies this decision report authorises construction and time-limited operation. The conditions in the issued works approval, as outlined in Table 9 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence amendment is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the gallium plant. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence amendment application for L6217/1983/15 (the refinery licence).

Table 9: Risk assessment of potential emissions and discharges from the premises during construction, commissioning and operation

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Reasoning
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction activities (Vehicle movements operation and construction of new building, plant and infrastructure.).	Dust	Air / windborne pathway causing impacts to health and amenity	Yarloop township.	Refer to section 6.1.1	C = Slight L = Unlikely **Low Risk**	Y	Condition 2	The delegated officer considered the applicant's controls, the proposed work hours (expected to be daytime) and the separation to receptors (>2 km to nearest human receptors) and determined that health and amenity are unlikely to be impacted by dust or noise from the construction works. Additional approval requirements (an approved Noise Management Plan) apply under the Noise Regulations if construction activities will occur outside the hours specified in Regulation 13. Given the proximity of environmental receptors (TEC) impact to vegetation health may occur if dust emissions are not sufficiently mitigated therefore the delegated officer considered it necessary to condition fugitive dust controls based on those proposed by the applicant.
		Air / windborne pathway causing impacts to vegetation health	TEC within adjoining Crown Reserves ~50 m south		C = Major L = Unlikely **Medium Risk**			
	Noise	Air / windborne pathway causing impacts to amenity	Yarloop township.		C = Minor L = Unlikely **Medium Risk**	Y	NA	
	Hydrocarbons	Direct discharge to land and infiltration causing contamination of localised soils	Localised soils	Refer to section 6.1.1	C = Slight L = Unlikely **Low Risk**	Y	NA	The delegated officer considered that the applicant implements existing spill control procedures, spill volumes during refueling are likely to be low, and with refueling facilities already established within the existing refinery there will be limited need for in-field refueling. The risk of hydrocarbon contamination during refueling activities is therefore sufficiently low to not require controls within the works approval
Installation of pipeline tie-in to the existing spent liquor stream	Spent bayer liquor	Direct discharge to land and infiltration causing contamination of localised soils and potentially groundwater Overland flow potentially impacting vegetation health.	Localised soils Groundwater <5 mbgl TEC ~200 m west of offtake/pipeline	Refer to section 6.1.1	C = Major L = Rare **Medium Risk**	Y	Condition 1	The delegated officer has considered that the offtake works will occur within the refinery area, over a bunded area, preferably during a shut-down with impacted pipes having been bled and isolated prior where possible to minimise the risk of process liquor discharges during the works. The proposed controls are necessary to minimise the likelihood of discharge of process liquor during pipeline tie-in works and have therefore been conditioned in the works approval to minimise the risk of impacts to receptors.
Operation (including time-limited-operations)								
Gallium train operation including the storage, handling and processing of process liquors, chemicals/ reagents, wastewater, metal precipitates and calcium sulphate solid waste	Noise	Air / windborne pathway causing impacts to amenity.	Yarloop township	Refer to section 6.1.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 1, 8, 12-16	The delegated officer had regard to the Noise Approval and the applicant's noise assessment (section 5) and noted that based on model predictions operation of the plant is predicted achieve no net increase in noise subject to implementing the proposed noise offsets. The risk profile of noise emissions is therefore not predicted to change as a result of the gallium plant operation. Noting that modelling was based on mobile equipment operation being restricted to daytime hours and noise mitigation at the tray seed pumps, the delegated officer elected to specify implementation of these mitigation measures as conditions within the works approval. Noise enclosures have also been specified for the chillers which are located outside and may be a dominant noise source for the plant. The delegated officer also noted that the noise assessment was based on two rather than three chillers, cooling towers and pumps. As these are external noise sources and may be dominant given their expected SWL, operation an additional chiller, cooling tower and pump may alter the model predictions and ability to achieve no net increase in noise. The delegated officer has therefore only authorised installation of two of each of these items noting that further modelling and assessment would be required to demonstrate that no net increase in noise as noise emissions from the additional infrastructure may necessitate further noise offsets. Achieving no net increase to noise levels and compliance with the Approved Levels is dependent on noise emissions from the installed infrastructure aligning with model inputs, effective implementation of the proposed noise mitigation measures and model accuracy. The applicant has proposed a noise model validation program to ensure the noise model accurately represents real-world conditions and is capable of demonstrating compliance with the Approved Levels. It will include update of the existing noise model to reflect as-constructed specifications and actual operational conditions through updates to model inputs (including sound power levels, attenuation factors, and other acoustic parameters) based on monitoring data collected during commissioning and time limited operation. The delegated officer agrees that, given there are some uncertainties within the noise

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Reasoning
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								modelling, potential for outcomes to change if the SWL or attenuation of installed infrastructure differs to model inputs, and there has been no recent verification of the accuracy of the model predictions in the field, post-installation noise validation is necessary to verify noise impacts. Noise validation requirements have therefore been included in the works approval, which include submission of a noise validation program for review, implementation of the agreed plan and submission of the results to the department. To ensure the noise validation program is sufficiently robust, the delegated officer considers it necessary for the applicant to submit the details of the program to the department for review, including the location and type of monitoring that will be undertaken (including any relevant standards which will be applied) to verify noise emissions, updates that will be made to the model, and comparison planned to demonstrate the accuracy of model predictions with respect to in-field measured noise levels and performance against the Approved Levels.
Gallium train operation including the storage, handling and processing of process liquors, chemicals/ reagents, wastewater, metal precipitates and calcium sulphate solid waste	Process chemicals, liquor and contaminated water.	Direct discharge to land through loss of containment and infiltration to groundwater resulting in contamination of localised soils and groundwater. Overland flow potentially impacting on vegetation health and/or surface water quality.	Localised soils Groundwater <5 mbgl TEC within adjoining Crown Reserves ~50 m south of gallium plant Multiple use wetlands ~ 450 m southwest of gallium plant Bancell Creek ~850 m south	Refer to section 6.1.1	C = Minor L = Possible **Medium Risk**	Y	Condition 1 and 8	The gallium plant will operate a closed loop system with the existing refinery receiving and returning spent bayer liquor following extraction of the gallium, and receiving and returning process water, therefore the plant will not have any direct discharges of process liquor or contaminated water to the environment. Noting the environmentally hazardous nature of the gallium plant process liquors, wastewater and reagents the delegated officer considers the applicant has proposed suitable containment and monitoring controls for the gallium plant infrastructure to minimise the risk of discharging these to the environment and causing contamination. This includes infrastructure being within an enclosed building with concrete bunding with sumps and recovery systems, additional treatment to concrete to inhibit corrosion, AS 3780 enclosed tanks for corrosive liquids, recovery of spills and operation of a real-time process monitoring system with sensors, alarms and automated shut-offs. These requirements have therefore been conditioned as construction and operational requirements within the works approval to maintain an acceptable level of risk.
	Potentially contaminated surface water	Overland runoff and infiltration to groundwater resulting in contamination of soils and groundwater Overland flow potentially impacting on vegetation health and/or surface water quality.	Localised soils Groundwater <5 mbgl TEC within adjoining Crown Reserves ~50 m south Multiple use wetlands ~ 450 m southwest Bancell Creek ~850 m south	Refer to section 6.1.1	C = Slight L = Rare **Low Risk**	Y	Condition 1	Given the gallium plant infrastructure will be established within an enclosed building with no proposed discharges, operation of the plant is not expected to generate potentially contaminated surface water. Infrastructure controls have been included in the works approval to ensure the plant is housed within an enclosed building with containment bunding as proposed in the application.
	Mixed metal precipitates	Direct discharge to land and infiltration of leachate to groundwater resulting in contamination of localised soils and groundwater.	Localised soils Groundwater <5 mbgl	Refer to section 6.1.1	C = Minor L = Rare **Low Risk**	Y	Condition 1, 8 and **11**	The delegated officer considered the infrastructure the applicant has proposed for containment of the wastes including dedicated recovery tanks and storage bins within the bunded enclosed building and determined there is low risk of the waste materials being discharged into the environment on the premises and causing contamination. Given the hazardous nature of the wastes and containment being the key control which will prevent discharge of the wastes the delegated officer included the applicant's containment measures as construction and operational conditions within the works approval. Noting the wastes are expected to require disposal to a Class III or IV landfill, a requirement for offsite disposal of the wastes to an authorised waste facility as proposed by the applicant, has also been included in the works approval, together with recording of waste volumes and disposal location.
	Calcium sulphate dust	Air / windborne pathway to vegetation causing impact on vegetation health. Air / windborne pathway to land and contamination of surface	Localised soils Groundwater <5 mbgl TEC within adjoining Crown Reserves ~50 m	Refer to section 6.1.1	C = Minor L = Rare **Low Risk**	Y	Condition 1, 8 and **11**	Calcium sulphate wastes will be removed from the premises for disposal. A requirement for offsite disposal of the wastes to an authorised waste facility as proposed by the applicant, has been included in the works approval, together with recording of waste volumes and disposal location to ensure this expectation is met. Given the damp nature of the calcium sulphate precipitate waste and its storage

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions [2] of works approval	Reasoning
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		water runoff	south					within a bunker within the gallium plant building the delegated officer considers it will be suitably contained to prevent dust emissions and direct discharge into the environment. The applicant's infrastructure and controls have therefore been specified in the works approval. The most likely opportunity for discharge into the environment is through minor spillages during loading to trucks for offsite disposal therefore the applicant's recovery controls have also been included as operational requirements in the works approval.
	Calcium sulphate waste/ leachate	Direct discharge to land and infiltration of leachate to groundwater resulting in contamination of localised soils and groundwater.						
Operation of bayer liquor and de-sulphated water transfer pipelines to and from plant	Spent bayer liquor and contaminated wastewater (de-sulphated water)	Direct discharge to land through loss of containment and infiltration to groundwater resulting in contamination of localised soils and groundwater. Overland flow potentially impacting on vegetation health and/or surface water quality.	Localised soils Groundwater <5 mbgl TEC within adjoining Crown Reserves ~50 m south of gallium plant and ~200 m west of pipelines Multiple use wetlands ~ 450 m southwest of gallium plant and ~600 m west of pipelines Bancell Creek ~850 m south	Refer to section 6.1.1	C = Major L = Unlikely **Medium Risk**	Y	Condition 1,8, 9 and 10	The transfer pipelines will be located within the refinery footprint within existing pipe racks which the applicant advised are generally located over concrete slabs. Given this setting, any loss of containment is expected to be largely confined within the refinery footprint. However, in the event of a significant release, material could migrate westward toward vegetation classified as a TEC. Pipeline monitoring is therefore critical to ensure loss of containment events are identified and managed promptly. Accordingly, the works approval includes conditions requiring visual inspections and continuous real-time monitoring of pipeline inflows and outflows, supported by alarm systems, as proposed by the applicant. To ensure the pipelines are fit for purpose and maintain their integrity over time, the delegated officer has also included a requirement that the pipelines are constructed from new materials in accordance with applicable Australian Standards.
Delivery of reagents	Chemicals/ reagents including acids and caustic soda or stormwater contaminated with these	Direct discharge to land through loss of containment and infiltration to groundwater resulting in contamination of localised soils and groundwater. Overland flow potentially impacting on vegetation health and/or surface water quality.	Localised soils Groundwater <5 mbgl TEC within adjoining Crown Reserves ~50 m south Multiple use wetlands ~ 450 m southwest Bancell Creek ~850 m south	Refer to section 6.1.1	C = Moderate L = Rare **Medium Risk**	Y	Condition 1 and 8	The reagent receival area is located at the north of the gallium plant building therefore has increased separation distance to vegetation and surface water receptors. Noting the environmentally hazardous nature of the reagents the delegated officer considers the applicant has proposed suitable containment and monitoring controls for reagent delivery to minimise the risk of discharging reagents to the environment and causing contamination. This includes the receival area being covered with bunding, sumps and recovery systems, recovery of spills and operation of a real-time process monitoring system with sensors, alarms and automated shut-offs to protect against overfill. These requirements have therefore been conditioned as construction and operational requirements within the works approval to maintain an acceptable level of risk. .
Transformer operation	Hydrocarbons	Direct discharge to land through loss of containment and infiltration to groundwater resulting in contamination of localised soils and groundwater.	Localised soils Groundwater <5 mbgl TEC within adjoining Crown Reserves ~50 m south	Refer to section 6.1.1	C = Moderate L = Possible **Medium Risk**	N	Condition 1	The applicant did not specify controls for transformers in the application. Noting that transformers can contain larger quantities of hydrocarbons and the proximity of sensitive receptors (groundwater and TEC) the delegated officer considered it necessary to specify bunding requirements for the transformers to minimise the likelihood of discharges to the environment.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

Note 3: Conditions 3 to 7 and 17 to 21 are all department imposed conditions required for compliance reporting, authorising time limited operation, and general complaint and record keeping requirements

7. Consultation

Table 10 provides a summary of the consultation undertaken by the department.

Table 10: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website and letters sent to stakeholders on 8 January 2026.	The department received 17 submissions related to the application. A summary of the comments received is included in Appendix 1.	Refer to Appendix 1.
Gnaala Karla Booja Aboriginal Corporation (GKB) advised of proposal on 8 January 2026	The department received a submission from GKB on 29 January 2026.	The department has had regard to the comments provided by GKB in its assessment of the application.
Local Government Authority (Shire of Waroona) advised of proposal on 8 January 2026	No comments received.	N/A
Department of Local Government, Industry Regulation and Safety (DLGIRS) advised of proposal 8 January 2026.	DLGIRS replied on 9 January 2026 advising that WorkSafe's Dangerous Goods Officers are actively engaged with the applicant and will ensure that any new equipment and processes are fully assessed.	See section 4.5 of this report.
Department of Energy and Economic Diversification (DEED) advised of proposal 8 January 2026.	DEED provided a response on 28 January 2026 confirming the State agreement covers the applicant's Wagerup facility, however, advises that the gallium operation does not acquire any interest or rights under the State Agreement. It will be solely subject to and regulated by any state and federal based legislation.	See section 4.2 of this report.
Community Alliance for Positive Solutions Inc. (CAPS) advised of proposal 8 January 2026.	A response was received from CAPS on 13 January 2026 and is included as part of the stakeholder comments included in Appendix 1.	Refer to Appendix 1 of this report.
Department of Health – Radiation Council advised of proposal 5 February 2026.	A response was received from DoH on 20 and 25 February 2026, and further information reviewed and comments provided 27 March 2026.	The department has considered the comments provided and has informed sections 3.2.1 and 6 above.
Department of Planning, Lands and Heritage (DPLH) was advised of the proposal and relevant comments received relating to Aboriginal Heritage on 20 March 2026.	A response was received from DPLH on 16 April 2026 acknowledging the information provided.	N/A
Applicant was provided with draft documents on 31 March and 30 April 2026.	A response was received from the applicant on 16 April and 1 May 2026 with comments.	Refer to Appendix 2 of this report.

8. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that the proposal to construct and operate a five train gallium plant at the Wagerup Alumina Refinery does not present an unacceptable risk to the environment or public health. This determination is based on the following.

- The plant will not have any direct impacts on remnant native vegetation due to its location within an existing cleared area of the refinery and intention to retain two remnant Jarrah trees located at the outskirts of the plant area.
- Construction is planned to occur within nominated hours 7am to 7pm Monday to Saturday. If works are planned outside these hours which will potentially exceed the assigned levels a separate Noise Management Plan approval is required under the Noise Regulations.
- Noise modelling indicates that operation of the gallium plant will have no net increase to received noise levels at the Noise Approval reference locations or Hamel subject to the implementation of noise controls specified in the works approval. Noise validation will be undertaken to confirm accuracy of model predictions.
- The gallium plant process and reagent tanks, pipelines, vessels and waste storage will be located within an enclosed building with suitable containment and monitoring infrastructure to prevent discharges to the environment.
- There will be no discharge of additional waste products or pollutants to the environment from the gallium plant. Air emissions are limited to water vapour, oxygen and hydrogen and all waste products will be returned to the refinery process (bayer liquor and wastewater) or disposed at suitably licensed offsite waste facilities.
- Transfers of bayer liquor and wastewater between the refinery and gallium plant will be located within the refinery footprint within existing pipe racks and will be subject to continuous monitoring to ensure if loss of containment occurs it can be promptly managed.

The applicant's proposed controls have been assessed as suitable and effective for managing the identified risks associated with emissions and discharges and have been incorporated as construction and operational requirements within the works approval.

Noise validation requirements have been specified through conditions on the works approval including submission and implementation of a Noise Validation Plan. Implementation of the plan will enable the noise model to be refined based on measured data to ensure it accurately represents real-world conditions and is capable of verifying noise impacts and demonstrating compliance with the Approved Levels. The plan will be reviewed by the department prior to implementation to ensure the validation program is sufficiently robust to accurately update the noise model. Outcomes of the validation program will be submitted to the department in a Noise Validation Report and are expected to inform a future licence amendment application for inclusion of the gallium plant in the refinery operating licence (outside the scope of this assessment).

The delegated officer considered it appropriate to authorise a time limited operations period of sufficient duration for all five gallium trains to commence operation. The extended time limited operations timeframe was based on the applicant's expected timeframes and allows sufficient time for the Noise Validation Plan to be implemented when all trains are in operation reflecting the maximum expected noise impact.

The delegated officer has therefore determined that a works approval will be granted for a period of three years based on expected project timeframe, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements. In undertaking this assessment and forming this view the delegated officer has also given consideration to the legislative and regulatory context for the refinery (section 4).

The applicant is required to submit a licence amendment application for the ongoing operation of the gallium plant beyond the expiry of the works approval. The application should be submitted at least 120 days prior to the works approval expiry to allow sufficient time for the assessment.

References

Alcoa of Australia (Alcoa) 2025, *Wagerup Refinery – Gallium Plant Works Approval Supporting Documentation*, December 2025, Western Australia

Alcoa 2026, *Gallium project factsheet*, Western Australia

Department of Water and Environmental Regulation (DWER) 2019a, *Guideline: Industry Regulation Guide to Licensing*, Perth, Western Australia

DWER 2019b, *Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)*, Perth, Western Australia

DWER 2020a, *Guideline: Risk Assessments*, Perth, Western Australia.

DWER 2020b, *Guideline: Environmental Siting*, Perth, Western Australia.

Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.

DER, 2015, *Identification and Investigation of Acid Sulphate Soils and Acidic Landscapes*, Perth, Western Australia.

Environmental Protection Authority (EPA) 1995, *Increase in alumina production to 3.3 million tonnes per annum at Wagerup alumina refinery, and associated bauxite mining activities*, EPA Bulletin 779, Government of Western Australia, Perth.

EPA 2006, *Wagerup alumina refinery – increase in production to 4.7 million tonnes per annum*, EPA Report No. 1215, Government of Western Australia, Perth.

EPA 2020, *Wagerup alumina refinery – production to a maximum capacity of 4.7 million tonnes per annum: section 46 inquiry assessment report*, EPA Report No. 1691, Government of Western Australia, Perth.

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

PGV, 2025, *Potential Gallium Plant Locations Pinjarra and Wagerup – Flora, Vegetation and Fauna Survey (V3)*, Western Australia

Government of Western Australia (2014). *Environmental Protection (Wagerup Alumina Refinery Noise Emissions) Amendment Approval 2014*. Western Australian Government Gazette, No. 181, 14 November, p. 4275.

Wood, 2026, *Alcoa Gallium Plant Environmental Noise Impact Assessment*, February 2026, Western Australia

Appendix 1: Summary of stakeholder comments

Table 11: Summary of community responses

Summary of comments relating to chemical use and transport, and waste composition, transport and disposal	DWER response
Comments relating to chemical use and transport, and waste composition, transport and disposal relating to the gallium plant included: • There is insufficient information on the composition, chemical nature (including contaminant leaching potential) and concentration of wastes produced by the gallium process to ensure appropriate storage, disposal and assess interactions with existing refinery waste. Without composition data, the department cannot determine whether these wastes constitute "Controlled Waste" under the Controlled Waste Regulations, Waste Acceptance Criteria (WAC) and landfill suitability, nor how they should be managed. • The proposal does not adequately describe waste volumes, leachate, or containment needs, despite introducing high-temperature metallurgical processes with spill and leak risks. • Historic issues with gallium production, including radium contaminated ammonium nitrate, and radioactive waste and dust raise concerns about repeat risks. • Alcoa has not provided documentation from licensed waste facilities confirming capacity or compliance with Controlled Waste Regulations. No contingency plans are outlined if disposal facilities cannot accept the waste. • The final disposal sites are not identified, and their suitability and capacity remain unassessed. The proposal does not explain what happens if no suitable disposal pathway exists. • Waste disposal is to be outsourced to unnamed contractors, with no assessment of leaching risk, containment capacity, or groundwater contamination potential at receiving facilities. • Alcoa is licensed to dispose of alumina production wastes, not gallium production wastes, creating uncertainty over regulatory compliance. • Existing waste issues, including extensive bauxite residue storage at Kwinana, heighten concern about additional poorly-defined waste streams. The plant significantly expands the site's toxic waste footprint, generating ~19,000 t/year of calcium sulphate and ~24 t/year of mixed-metal/vanadium precipitates • The application does not describe required tailings storage facilities resulting from changes in material delivery or processing. • The proposal provides little detail on chemical transport, despite large quantities needing to be delivered to site. • Chemical deliveries could significantly increase truck traffic—potentially doubling current volumes—with associated noise and community impacts that are not acknowledged in the works approval.	The delegated officer acknowledges the concerns regarding chemical use and transport, and waste composition, transport and disposal. Process inputs, outputs and waste products are described in section 3.2.1 and have been considered in this assessment. As detailed in this section and the risk assessment in Table 9 , there will be no on-site disposal of solid waste products from the gallium extraction process and the works approval includes conditions requiring suitable containment of those wastes as well as removal to a licensed disposal facility. No authorisation has been provided to discharge waste products from the gallium plant to the environment. Based on testing to date the applicant expects wastes will be disposed to a class III or IV landfill facility and is undertaking further test work as the project progresses to confirm the appropriate disposal requirements. As per section 2.3, and the regulatory framework for assessment and regulation under Part V of the EP Act, offsite waste disposal is not within the scope of the assessment of this application, which is limited to activities which undertaken within the prescribed premises boundary. Landfill facilities must ensure waste received meets acceptance criteria for the relevant landfill class as defined in Table 5 of the *DWER Landfill Waste Classification and Waste Definitions 1996 (as amended 2019)* and the applicant is required to comply with all other relevant legislative requirements for controlled and radioactive wastes if testing confirms they are classified as such, including but not limited to the Environmental Protection (Controlled Waste) Regulations 2004, Radiation Safety (General) Regulations 1983 (WA), and the *Radiation Safety Act 1975 (WA)*. It is noted that concerns regarding radioactive characteristics may be related to a historical gallium plant proposed at Pinjarra which was intended to process Monazite, a radionuclide bearing ore from nearby mineral sands operations which typically contains up to 12% of thorium by weight. The Wagerup gallium plant has been designed to process bayer liquor which has significantly lower concentration of radioactive elements and accordingly, as outlined in section 3.2.1,

• New chemical reagents may compromise existing circuits already affected by seepage, and the application does not specify which reagents will be used or how they will be neutralised.	is not expected to require regulation as a radioactive substance.
Summary of comments relating to the risk of contamination	**DWER response**
Comments relating to the risk of discharges from the gallium plant causing contamination included: • The application provides inadequate monitoring, missing key contaminants such as gallium, vanadium, PFAS, hydrocarbons, and metals, and does not commit to public reporting. • Groundwater and surface water monitoring do not capture upstream mining impacts or risks associated with authorised waste disposal, despite known seepage issues. Existing monitoring points (e.g., SP12) reflect historical alumina-only risks and do not account for new chemical processes or waste streams. • The application does not prove that containment systems meet required standards or identify critical containment infrastructure as required by the department's guidelines. • The application states that spent liquor and return process water will be returned to the refinery "where possible," but does not explain how these liquids will be managed when this is not possible or when the refinery eventually ceases operations. • The applicant's dismissal of ASS management as 'unwarranted'—without core sampling—ignores the potential for acidic discharges during construction to mobilise existing heavy metal plumes in the groundwater.	The delegated officer acknowledges the respondent's concerns relating to pollution and contamination risk given the classification of the refinery as a contaminated site due to past incidents and practices. Based on the applicant's proposed controls (section 6.1.1), the department's risk assessment (section 6.2) and the associated controls which have been included for construction and operation of the gallium plant, the delegated officer is satisfied that risk of contamination is sufficiently mitigated subject to implementation of those controls. The delegated officer also notes that the applicant is also required to comply with relevant Dangerous Goods legislation in operating the gallium plant.
Summary of comments relating to contaminated sites	**DWER response**
Comments relating to the existing contaminated site classification of the Wagerup Refinery included: • The proposal does not demonstrate alignment with ESD principles. How will Alcoa ensure the proposed gallium plant complies with Ecologically Sustainable Development principles under the EP Act, given the site is classified as "Contaminated – remediation required." • The application does not explain how gallium extraction will interact with existing soil or groundwater contamination, nor how groundwater abstraction for remediation is monitored, reported, or managed. • Stakeholders highlight that there is no requirement to disclose the volume or quality of abstracted groundwater, raising concerns that inadequately monitored remediated water may be recirculated into refinery or gallium operations. • Alcoa has not clarified how it will prevent interactions between contaminated groundwater, seepage pathways, and gallium-related liquid wastes. • Past refinery seepage issues suggest viable pathways for discharge, and the proposal lacks site-specific geochemical modelling needed to confirm whether modified residue leachate can be considered benign.	Gallium plant construction works, will not intersect with any groundwater remediation activities (abstraction) undertaken at the refinery and does not involve significant depth of ground disturbance therefore is not expected to interact with the existing contaminated site at the refinery which is actively managed under the *Contaminated Sites Act 2003* and Contaminated Sites Regulations 2006. Contaminated sites management is beyond the scope of the department's risk-based regulatory framework for assessment and regulation under Part V Division 3 of the EP Act. As detailed in this assessment the gallium plant is a closed loop system with no requirement for discharges to the environment. Accordingly, the works approval does not authorise any waste discharges to the environment. Solid waste products will be removed from the premises for disposal at an appropriately licensed waste facility and liquid waste products will be returned to the refinery for recirculation. To mitigate the risk of contamination from gallium plant operation, in accordance with the risk assessment outcomes (Table 9) the applicant's proposed containment controls (which include process infrastructure housed within an enclosed shed with bunded

	containment and monitoring) have been included as infrastructure and operational requirements in the works approval.
Summary of comments relating to energy consumption	**DWER response**
Comments relating to additional energy consumption due to the addition of the gallium plant to the existing refinery included: • The application provides no information on the expected increase in fossil fuel or natural gas use, energy demand, water consumption, or greenhouse gas emissions associated with gallium production. • Key environmental impacts—energy use, electricity demand, water needs, and emissions—are not assessed, leaving major gaps in understanding the project's footprint. Overall, the proposal fails to evaluate the full environmental risks, particularly those linked to increased energy and resource consumption.	The applicant was requested to provide GHG emission information which is detailed in section 2.3. Additional GHG emissions are predicted to be less than 12,000 tpa. As detailed in this section GHG emissions are excluded from this assessment as they are beyond the current scope of the department's risk-based regulatory framework for assessment and regulation under Part V Division 3 of the EP Act. The gallium plant GHG emissions will be incorporated into the existing Wagerup Refinery Safeguard Mechanism reporting as an ancillary activity in accordance with requirements of the NGER Act.
Summary of comments relating to prescribed premises category for the gallium plant	**DWER response**
Comments relating to the prescribed premises category of the gallium plant included: • The proposal is inaccurately framed as an amendment to Category 46 (bauxite refining), even though gallium refining is a new chemical process that should also fall under Category 31 and potentially Category 5. • The application is materially deficient, as the incorrect categories prevent proper assessment of new chemical inputs, waste streams, and tailings requirements. • Gallium processing is fundamentally different from alumina refining and must be assessed as a new industrial activity, not an extension of existing operations. • The applicant's claim that operations, inputs, outputs, infrastructure, and emissions will not change is contradicted by the introduction of substantial new processes. Because of these inconsistencies and omissions, the proposal requires more accurate categorisation and a more rigorous environmental assessment.	The delegated officer considers that category 46: bauxite refining is appropriate for the gallium plant as it is an additional process within the existing bauxite refining activity undertaken at the refinery (refer to section 2.2 and Figure 1). It is not considered necessary to include additional prescribed premises categories within the works approval as they will not alter the department's assessment of the application as it does not change the emissions and discharges which are considered in the assessment or the controls included in the works approval.
Summary of comments relating to water abstraction	**DWER response**
Comments relating to water abstraction included: • Significant concerns remain regarding Alcoa's lack of assessment of the gallium plant's additional water demand and its potential impacts on local water resources, other users, and the already stressed NJF ecosystem. • The proposal provides no evidence that sufficient water can be secured from Harvey Water without affecting environmental flows or existing allocations. • No details are given on how the 220 ML/year demand will be monitored, mitigated, or balanced with cumulative water use from the refinery. • With no clear demonstration of active groundwater remediation or transparency around abstraction, concerns persist that contaminated groundwater may be inadequately controlled. Overall, the	As per section 4.5, water abstraction is regulated separately under the RIWI Act. While the delegated officers acknowledges concerns raised regarding water abstraction and related impacts, these matters are beyond the scope of the department's risk-based regulatory framework for assessment and regulation of emissions and discharges under Part V Division 3 of the EP Act and are not addressed further.

proposal fails to show responsible water management or safeguards to prevent further strain on a region already facing drought and ecological decline.	
Summary of comments relating to noise and noise modelling	**DWER response**
Comments relating to the methodology for noise impacts and noise modelling included: • Alcoa's claim of "no net increase" in noise is unclear, as its own modelling shows measurable noise increases. The proposal does not specify what measures or noise offsets will be used to ensure compliance with Regulation 17. • Community concerns remain unresolved, including night-time operational noise audible up to 15 km away, despite strict night-time limits. Potential noise impacts on black cockatoos reliant on remnant jarrah trees are not addressed. • The report does not justify why civil preparation is identified as the most significant noise source. Night-time construction requires a Noise Management Plan, but the documentation lacks detail. • Baseline noise monitoring lacks clarity on whether it included seasonal variations or other environmental factors.	The department has reviewed and considered the applicant's noise impact assessment and modelling (section 5) and this has informed the risk assessment outcomes for noise impacts detailed in 6.2. Based on this assessment the delegated officer determined to include requirements for noise verification to ensure noise impacts are accurately quantified and assessed based on the implemented infrastructure and controls. The delegated officer notes that the department is assessing a further Noise Approval under regulation 17 of the Noise Regulations which will further consider the noise impacts of the broader refinery.
Summary of comments relating to risk assessment	**DWER response**
Comments relating to the risk assessment process for the gallium plant included: • It is unclear whether Alcoa has historical evidence or independent audits demonstrating that its proposed controls effectively manage similar risks at other sites. • Commissioning the new high-temperature metallurgical circuit carries a significant risk of spills and leaks, yet the application underestimates these risks by rating them as Low. • Key tables fail to classify high-risk equipment correctly, and pollution-prevention specifications are missing.	The department has conducted its own risk assessment of the application as per its published regulatory framework (*Guideline: Risk assessments*) which is documented in section 6.2. The works approval has been granted with controls considered necessary to ensure as acceptable level of risk is maintained through construction and operation of the gallium plant.
Summary of comments relating to aboriginal heritage	**DWER response**
Comments related to aboriginal heritage at the Wagerup Refinery. • The application lacks evidence of an Aboriginal Heritage Survey and consultation with registered knowledge holders for the WAGERUP 4 site. • Concerns relating to Aboriginal cultural heritage impacts, such as the destruction of sacred sites. • Until a final Aboriginal Cultural Heritage Management Plan is completed, DWER should not issue a Works Approval. Past land use is not adequate justification; the applicant must show current, project-specific compliance to ensure the protection of cultural heritage and Traditional Owner interests.	As per the details in the application, the applicant has engaged with Gnaala Karla Booja Aboriginal Corporation as part of its stakeholder engagement. The applicant advised that an archaeological survey of the gallium plant area was completed in February 2026 and that nature of works within the refinery footprint are not expected to interact with any remnant cultural materials. The applicant has heritage management inductions, procedures and stop-work practices which are implemented to during ground disturbing activities in the event unanticipated Aboriginal cultural heritage materials are encountered. The delegated officer acknowledges concerns raised regarding direct impacts to Aboriginal cultural heritage, and notes these matters are beyond the scope of the department's risk-based regulatory framework for assessment and regulation of emissions

	and discharges under Part V Division 3 of the EP Act. The applicant is required to avoid direct disturbance of Aboriginal heritage sites or isolated artefacts to avoid committing an offence under the *Aboriginal Heritage Act 1972*.
Summary of comments relating to native vegetation clearing	**DWER response**
Comments relating to clearing of native vegetation for the gallium plant included: • The planned removal of 0.04 ha of potential foraging habitat is viewed as part of a larger pattern of clear-felling driven by ongoing mining necessary to supply the refinery.	No native clearing is proposed for construction or operation of the gallium plant. The plant will be established within an existing cleared area at the refinery. There are two remnant jarrah trees at the refinery which the applicant proposes to retain. The department has considered indirect impacts to native vegetation in the risk assessment detailed in section 6.2 and has included conditions in the works approval to appropriately mitigate the risk of impacts to nearby native vegetation.
Summary of comments relating to sources of gallium, bauxite mining and cumulative impacts	**DWER response**
Comments relating to sources of gallium, bauxite mining and cumulative impacts included: • The proposal does not specify the expected lifetime of the gallium project. • It is unclear whether gallium will be sourced only from bauxite mined within the Willowdale boundary, or whether bauxite from other locations will be transported to Wagerup. • Alcoa assumes a continual supply of fresh caustic liquor from ongoing bauxite processing but provides no justification for this assumption. • The application does not state whether the applicant intends to extract gallium from red-mud tailings, raising concerns about potential future expansion of processing activities. • No detailed information is provided on the gallium resource, including its size, reserves, or whether ore sourcing will extend beyond Willowdale or require expanded forest mining. • The application does not identify how much additional bauxite would be required to support gallium production, leaving uncertainties about potential increased forest clearing and related environmental impacts. • The gallium plant proposal is inseparable from the broader impacts of bauxite mining in the jarrah forests, the only jarrah forests in the world and critical habitat for endangered black cockatoos. • Surface water sampling in McKnoes Brook and a tributary shows elevated PFAS (PFOS above NEMP 2020 criteria) and aluminium above ADWG standards. These waterways drain into Sampson Brook, the Harvey River, and the Peel-Harvey Estuary, a Ramsar-listed wetland, making contamination risks highly significant. Comprehensive monitoring of Sampson Brook and the South Drain is requested due to the high risk of contamination to sensitive receptors. • Alcoa should disclose any planned expansion of the Willowdale Mine so cumulative impacts can be properly assessed. • There are concerns that the way Alcoa has submitted this Works Approval application may hinder proper environmental assessment, particularly by obscuring the cumulative impacts of its wider	The delegated officer acknowledges there is a high degree of community concern regarding the sources of gallium for operation of the plant, and broader cumulative impacts associated with the applicant's mining operations. As per section 2.3, the scope of the department's assessment of the application is limited to activities undertaken within the prescribed premises boundary. Mining activities and impacts occurring outside the premises are therefore beyond department's risk-based regulatory framework for assessment and regulation of the premises under Part V Division 3 of the EP Act and are not addressed further in this assessment. As described in this report (sections 2.2 and 3.2) the gallium plant has been designed to recover gallium from existing bayer liquor in the refining. As detailed in section 4.1, the gallium plant does not require any increase to the rate or extent of bauxite mining as gallium will be extracted from spent bayer liquor which already circulates within the refinery. Recovery from other sources, including residue and bauxite ore is not proposed and is not within the scope of the application. Any change to the plant inputs (i.e. additional gallium sources or bayer liquor) will require further authorisation in accordance with requirements of section 53 of the EP Act, therefore would be subject to further assessment subject to an application.

operations across the Northern Jarrah Forest (NJF). • The approach appears to constitute project-slicing, potentially reducing the visibility of broader environmental impacts that are currently under EPA assessment. By separating the gallium plant proposal from its wider mining operations, Alcoa may be bypassing scrutiny of cumulative impacts, including additional clearing and habitat loss in the NJF. • The applicant's assessment of protected species is fundamentally flawed as it ignores the 'indirect consequences' mandate under Section 527E of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). As the refinery expansion is a 'substantial cause' of continued mining operations, the resulting habitat loss for Black Cockatoos in the NJF must be assessed as a direct impact of this application. • Request the department pause or suspend approvals until federal review outcomes are known and cumulative impacts on Matters of National Environmental Significance (MNES) are fully considered • Gallium production is dependent on alumina refining, which relies on bauxite mining in native jarrah forest, yet no resources and reserves statement has been provided to clarify how much ore remains approved for extraction at Willowdale or whether ore will be sourced from Huntly or future mine expansions. • If future mining is restricted or denied, Alcoa has not identified how it would source gallium or whether it would continue extracting it from an unreplenished liquor stream. • The application assumes an ongoing supply of fresh caustic liquor but provides no justification for this assumption. There is no guarantee Alcoa will be permitted to continue large-scale jarrah forest mining; if mining approvals are restricted, the proposal does not explain how gallium would be sourced, nor whether extraction would continue from an unreplenished liquor stream. • Estimates suggest the Wagerup refinery already contains enough gallium in existing liquor streams to supply 10 years of production at 100 tpa, and combined streams from Wagerup, Pinjarra, and Kwinana could provide up to 25 years without further mining. If this is true, we propose gallium extraction be limited to recycling the gallium already in the caustic liquor stream.	
Summary of comments relating to significant environmental impact and assessment under Part IV of the EP Act	**DWER response**
Comments relating to significant environmental impact and EP Act Part IV assessment for the gallium plant included: • The application is considered materially inadequate, preventing a rigorous or proper environmental assessment. • The proposal meets multiple significance thresholds under the EP Act and relevant policies. • It introduces new chemical processing infrastructure, reagents, and waste streams not previously assessed under MS728 or under Part IV of the EP Act. • The project's portrayal as a "closed-loop" system is misleading, as gallium extraction is dependent on upstream bauxite mining at Willowdale, which is currently undergoing a Public Environmental Review due to major environmental impacts.	The scope of the department's assessment of the application was limited to activities which will occur within the prescribed premises boundary and did not identify the gallium plant as likely to have any significant effect on the environment. As per the department's risk assessment detailed in 6.2, emissions and discharges associated with construction and operation of the gallium plant have been assessed as having a low to medium risk of impacting environmental and public receptors. Based on the assessment outcomes, conditions have been applied in the works approval to ensure implantation of the project aligns with the assessed risk. The delegated officer gave consideration to existing approvals and

• The proposal's feedstock dependency and chemical complexity indicate it is a significant proposal, impacting MNES. • The Part V Works Approval process is not suitable for assessing the full bauxite-to-gallium value chain or its long-term indirect environmental impacts. • By creating 20 years of new infrastructure lock-in, the proposal contributes to cumulative impacts on the Northern Jarrah Forest that cannot be evaluated within a Works Approval. • Approving the gallium refinery before EPA assessments of the Willowdale and potentially Huntly mining operations would be improper, as ore supply dependencies remain unresolved. • Due to the risks of waste generation, contamination, and cumulative forest impacts, the proposal is likely to have a significant environmental effect. • Given the proposal's scale, complexity, and environmental significance, a standard Works Approval is insufficient to assess the full scope of risks. • The proposal introduces new processes, chemicals, infrastructure, and waste streams, meaning a standalone Works Approval is not adequate for proper environmental assessment. • The department has a statutory obligation to refer the proposal to the EPA under s38(4) or s38(5) of the EP Act for full environmental assessment to ensure comprehensive evaluation of cumulative impacts. • Clause 18(a) of the Alumina Refinery (Wagerup) Agreement Act permits Alcoa to recover by-products such as gallium, but this is only an authorisation in principle, not an environmental approval. This clause does not approve the specific processes, scale, infrastructure, chemicals, or waste streams proposed in the works approval. • The proposal is presented as a simple extension of existing alumina refining, but it actually introduces new chemical processing infrastructure and waste outputs not assessed under Ministerial Statement 728. • The key issue is not whether gallium extraction is technically feasible, but that the project has not undergone the required comprehensive assessment under the EP Act, and therefore must be further assessed.	assessment processes under Part IV of the EP Act in assessing the application as detailed in section 4.1 finding the application is not inconsistent with the assessed proposal or the conditions of MS728 or within the scope of the EPA's assessment of mining activities.
Summary of other comments	**DWER response**
• Geopolitical impacts, such as being classified by the US Department of War as a 'domestic source' for their weapons supply chain. • The current process provides no avenue to raise these concerns in detail, or to request that the Gallium Project be assessed for these risks in detail. • The applicant's history raises doubts about its reliability and trustworthiness in preventing environmental harm. • There are concerns that Alcoa's compressed project timeline could pressure regulators to fast-track approvals, compromising environmental scrutiny. • Stakeholder consultation from the applicant is not broad enough to capture all parties and persons	The delegated officer acknowledges other matters were raised in submissions. The works approval is limited to authorising the construction and time-limited operation of the gallium plant only. Matters raised outside this are beyond the scope of the department's risk-based regulatory framework for assessment and regulation of the premises under Part V Division 3 of the EP Act and are therefore not addressed further in this assessment. Access to reports and data submitted by the applicant may be requested under the *Freedom of Information Act 1992* .

who are directly affected by the proposal. • Industry standards are shifting toward public disclosure of environmental monitoring data. It is requested that historical, current, and future monitoring data for Alcoa's operations be made publicly available to allow full assessment of risks to sensitive receptors. Transparency expectation and public access to monitoring results is essential for maintaining community trust and enabling independent verification.	

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
Comments provided by the works approval holder on 16 April 2026		
Figure 2	An updated general layout of the gallium plant infrastructure was provided.	Figure 2 updated in the works approval.
Works approval: Condition 1, Table 1; Condition 9, Table 2, Condition 12, Table 4, Figure 2 Decision Document: Figure 3, Section 3.1, Section 3.2, Table 1, Table 2, Table 3, Table 7 and Table 9	Provided details of a process change in the purification step which will result in vanadium precipitated from the process liquor being returned to the refinery as a calcium vanadate slurry via the bayer liquor circuit rather than being precipitated and collected as a solid waste for disposal. Requested updates to the works approval conditions and decision report to reflect this process change. Provided details and clarifications of additional or altered infrastructure items which will be part of the gallium plant, further details on the electrowinning circuit and calcium sulphate storage bunker and pipeline construction standards. Clarified that the plant will be housed within a single building. Requested updates to the works approval conditions to reflect the changes and clarification provided.	The delegated officer noted the process change does not introduce additional emissions and reduces waste streams for offsite disposal therefore does not alter the risk assessment. Figure 3 and relevant conditions in the works approval and sections in the decision report were updated accordingly. The delegated officer noted that the small volume of calcium vanadate solution (0.05m^3/hr) is less than 0.5% of the spent liquor return flow therefore is not expected to change the nature of the liquor returned to the refinery. Requested updates to infrastructure requirements in the works approval and details in the decision report (conditions and sections as noted) were also made as they did not result in any change to the assessed emissions and discharges.
Works approval: Condition 1, Table 1, Item 8 and item 12 Decision report: Section 5.3, Table 7	Confirmed details for the cooling plant infrastructure and noise mitigation. Chillers will be housed within original equipment manufacturer supplied enclosures, designed to mitigate noise and clarified cooling water pumps are not proposed to be established in a shed or enclosure. The cooling plant design includes three cooling towers, cooling water pumps and chiller units which differs to the model scenario provided in the application which included two of each item. Requested the works approval include authorisation for three of each cooling plant item with a condition requiring a revised noise impact assessment be submitted prior to time limited operation which demonstrates no net increase to the refinery noise emissions and implementation of any additional noise offset measures identified in the assessment prior to commencing time limited operation. Requested removal of specified SWL for the cooling plant and the tray seed pump noise enclosure reduction in Table 1 (items 8 and 12) on the basis that specific SWL of individual infrastructure items are ultimately irrelevant provided the operation of the gallium plant results in no net increase in noise emissions from the refinery which will be quantified through the noise validation condition requirements. Prescribing individual SWL could result in a scenario where no net increase	While three cooling towers, cooling water pumps and chiller units are planned for construction, the noise assessment which was assessed included only two of each cooling plant item. Accordingly, "no net increase" in noise levels has only been demonstrated as achievable through modelling based on two of each cooling plant item. The applicant did not provide justification for the omission of the additional cooling plant items from the modelling or evidence to demonstrate inclusion of additional cooling plant infrastructure will not alter modelled noise impacts. On the basis that the cooling plant is external and may be dominant given predicted SWL, and the applicant has not demonstrated that operation of the gallium plant with three cooling towers, cooling water pumps and chiller units is able to achieve 'no net increase' in noise levels, the works approval only includes authorisation for establishment of two of each cooling plant item. The proposed approach of including conditions requiring submission of further modelling, potentially requiring offsets depending on model conclusions is not supported as it requires authorising additional noise sources which could alter the risk assessment without a formal assessment process. It is open to the applicant to apply for a works

	in noise emissions can be demonstrated however and compliance with condition 12(d) met yet the infrastructure is deemed non-compliant with Condition 1 due to the infrastructure exceeding the SWL.	approval amendment at a future date supported by an updated noise assessment for operation of the gallium plant with the additional infrastructure. The delegated officer considered it appropriate to remove the SWL requirements applicable to the tray seed pump noise enclosures, chiller units and cooling towers on the basis that onus remains on the applicant to ensure the installed infrastructure does not increase noise levels from the refinery and a comprehensive noise validation program has been conditioned in the works approval.
Condition 2	Requested removal of the condition requiring establishment of 10-metre tree protection zones as the requirement cannot be achieved around both trees due to the proximity of existing and planned infrastructure. Additionally, clearing of native vegetation is sufficiently regulated under Part V, Division 2 of the EP Act and does not require duplication through conditions in the works approval. Advised of commitment to retaining the two remnant jarrah trees in proximity to the plant and will install temporary construction fencing around both trees for the duration of construction activities.	The condition has been removed on the basis that the applicant intends to retain the trees, establish construction fencing around them and seek further approval under Part V, Division 2 of the EP Act if a need to clear the trees arises. The works approval does not include any specific authorisation for clearing of the remnant trees.
Condition 4	Requested changes to condition 4 to enable submission of individual environmental compliance reports following the construction of each train due to the staged nature of the works.	Noting the staged nature of the works, the delegated officer amended the condition to enable submission of individual environmental compliance reports for each train.
Comments provided by the works approval holder on 1 May 2026		
Works Approval: Condition 1, Table 1 Decision document: Section 6.1.1, Table 7	Gallium plant building - Requested addition of 'northern' to line 2 requirement (b) to account for the location of reagent delivery access roller doorways on the northern face of the gallium plant building with associated update to the description of this noise control measure in the decision report. Common process and reagent tanks - Provided clarification that spills within the caustic soda and caustic water storage tank bund will be transferred to the return water transfer tank and spills within the 98% sulfuric acid storage tank bund will be transferred to the primary acid neutralisation tank. Requested changes to line 4 requirements(d)(iv) and (e)(iv) to reflect this. Reagent receival area - Provided clarification that the reagent receival area is external to the gallium plant building and will comprise a roofed structure over top of the bunded delivery area to minimise rain ingress. Requested removal of line 5 requirement (a) and update to the description of the control measure in the decision report to reflect the design.	Requested updates to infrastructure requirements in the works approval and details in the decision report (conditions and sections as noted) were made as they did not result in any change to the assessed emissions and discharges.