Permit

Environmental Protection Act 1994

Environmental Authority

A transitional environmental program (TEP) relates to this environmental authority and is currently in force until 31 December 2027. The holder of this environmental authority is also the holder of the TEP. A copy of the TEP, titled 'Transitional Environmental Program, Document Reference MAN-E-101142209 dated 17 August 2026' can be obtained from the Department of the Environment, Tourism, Science and Innovation, PO Box 5065 GLADSTONE QLD 4680. In accordance with section 349 of the Environmental Protection Act 1994 (the Act), the holder of an approval for a TEP must achieve full compliance with the Act for the matters dealt with by the TEP at the end of the period over which the TEP is carried out. It is an offence to contravene a requirement of the TEP or a condition of the TEP approval.

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EPPR00494413

Environmental authority takes effect on 19 March 2026.

Environmental authority holder(s)

Name(s)	Registered address
Queensland Alumina Limited	Parsons Point GLADSTONE QLD 4680

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
ERA 07 - Chemical manufacturing 6(d) - Manufacturing, in a year, the following quantities of inorganic chemicals, other than inorganic chemicals to which items 1 to 4 apply - more than 100,000t	Lot 2/RP615744, Lot 4/SP203074
ERA 08 - Chemical Storage 5 - storing 200 cubic metres or more of chemicals that are liquids, other than chemicals mentioned in items 1 to 3, under subsection (1)(d)	Lot 3/CTN2051, Lot 38/CTN1559, Lot 4/SP203074, Lot 57/CTN1559
ERA 08 - Chemical Storage 4 - storing 200t or more of chemicals that are solids or gases, other than chemicals mentioned in items 1 to 3, under subsection (1)(d)	Lot 3/CTN2051, Lot 38/CTN1559, Lot 4/SP144771, Lot 4/SP203074, Lot 57/CTN1559
ERA 08 - Chemical Storage 3 - Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	Lot 3/CTN2051, Lot 38/CTN1559, Lot 4/SP144771, Lot 4/SP203074, Lot 57/CTN1559
ERA 14 - Electricity generation 2(a) - Generating electricity by using a fuel, other than gas, at a rated capacity of 10MW electrical to 150MW electrical	Lot 4/SP203074
ERA 15 - Fuel burning Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour	Lot 2/RP615744, Lot 4/SP203074
ERA 16 - Extraction and Screening 2(c) - Extracting, other than by dredging, in a year, the following quantity of material - more than 1,000,000t	Lot 21/CTN1199, Lot 38/CTN1559, Lot 4/SP203074, Lot 42/CTN1904, Lot 5/SP144771, Lot 57/CTN1559

Environmentally relevant activity/activities	Location(s)
ERA 16 - Extraction and Screening 1(a) - Dredging, in a year, the following quantity of material - 1000t to 10,000t	Lot 57/CTN1559
ERA 31 - Mineral processing 2(b) - Processing, in a year, the following quantities of mineral products, other than coke - more than 100,000t	Lot 2/RP615744, Lot 234/CP903849, Lot 4/SP203074, Lot 81/SP253018
ERA 33 - Crushing, milling, grinding or screening Crushing, grinding, milling or screening more than 5000t of material in a year	Lot 234/CP903849, Lot 321/CNT1652, Lot 38/CTN1559, Lot 4/SP203074, Lot 42/CTN1904, Lot 5/SP144771, Lot 57/CTN1559
ERA 38 - Surface coating 2 - Coating, painting or powder coating, using, in a year, more than 100t of surface coating materials	Lot 4/SP203074
ERA 47 - Timber milling and wood chipping (a) - Milling, in a year, the following total quantity of timber - 5000t to 10,000t	Lot 234/CP903849, Lot 38/CTN1559, Lot 42/CTN1904, Lot 5/SP144771, Lot 57/CTN1559
ERA 50 - Mineral and bulk material handling 1(a) - Loading or unloading 100t or more of minerals in a day, other than loading or unloading mentioned in item 3, or storing 50,000t or more of minerals - within 5km of the highest astronomical tide or 1km of a watercourse	Lot 194/CTN1105, Lot 2/RP613635, Lot 3/CTN2051, Lot 321/CNT1652, Lot 4/SP203074, Lot 52/CTN1105, Lot 76/CTN2051, Lot 78/CTN1295
ERA 50 - Mineral and bulk material handling 2 - Loading or unloading 100t or more of bulk materials in a day, other than loading or unloading mentioned in item 3, or storing bulk materials	Lot 194/CTN1105, Lot 2/RP613635, Lot 3/CTN2051, Lot 321/CNT1652, Lot 4/SP203074, Lot 52/CTN1105, Lot 76/CTN2051, Lot 78/CTN1295
ERA 60 - Waste disposal 1(d) - Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a) - more than 200,000t	Lot 10/CL40376, Lot 188/CL4083, Lot 21/CTN1199, Lot 234/CP903849, Lot 275/CL40102, Lot 320/CTN1607, Lot 348/CTN1664, Lot 38/CTN1559, Lot 4/SP203074, Lot 42/CTN1852, Lot 42/CTN1904, Lot 5/SP144771, Lot 57/CTN1559
ERA 62 - Resource recovery and transfer facility operation 1(d) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 1 regulated waste	Lot 234/CP903849, Lot 3/CTN2051
ERA 62 - Resource recovery and transfer facility operation 1(c) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	Lot 234/CP903849, Lot 3/CTN2051
ERA 62 - Resource recovery and transfer facility operation 1(b) - Operating a facility for receiving and sorting, dismantling, baling or temporarily storing general waste	Lot 234/CP903849
ERA 63 - Sewage Treatment 1(c) - Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 1500 but not more than 4000EP	Lot 3/CTN2051, Lot 4/SP203074, Lot 5/SP144771, Lot 57/CTN1559

Additional information for applicants

Environmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of land give written notice to the administering authority if they become aware of the following:

- the presence of, or happening of an event involving, a hazardous contaminant on the land that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours); or
- if the land is contaminated land – a change in the condition of the land that is causing, or is reasonably likely to cause, serious or material environmental harm (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the land (notice must be given within 20 business days).

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term ‘duty to notify’.

Take effect

Please note that, in accordance with section 200(1) of the EP Act, an EA has effect:

(a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority—on the nominated day; or

(b) if the authority states a day or an event for it to take effect—on the stated day or when the stated event happens; or

(c) otherwise—on the day the authority is issued.

However, in accordance with section 200(2) of the EP Act, the day that the EA takes effect may not be before:

(a) if the authority is for a resource activity—the day the relevant tenure is granted to the applicant; or

(b) if a development permit for a material change of use of premises under the *Planning Act 2016* is necessary for carrying out an activity that related to the authority—the day the development permit takes effect; or

(c) if an SDA Approval under the *State Development and Public Works Organisation Act 1971* is necessary for carrying out an activity that relates to the authority—the day the approval takes effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

The anniversary day of this EA is the same day each year as the effective date. The payment of the annual fee will be due each year on this day.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid EA.

	19 March 2026
Signature	Date

Sara Staunton

Department of the Environment, Tourism, Science and Innovation
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:

Minerals Business Centre
PO Box 7230, Cairns QLD 4870
Phone: (07) 4222 5352
Email: ESCairns@detsi.qld.gov.au

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this EA, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to restore the environment (section 319C)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443).

Other permits required

This permit only provides an approval under the EP Act. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department, and other State and Federal Government agencies prior to commencing any activity at the site. For example, this may include permits or approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access State controlled roads), the Department of Natural Resources and Mines, Manufacturing, and Regional and Rural Development (to clear vegetation), and the Department of Primary Industries (to clear marine plants or to obtain a quarry material allocation).

Obligations under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Matters of national environmental significance (MNES) are regulated under the Commonwealth EPBC Act rather than under state legislation. You may need to submit a referral if your project potentially impacts any matters protected under the EPBC Act. For more information on self-assessments, and referral and assessment processes, please visit the Australian Government Department of Climate Change, Energy, the Environment and Water's website at www.dcceew.gov.au/environment/epbc/advice.

Obligations under the *Mining and Quarrying Safety and Health Act 1999*

If you are operating a quarry, other than a sand and gravel quarry where there is no crushing capability, you will be required to comply with the *Mining and Quarrying Safety and Health Act 1999*. For more information on your obligations under this legislation, visit Resources Safety and Health Queensland's website at www.rshq.qld.gov.au, or call 13 QGOV (13 74 68) or your local Mines Inspectorate Office.

Development approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this EA are separate, and in addition to, any conditions that may be on the development approval. If a copy of this EA is attached to a development approval, it is for information only and may not be current. Please contact the Department of the Environment, Tourism, Science and Innovation to ensure that you have the most current version of the EA relating to this site.

Obligations under the *Aboriginal Cultural Heritage Act 2003* and *Torres Strait Islander Cultural Heritage Act 2003* (the Cultural Heritage Acts)

The Cultural Heritage Acts require anyone who carries out a land-use activity to exercise a duty of care. This 'duty of care' means land users must take all reasonable and practicable measures to ensure their activity does not harm Aboriginal or Torres Strait Islander cultural heritage, and applies to any activity where Aboriginal or Torres Strait Islander cultural heritage is located. For more information on your obligations under this legislation, please visit the Department of Women, Aboriginal and Torres Strait Islander Partnerships and Multiculturalism webpage at, www.dwatsipm.qld.gov.au.

Conditions of environmental authority

The environmentally relevant activities conducted at the locations described above must be conducted in accordance with the following site-specific conditions of approval.

This environmental authority consists of the following:

- Schedule G – General
- Schedule N – Acoustic
- Schedule A – Air
- Schedule L – Land
- Schedule W – Water
- Definitions
- Appendices

Schedule G – General

G1 All reasonable and practicable measures must be taken to minimise the likelihood of environmental harm being caused.

G2 All information and records required by the conditions of this environmental authority must be kept for a period of at least five (5) years and provided to the **administering authority** in the specified format upon request.

G3 An Environmental Management System (EMS) that includes all the requirements of and conforms to AS/NZS ISO 14001:2004 (Environmental Management Systems - requirements with guidance for use) or more recent versions must be implemented.

G4 The **administering authority** must be notified by telephone as soon as practicable, but within twelve (12) hours of becoming aware of any emergency, event or incident which:

(a) results in the release of contaminants not in accordance with, or reasonably expected to be not in accordance with, the conditions of this environmental authority; and

(b) has the potential to cause material or serious environmental harm.
Note: The Pollution Hotline is the most appropriate after-hours contact.

G5 All other breaches not in accordance with or reasonably expected not to be in accordance with the conditions of this environmental authority must be reported to the **administering authority** within twenty-four (24) hours or the next business day.

G6 A monthly compliance report outlining the following must be submitted to the **administering authority** within twenty (20) business days of the end of each month:

(a) the date and time of initial notifications reported to the **administering authority** as required by (G4) and (G5);

(b) complaint information as required by conditions (G15) and (N2) received in the month;

(c) visible dust events report as required by condition (A12) and (A13); and

(d) a summary of the month's non-compliances with the environmental authority including written advice detailing the below information regarding any notification in accordance with condition (G4) and (G5):

i. the name of the holder of the environmental authority and the environmental authority number;

ii. the name and telephone number of a designated contact person;

iii. the location of the release/event;

iv. the time and date of the release/event;

v. the time the holder became aware of the release/event;

vi. the suspected cause of the release/event;

vii. details of the approximate quantity of substance released;

viii. details of the area/location impacted by the release/event;

ix. a description of the resulting effects of the release/event;

x. the results of any sampling performed in relation to the release/event;

xi. actions taken to mitigate any environmental harm (including **environmental nuisance**) caused by the release/event; and

xii. proposed actions to prevent a recurrence of the release/event.

G7 All instruments, equipment and measuring devices used for measuring or monitoring must be calibrated, operated and maintained in accordance with the manufacturer's specifications and/or reference method requirements and/or **NATA** requirements.

G8 All Continuous Environmental Monitoring Systems required by this environmental authority must have an instrument availability of at least 80% except for the continuous monitoring of release points in Schedule 2, Table 2 (Required release point determinations) which must have an instrument availability of at least 90%.

G9 All analysis and tests required under this environmental authority must be carried out by a laboratory that has **NATA certification** for such analysis and tests. The only exception to this condition is for the in-situ monitoring of:

(a) physicochemical parameters in **waters**, sediment and soil samples for pH, temperature, turbidity, electrical conductivity, dissolved oxygen, and volumetric flow;

(b) wind speed, wind direction, rainfall, air temperature and relative humidity;

(c) gas velocity, volumetric flow rates, temperature and moisture content in stacks; and

(d) noise level descriptors such as LA10, LA90, LAeq, LAmax, LCpeak and 1/3rd octave frequency; and

(e) event-based Direct Toxicity Assessment required under conditions W8 and W9.

G10 Records and raw data relating to the accuracy, precision, and reliability of the results of monitoring required by this environmental authority must be kept. This includes, but is not limited to:

(a) records taken in the field during sampling;

(b) chain of custody documentation for samples taken;

(c) calibration records;

(d) raw data; and

(e) laboratory analysis reports.

G11 An Emergency Incident Response Plan must be implemented that complies with ISO14001. The Emergency Incident Response Plan must be reviewed within three (3) months of completion of the Emissions Verification Study required by condition (A10) and (A11) to incorporate any change (new or increased) in hazards identified through the study

G12 The holder must maintain a capability of reporting to the **administering authority** within three hours of any air emission incident that has the potential for, adverse impacts beyond the **site** boundary. The report must detail the source, potential path and the approximate dispersion concentration for contaminants within the plume that present a risk of material environmental harm and be made available to the **administering authority** and other emergency services agencies.

G13 The holder must:

(a) Obtain from a suitably qualified third party auditor a report on compliance with the conditions of this environmental authority on or before 30 August 2016, and every three (3) years thereafter;

(b) provide each report to the **administering authority** within twenty-eight (28) business days of its completion; and

(c) accompany each report with a statutory declaration from the auditor, stating that the report accurately represents the findings of the auditor and that the report has been prepared independently of the holder and is the independently held opinion of the auditor.

G14 The scale of the alumina refinery and associated **environmentally relevant activities** authorised under this environmental authority is the scale indicated in the application information titled “2013 QAL Major Amendment Application” and the intensity of use for the **environmentally relevant activities** is for the production of not more than 4.5 million tonnes of alumina per calendar year.

G15 The holder must record the following details for all complaints received and provide this information to the **administering authority** with each month's compliance report:

(a) time, date, name and contact details of the complainant (name when authorised by the complainant);

(b) reasons for the complaint;

(c) response and any investigations undertaken;

(d) conclusions formed;

(e) grounds for forming the conclusions; and

(f) any actions taken as a result of the complaint

G16 When requested by the **administering authority**, monitoring must be undertaken by an **appropriately qualified person(s)** to investigate any complaint of alleged **environmental nuisance** caused by a release from the **site** at any **sensitive receptor**. The request may outline:

(a) When the monitoring must be commenced;

(b) The duration of the monitoring;

(c) The methods and relevant standard to be complied with;

(d) Any evaluation, inspection and review of potential dust, particulate matter, odour or other noxious/ offensive emission sources and associated pollution control systems;

(e) Any review and interpretation of monitoring results;

(f) Any modelling required; and

(g) The date, the results and analysis is to be submitted to the **administering authority**

G17 Irrespective of any release limits in this environmental authority, the holder must not cause **environmental nuisance**.

Note: In the first instance the matter will be responded to via the QAL complaint procedure and managed via the QAL Environment Management System.

G18 By 31 December 2026 an Asset Management System (AMS) that includes all the requirements of and conforms to AS/NZS ISO55001:2014 (Asset management - Management systems - Requirements) or more recent versions must be prepared and implemented.

G19 The AMS required by condition G18 must be reviewed and certified as conforming with ISO 55001 by an appropriately qualified person:

(a) who is independent of the EA holder and any shareholder of the EA holder; and

(b) with demonstrated skills and experience in alumina refinery operations, ISO 14001 Environmental Management System and ISO 9001:2015 Quality Management System; and

(c) who is a practicing professional engineer, or

(d) as agreed with the administering authority.

G20 The AMS required by condition G18 must cover the entire lifecycle of assets associated with plant and equipment, including, but not limited to the assets used in the carrying out of environmentally relevant activities under this Environmental Authority which involve either:

(a) handling of hazardous chemicals; and/or

(b) the application of high temperature and pressure.

G21 On or before 31 December 2026 and at least every 3 years thereafter, the holder must ensure that the AMS required by G18 will be independently reviewed by an appropriately qualified person in accordance with G19. A copy of the certification report and the accompanying statutory declaration will be provided to the administering authority within 28 days of the completion of the review by the qualified person.

G22 The Strategic Asset Management Plan (SAMP) must be amended within 30 days of each review as required to ensure compliance with the conditions of the EA.

Schedule N – Acoustic

N1 Noise levels must comply with Table 8 (Attended noise measurement locations and limits) and the associated requirements.

Associated requirements:

1. Monitoring must be undertaken annually in winter by an **appropriately qualified person(s)** at all attended noise monitoring locations in Table 8 (Attended noise measurement locations and limits) and as referenced in Schedule 1 Figure 7 (Attended noise monitoring locations).
2. The method of measurement and reporting of noise levels must comply with the latest edition of the **administering authority**'s Noise Measurement Manual.

N2 All noise complaints of **environmental nuisance** must be reported to the

administering authority in the monthly compliance report as required by condition (G6). The report must include all requirements of condition (G15) and the continuous monitoring records as well as other relevant noise monitoring records taken at the time of the complaint.

N3 Noise must be continuously monitored at the locations and comply with the associated requirements as specified in Table 9 (Continuous noise measurement location).

Associated requirements include:

(a) instrumentation that is on-line, real-time, contain noise source detection (audio) and be able to be recorded;

(b) the noise level measured is LAeq,adj,15 mins; and

(c) the method of measurement and reporting of noise levels must comply with the latest edition of the **administering authority**'s Noise Measurement Manual.

N4 Monitoring must be undertaken by an **appropriately qualified person(s)** during blasting activities and blasting must not exceed the following when monitored at the nearest dwelling:

(a) the air blast overpressure must not exceed more than 115dB Z Peak for 4 out of any 5 consecutive blasts;

(b) the air blast overpressure must not exceed more than 120dB Z Peak from any single blast; and

(c) the ground vibration is:

i. for vibrations of more than 35Hz—more than 25mm a second ground vibration, peak particle velocity; or

ii. for vibrations of no more than 35Hz—more than 10mm a second ground vibration, peak particle velocity.

N5 Blasting must not occur on Sundays and public holidays. Blasting can only occur during the hours of 8:00am to 5:00pm Monday to Friday and 9:00am to 3:00pm on Saturdays.

Table 8 Attended noise measurement locations and limits

Attended noise monitoring locations	**Attended noise monitoring locations** (Eastings and Northings)	**Noise Limits**	
		Daytime 7am – 6pm (same day)	Evening and Night- time 6pm – 7am (next day)
		Noise level measured $L_{Aeq,adj,15\ mins}$	
N1	N - 7360649.585, E - 324397.467	55 dB(A)	50 dB(A)
N2	N - 7360132.124, E - 324070.421	55 dB(A)	50 dB(A)
N3	N - 7359328.387, E - 323842.531	55 dB(A)	50 dB(A)
N4	N - 7357979.739, E - 324307.369	55 dB(A)	50 dB(A)

Table 9 Continuous noise measurement location

Location descriptor	**Noise measured at a set location** (Eastings and Northings)
Barney Point (Scout Hall)	N - 7360394.091 E - 324213.872

Schedule A – Air

A1 A weather monitoring station must be maintained which measures and records the following meteorological parameters:

(a) air temperature;

(b) relative humidity;

(c) wind direction;

(d) wind speed; and

(e) rainfall.

A2 Contaminants must only be released to the atmosphere from the release points identified in Schedule 2, Table 1 (Contaminant release limits to air).

A3 Dilution air must not be added after the exit of the Induced Draft Fan on Boilers 1, 2, 3, 4, 5, 6, 7, Calciners 1, 2, 3 and Lurgi Calciner and after the exit of the Furnace on Package Boilers 1, 2, 3.
Note: The intent of this condition is to a**void** addition of dilution air to meet emission concentration limits.

A4 Contaminants must not be released to the atmosphere at a concentration calculated over the averaging period, as measured at a monitoring point, in excess of that stated in Schedule 2, Table 1 (Contaminant release limits to air).

A5 Contaminants must be monitored at the **minimum** frequency specified in Schedule 2, Table 2 (Required release point determinations).

A6 Monitoring of any releases to the atmosphere required by a condition of this environmental authority must be carried out in accordance with the following requirements:

(a) monitoring provisions for the release points listed in Schedule 2, Table 1 (Contaminant release limits to air) must comply with the Australian Standard AS 4323.1 - 1995 'Stationary source emissions Method 1: Selection of sampling positions' (or more recent editions);

(b) all determinations of contaminant releases to the atmosphere must be made by an **appropriately qualified person(s)** and in accordance with methods prescribed in the most recent version of the **administering authority**'s Air Quality Sampling Manual or other method stated in Table 3 (Contaminant determination methods);

(c) samples must be taken when emissions are expected to be representative of actual operating conditions for the sample frequency period;

(d) during the sampling period, the following additional information must be gathered:

i. emission source related production rates at the time of sampling and detailed commentary on the stability of the related process leading up to (at least twenty – four (24) hours) and during the time of sampling; and

ii. any other factors that may influence air emissions (e.g. changes to operating conditions).

(e) the following **minimum** test must be performed for each required determination specified in Schedule 2, Table 1 (Contaminant release limits to air):

i. gas velocity and volume flow rate;

ii. temperature; and

iii. water vapour concentration.

A7 A maintenance program must be developed that provides an inventory of what air pollution control equipment needs to be maintained, identifies the standard and frequency to which it will be maintained and keeps a history of the maintenance performed.

A8 Where pollution control systems are installed to treat exhaust gases, dust and vapours:

(a) they must be maintained and operated in accordance with the manufacturer's operating instructions and manufacturer's specifications; and

(b) for fabric filter dust collectors, replacement bags must be available and the collectors must, at all times:

i. be fitted with a device (e.g. differential pressure sensor) installed across the boundary of the active filter bags to detect filter medium breakthrough; and

ii. have a monitoring system including an alarm, installed and operating to alert of filter medium breakthrough.

A9 Where monitoring of air pollution control equipment indicates impeded operational performance of pollution control equipment, standby systems must operate to ensure continuous operation of the air pollution control system or the plant serviced by the air pollution control systems must be safely shut down as soon as practicable, unless otherwise agreed by the **administering authority**.

A10 All complaints of visible dust events must be notified to the **administering authority** within twenty-four (24) hours or on the next business day.

A11 A report detailing the occurrence of each visible dust event in condition (A12) must be submitted to the **administering authority** in the monthly compliance report with the following information:

(a) time and date of the event;

(b) the dust source;

(c) relevant operations occurring at the time;

(d) nearest sensitive place at the time of the event;

(e) wind speed and direction;

(f) remedial action taken; and

(g) details of any complaints if received.

A12 The holder must, when requested in writing by the **administering authority**, contribute to the undertaking of an ambient air monitoring program in consultation with the **administering authority**.

A13 A dust and/or particulate matter monitoring program that complies with Schedule 2, Table 4 (Dust and/or particulate matter monitoring program) and Schedule 1, Figure 6 (Ambient dust monitoring locations) must be undertaken by an **appropriately qualified person(s)**.

A14 The release of dust and/or particulate matter as a result of the **environmentally relevant activities** to which this environmental authority relates must not exceed the limits stated in Schedule 2, Table 4 (Dust and/or particulate matter monitoring program).

A15 It is not a contravention of condition (A16) if it can be shown that other site(s), not impacted by the **environmentally relevant activities** to which this environmental authority relates, but is representative of background condition, is also in exceedance of these limits.

A16 The burning of flammable substances during firefighting training exercises must only be conducted at times when prevailing wind conditions are least likely to cause an **environmental nuisance** at a nuisance sensitive place.

A17 The **administering authority** must be notified before burning any alternative fuel other than the following:

(a) coal, natural gas, diesel, fuel oil; and

(b) hydrocarbon contaminated coal, recycled oils, greases and degreasers.

Table 3 Contaminant determination methods

Parameter	Test Method
Gas Velocity, Volumetric Flow Rate and Temperature	USEPA Method 2 AS 4323.1
Moisture Content	USEPA Method 4
Oxygen (O_2)	USEPA Method 3A
Carbon Dioxide (CO_2)	USEPA Method 3A
Oxides of Nitrogen (NO, NO_2 and NO_x)	USEPA Method 7E
Particulates (TSP)	AS 4323.2
Total volatile organic compounds (TVOC) as n-propane equivalent	USEPA Method 25A USEPA SW-846 Method 0031
Sulphur Dioxide (SO_2)	USEPA Method 6C USEPA Method 8
Cadmium	USEPA Method 29
Mercury	USEPA Method 29 USEPA Method 30B

Schedule L – Land

L1 There must be no release of contaminants to **land** other than:

(a) spillage of process contaminants that will be contained within the on-site process containment system as identified in Schedule 1, Figure 1 (Process Containment System); and

(b) process residue authorised by condition (L8) to be placed in the **Residue disposal area**s.

L2 All flammable and combustible liquids must be stored and handled in accordance with AS1940 Storage and Handling of Flammable and Combustible Liquids.

L3 Any liquids stored on site must:

(a) be stored in and serviced by a containment system that is impervious to the materials stored;

(b) be controlled in a manner that minimises the risk of any release to **land**; and

(c) in the event of an accidental release to **land**, be promptly removed from the ground and the affected area be remediated (including the removal of impacted soil where necessary) to minimise any residual contamination.

Note: It is recognised that pre-existing contamination listed on the Contaminated Sites Register is being managed under a Contamination Management Plan. This includes annual reporting of groundwater monitoring as per condition (W28) and an on-going maintenance program for concrete slab repairs.

L4 Containment systems must:

(a) have storage capacity sufficient to contain at least 110% of a single storage tank; and

(b) be maintained and have storage capacity sufficient to contain 100% of the largest storage tank plus 10% of the second largest storage tank in multiple storage areas; and

(c) for drum storages be **bund**ed and maintained so that the capacity of the **bund** is sufficient to contain at least 110% of the largest drum stored or 25% of the total volume stored in drums whichever is greater; or

(d) for excess liquor from any storage tank failure that enters the East Contaminants Pond be managed within the East Contaminants, Neutralising and Tidal Pond network consistent with the procedures in the QAL Business Resilience Management Plan.

L5 Acid sulfate soils must be managed in accordance with the Queens**land** Acid Sulfate Soil Technical Manual and Soil Management Guidelines 2002 such that contaminants are not directly or indirectly released, as a result of the **activity**, to any **waters** or the bed and banks of any **waters**.

L6 Subject to the exemption below, as soon as practicable, but no later than six (6) months after completing extraction activities, areas disturbed as a result of extractive and screening activities must be rehabilitated by:

(a) undertaking works to establish a safe, **stable**, non-polluting **land**form similar to that of surrounding undisturbed areas (or other use as agreed with the **land**owner), including where relevant;

(b) removing any stockpiles;

(c) re-establishing surface drainage lines;

(d) minimising the potential for slumping, subsidence or erosion;

(e) reinstating the **topsoil** if area is going to be revegetated;

(f) respreading any cleared vegetation;

(g) promoting establishment of vegetation of similar species composition and density of cover;

(h) ensuring that the quality of stormwater, water and seepage released from the disturbed areas is such that there is no release of prescribed water contaminants;

(i) ensuring that the water quality of any residual water bodies meets criteria for subsequent uses and does not cause environmental harm; and

(j) removing **infrastructure** from the site.

*Note: Where the areas disturbed as a result of extractive and screening activities are to be included in the future residue management area **dam**, specifically for the placement of residue, the holder must only comply with part (c) and (d) of this condition.*

L7 The **Residue disposal area**s must be wholly located within the control points defined in Table 11 (Location of **Residue disposal area**s) and as shown in Schedule 1, Figure 2 (**Residue disposal area** Location – Ash **Dam**), Schedule 1, Figure 3 (**Residue disposal area** Location – Mineral Waste Disposal Facility), Schedule 1, Figure 4 (**Residue disposal area** Location – Asbestos **Land**fill) and Schedule 1, Figure 5 (**Residue disposal area** Location – Red Mud **Dam**).

L8 The **Residue disposal area**s must comply with the basic details in Schedule 2, Table 12 (Basic Details of Residue Areas).

L9 The **Regulated dam**s must meet the hydraulic performance criteria specified in Schedule 2, Table 13 (Hydraulic Performance of **Regulated dam**s).

L10 The **Residue disposal area**s assessed as **Regulated dam**s must be constructed in accordance with a certified **design plan** that has been submitted to the **administering authority** and such that the resulting **dam** will deliver the performance stated in that submitted **design plan** and that **dam** is compliant in all respects with this environmental authority.

L11 **Construction** and operation, including any modification or lift of the residue areas assessed as **Regulated dam**s, must not be commenced unless:

(a) the holder has submitted to the **administering authority** two (2) copies of a **design plan**, together with the **certification** of a suitably qualified and experienced person that the design of the **Regulated dam**s will deliver the performance stated in that submitted **design plan** and that **dam** is compliant in all respects with this environmental authority; and

(b) at least twenty (20) business days has passed since the receipt of those documents, or the **administering authority** notifies the holder that a **design plan** and **certification** has been submitted for that **dam**.

L12 When **construction**, including any modification or lift of the **Regulated dam**s, is complete, the holder **must submit to the administering authority two (2) copies of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in that submitted design plan and that dam is** compliant in all respects with this environmental authority.

L13 An operational plan must be kept current for the **Residue disposal area**s which are assessed as **Regulated dam**s.

L14 Where an operational plan covers decommissioning and **rehabilitation**, the operational plan must

be consistent with the **design plan** of the **Regulated dam**s and the **rehabilitation** requirements of this environmental authority.

L15 The **administering authority** must be notified as soon as possible, but within 24 hours, of the level in the Red Mud **Dam** reaching the **mandatory reporting level** (MRL).

L16 The **Regulated dam**s must be inspected annually by a suitably qualified and experienced person. At each annual inspection, the condition and adequacy of all components of the **Regulated dam**s must be assessed:

(a) against the most recent hazard assessment report and **design plan**;

(b) against recommendations contained in previous annual inspections reports;

(c) to ensure that the **dam**s can continue to perform their planned functions in a safe and satisfactory manner;

(d) for changes in circumstances potentially leading to a change in hazard category;

(e) for conformance with the conditions of this environmental authority;

(f) for conformance with the 'as constructed' drawings of the certified design plan; and

(g) for the adequacy of the available storage in each **dam**, based on an actual observation or observations taken no more than three months prior to 1 November of each year, of accumulated residue, state of the containment barrier and the level of liquids against the height of **spillway** in the **dam**s.

L17 By the 1st of November each year, a **mandatory reporting level** must be determined and marked on the Red Mud **Dam**.

L18 A final assessment of adequacy of available storage in the Red Mud **Dam** must be based on a **dam** level observed within the month of October each year and result in an estimate of the level in that **dam** as at 1 November each year.

L19 For each annual inspection, a report on the condition and adequacy of the **regulated dam**s, certified by the suitably qualified and experienced person and including any recommended actions to be taken to ensure the integrity of the **regulated dam**s, must be provided to the **administering authority** by 1 December each year.

L20 A Decommissioning Strategy for the **Residue disposal area**s must be documented and submitted to the **administering authority** by 31 August 2020.

L21 The holder must:

(a) review the Decommissioning Strategy every seven (7) years and submit the updated strategy to the administering authority in that year;

(b) decommission the Residue disposal areas in accordance with the Decommissioning Strategy current at the time of decommissioning; and

(c) ensure that upon cessation of operation of the Residue disposal areas, they are maintained so as to avoid environmental harm until that area is decommissioned.

L22 Each **regulated dam** must be decommissioned such that it complies with the **rehabilitation** requirements of this environmental authority and:

(a) becomes a stable landform, that no longer contains flowable substances; and/or

(b) becomes a void authorised by the administering authority to remain after decommissioning; or

(c) the **dams' contents are approved or authorised under relevant legislation for a** beneficial use.

L23 Leachate must not be released to any surface **waters**, the bed or banks of any such **waters** or to any sedimentation pond used for the treatment and/or storage of stormwater runoff from the Ash Pond.

L24 A leachate collection system must:

(a) be installed and maintained to effectively and efficiently collect leachate generated in each operational **land**fill unit;

(b) not result in the release to surface **waters** or any ponds used for the treatment and/or storage of stormwater runoff; and

(c) be developed by an **appropriately qualified person(s)** possessing appropriate qualifications and experience in the field of waste management including hydrogeology and geotechnical engineering to be able to competently make recommendations about these matters.

L25 An Operational Management Plan for the Mineral Waste Disposal Facility must be developed and implemented, which addresses but is not limited to the following:

(a) expected life span of the facility and strategies to optimise volume of waste to facility;

(b) a leachate collection system as required under condition (L24) including operational and maintenance protocols for management of this system;

(c) operational and maintenance protocols for the management of the facility, including operational controls to reduce generation of dust from the facility; and

(d) routine inspections to ensure the facility is operating in accordance with the Operational Management Plan.

L26 All forms of asbestos waste generated by the QAL refinery must be disposed to a designated asbestos **land**fill unit that is separate to other waste disposal areas.

L27 A Final Land Use and Rehabilitation Plan must be developed for Residue Disposal Areas, the sand ponds and historical **land**fills 1, 2, 3 and 4 areas. The plan must be submitted to the **administering authority** by 31 August 2020, and must address at least the following:

(a) decommissioning planning including:

i. disturbance type and disturbance area and land use after operations cease;

ii. proposed acceptance criteria including final surface level and contours, final drainage system, landform geotechnical stability criteria including surface settlement, sustainability of drainage works, susceptibility to erosion processes, leachate production, and surface water contamination;

iii. species of vegetation to be planted for the rehabilitation program taking into consideration the surrounding land use;

iv. receiving and run-off water standards; and

v. **indicators** for success;

(b) the design of a final cover system including thickness and permeability of cover layers and any lateral drainage layers and **infrastructure** systems for stormwater and leachate management;

(c) erosion prevention systems to minimise erosion and to minimise water ponding;

(d) **rehabilitation** trials based on the requirements addressed in L27(a), (b) and (c);

(e) revegetation and stabilisation program to minimise final cover erosion (for the mineral waste disposal facility and historic **land**fills, final cover species root penetration must not occur through to the waste pile);

(f) procedures for maintaining and operating any stormwater management system and leachate collection system;

(g) total waste volumes or tonnage of the residue disposal facility being closed; and

(h) measures and schedule timeframes for:

i. the implementation and maintenance of a final cover system, including effective drainage systems to minimise erosion and water ponding;

ii. monitoring of any leachate, surface water, receiving water and groundwater monitoring system at a frequency sufficient to detect any release of contaminants to water resources;

iii. monitoring of the structural integrity and effectiveness of the final cover system, particularly for erosion and subsidence of the cover system;

iv. an action plan to address knowledge gaps where further information is required to address the above requirements;

v. a stabilisation program including practicable measures for revegetation and or mulching; and

vi. inspection every four (4) years by a suitably qualified and experienced person and the preparation of annual rehabilitation progress reports.

Note: The holder must ensure that the Final Land Use and Rehabilitation Plan includes all relevant and available information. Where specific details required to address a particular requirement of condition L27 are not fully known, the holder must identify all knowledge gaps for the particular requirement and provide an action plan to address the knowledge gaps. The holder must progressively update the plan, in accordance with condition L28(a), as the knowledge gaps are addressed.

L28 The holder must:

(a) submit any amendments to the Final Land Use and Rehabilitation Plan to the administering authority;

(b) 5 years prior to closure of each of the Residue disposal areas, the sand ponds or historic landfills 1,2,3 and 4 areas, ensure that all knowledge gaps identified in the Final Land Use and Rehabilitation Plan in relation to that particular area are addressed in accordance with condition L27.

(c) ensure that all Residue disposal areas, sands ponds and historical landfills 1, 2, 3 and 4 areas are rehabilitated in accordance with the acceptance criteria, referred to in the report provided in condition (L27);

(d) submit an annual rehabilitation progress report to the administering authority once the final land use and rehabilitation plan is implemented at the closure of the each of the Residue disposal areas, the sand ponds and historical landfills 1, 2, 3 and 4 areas. The report should be provided by the 17 January each year, until the environmental authority is surrendered or the administering authority advises that this reporting is no longer required (whichever is the earlier); and

(e) for the purposes of preventing and/or minimising the likelihood of environmental harm being caused as a result of deposition of waste, the holder, following cessation of deposition of waste in a Residue disposal area, conduct post closure management measures identified in the Final Land Use and **Rehabilitation** Plan under condition (L27) for:

i. a period of 30 years; or

ii. such shorter period until it is demonstrated to the administering authority in a competent manner using factually correct information that the Residue disposal area and surrounding site are geotechnically **stable** and that no release of waste materials, leachate, or other contaminants to the environment is likely.

L29 A Waste Management Plan must be developed and implemented which addresses at least the following matters:

(a) the types and amounts of wastes generated;

(b) how the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices mentioned in the waste management hierarchy (Waste Reduction and Recycling Act 2011);

(c) procedures for identifying and implementing opportunities to improve the waste management practices employed;

(d) procedures for auditing waste loads;

(e) how often the performance of the waste management practices will be assessed, at least annually; and

(f) operation and maintenance of a weighbridge facility to enable monitoring and recording of mineral wastes to the mineral waste disposal facility, and other wastes to be handled by the on-site Waste Transfer Facility.

Schedule W – Water

W1 Contaminant(s) must only be released to **waters** at the locations and in accordance with the contaminant release conditions mentioned in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring).

W1a Notwithstanding any other condition of this Environmental Authority, contaminant releases to waters must not cause environmental harm.

W2 Monitoring of contaminants released to **waters** must be undertaken by an appropriately qualified Person(s) for parameters, at the locations and at the **minimum** frequencies specified in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring).

W3 There must be no visible hydrocarbon sheen released from authorised release points in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring).

W4 Measurements of volumes released from discharge locations mentioned in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring) must be determined by an appropriate method with an accuracy of +/-10%, (e.g. a calibrated flow meter).

W5 Monitoring and sampling must be carried out in accordance with written procedures and must address the requirements of the latest version of the following documents unless otherwise approved by the administering authority:

(a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009;

(b) for groundwater, Groundwater Sampling and Analysis – A Field Guide (2009:27 GeoCat#6890.1) and Australian Standard AS/NZS 5667.11:1998 Water Quality – Sampling – Guidance on sampling of groundwaters.

W6 The pH of discharge from the intermittent discharge locations in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring) must be:

(a) monitored by an **appropriately qualified person(s)**;

(b) monitored every two (2) hours of an incident which results in the release of contaminants not in accordance with or reasonably expected not to be in accordance with the conditions of this environmental authority; and

(c) the monitoring must only cease once pH is within the intermittent discharge location limit stated in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring).

W7 A toxicological risk assessment must be undertaken to determine whether any proposed or accidental change to the process (including changes to inputs and/or treatment process) is likely to result in an increased toxicological effect to aquatic organisms in the receiving environment and this assessment must be submitted to the **administering authority** within thirty (30) business days of the proposed or accidental change occurring. The toxicological risk assessment must focus on identifying wastewater quality or receiving environment conditions that may result in toxicity to biota within the **mixing zone** and must at least consider the wastewater and receiving water quality, temporal context and include supporting evidence for the outcome of the risk assessment.

W8 Where the toxicological risk assessment in condition (W7) determines that an increased toxicological effect may occur, a Direct Toxicity Assessment (DTA) must be undertaken as soon as practicable but within three (3) months of the change occurring. The DTA must be undertaken utilising indicator organism(s) appropriate to the change and must comply with the DTA procedure in condition (W10).

W9 An Event-based Direct Toxicity Assessment (Event-based DTA) must be undertaken wherever the **maximum** dissolved aluminium release limit of 3.0mg/L, indicated in Schedule 2, Table 5 (Contaminants, sources, locations of releases to **waters**, release limits and monitoring) is exceeded on four (4) consecutive occasions as measured at the RMD2 release point. The DTA must be undertaken utilising indicator organism(s) appropriate to the change and must comply with the DTA procedure in condition (W10). After the third consecutive exceedance, preparations must be made so that should a fourth consecutive exceedance be confirmed, an Event-based DTA can be performed immediately.

W10 All DTA's required by this environmental authority must include all information relevant to the DTA, including specific methods and protocols to be adhered to in conducting test water and diluent water collections, field testing and laboratory-based chemical analyses for key water quality parameters, and associated information necessary to determine whether concentrations of contaminants have the potential to be toxic within the receiving environment to any organisms assessed in the DTA. The information to appear in the DTA procedure must be agreed to by the **administering authority**.

W11 The DTA results must be submitted to the **administering authority** in the form of a DTA Report no more than thirty (30) business days after completion of the DTA tests. The DTA Report must include but not be limited to:

(a) providing details in relation to adherence to the **administering authority** approved DTA Procedure document required under (W10), including details of any deviations from the approved procedures;

(b) DTA test results including NOEC, LOEC, and EC10, LC10 (where applicable) for all bioassays;

(c) all relevant test sample and diluent collection and delivery details (where applicable) including the time between test sample collection and the commencement of the DTA;

(d) details of any manipulation of the test sample or diluent required to establish or re-establish the in situ water quality parameters, or to meet other aims of the assessment;

(e) results of the chemical analysis for chemicals of concern (COC) (i.e. the **standard metal(loid)s** are a **minimum** requirement in addition to any other parameters indicative of any change), in the test water, and the diluent. It may be necessary for each of the treatments in the dilution series to be analysed for the COC individually, particularly where there may be potential for COC to precipitate or otherwise not demonstrate a linear concentration-dilution relationship;

(f) relating the DTA results to the receiving environment based on the most up-to-date understanding of **mixing zone** and dilution effects under different states of the tidal prism and with the current discharge structure;

(g) other expert interpretation of results; and

(h) conclusions and recommendations.

W12 A diffuser validation report must be submitted to the **administering authority** within three (3) months of any diffuser structure serving the RMD2 discharge point undergoing any significant structural modification or change in operation.

W13 A diffuser inspection must be conducted by **appropriately qualified person**(s) no less than every two (2) years and maintenance must be undertaken if required, to ensure full functionality of the diffuser with all ports clear and operational as originally designed.

W14 The holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, water quality and flows, and sediment quality due to the authorised activities. This must include monitoring the effects of the activities on the receiving environment periodically (under natural flow conditions) and while contaminated water is being discharged from the site. For the purposes of the REMP, the receiving environment is the **waters** of South Trees Inlet and connected or surrounding **waters**. The REMP should encompass any sensitive receiving **waters** or environmental values downstream of the authorised activities that will potentially be directly affected by an authorised release of contaminated water.

W15 In relation to the REMP required by condition (W14), a report, summarising the findings of the REMP for the previous calendar year (from January to December) must be submitted to the **administering authority** by the 31 March each year.

W16 A Water Management Plan must be developed by an **appropriately qualified person(s)** and implemented. The plan must address erosion and sediment controls on site to minimise erosion and the release of sediment to receiving **waters** and contamination of stormwater.

W17 Water quality within the **mixing zone** of the Red Mud Dam discharge points must be monitored in accordance with Schedule 2, Table 6 (**Trigger values** – Red Mud **Dam mixing zone**).

W18 Where the **trigger values** identified in Schedule 2, Table 6 (**Trigger values** – Red Mud **Dam mixing zone**) are exceeded, the holder must undertake an investigation, which outlines:

(a) Details of the investigation carried out; and

(b) Actions taken to prevent environmental harm and exceedances of the **Water quality objectives** outside of the **mixing zone**. The results of the investigation must be provided to the **administering authority** within thirty (30) business days of the holder becoming aware of the exceedance, or at a later date agreed in writing by the **administering authority**.

W19 The release of contaminants to groundwater is prohibited.

W20 The activity must not cause a deterioration of groundwater quality when measured at any bore listed in Table 7 - Groundwater monitoring locations, quality characteristics and frequency.

W21 Groundwater quality and standing water level must be monitored:

(a) at the locations specified in Table 7 - Groundwater monitoring locations, quality characteristics and frequency; and

(b) at the frequencies specified in Table 7 - Groundwater monitoring locations, quality characteristics and frequency; and

(c) for the quality characteristics identified in Table 7 - Groundwater monitoring locations, quality characteristics and frequency for the hydrogeological feature in which the bore is located.

W22 Groundwater measured from any compliance bore specified in **Table 7 - Groundwater monitoring locations and frequency** must not exceed the corresponding Limit A/Limit B specified in **Table 10 – Groundwater quality limits (compliance bores only)** on any three consecutive sampling events.

W23 If groundwater contaminant limits specified in **Table 10 – Groundwater quality limits (compliance bores only**) exceed the corresponding Limit A/Limit B on any three consecutive sampling events, the environmental authority holder must review the source, pathways of the potential impact and effectiveness of seepage management systems and include the review findings in the monthly compliance report as per condition (G6).

W24 This ccondition is removed on 19 March 2026.

W25 A Groundwater Management Program must be developed, documented and implemented by an appropriately qualified person(s).

W26 The Groundwater Management Program required by Condition (W25) must:

(a) identify potential sources, mechanisms, and pathways of contamination to groundwater from the activity; and

(b) ensure that all potential groundwater impacts due to the activity are identified, monitored and mitigated; and

(c) document the sampling and monitoring methodology; and

(d) ensure that adequate groundwater monitoring and data analysis is undertaken to achieve the following objectives:

a. detect any impacts to groundwater levels due to the activity;

b. detect any impacts to groundwater quality due to the activity;

c. determine compliance with condition (W40); and

(e) include an appropriate quality assurance and quality control program;

(f) include a conceptual groundwater model;

(g) specify the purpose of each groundwater bore, the monitoring location, quality characteristics and frequency; and

(h) include a review process to identify improvements to the program that includes addressing any comments provided by the administering authority.

W27 From 30 September 2023, the Groundwater Management Program must be reviewed annually by an appropriately qualified person(s) to determine if it continues to meet the requirements stated in condition (W26).

W28 An Annual Groundwater Monitoring Report must be prepared for the period of 1 July to 30 June by an appropriately qualified person(s) and the report submitted to the **administering authority** each year by 30 September. The report must include but not be limited to:

a) an assessment, analysis and interpretation of groundwater quality results from each monitoring event, including time series graph of all data and an assessment of trends in the groundwater quality and level, a graphical comparison with at least the past five (5) years monitoring data;

b) recommendation/s of the review that is conducted by the appropriately qualified person(s) under condition W27;

c) an assessment, analysis and interpretation of results from Seepage Management Plan required under condition (W42);

d) investigation of any potential groundwater quality deterioration when measured at any bore listed in Table 7 - Groundwater monitoring locations, quality characteristics and frequency;

e) an updated list of locations on the contaminated sites register that are managed under the Contamination Management Plan;

f) identification of groundwater monitoring locations where results indicate contamination of a parameter in Schedule 2 Table 7 – Groundwater monitoring locations, monitoring parameters and frequency and details of the scope of investigation(s) that will be/have been conducted that comply with the latest version of the *National Environment Protection (assessment of Site Contamination) Measure 1999*; and

g) a review process to identify improvements to the Seepage Management Plan that includes addressing any comments provided by the appropriately qualified person(s) required under condition W50.

W29 The construction, maintenance and decommissioning of groundwater monitoring bores must be undertaken in a manner that:

(a) prevents contaminants entering the groundwater; and

(b) ensures the integrity of the bores to obtain representative groundwater samples from the target aquifer; and

(c) maintains the hydrogeological environment within the aquifer.

W30 A bore drill log must be kept for each compliance, operational and interpretation groundwater monitoring bore constructed after 30 September 2021, which includes:

(a) bore identification reference and geographic coordinate location;

(b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details;

(c) standing groundwater level and water quality parameters including physical parameters and results of laboratory analysis for the possible trigger parameters;

(d) lithological data and stratigraphic interpretation by an appropriately qualified person(s) to identify important features associated with groundwater monitoring; and

(e) target hydrogeological feature of the bore.

W31 Groundwater rise as a result of activities within the Northern Decant Pond, depicted in **Figure 5 Residue Disposal Area Location – Red Mud Dam** must not cause environmental harm.

W32 The holder must prevent the expression of groundwater from the Northern Decant Pond, depicted in **Figure 5 Residue Disposal Area Location – Red Mud Dam**.

W33 By 30 September 2021, a Groundwater Expression Management Plan (GEMP) for the Northern Decant Pond must be developed by an **appropriately qualified person(s)** and implemented.

W34 The GEMP required by condition W33 must, at a minimum:

(a) ensure that potential risks due to groundwater rise at the **Residue Disposal Area** are identified, monitored and mitigated;

(b) include commitments detailing:

i. control measures to prevent groundwater expression/s;

ii. the assessment of the effectiveness of the installed groundwater expression system/s;

iii. additional measures required for the collection of groundwater expressions should the current groundwater expression system/s be determined to not be performing as designed;

iv. the key outcomes and measurable indicators to determine if the requirements of conditions (W31-W32) have been achieved;

(c) include the annual review, analysis and interpretation of the results by an **appropriately qualified person(s)** of the monitoring data collected in accordance with condition W20;

(d) include notification procedures to ensure compliance with conditions G4 and G5.

W35 The GEMP required by condition W33 must be reviewed and updated by an **appropriately qualified person(s)** by 30 November, each year to ensure compliance with condition W34.

W36 All seawater intake structures must be equipped with a mesh grate or cage structure designed to minimise the potential for marine fauna becoming impinged onto the mesh or entrained into the pipeline without impeding the functionality of seawater intake.

W37 Written notification of the commencement date must be provided to the **administering authority** at least five (5) business days prior to establishing a new dredging activity.

W38 Dredge spoil must be directly disposed into a Red Mud **Dam** specified in **Schedule 1, Figure 5** (**Residue disposal area** Location **–** Red Mud **Dam**).

W39 Prior to the commencement of a new dredging activity, a Dredge Management Plan (DMP) must be developed and implemented, and the DMP must contain the following:

(a) 1. Clearly stated aims and objectives;

(b) 2. Description of dredging operation including;

i. Type of equipment to be used in dredging;

ii. Volume of dredge material to be removed;

iii. Duration and timing of the dredging campaign;

iv. Methods to be utilised for transporting dredge spoil; and

v. Dredge spoil disposal methods;

(c) Maps or plans showing:

i. Legend, north arrow and scale;

ii. Boundaries of dredging operation;

iii. Estimated zone of influence of sediment plumes;

iv. Location of designated disposal sites;

v. Location of sensitive receptors; and

vi. All monitoring locations;

(d) A detailed description of the sediment plume-associated monitoring program including:

i. Monitoring regime and methods;

ii. Monitoring sites;

(e) **Trigger values** and associated management actions if **trigger values** are exceeded.

Seepage Management

W40 **Long term improvement** – From 22 December 2023, the environmental authority holder must ensure that groundwater quality is improved in operational bores specified in **Table 7 - Groundwater monitoring locations, quality characteristics and frequency** until such time as the groundwater quality is consistent with the quality range reasonably expected to be associated with natural variability.

W41 The environmental authority holder must install, operate and maintain Seepage Management System(s) to contain seepage and prevent seepage from all site infrastructure moving beyond the operational bores specified in **Table 7 - Groundwater monitoring locations, quality characteristics and frequency**.

W42 Seepage generated from the activity must be managed in accordance with a Seepage Management Plan.

W43 The Seepage Management Plan must be developed and certified by an appropriately qualified person(s) as compliant with the seepage management conditions of this environmental authority.

W44 The Seepage Management Plan and appropriately qualified person(s) certification must be submitted to the department by 22 December 2024.

W45 The Seepage Management Plan may be amended and takes effect 30 days after submission of the appropriately qualified person(s) certification to the administering authority, where the following have been completed:

(a) a certification from an appropriately qualified person(s) that certifies the amended Seepage Management Plan as compliant with the seepage management conditions W40 – W51 of this environmental authority; and

(b) an assessment by an appropriately qualified person(s) and an associated substantiation report and certification is completed and submitted to the administering authority.

W46 The Seepage Management Plan must:

(a) identify origins of saline and/or metalliferous Red Mud Dam drainage and seepage within the Red Mud Dam location as per **Figure 5 – Residue disposal area Location – Red Mud Dam** and **Table 11 – Location of Residue disposal areas**,

(b) describe the Seepage Management System, and detail each of the constituent seepage controls that form part of the system; and

(c) include documentation reasonably required for an independent technical review and substantiation of the plan.

W47 The Seepage Management Plan must include design plans for each of the seepage controls that form part of the Seepage Management System. The design plans must:

(a) contain the design details for each seepage control;

(b) contain 'as constructed' drawings certified by the appropriately qualified person(s) for each design;

(c) provide specifications for the measures, plant and equipment that form part of the design for each of the seepage controls;

(d) include a map or figure to scale that depicts the location and type of seepage control installed/ to be installed;

(e) include the operating rules, maintenance and monitoring/checking requirements, predicted performance, outline how performance will be assessed, and include performance validation monitoring for each of the seepage controls; and

(f) describe the overall Seepage Management System, and detail how each seepage control forms part of the broader Seepage Management System, including a schematic diagram of interceptions, storages, transfers and disposal facilities.

W48 The Seepage Management Plan must:

(a) include best practice environmental management controls that effectively capture and contain seepage such that contaminants that will, or have the potential to, cause environmental harm are not released, unless the release is permitted under the conditions of this environmental authority; and

(b) include a seepage monitoring program that is designed to detect locations both on and off the site boundaries, where seepage may express at the surface, and locations where seepage may not be captured within the Seepage Management System.

W49 All recovered seepage must be returned to a structure or facility lawfully authorised to receive the seepage.

W50 Annually an appropriately qualified person(s) must review the Seepage Management Plan, including the seepage monitoring program, and submit a review report to the department by 31 October of each calendar year. The review report must:

(a) include a certification by the appropriately qualified person(s) that the Seepage Management Plan is compliant with the seepage management conditions of the environmental authority or detail amendments necessary to the Seepage Management Plan such that compliance can be achieved.

(b) detail the review method and findings, an assessment of the effectiveness of the Seepage Management Plan, and detail and review the findings of the monitoring program designed to detect seepage that may not be captured.

(c) include an assessment of the performance of the Seepage Management System as a whole in meeting its intent and continuing to remain as fit for purpose.

(d) include documentation reasonably required for an independent technical review and substantiation of the performance. This, as a minimum, must include for each seepage control;

i. the volume of seepage captured and when, and any changes in seepage volume over time;

ii. the quality of the seepage with respect to the quality characteristics listed in **Table 7 – Groundwater monitoring locations and frequency** for Red Mud Dam and any changes over time;

iii. the source of the seepage, influences on the quality and quantity of seepage generated, and if not well understood, recommended investigations to establish this information;

iv. the disposal location for captured seepage; and

v. an assessment of the performance of each individual seepage control in meeting the design intent and continuing to remain as fit for purpose.

W51 The Seepage Management Plan must be amended within 30 days of each annual review as required to ensure compliance with the conditions of the EA.

Groundwater Impacts on Flora and Fauna Habitat

W52 By 24 June 2024 the environmental authority holder must develop a Vegetation Survey Plan targeting the area surrounding the Residue disposal area Location – Red Mud Dam.

W53 The Vegetation Survey Plan must outline a program of works sufficient to identify any actual or potential impacts on vegetation communities, health, diversity and composition, as a result of activities authorised under this environmental authority.

W54 The Vegetation Survey Plan must be certified by an appropriately qualified person(s) as being appropriate to achieve the outcome outlined in condition W53.

W55 The Vegetation Survey Plan must include at the minimum the following (referencing relevant standards and methodologies as appropriate):

(a) selected survey and assessment methodologies, evaluating the applicability of both proven and emerging technologies,

(b) description of the selected survey locations, including analogue sites and relevant maps

(c) data collection for vegetation cover density, species diversity and abundance, vegetation health and stress; and

(d) details of the required frequency of monitoring to capture seasonal variation.

W56 The Vegetation Survey Plan must be reviewed and updated by an appropriately qualified person(s) as often as necessary, to ensure compliance with condition W53. Any revised Vegetation Survey Plan must be recertified as per condition W54.

W57 By 30 November each year, an annual vegetation and fauna habitat assessment report must be submitted to the administering authority. The report must detail the work conducted as outlined in and in response to the Vegetation Survey Plan, the findings of the work, any actual or potential

impacts and any recommendations. Documentation must be sufficient to allow for an independent technical review and substantiation of the findings.

Prescribed environmental matters - matters of State environmental significance

W58 Direct or indirect impacts to matters of State environmental significance (MSES) as a result of activities authorised under this environmental authority must not occur.

W59 An amendment application in accordance with the *Environmental Protection Act 1994*, must be prepared and submitted to the administering authority by 31 December 2025 that nominates and supports an alternate discharge location for RMDs with consideration of the final report and associated findings resulting from the Notice to Conduct or Commission an Environmental Evaluation (STAT1431).

Definitions

Key terms and/or phrases used in this document are defined in this section. Holders should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

"act" means the *Environmental Protection Act 1994*.

“activity” means the **environmentally relevant activities** carried out by the holder.

"administering authority" means the Department of the Environment, Tourism, Science and Innovation or its successor in the administration of the *Environmental Protection Act 1994.*

“AEP” means the Annual Exceedance Probability, which is the probability that at least one event in excess of a particular magnitude will occur in any given year.

“appropriately qualified person(s)” means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.

“associated works” in relation to a **dam**, means:

(a) operations of any kind and all things constructed, erected or installed for that **dam**; and

(b) any **land** used for those operations.

“AWQ guidelines” means the ‘Australian and New Zea**land** Guidelines for Fresh and Marine Water Quality’, volumes 1, 2 and 3, published by ANZECC and ARMCANZ in October 2000 or more recent versions.

“bed and banks” for a **watercourse** or **wetland** means **land** over which the water of the **watercourse** or **wetland** normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include **land** adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.

“beneficial use” refer to *Waste Reduction and Recycling Act 2011*.

“BOD5” means the 5 day biochemical oxygen demand determined using standard tests (e.g. those used by NATA laboratories). This test is not inhibited for nitrification, otherwise would be referred to as “carbonaceous” BOD.

“COD” means chemical oxygen demand determined using standard tests (e.g. those used by NATA laboratories).

"bore type” refer to classification of bores for specific purposes. **“compliance bore”** is specified to monitor for environmental impacts from potential sources of contamination. **“operational bore”** is specified to monitor the progress of mitigation measures. **“interpretation bore”** is specified to improve the understanding of the aquifer and its behaviour in relation to potential environmental impacts other than those from the activity.

“bund” or “**bund**ed” in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the **bund** is the main part of a spill containment system, the whole system (or **bund**ed area) is sometimes colloquially referred to within industry as the **bund**. The **bund** is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, **bund**s are also used for fire protection, product recovery and process isolation.

“certification”, "certifying" or “certified” by a suitably qualified and experienced person in relation to a **design plan** or an annual report regarding **dam**s, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

(a) exactly what is being certified and the precise nature of that **certification**;

(b) the relevant legislative, regulatory and technical criteria on which the **certification** has been based;

(c) the relevant data and facts on which the **certification** has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and

(d) the reasoning on which the **certification** has been based using the relevant data and facts, and the relevant criteria.

“construction” or "constructed" in relation to a **dam** includes physical **construction** works for the building of a new **dam**, and modifying or lifting an existing **dam**, but does not include site preparatory works (in advance of **construction**) or investigations and testing necessary for purposes of preparing a **design plan**.

“contaminant(s)” as defined in part 3, division (2) two of the Environmental Protection Act 1994.

“contamination management plan” a QAL document which outlines the processes undertaken to prioritise and investigate potentially contaminated sites, which are conducted in compliance with the latest version of the National Environmental Protection (assessment of Site Contamination) Measure. The plan also incorporates a site overview and strategy for further works to be conducted for locations within the contaminated sites register.

“contaminated sites register” means a list of sites prepared and maintained by the holder (defined by GPS Northing/Easting locations) which details known site history, contaminants of concern, land tenure associated with the site, site assessments undertaken, information on further management and remediation strategies.

“continuous environmental monitoring systems” includes monitoring systems as required for weather station (condition A1), noise monitoring (condition N3), stack monitoring (condition A5), ambient air monitoring (condition A15), and surface water monitoring (condition W2).

“dam” means a **land**-based structure or a **void** that is designed to contain, divert or control **flowable substance**s, and includes any substances that are thereby contained, diverted or controlled by that **land**-based structure or **void** and associated works. A **dam** does not mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.

“design plan” is the documentation required to describe the physical dimensions of the **dam**, the materials and standards to be used for **construction** of the **dam**, and the criteria to be used for operating the **dam**. The documents must include all investigation and design reports, plans and specifications sufficient to hand to a contractor for **construction**, and planned decommissioning and **rehabilitation** outcomes; so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment for the structure. Documentation must be such that a ‘suitable qualified and experienced person’ could conduct an independent review without seeking further information from the designer.

"design storage allowance" or "DSA" means an available volume, estimated in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queens**land** (DME 1995), that must be provided in a **dam** as at the first of November each year in order to prevent a discharge from that **dam** to a probability (AEP) specified in that guideline. The DSA is estimated based on 100% runoff of wet season rainfall at the relevant AEP, taking account of process inputs during that wet season, with no allowance for evaporation.

“deterioration of groundwater quality” means no increase in the concentrations of quality characteristics listed in Table 7 and no increase or decrease in pH, as determined by assessing relevant groundwater monitoring data in accordance with the document *Using monitoring data to assess groundwater quality and potential environmental impacts* prepared by Department of Science, Information Technology and Innovation dated March 2021 or subsequent revisions or an alternative methodology deemed acceptable by the administering authority.

"determined" by a suitably qualified and experienced person in relation to a hazard assessment of a **dam** means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

(a) exactly what has been assessed and the precise nature of that assessment;

(b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;

(c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and

(d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

“dredging” means to clear out dredge material.

“Dredge Management Plan (DMP)” is an environmental management plan for the dredging **activity**. It defines and describes the:

- scope, timing and duration of the dredging operation
- sediment plume-associated monitoring programs
- assessment of data and **trigger values**, and
- management actions that may be required in response to adverse monitoring results

The DMP includes an aim to prevent and minimise environmental harm to **sensitive receptor**s as a result of the dredging **activity**.

“dredge material” is the sea, river or **lake** bed material (e.g. stone, gravel, sand, rock, clay, mud, silt and soil) as it remains in situ, prior to dredging disturbance.

“dredge spoil” is dredge material that has been disturbed (i.e. extracted, transported, placed or disposed).

"dust collector" means a device used for filtering particulate from the air which is otherwise free from fume or gaseous contaminants.

"dwelling" means any of the following structures or vehicles that is principally used as a residence:

(a) a house, unit, motel, nursing home or other building or part of a building;

(b) a caravan, mobile home or other vehicle or structure on land; or

(c) a water craft in a marina.

"environment" includes:

(a) ecosystems and their constituent parts, including people and communities;

(b) all natural and physical resources;

(c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community; and

(d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

“environmental authority” refers to schedule 4 of *Environmental Protection Act 1994*.

“environmentally relevant activities” is any **activity** mentioned in Schedule 2 of the Environmental Protection Regulation 2008.

"environmental nuisance" means unreasonable interference or likely interference with an

environmental value caused by:

(a) aerosols, fumes, light, noise, odour, particles or smoke;

(b) an unhealthy, offensive or unsightly condition because of contamination; or

(c) another way prescribed by regulation.

“flowable substance” means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a **flowable substance** can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

“foreseeable future” is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year **foreseeable future** with an acceptable probability of failure before that time.

“guideline values” are values for environmental health **indicators** designed to ensure that environmental values (EV) of water(s) are protected. Water quality **Guideline values** (GVs) for an EV are provided under the Environmental Protection (Water) Policy 2009 (in order of preference), according to:

(a) site specific documents;

(b) the Queensland **Water quality guidelines** 2009 (QWQ Guidelines);

(c) the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ, 2000); or

(d) other relevant **water quality guidelines** published by a recognised entity.

Where there are multiple water quality GVs for a particular indicator to protect different EVs, the most stringent water quality GV applies. Where GVs are not available in the above listed documents, users should derive their own locally-derived GVs in accordance with administering authority-approved guidelines or procedures (QWQ Guidelines), or peer-reviewed scientific literature.

“hazard” in relation to a **dam** as defined means the potential for environmental harm resulting from the collapse or failure of the **dam** to perform its primary purpose of containing, diverting or controlling **flowable substance**s.

“hazard category” means a category, either low significant or high, into which a **dam** is assessed as a result of the application of tables and other criteria in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

“holder" means any person who is the holder of, or is acting under, this environmental authority.

“hydraulic performance” means the capacity of a **regulated dam** to contain or safely pass **flowable substance**s based on a probability (AEP) of performance failure specified for the relevant hazard category in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

“impeded operational performance of pollution control equipment” means when the pollution control equipment is not operating to design specification in relation to pollutant removal.

"indicators" and **water quality guidelines** for an environmental value are decided using the following documents:

(a) site specific documents for the water;

(b) the 'QWQ guidelines';

(c) the 'AWQ guidelines';

(d) other relevant documents published by a 'recognised entity'.

"infrastructure" means water storage **dam**s, roads and tracks, buildings and other structures built for the purpose and duration of the conduct of the **environmentally relevant activities**, but does not include other facilities required for the long term management of the impact of those activities or the protection of potential resources. Such other facilities include **dam**s other than water storage **dam**s, waste dumps, **void**s, or stockpiles and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

"lake" means:

(a) a lagoon, swamp or other natural collection of water, whether permanent or intermittent; or

(b) the bed and banks and any other element confining or containing the water.

"land" means any parcel of land and area of ground together with any trees, crops or permanently attached buildings and including the airspace above land; and land that is, or is at any time, covered by waters; and waters. Land includes sealed and unsealed areas, road, dirt and soil.

"$L_{Amax\ adj,\ 15\ mins}$" means the average **maximum** A-weighted sound pressure level; adjusted for noise character and measured over a time period of 15 minutes, using Fast response.

"L_{Amax}" means the instantaneous **maximum** A-weighted sound pressure level; using Fast response.

"levee", "dyke" or "**bund**" means a long embankment that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or **flowable substance**s at any other times.

"Limit A" means 80th percentile of a dataset (80% of the data points are less than or equal to that value), **"Limit B"** means 95th percentile of a dataset (95% of the data points are less than or equal to that value)

"mg/L" means milligrams per litre.

"mandatory reporting level" or "MRL" means a warning and reporting level determined in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995). An MRL is the lowest level required in a **regulated dam** to allow either of the following to be retained:

(a) the runoff from a 72 hour duration storm at the AEP specified in the Table 13; or

(b) a wave allowance at that AEP as estimated using a recognised engineering method.

"major wet weather events" is equal to or greater than a one (1) in ten (10) year twenty-four (24) hour rain event for Gladstone as calculated by the Hydrometeorological Advisory Service, Australian Bureau of Meteorology.

"maximum" means that the measured value of the quality characteristic or contaminant must not be greater than the release limit stated.

"minimum" means that the measured value of the quality characteristic or contaminant must not be less than the release limit stated.

“mixing zone” means an area of the receiving environment associated with a point source release

within which contaminant concentrations occur outside of the normal ambient range and where **water quality objectives** do not apply.

"NATA" means the National Association of Testing Authorities, Australia.

“**natural gas**” includes CSG.

“NEPM groundwater investigation level” means the concentration of a contaminant above which further appropriate investigation and evaluation is required as set out in the ‘Guideline on the Investigation Levels for Soil and Groundwater’ prepared by the National Environment Protection (assessment of site contamination) Measure 2013 or more recent versions.

“new dredging activity” means a dredging **activity** that is currently not underway, the next stage of a dredging campaign that is currently underway, or a discretely separate area in a larger dredge campaign that is currently underway.

"nuisance sensitive place" means any of the following:

(a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises;

(b) library and educational institution (including a school, college and university;

(c) childcare centre or kindergarten;

(d) school or playground;

(e) hospital, surgery or other medical institution;

(f) an area identified under the Nature Conservation Act 1992 as a protected area or an area identified as a critical habitat or an area of major interest in a conservation plan;

(g) marine park under the Marine Parks Act 2004;

(h) park or garden that is open to the public (whether or not on payment of an amount) for use other than for sport or organised entertainment; or

(i) a place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

“occasion” means any four sample results for metals and any four (4) 24-hour periods where continuous samples indicate an exceedance.

“operational plan” means a document that amongst other things sets out procedures and criteria to be

used for operating a **dam** during a particular time period. The operational plan as defined herein may form part of a plan of operations or plan otherwise required in legislation.

“pre-existing” means known groundwater contamination prior to August 2013 under the refinery and under island **bund** #4.

“process contaminants” means liquids and slurries used or produced in the processing of bauxite to alumina and does not include hydrocarbons.

“QWQ guidelines” means the document called ‘Queensland Water quality guidelines 2009’ or more recent versions.

"range" means that the measured value of the quality characteristic or contaminant must be less than the higher release limit stated and greater than the lower release limit stated.

"recognised entity" means:

(a) a local government;

(b) a public sector unit;

(c) an agency of the Commonwealth or another State, however called, with similar functions to the functions of the chief executive;

(d) a ministerial council established by the Council of Australian Governments;

(e) the Commonwealth Scientific and Industrial Research Organisation;

(f) a research centre completely or partly funded by the Commonwealth;

(g) an Australian university;

(h) a Queensland regional NRM body;

(i) Healthy Waterways Limited ACN 137 943 554; and

(j) any other international best proactive guideline including NEPM groundwater investigation level or Dutch Intervention Guidelines target value.

"regulated dam" means any **dam** in the significant or high hazard category as assessed in the most recent version of the Manual for Assessing Hazard Categories and Hydraulic Performance of **Dam**s.

"Rehabilitation" means the process of reshaping and revegetating land to restore it to a **stable** landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

"residue disposal areas" means the areas defined in condition (L7) and includes Ash **Dam**, Red Mud **Dam**, Mineral Waste Disposal Facility and Asbestos Landfill.

"representative of actual operating conditions" means stack testing must be carried out when production rates are within 10% or greater than the average production rate of three (3) months prior (excluding shutdowns) to when the testing is to be undertaken.

"RL" means reduced level, relative to mean sea level as distinct from depths to water.

"sediment plume-associated monitoring" means environmental monitoring associated with risk management of sediment plume impacts.

"sensitive receptor" means any of the following.

(a) A dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises.

(b) Library and educational institution (including a school, college and university.

(c) Childcare centre or kindergarten.

(d) School or playground.

(e) Hospital, surgery or other medical institution.

(f) An area identified under the *Nature Conservation Act 1992* as a protected area or an area identified as a critical habitat or an area of major interest in a conservation plan.

(g) Marine park under the *Marine Parks Act 2004*.

(h) Park or garden that is open to the public (whether or not on payment of an amount) for use other than for sport or organised entertainment.

(i) A place used as a workplace, an office or for business or commercial purposes and includes a place within the curtilage of such a place reasonably used by persons at that place.

"site" means the lot and plan locations to which the Environmental Authority relates.

"specialist in the field" means a person or body possessing the relevant experience and qualifications to perform the required measurements and subsequent interpretation, evaluation and explanation of the monitoring results, trends and programs.

"spillway" means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the **dam**, normally under flood conditions or in anticipation of flood conditions.

"stable" in relation to land, means land form dimensions are and will remain within **tolerable limits** now and in the **foreseeable future**. Issues to be properly considered in regard to whether or not the landform is **stable** include geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

"standard metal(loid)s" includes Al, V, Mo, Ga, As, Hg, Cd, Pb, Zn, Cu, Ni, Fe, Mn, Se, Co.

"suitably qualified and experienced person" in relation to **dam**s means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the Professional Engineers Act 2002, or at the relevant time holds a 'deemed registration' within the meaning of the *Mutual Recognition (Queensland) Act 1992*; and has knowledge, suitable experience and demonstrated expertise in relevant fields, as set out below:

(a) knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of **dam**s; and

(b) a total of five years of demonstrated expertise in the geomechanics of **dam**s with particular emphasis on stability, geology and geochemistry, and

(c) a total of five years of demonstrated expertise in three of the following categories:

i. investigation and design of **dam**s;

ii. **construction**, operation and maintenance of **dam**s;

iii. hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology;

iv. hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes;

v. hydrogeology with particular reference to seepage, groundwater;

vi. solute transport processes and monitoring thereof; or

vii. **dam** safety.

"suitably qualified third party auditor" means a person with a relevant qualification and at least five (5) years' experience in the field of environmental auditing that is accepted by the administering authority.

"tolerable limits" means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing **dam**age and limiting infiltration and percolation.

"topsoil" means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological **activity** than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.

"trigger values (TV)" are values that, when exceeded, result in a management response, action or investigation. TVs can be **guideline values** attributed to a specific contaminant or ecological measure. TVs can be applied within a **mixing zone**.

"void" means any constructed, open excavation in the ground.

"visible dust event" means an event that results in visible dust moving beyond the lot and plan where the relevant environmentally relevant **activity** is carried out.

"waters" includes all or any part of a river, stream, **lake**, lagoon, pond, swamp, **wetland**, unconfined surface water, unconfined water in natural or artificial **watercourse**s, bed and banks of a **watercourse**, **dam**s, non-tidal or tidal **waters** (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.

"watercourse" means a river, creek or stream in which water flows permanently or intermittently (a) in a natural channel, whether artificially improved or not; or (b) in an artificial channel that has changed the course of the **watercourse**. **Watercourse** includes the bed and banks and any other element of a river, creek or stream confining or containing water.

"water quality guidelines" are quantitative measures or statements for **indicators**, including contaminant concentration or sustainable load measures of water that protect a stated environmental value.

water quality objectives (WQO)" are published **guideline values** contained in Schedule 1 of the Environmental Protection (Water) Policy 2009 (EPP Water), WQOs only apply outside of authorised **mixing zone**s. Where WQOs are not scheduled within the EPP Water, the QWQ Guidelines apply as default WQOs. Where QWQ **Guideline values** are not available, locally-derived **guideline values** should be developed in accordance with the procedures prescribed in the QWQ Guidelines or other referenced guidelines.

"weekly" in relation to a **minimum** sample frequency refers to the collection of one (1) representative water sample every seven (7) days, +/- one (1) day.

"wetland" means an area shown as a **wetland** on a 'Map of referable **wetland**s', a document approved by the chief executive (environment). A map of referable **wetland**s can be viewed at www.ehp.qld.gov.au. "zone of influence" means the area where at least some level of sediment plume impacts are expected to occur.

Appendices

Schedule 1—Approved plans

Figure 1 Process Containment System

Figure 2 Residue disposal area Location – Ash Dam

Figure 3 Residue Disposal Area Location – Mineral Waste Disposal Facility

Figure 4 Residue disposal area Location – Asbestos Landfill

Figure 5 Residue disposal area Location – Red Mud Dam

Figure 6 Ambient dust monitoring locations

Figure 7 Attended noise monitoring locations

Figure 8 Mixing zone South Trees Inlet – Red Mud Dam#2 Discharge

Figure 9 Groundwater monitoring locations – Refinery

Figure 10 Groundwater monitoring locations – South Trees Island

Figure 11 Groundwater monitoring locations – Red Mud Dam

Schedule 2—Release limits and monitoring

Table 1 Contaminant release limits to air

Table 2 Required release point determinations

Table 3 Not included in Schedule 2 (see Condition (A6))

Table 4 Dust and/or particulate matter monitoring program

Table 5 Contaminants, sources, locations of releases to waters, release limits and monitoring

Table 6 Trigger values – Red Mud Dam mixing zone

Table 7 Groundwater monitoring locations, quality characteristics and frequency

Table 8 Not included in Schedule 2 (see Condition (N1))

Table 9 Not included in Schedule 2 (see Condition (N3))

Table 10 Groundwater quality limits (compliance bores only)

Table 11 Location of Residue disposal areas

Table 12 Basic Details of Residue Areas

Table 13 Hydraulic Performance of Regulated dams

Schedule 1—Approved plans

Figure 1 Process Containment System

Figure 1 : Process Containment System
Environmental authority EPPR00494413

Figure 2 Residue disposal area Location – Ash Dam

Vertex coordinates (GDA94 MGA56)

Vertex No.	Easting	Northing	Vertex No.	Easting	Northing
1	326859	7360111	22	326304	7357866
2	326931	7359995	23	326208	7358270
3	326981	7359945	24	326240	7358276
4	327005	7359920	25	326310	7358456
5	327017	7359851	26	326356	7358592
6	327038	7359678	27	326375	7358602
7	327014	7359463	28	326400	7358618
8	326994	7359302	29	326444	7358644
9	326986	7359041	30	326485	7358683
10	326980	7358822	31	326509	7358708
11	326970	7358700	32	326524	7358728
12	326930	7358524	33	326523	7358756
13	326917	7358386	34	326523	7358783
14	326902	7358180	35	326523	7358821
15	326863	7357945	36	326500	7358839
16	326842	7357797	37	326395	7358918
17	326806	7357631	38	326339	7359133
18	326776	7357517	39	326357	7359198
19	326651	7357582	40	326355	7359240
20	326528	7357681	41	326754	7360020
21	326368	7357812	42	326829	7360095

Aerial photography by Nearmap, flown 01/11/2023

Legend

- Residue disposal area vertex
- Residue disposal area - Ash Dam

A4
1:19,000

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Figure 2 : Residue disposal area - Ash Dam
Environmental authority EPPR00494413

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Figure 3 Residue Disposal Area Location – Mineral Waste Disposal Facility

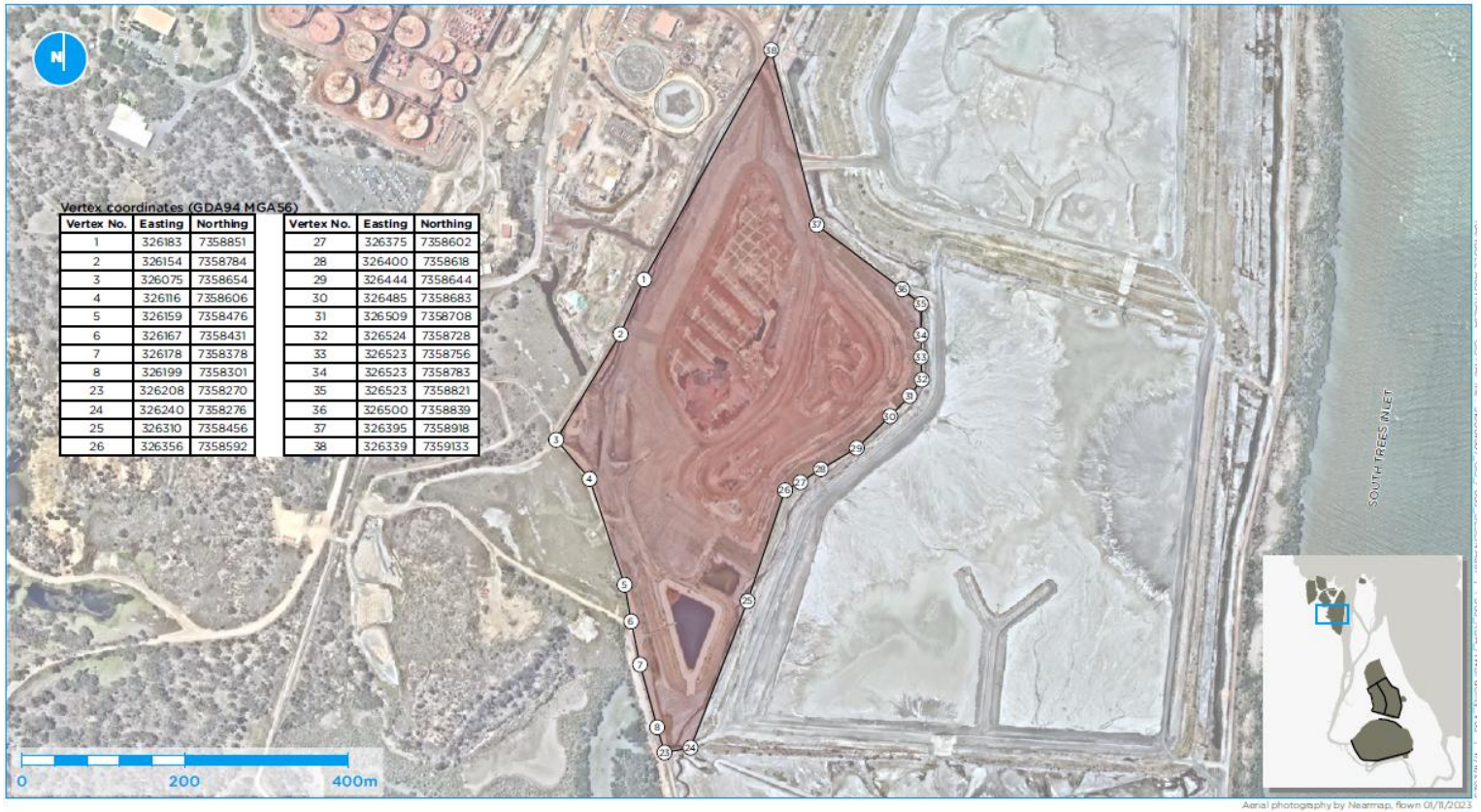

Figure 3 : Residue disposal area - Mineral Waste Disposal Facility
Environmental authority EPPR00494413

Figure 4 Residue disposal area Location – Asbestos Landfill

Vertex coordinates (GDA94 MGA56)

Vertex No.	Easting	Northing
1	325859	7358534
2	325867	7358512
3	325870	7358504
4	325892	7358483
5	325892	7358443
6	325891	7358439
7	325876	7358433
8	325884	7358400
9	325903	7358362
10	325877	7358350
11	325853	7358372
12	325835	7358411
13	325832	7358420
14	325831	7358476
15	325825	7358504
16	325828	7358505
17	325832	7358508
18	325835	7358518
19	325836	7358525

Aerial photography by Nearmap, flown 01/11/2023

Legend

Residue disposal area vertex

Residue disposal area - Asbestos Landfill

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Figure 4 : Residue disposal area - Asbestos Landfill

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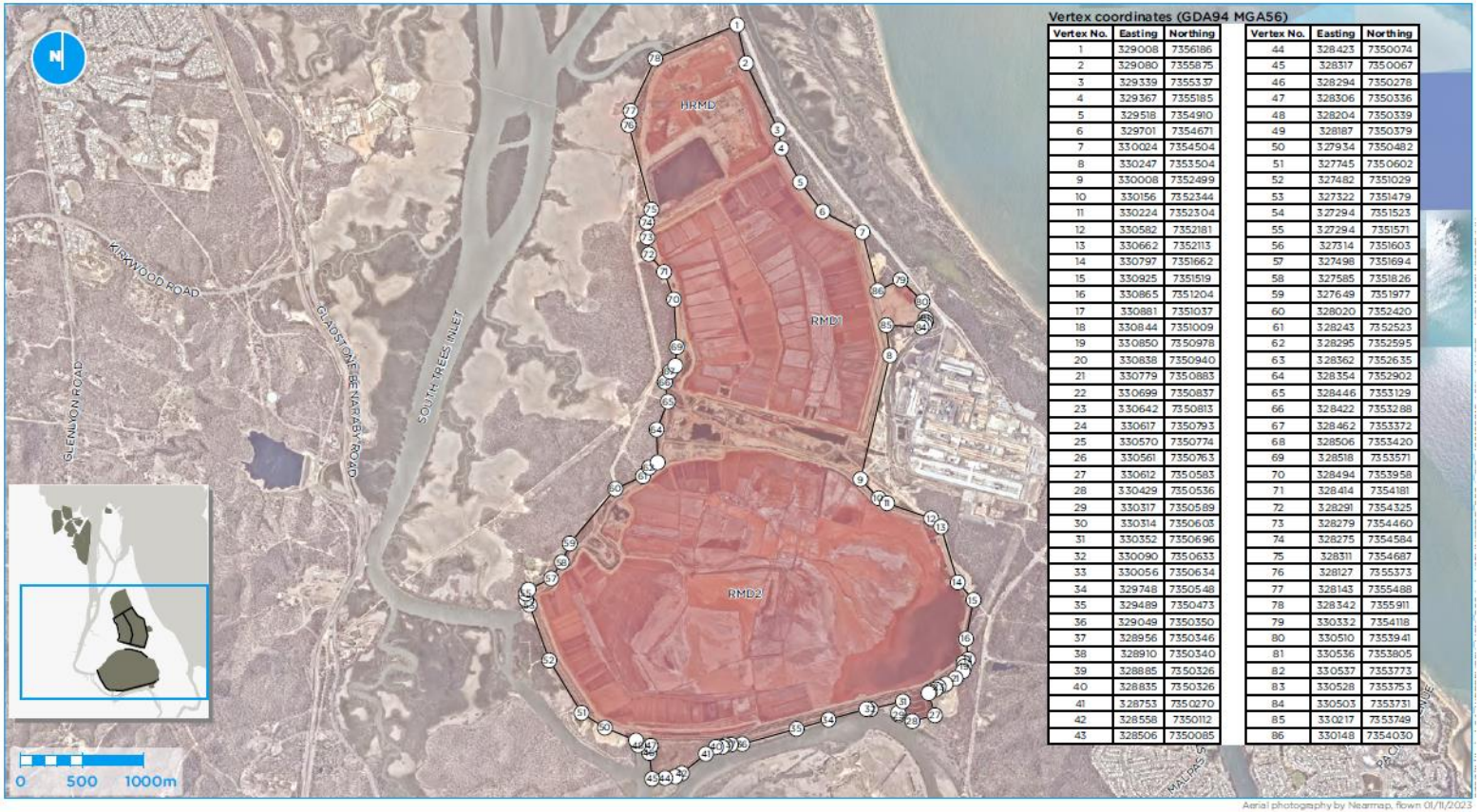
Figure 5 Residue disposal area Location – Red Mud Dam

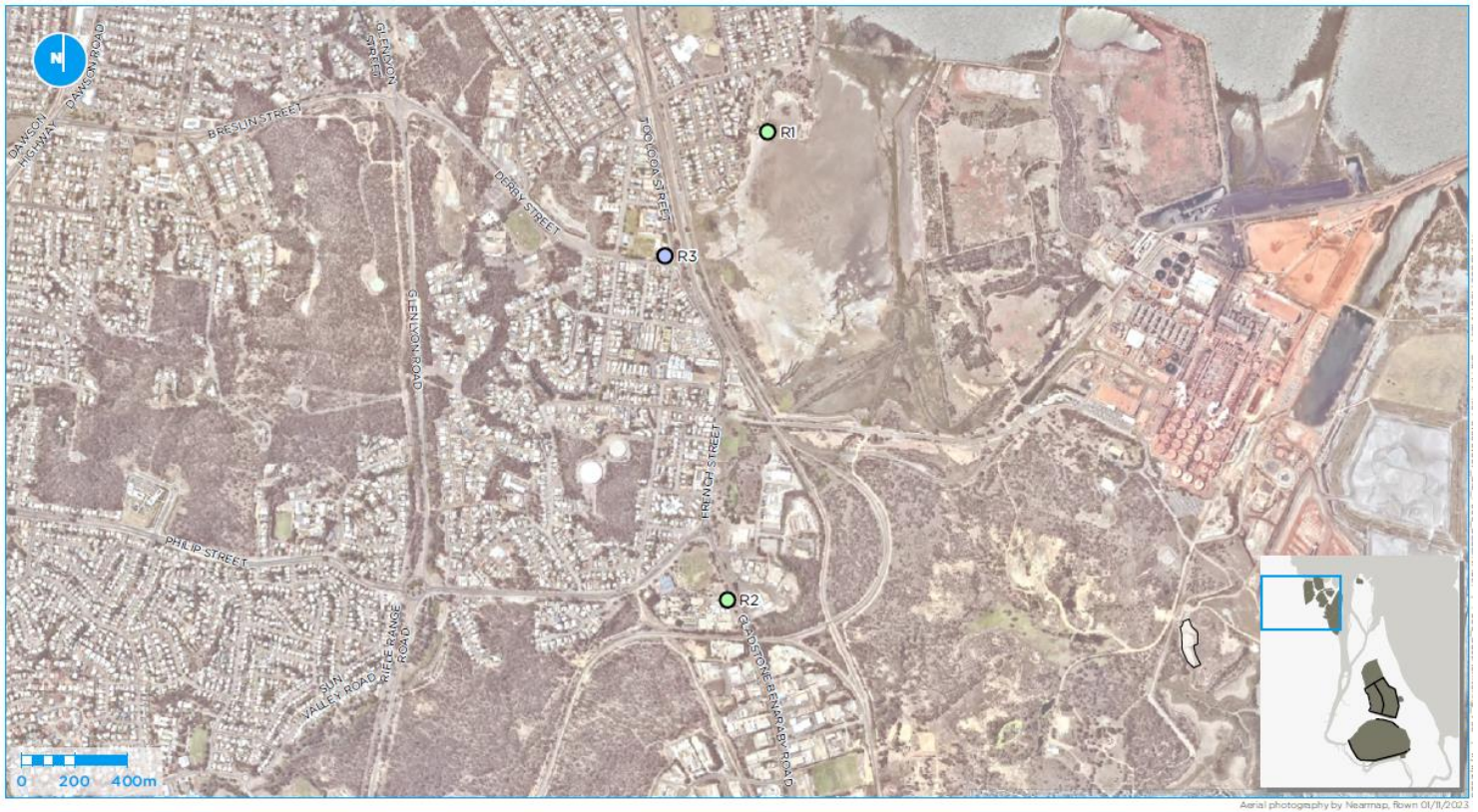


Vertex coordinates (GDA94 MGA56)

Vertex No.	Easting	Northing
1	329008	7356186
2	329080	7355875
3	329339	7355537
4	329367	7355185
5	329518	7354910
6	329701	7354671
7	330024	7354504
8	330247	7353504
9	330008	7352499
10	330156	7352344
11	330224	7352304
12	330582	7352181
13	330662	7352113
14	330797	7351662
15	330925	7351519
16	330865	7351204
17	330881	7351037
18	330844	7351009
19	330850	7350978
20	330838	7350940
21	330779	7350883
22	330699	7350837
23	330642	7350813
24	330617	7350793
25	330570	7350774
26	330561	7350763
27	330612	7350583
28	330429	7350536
29	330317	7350589
30	330314	7350603
31	330352	7350696
32	330090	7350633
33	330056	7350634
34	329748	7350548
35	329489	7350473
36	329049	7350350
37	328956	7350346
38	328910	7350340
39	328885	7350326
40	328835	7350326
41	328753	7350270
42	328558	7350112
43	328506	7350085
44	328423	7350074
45	328317	7350067
46	328294	7350278
47	328306	7350336
48	328204	7350339
49	328187	7350379
50	327934	7350482
51	327745	7350602
52	327482	7351029
53	327322	7351479
54	327294	7351523
55	327294	7351571
56	327314	7351603
57	327498	7351694
58	327585	7351826
59	327649	7351977
60	328020	7352420
61	328243	7352523
62	328295	7352595
63	328362	7352635
64	328354	7352902
65	328446	7353129
66	328422	7353288
67	328462	7353372
68	328506	7353420
69	328518	7353571
70	328494	7353958
71	328414	7354181
72	328291	7354325
73	328279	7354460
74	328275	7354584
75	328311	7354687
76	328127	7355373
77	328143	7355488
78	328342	7355911
79	330332	7354118
80	330510	7353941
81	330536	7353805
82	330537	7353773
83	330528	7353753
84	330503	7353731
85	330217	7353749
86	330148	7354030

Figure 5 : Residue disposal area - Red Mud Dam
Environmental authority EPPR00494413

Figure 6 Ambient dust monitoring locations



Legend

Ambient dust monitoring

- Particle Matter (PM10)
- Total Suspended Particles (TSP)

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Figure 6 : Ambient dust monitoring locations

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Figure 7 Attended noise monitoring locations

Figure 7 : Attended noise monitoring locations
Environmental authority EPPR00494413

Figure 8 Mixing zone South Trees Inlet – Red Mud Dam#2 Discharge

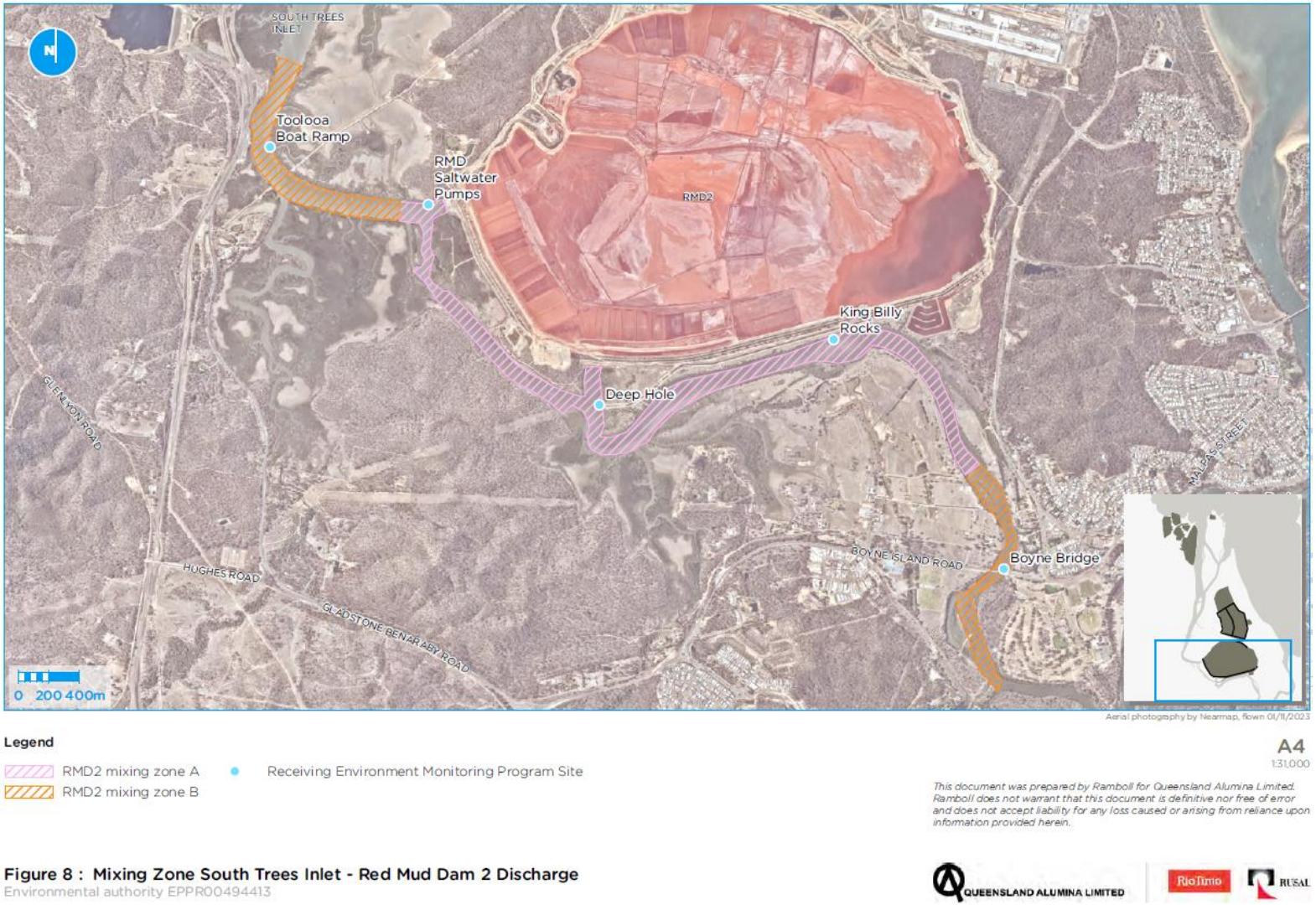

Figure 8 : Mixing Zone South Trees Inlet - Red Mud Dam 2 Discharge
Environmental authority EPPR00494413

Figure 9 Groundwater monitoring locations – Refinery

Aerial photography by Nearmap, flown 01/11/2023

Legend

Groundwater monitoring locations

- Compliance bore
- Operational bore

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Figure 9 : Groundwater monitoring locations - Refinery
Environmental authority EPPR00494413

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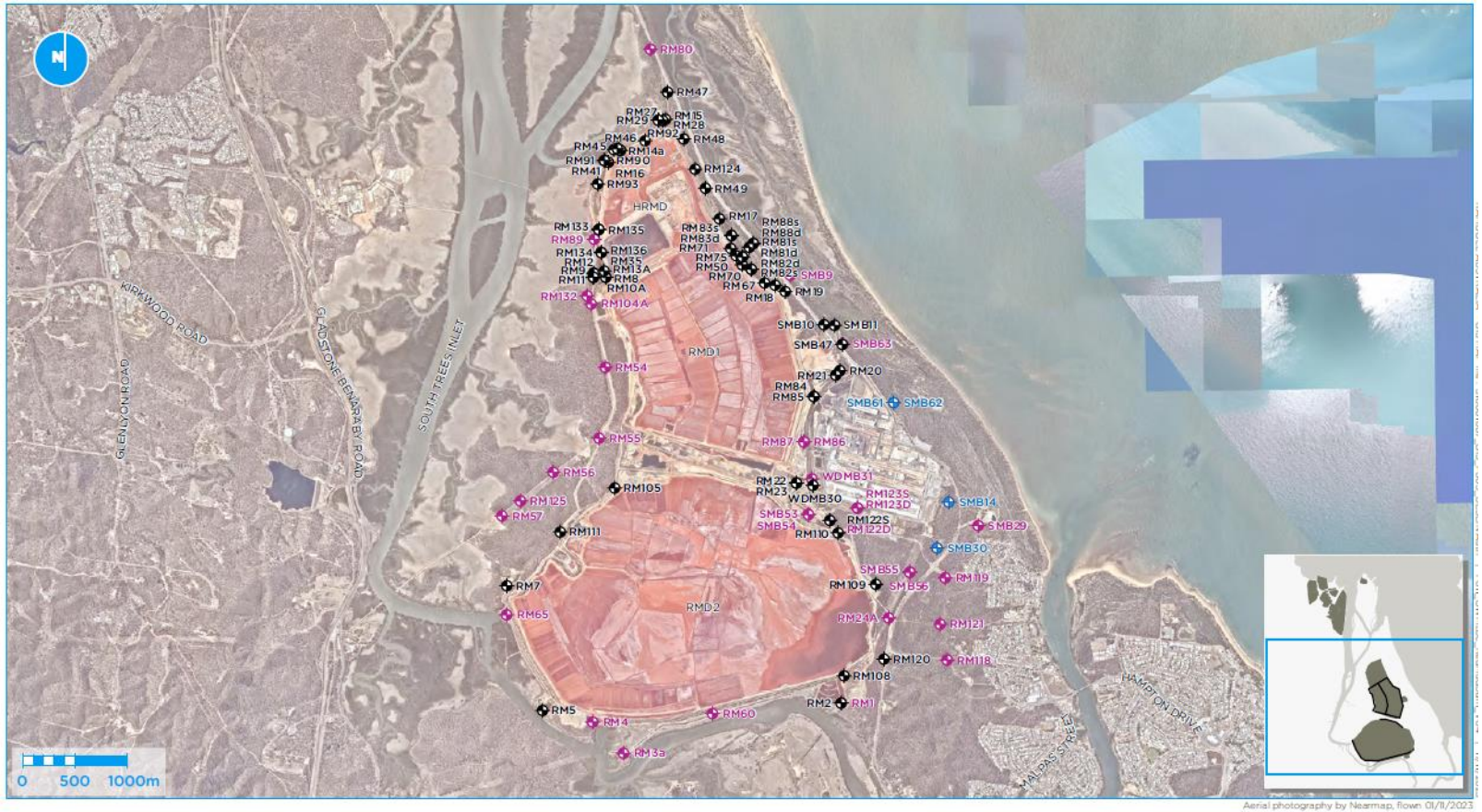
Figure 10 Groundwater monitoring locations – South Trees Island

Figure 10 : Groundwater monitoring locations - South Trees Island
Environmental authority EPPR00494413

Figure 11 Groundwater monitoring locations – Red Mud Dam



Legend

Groundwater monitoring locations

- Compliance bore
- Operational bore
- Interpretation bore

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Figure 11 : Groundwater monitoring locations - Red Mud Dam
Environmental authority EPPR00494413

Schedule 2—Release limits and monitoring

Table 1 Contaminant release limits to air

Release point	Contaminant release	Maximum concentration release limit	Averaging Period	Minimum release height (metres - Australian Height Datum)
CFB1 (Boiler 1)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	103
	Oxides of Nitrogen	1000mg/Nm^3 (dry)	1 hour rolling average	
	Sulphur Dioxide	1200mg/Nm^3 (dry)	1 hour rolling average	
	Mercury	0.2mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
CFB2 (Boiler 2)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	103
	Oxides of Nitrogen	1000mg/Nm^3 (dry)	1 hour rolling average	
	Sulphur Dioxide	1200mg/Nm^3 (dry)	1 hour rolling average	
	Mercury	0.2mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
CFB3 (Boiler 3)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	103
	Oxides of Nitrogen	1000mg/Nm^3 (dry)	1 hour rolling average	
	Sulphur Dioxide	1200mg/Nm^3 (dry)	1 hour rolling average	
	Mercury	0.2mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	

Release point	Contaminant release	Maximum concentration release limit	Averaging Period	Minimum release height (metres - Australian Height Datum)
CFB4-5 (Boiler 4/5)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	103
	Oxides of Nitrogen	1000mg/Nm^3 (dry)	1 hour rolling average	
	Sulphur Dioxide	1200mg/Nm^3 (dry)	1 hour rolling average	
	Mercury	0.2mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
CFB6-7 (Boiler 6/7)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	103
	Oxides of Nitrogen	1000mg/Nm^3 (dry)	1 hour rolling average	
	Sulphur Dioxide	1200mg/Nm^3 (dry)	1 hour rolling average	
	Mercury	0.2mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
PB1 (Package Boiler 1)	Oxides of Nitrogen	350mg/Nm^3 (dry)	1 hour rolling average	52
PB2 (Package Boiler 2)	Oxides of Nitrogen	350mg/Nm^3 (dry)	1 hour rolling average	52
PB3 (Package Boiler 3)	Oxides of Nitrogen	350mg/Nm^3 (dry)	1 hour rolling average	52
GSC1 (Calciner 1)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	61

Release point	Contaminant release	Maximum concentration release limit	Averaging Period	Minimum release height (metres - Australian Height Datum)
	Oxides of Nitrogen	200mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
GSC2 (Calciner 2)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	61
	Oxides of Nitrogen	200mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
GSC3 (Calciner 3)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	61
	Oxides of Nitrogen	200mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
FBC1 (Lurgi Calciner)	Particulates	50mg/Nm^3 (dry)	24 hour rolling average	56
	Oxides of Nitrogen	200mg/Nm^3 (dry)	-	
	Total volatile organic compounds (TVOC) as n-propane equivalent	40mg/Nm^3 (dry)	-	
TO1	Thermal Oxidiser	-	-	28
TO2	Thermal Oxidiser	-	-	29

Table 2 Required release point determinations

Release point	Contaminant Released	Frequency
CFB1 (Boiler 1)	Particulates	Continuous
	Oxides of Nitrogen	Continuous
	Sulphur Dioxide	Continuous
	Mercury	One Coal Fired Boiler release point annually
	Total volatile organic compounds as n-propane equivalent	One Coal Fired Boiler release point annually
CFB2 (Boiler 2)	Particulates	Continuous
	Oxides of Nitrogen	Continuous
	Sulphur Dioxide	Continuous
	Mercury	One Coal Fired Boiler release point annually
	Total volatile organic compounds as n-propane equivalent	One Coal Fired Boiler release point annually
CFB3 (Boiler 3)	Particulates	Continuous
	Oxides of Nitrogen	Continuous
	Sulphur Dioxide	Continuous
	Mercury	One Coal Fired Boiler release point annually
	Total volatile organic compounds as n-propane equivalent	One Coal Fired Boiler release point annually
CFB4-5 (Boiler 4/5)	Particulates	Continuous
	Oxides of Nitrogen	Continuous
	Sulphur Dioxide	Continuous
	Mercury	One Coal Fired Boiler release point annually
	Total volatile organic compounds as n-propane equivalent	One Coal Fired Boiler release point annually
CFB6-7 (Boiler 6/7)	Particulates	Continuous
	Oxides of Nitrogen	Continuous

	Sulphur Dioxide	Continuous
	Mercury	One Coal Fired Boiler release point annually
	Total volatile organic compounds as n-propane equivalent	One Coal Fired Boiler release point annually
PB1 (Package Boiler 1)	Oxides of Nitrogen	Continuous
PB2 (Package Boiler 2)	Oxides of Nitrogen	Continuous
PB3 (Package Boiler 3)	Oxides of Nitrogen	Continuous
GSC1 (Calciner 1)	Particulates	Continuous
	Oxides of Nitrogen	One Calciner release point annually
	Total volatile organic compounds as n-propane equivalent	One Calciner release point annually
GSC2 (Calciner 2)	Particulates	Continuous
	Oxides of Nitrogen	One Calciner release point annually
	Total volatile organic compounds as n-propane equivalent	One Calciner release point annually
GSC3 (Calciner 3)	Particulates	Continuous
	Oxides of Nitrogen	One Calciner release point annually
	Total volatile organic compounds as n-propane equivalent	One Calciner release point annually
FBC1 (Lurgi Calciner)	Particulates	Continuous
	Oxides of Nitrogen	Annually
	Total volatile organic compounds as n-propane equivalent	Annually
TO1	Cadmium	Annually
	Mercury	Annually
TO2	Cadmium	Annually
	Mercury	Annually

Table 4 Dust and/or particulate matter monitoring program

Indicator	Limit	Averaging Periods	Locations	Minimum Monitoring Frequency
TSP	90 µg/m^3	24 hour	R1, R2, R3, (See Figure 6)	Continuously
Particulate Matter less than 10µm in aerodynamic diameter (PM_{10})	50 µg/m^3	24 hour	R3 (See Figure 6)	Continuously
Dust deposition (total insoluble solids)	120mg/m^2/day	30 days	R1, R2 (See Figure 6)	Monthly

Associated requirements include:

The following relevant Australian Standards are to be used in Table 4 unless otherwise agreed to in writing by the ***administering authority****.*

(a) AS/NZS 3580.1.1:2007 Methods for sampling and analysis of ambient air - Part 1.1: Guide to siting air monitoring equipment.

(b) AS/NZS 3580.9.8:2001 Method 9.8: Determination of suspended particulate matter – PM10 continuous direct mass method using a tapered element oscillating microbalance analyser.

(c) AS/NZS 3580.9.3:2003 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method.

(d) AS/NZS 3580.10.1:2003 Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method.

(e) AS/NZS 3580.9.11:2008 Methods for determination of suspended particulate matter, PM10 beta attenuation monitors

Table 5 Contaminants, sources, locations of releases to waters, release limits and monitoring

Release Point		Contaminants, Source and Receiving Environment	Parameters (units)	Release Limit			Minimum sample frequency
Eastings and Northings	Name						
Locations				Minimum	Median	Maximum	
326791.838 7357598.907	#4 Ash **dam**	Discharge of seawater and stormwater runoff from ash **dam**, to Ash **Dam** decant pond over **spillway** into South Trees Inlet	pH	6.5	6.5-9.0 (based on 4 day rolling median)[1]	9.5	Continuous
			Total Suspended Solids (TSS) (**mg/L**)	-	50 (based on 6 week rolling median)[2]	100	**Weekly**
			Dissolved oxygen (**mg/L**)	2.0	-	-	**Weekly**
			Standard metal(loid)s[3] (Dissolved metals[4]) (**mg/L**)	-	-	-	Monthly, Daily if pH is outside limits
			Volume (m^3/day)	-	-	-	Continuous
326491.364 7359713.455	Neutralising pond	Discharge of seawater, **process contaminants**, stormwater runoff of alumina A frame, bauxite stockpile, fuel storage area, mineral waste disposal facility, waste transfer station and buffer zone to South Trees Inlet Tidal Pond via pond **spillway**.	pH	6.5	6.5-9.0 (based on 4 day rolling median)[1]	9.5	Continuous
			Total Suspended Solids (TSS) (**mg/L**)	-	50 (based on 6 week rolling median)[2]	100	**Weekly**
			Dissolved oxygen (**mg/L**)	2.0	-	-	**Weekly**

Release Point		Contaminants, Source and Receiving Environment	Parameters (units)	Release Limit			Minimum sample frequency
Eastings and Northings	Name			Minimum	Median	Maximum	
Locations							
			Aluminium (Dissolved[4]) (**mg/L**)	-	-	3.0	**Weekly**, Daily if pH is outside limits
			Standard metal(loid)s[3] (Dissolved metals[4]) (**mg/L**)	-	-	-	Monthly, Daily if pH is outside limits
			Volume (m^3/day)	-	-	-	Continuous
326014.472 7360165.382	West Coal Stilling pond	Discharge of seawater, stormwater from coal stockpile, calciners, and **process contaminants** overflow from West Contaminants Pond to intertidal mangroves and Port Curtis via pond **spillway**	pH	6.5	-	9.5	Continuous
			Total Suspended Solids (TSS) (**mg/L**)	-	-	50	**Weekly**
			Dissolved oxygen (**mg/L**)	2.0	-	-	**Weekly**
			Aluminium (Dissolved[4]) (**mg/L**)	-	-	3.0	**Weekly**, Daily if pH is outside limits
			Standard metal(loid)s[3] (Dissolved metals[4]) (**mg/L**)	-	-	-	Monthly, Daily if pH is outside limits
			Volume (m^3/day)	-	-	-	Continuous
End of Channel: 328335.9224 7350075.171	RMD#2 (includes end of channel, biopond, and C-	Residue waste water from RMD#2 decant pond to South Trees Inlet via 2 diffusers and over**land** flow from bio-pond.	pH	6.5	6.5-9.0 (based on 4 day rolling median)[1]	9.5	Continuous

Release Point		Contaminants, Source and Receiving Environment	Parameters (units)		Release Limit			Minimum sample frequency
Eastings and Northings	**Name**				**Minimum**	**Median**	**Maximum**	
Locations								
Biopond: 328412.969 7350074.299 C-Gate Side Discharge: 328569.774 7350126.214	Gate side discharge)		Total Suspended Solids (TSS) (**mg/L**)		-	50 (based on 6 week rolling median)[2]	100	**Weekly**
			Dissolved oxygen (**mg/L**)		2.0	-	-	Continuous
			BOD5(mg/L)		For interpretation			Weekly
			COD(mg/L)		For interpretation			Weekly
			Standard metal(loid)s[3] (Dissolved metals[4]) (**mg/L**)		-	-	-	Monthly, Daily if pH is outside limits
			Aluminium (Dissolved[4]) (**mg/L**)	Magnesium concentration at sea water break tank[5] is less than (<) 900mg/L	-	-	3.0[6]	**Weekly**, Daily if pH is outside limits

Release Point		Contaminants, Source and Receiving Environment	Parameters (units)		Release Limit			Minimum sample frequency
Eastings and Northings	Name				Minimum	Median	Maximum	
Locations								
			Aluminium (Dissolved[4]) (**mg/L**)	Magnesium concentration at sea water break tank[5] is equal to or greater than (≥) 900mg/L	-	-	1.5	
			Volume (m^3/day)		-	-	170,000	Continuously
Intermittent releases								
326654.551 7360077.85	Sweetening bauxite pond	Stormwater runoff from bauxite stockpile area to overflow drain into South Trees Inlet Tidal Pond	pH		6.5	-	9.5	Daily upon discharge
			Turbidity (NTU)		-	-	150	Daily upon discharge
			Standard metal(loid)s[3] (Dissolved metals[4]) (**mg/L**)		-	-	-	Daily if pH is outside limits
327935.295 7360503.626	Is**land Bund** #4	Stormwater from caustic **bund** to **land** via **bund** valve	pH		6.5	-	9.0	Daily upon discharge
328194.896 7360505.498	Is**land Bund** #2	Stormwater from caustic **bund** to **land** via **bund** valve	pH		6.5	-	9.0	Daily upon discharge

Release Point		Contaminants, Source and Receiving Environment	Parameters (units)	Release Limit			Minimum sample frequency
Eastings and Northings	Name			Minimum	Median	Maximum	
Locations							
325204.4107 7359402.32	**Wetland** Valve Release	Discharge of seawater, stormwater and surface runoff from plant west side including surface areas, workshops, etc. and west gate pond (calciners) to **wetland**s and mudflat area via valve.	pH	6.5	-	9.0	Daily upon discharge
			Total Suspended Solids (TSS) (**mg/L**)	-	-	50	Daily upon discharge
			Standard metal(loid)s[3] (Dissolved metals[4]) (**mg/L**)	-	-	-	Daily if pH is outside limits
			Aluminium (Dissolved[4]) (**mg/L**)	-	-	0.6	Daily if pH is outside limits

1. *Where Median pH range is influenced by **major wet weather events**, a **minimum** 98% compliance must be achieved in a calendar year.*
2. *Where Median TSS is influenced by **major wet weather events** a **minimum** 90% compliance must achieved in a calendar year.*
3. ***Standard metal(loid)s** suite is Al, V, Mo, Ga, As, Cd, Pb, Zn, Cu, Ni, Fe, Mn, Se, Co.*
4. *Dissolved Metals as measured by field filtering at <0.45µm.*
5. *Sea Water Break Tank location – Eastings: 327961.48, Northings: 7351907.162.*
6. *The **maximum** limit applied for twenty-one (21) days after the Magnesium concentration returns to ≥900mg/L.*

Table 6 Trigger values – Red Mud Dam mixing zone

Monitoring Locations	Parameter	Trigger Value		Monitoring Frequency
		Instantaneous Maximum	Annual Median	
Mixing zone - Section A Between upstream Extent (*E326979 N7351359*) and downstream Extent (*E330741 N7349665*) Refer to Figure 8 in Schedule 1				
Monitoring Points: Deep Hole (E328291 N7350087) King Billy Rocks+ *(E329832 N7350517)* RMD Saltwater+ Pumps (E*327167 N7351405)*	pH	-	7.0 – 8.4[1]	Continuously (Deep Hole); Monthly (King Billy Rocks+, RMD Saltwater Pumps+)
	Dissolved* Aluminium (µg/L)	600[2]	60[2]	Monthly
	Dissolved* Gallium (µg/L)[3]	86	-	Monthly
	Dissolved* Molybdenum (µg/L)[3]	540	-	Monthly
	Dissolved* Vanadium (µg/L)[4]	100	-	Monthly
Mixing zone - Section B Between upstream Extent (*E326257 N7352345*) and downstream Extent (*E326979 N7351359*) AND Between upstream Extent (*E330741 N7349665*) and downstream Extent (*E330926 N7348247*). Refer to Figure 8 in Schedule 1.				
Monitoring Points: Boyne Bridge (*E330950 N7349007*) Toolooa Boat Ramp *(E326126 N7351783)*	pH	-	7.0 – 8.4[1]	Continuously (Boyne Bridge); Monthly (Toolooa Boat Ramp)
	Dissolved* Aluminium (µg/L)	100[2]	24[1]	Monthly
	Dissolved* Gallium (µg/L)[3]	86	-	Monthly
	Dissolved* Molybdenum (µg/L)[3]	540	-	Monthly
	Dissolved* Vanadium (µg/L)[4]	100	-	Monthly

+ Sampled monthly, if safe to do so

** Dissolved metals as measured by field filtering at <0.45µm*

1 WQO for Upper South Trees (EPP Water 2009)

*2 locally derived ('Development of Water Quality Targets for QAL RMD2 **Mixing zone**', Parry, 2015)*

*3 derived from toxicity data ('Development of Water Quality Targets for QAL RMD2 **Mixing zone**', Parry, 2015)*

4 ANZECC & ARMCANZ 2000

Table 7 – Groundwater monitoring locations, quality characteristics and frequency

Monitoring Point[1]	Location Coordinates (GDA 94)		Bore Type	Hydro-geological unit	Top of Casing RL (mAHD)[2]	Surface RL (mAHD)[2]	Screened interval bgl (m)	Aquifer	Quality Characteristic[5,6]	Monitoring Frequency
	Easting	Northing								
South Trees Island										
ST4b	328183.980	7360426.236	Compliance	Gravel, Sand	4.554	3.897	3.3-5.5	Shallow	Total Recoverable Hydrocarbons (TRH)[3] Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride Field Filtered Metal(loid)s (Aluminium, Arsenic, Gallium, Molybdenum, Vanadium) Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide) Electrical Conductivity pH Standing water level	Quarterly
ST5	328082.2318	7360335.001	Compliance	Silty Sand	4.218	3.482	2.05-5.05	Shallow		
ST7	327850.1036	7360634.349	Operational	Silty Sand	4.585	4.119	2.0-5.0	Shallow		
ST8b	327882.179	7360734.694	Compliance	Sand, Sandy Gravel	5.005	4.310	3.5-6.5	Shallow		
ST9	327935.213	7360572.43	Operational	Clayey Sand, Silty Clayey Sand	4.679	4.228	2.5-5.5	Shallow		
ST28	328218.358	7360536.554	Compliance	Sand	3.336	2.340	4.5-7.5	Shallow		
ST95a	327805.289	7360618.115	Compliance	Gravel, Sand	4.181	4.167	3.5-6.5	Shallow		
ST123	328186.630	7360685.580	Compliance	Gravelly Sand	2.533	1.725	6.4-8.0	Shallow		
ST125	328201.016	7360597.389	Compliance	Silty Sand	2.606	1.670	2.5-5.5	Shallow		
Plant										
AP1a	325868.909	7360019.953	Operational	TBA	5.275	4.394	2.0-5.0	Shallow	Total Recoverable Hydrocarbons (TRH)[3]	Quarterly

AP2b	325882.441	7360021.459	Compliance	Claystone	5.270	4.369	9.0-12.0	Deep	Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride Field Filtered Metal(loid)s (Aluminium, Arsenic, Gallium, Molybdenum, Vanadium) Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide) Electrical Conductivity pH Standing water level	
AP3	325612.0582	7359733.247	Compliance	Clayey Gravel	6.555	5.900	1.7-3.2	Shallow		
AP4	325609.2282	7359734.327	Compliance	Shale	6.545	5.865	12.6-15.6	Deep		
AP5a	325486.219	7359813.725	Compliance	Sand, Clayey Sand, Fill	5.684	4.873	0.7-3.4	Shallow		
AP13	326137.765	7360164.214	Operational	Silty Clay	4.517	4.392	1.5-4.5	Shallow		
AP15	325706.527	7359025.092	Compliance	Shale	21.669	21.139	19.0-31.0	Deep		
AP16a	326094.4645	7359134.211	Operational	Shale	4.835	4.297	7.7-13.7	Deep		
AP17a	326095.0745	7359136.081	Operational	Silty Clayey Gravel, Shale	4.879	4.281	2.5-5.5	Shallow		
AP43	325009.3119	7359193.441	Compliance	Clay, Silty Clay	4.594	3.861	2.5-5.5	Shallow		
AP44	325004.5119	7359183.641	Compliance	Claystone, Mudstone	4.588	3.568	6.0-12.0	Deep		
Ash/Sand Ponds										
AP7a	324841.908	7360162.470	Operational	Sandy Clay, Fill	4.423	3.603	0.9-2.1	Shallow	Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride Field Filtered Metal(loid)s (Aluminium, Arsenic, Gallium, Molybdenum, Vanadium)	Quarterly
AP8a	324891.733	7360563.913	Compliance	Clayey Sand, Fill	4.447	3.374	1.2-2.7	Shallow		
AP9a	325140.388	7360623.403	Compliance	Gravelly Sandy Clay, Fill	4.795	3.820	1.6-3.1	Shallow		

AP10	325359.4706	7360649.521	Compliance	Sandstone	4.107	3.540	1.75-3.25	Shallow	Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide) Electrical Conductivity pH Standing water level	
AP11a	325715.647	7360802.098	Operational	Clayey Gravel, Silty sand, Fill	5.012	4.421	1.9-4.9	Shallow		
AP12a	325948.592	7360562.095	Operational	Clayey Gravel	5.577	4.588	4.7-6.2	Deep		
AP14	325358.4406	7360645.881	Compliance	Shale	4.115	3.575	9.0-15.0	Deep		
AP18a	326772.080	7357525.692	Compliance	Silty Clay	5.217	4.31	4.1-7.1	Deep		
AP60	326961.938	7358713.319	Compliance	Clayey Silt, Gravelly Clay, Clay, Fill	6.011	5.096	0.9-3.9	Shallow		
AP64	326871.119	7360098.96	Compliance	Gravel, Clay, Fill	5.661	4.985	1.5-4.5	Shallow		
Landfills										
LF6	326335.179	7359226.856	Operational	Clay	6.557	5.158	2.6-5.6	Shallow	Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride	Quarterly
LF7	326165.371	7358400.285	Compliance	Sand	3.990	3.347	2.5-5.5	Shallow		

LF17	326107.046	7358410.566	Operational	TBA	2.979	2.565	0.5-1.0	Shallow	Field Filtered Metal(loid)s (Aluminium, Arsenic, Gallium, Molybdenum, Vanadium) Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide) Electrical Conductivity pH Standing water level	
Red Mud Dam 2										
RM1	330565.2676	7350562.596	Compliance	Sandstone	7.958	7.502	6.0-12.0	Shallow	Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride Field Filtered Metal(loid)s (Aluminium, Arsenic, Cobalt, Gallium, Manganese, Molybdenum, Vanadium) Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide) Electrical Conductivity pH, Total dissolved solids[4],	Quarterly (at a minimum)
RM3a	328465.5915	7350076.901	Compliance	Silty Clay	4.532	4.352	1.0-4.0	Shallow		
RM4	328168.457	7350377.502	Compliance	Shale	9.33	8.961	9.85-15.85	Shallow		
RM24a	331020.09	7351380.43	Compliance	Sandstone	28.050	27.280	16.0-19.0	Shallow		
RM54	328290.686	7353795.776	Compliance	Mudstone	17.280	16.390	15.5-18.5	Shallow		
RM55	328230.585	7353112.48	Compliance	Clay, Mudstone	8.120	6.750	9.0-12.0	Shallow		
RM56	327788.688	7352784.983	Compliance	Mudstone	8.670	7.870	7.0-10.0	Shallow		

RM57	327294.091	7352364.286	Compliance	Mudstone	3.890	3.100	8.0-11.0	Shallow	Standing water level	
RM60	329322.276	7350458.598	Compliance	Silty Clay, Clay, Shale	4.840	3.960	2.0-7.0	Shallow		
RM65	327339.2901	7351411.093	Compliance	Clay	4.290	3.430	3.0-6.0	Shallow		
RM105	328381.081	7352632.312	Operational	Claystone	31.040	30.284	22.5-25.5	Shallow		
RM109	330896.367	7351704.543	Operational	Sandstone	22.726	22.005	17.9-20.9	Deep		
RM110	330532.939	7352200.297	Operational	Claystone	19.373	18.891	18.0-21.0	Deep		
RM111	327856.48	7352208.696	Operational	Claystone	39.416	38.879	21.0-24.0	Shallow		
RM122S	330453.584	7352319.829	Operational	Claystone, Gravelly Clay	11.653	10.898	6.5-12.0	Shallow		
RM122D	330452.391	7352319.206	Compliance	Claystone	11.596	10.913	20.8-26.8	Deep		
RM123D	330719.616	7352438.771	Compliance	Claystone	14.667	14.002	18.0-24.0	Deep		
RM123S	330719.577	7352439.894	Compliance	Claystone, Sandy Gravelly Clay, Clayey Sand	14.716	14.041	11.0-14.0	Shallow		
RM125	327473.376	7352507.661	Compliance	Claystone	19.834	18.990	9.0-18.0	Shallow		
RM132	328115.193	7354484.46	Compliance	Claystone	6.257	5.337	2.0-6.0	Shallow		

SMB09	330073.455	7354684.525	Compliance	Sand, Gravel	1.9	1.11	0.9-2.4	Shallow		
SMB29	331881.999	7352270.09	Compliance	Siltstone	9.1	8.59	10.2-13.2	Shallow		
SMB53	330244	7352379.13	Compliance	Sandstone, Slate	10.67	9.86	21.3-24.3	Deep		
SMB54	330248	7352376.1	Compliance	Sandstone, Slate, Schist	10.52	9.72	9.3-12.3	Shallow		
SMB55	331223.08	7351823.02	Compliance	Quartzite, Slate	22.72	21.94	30.0-33.0	Deep		
SMB56	331223.97	7351819.95	Compliance	Slate, Quartzite	22.51	21.71	13.0-16.0	Shallow		
SMB63	330578.072	7354019.565	Compliance	Claystone, Quartz	6.193	5.542	28.5-32.0	Deep		
WDMB31	330280.351	7352719.975	Compliance	Sandy Clay, Shale, Clay	9.69	9.320	9.0-12.0	Deep		
Historical Red Mud Dam										
RM8	328296.347	7354662.868	Operational	Silty Sand, Sandstone/ Silty Clay	7.432	7.330	1.4 – 4.4	Shallow	Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride Field Filtered Metal(loid)s (Aluminium, Arsenic, Cobalt, Gallium, Molybdenum, Manganese, Vanadium) Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide)	Quarterly (at a minimum)
RM9	328293.86	7354665.13	Operational	Mudstone	7.490	7.272	12.0 – 15.0	Deep		
RM10a	328175.329	7354664.823	Operational	Mudstone	5.203	4.693	8.5 – 11.5	Deep		
RM11	328172.8869	7354660.87	Operational	Silty Clay, Mudstone	4.572	4.311	1.1 – 4.1	Shallow		
RM12	328177.0869	7354703.77	Operational	Silty Clay, Mudstone	4.610	4.310	0.95 – 3.95	Shallow		

RM13a	328178.666	7354701.701	Operational	Mudstone	4.831	4.226	8.5 – 11.5	Deep	Electrical Conductivity pH Standing water level	
RM14A	328424.191	7355896.536	Operational	Unknown	6.184	5.234	TBA	Shallow		
RM15	328867.4833	7356185.659	Operational	Sand	4.340	3.802	1.6 – 4.6	Shallow		
RM16	328317.9868	7355771.162	Operational	Sand, Silty Sand	6.223	5.751	3.0 – 6.0	Shallow		
RM17	329389.608	7355226.303	Operational	Sand	6.222	5.736	1.95-4.95	Shallow		
RM124	329156.132	7355704.793	Operational	Gravelly Sand, Quartz Sand, Sandy Clay	6.473	5.867	3.5-8.0	Shallow		
RM18	329923.575	7354588.769	Operational	Sand	5.047	4.609	0.77 – 3.77	Shallow		
RM19	330021.5743	7354527.469	Operational	Claystone	10.535	10.140	14.7-20.7	Deep		
RM20	330549.196	7353763.298	Operational	Clayey Sand	8.96	8.613	2.43-5.43	Shallow		
RM21	330510.226	7353720.238	Operational	Claystone	8.98	8.578	15.0-21.0	Deep		
RM28	328804.345	7356178.249	Operational	Silty Clay, Sand, Clay	3.175	2.686	6.0 – 14.5	Deep		
RM29	328799.270	7356177.262	Operational	Silty Sand, Clayey Silt	3.293	2.672	2.0 – 5.0	Shallow		
RM45	328372.787	7355892.861	Operational	Sand	4.455	3.618	2.1 – 6.0	Shallow		

RM47	328890.015	7356446.791	Operational	Sand	3.136	2.347	3.0-6.0	Shallow		
RM48	329044.977	7355995.209	Operational	Sand, Silty Clay	7.566	6.743	6.0-9.0	Deep		
RM49	329255.307	7355520.541	Operational	Sandy Clay, Silty Clay	6.556	5.702	6.0-9.0	Deep		
RM75	329676.979	7354951.949		Unknown	4.135	3.435	2.6-4.8	Shallow		
RM80	329370.24	7355162.89	Compliance	Sand, Clayey Sand	4.48	3.419	3.4-4.9	Shallow		
RM86	330204.183	7353079.502	Compliance	Slate	10.758	10.199	19.5-22.5	Deep		
RM87	330203.971	7353076.734	Compliance	Sandy Clay, Sandstone, Shale	10.863	10.271	7.0-10.0	Shallow		
RM89	328183.727	7355029.223	Compliance	Claystone	3.186	2.487	2.8-6.0	Shallow		
RM93	328216.738	7355561.849	Operational	Silty Sand	6.656	6.131	3.0-6.0	Shallow		
RM94	328189.741	7355271.564	Operational	Clay, Sandy Clay	7.534	6.835	4.2-7.2	Deep		
RM35	328280.029	7354723.604	Operational	Silty Sand	8.006	7.260	1.7 – 6.2	Shallow		
RM50	329550.170	7354870.322	Operational	Clayey Sand, Sandy Clay, Silty Clay	5.890	5.020	6.0 – 9.0	Deep		
RM70	329608.33	7354784.39	Operational	Sandy Gravel	6.38	5.619	3.0-6.0	Shallow		

RM104a	328155.399	7354405.938	Compliance	Sandstone	11.095	10.180	6.5-12.5	Shallow		
RM118	331582.956	7350976.299	Compliance	Slate, Quartzite	39.983	39.036	18.7-33.7	Shallow		
RM119	331563.819	7351767.232	Compliance	Slate	26.615	25.763	18.6-21.6	Shallow		
RM121	331516.286	7351319.639	Compliance	Slate	32.593	31.793	20.6-23.6	Shallow		
RM133	328227.954	7355125.574	Operational	Silty Sand	8.970	7.987	5.7 – 8.7	Shallow		
RM134	328250.570	7354904.662	Operational	Silty Sand	9.865	8.920	3.0 – 6.0	Shallow		
RM135	328228.476	7355122.793	Operational	Sand	8.982	8.012	13.0-16.0	Deep		
RM136	328251.564	7354900.542	Operational	Claystone	9.794	8.853	8.6-14.6	Deep		
Interpretation Bores										
SMB14	331599.0005	7352496.909	Interpretation	Clayey SILT	8.3	7.62	7.0-8.5	Deep	Major Ions (Ca, Mg, Na, K, Cl, SO4) Fluoride	Quarterly (at a minimum)
SMB30	331485.0531	7352054.9972	Interpretation	Siltstone	28.8	28.38	23.0-26.0	Deep		
SMB61	331067.407	7353457.028	Interpretation	Clay, Claystone	9.231	8.526	4.0-10.0	Shallow		

SMB62	331068.03	7353455.966	Interpretation	Inferred Claystone	9.322	8.524	22.6-25.6	Deep	Field Filtered Metal(loid)s (Aluminium, Arsenic, Gallium, Molybdenum, Vanadium) Alkalinity (Total, Carbonate, Bicarbonate and Hydroxide) Electrical Conductivity pH Standing water level	

1. *In conjunction with maps of approximate locations within Figure 9 Groundwater monitoring locations – Refinery, Figure 10 Groundwater monitoring locations – South Trees Island and Figure 11 Groundwater monitoring locations – Residue Disposal Area.*
2. *RL must be measured at the top of the bore casing and at the surface to the nearest 5cm.*
3. *TRH required on ST5, AP1a – AP5, AP13, AP15 – AP17a, LF6, LF7 and LF17 only.*
4. *The requirement to monitor for Total dissolved solids to be re-assessed by 22 December 2025.*
5. *pH and EC are field measurements.*
6. *Field filtered metal(loid)s represent the dissolved (<0.45 µm) fraction*

Table 10 – Groundwater contaminant limits (compliance bores only)

Bore	pH (units)[1]	Electrical Conductivity (µS/cm)[1]	Aluminium (µg/L)[2]	Arsenic (µg /L)[2]	Cobalt (µg /L)[2]	Fluoride (mg/L)	Gallium (µg /L)[2]	Manganese (µg /L)[2]	Molybdenum (µg /L)[2]	Vanadium (µg /L)[2]
	Limit A (20th to 80th percentile) only	**Limit B (95th percentile) only**								
RM1	6 -7	50,000	24	2	26	2	2	1,700	2.5	3.1
RM104a	5.8-6.4	52,000	24	2	2.6	2	2	6,400	1.4	1
RM118	6-7	50,000	24	27	32	2	2	2,800	9.6	1.9
RM119	6-7	12,000	24	3.7	3.3	2	2	2,500	3.6	1.9
RM121	6-7	8,400	24	4.9	3.8	2	2	1,300	11.8	1.9
RM122d	5.7-7	45,000	24	7	11	2	2	2,700	6	1.9
RM123s	6-7	28,500	24	3.2	18.4	2	2	310	6	1.9
RM123d	6-7	24,000	55	2	3	2	2	310	6	1.9
RM125	5.8-6.8	18,000	24	3.6	11	2	2	1,500	6	1.7
RM132	5.6-7.1	63,500	24	2	2.5	2	2	910	1	1.9
RM24/RM24a	6.4-7.0	9,700	24	2.2	1	2	2	160	1.4	1.2

Bore	pH (units)[1]	Electrical Conductivity (µS/cm)[1]	Aluminium (µg/L)[2]	Arsenic (µg /L)[2]	Cobalt (µg /L)[2]	Fluoride (mg/L)	Gallium (µg /L)[2]	Manganese (µg /L)[2]	Molybdenum (µg /L)[2]	Vanadium (µg /L)[2]
	Limit A (20th to 80th percentile) only	**Limit B (95th percentile) only**								
RM3/RM3a	6-7	57,000	70	19.2	82	2	2	31,400	9.8	1.6
RM4	6-7	25,000	24	2.4	7.5	2	2	7,600	5.6	1.6
RM54	4.6-6.0	600	1,000	1.4	1	2	2	110	1.1	1.9
RM55	6-7	47,000	24	2	4.4	2	2	2,900	3	1.2
RM56	6-7	41,000	24	5.1	22	2	2	7,500	6	1.9
RM57	6-7	64,000	24	2.5	2.3	2	2	2,700	2.9	1.9
RM60	6-7	46,000	24	13.4	34	2.7	2	7,200	23.4	3
RM65	6.8-7.5	62,000	24	1.9	1	2.6	2.6	6.8	37	4.5
RM80	5.7-6.5	30,000	24	3.3	2	2	2	1,900	10	2.6
RM86	5.4-6.5	62,000	24	11	27	2	2	4,200	3.6	1.9
RM87	5.6-6.2	50,000	24	7.2	50	2	2	5,700	1.3	1.9
RM89	6.6-7.4	68,000	24	1.7	3.2	3.7	2	4,300	9	1.9
SMB29	6-7	24,000	24	3	2.3	2	2	95	2	1.9

Bore	pH (units)[1]	Electrical Conductivity (µS/cm)[1]	Aluminium (µg/L)[2]	Arsenic (µg /L)[2]	Cobalt (µg /L)[2]	Fluoride (mg/L)	Gallium (µg /L)[2]	Manganese (µg /L)[2]	Molybdenum (µg /L)[2]	Vanadium (µg /L)[2]
	Limit A (20th to 80th percentile) only	**Limit B (95th percentile) only**								
SMB53	6-7	63,000	24	2	39	2	2	11,000	6	1.9
SMB54	5.6-6.4	34,000	24	5.3	62	2	2	2,000	6	1.9
SMB55	6-7	12,000	24	34	1	2	2	770	3.4	1.9
SMB56	5.7-6.3	25,000	24	2.1	3.6	2	2	800	1.7	1.9
SMB63	5.4-6.5	66,000	32	5.8	250	2	4.2	15,000	1.6	1
SMB9	6-7	64,000	24	2.7	7.7	2	2	1,100	6.8	1.9
WDMB31	6-7	22,500	24	2	18	2	2	580	1	1

1. pH and EC are field measurements. 2. Field filtered metal(loid)s represent the dissolved (<0.45 µm) fraction.

Table 11 Location of Residue disposal areas

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
Red Mud Dam (Schedule 1, Figure 5)	1	329,008	7,356,186
	2	329,080	7,355,875
	3	329,339	7,355,337
	4	329,367	7,355,185
	5	329,518	7,354,910
	6	329,701	7,354,671
	7	330,024	7,354,504
	8	330,247	7,353,504
	9	330,008	7,352,499
	10	330,156	7,352,344
	11	330,224	7,352,304
	12	330,582	7,352,181
	13	330,662	7,352,113
	14	330,797	7,351,662
	15	330,925	7,351,519
	16	330,865	7,351,204
	17	330,881	7,351,037
	18	330,844	7,351,009
	19	330,850	7,350,978
	20	330,838	7,350,940
	21	330,779	7,350,883
	22	330,699	7,350,837
	23	330,642	7,350,813
	24	330,617	7,350,793
	25	330,570	7,350,774
	26	330,561	7,350,763
	27	330,612	7,350,583
	28	330,429	7,350,536
	29	330,317	7,350,589
	30	330,314	7,350,603
	31	330,352	7,350,696
	32	330,090	7,350,633
	33	330,056	7,350,634
	34	329,748	7,350,548
	35	329,489	7,350,473
	36	329,049	7,350,350
	37	328,956	7,350,346
	38	328,910	7,350,340
	39	328,885	7,350,326
	40	328,835	7,350,326
	41	328,753	7,350,270
	42	328,558	7,350,112

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	43	328,506	7,350,085
	44	328,423	7,350,074
	45	328,317	7,350,067
	46	328,294	7,350,278
	47	328,306	7,350,336
	48	328,204	7,350,339
	49	328,187	7,350,379
	50	327,934	7,350,482
	51	327,745	7,350,602
	52	327,482	7,351,029
	53	327,322	7,351,479
	54	327,294	7,351,523
	55	327,294	7,351,571
	56	327,314	7,351,603
	57	327,498	7,351,694
	58	327,585	7,351,826
	59	327,649	7,351,977
	60	328,020	7,352,420
	61	328,243	7,352,523
	62	328,295	7,352,595
	63	328,362	7,352,635

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	64	328,354	7,352,902
	65	328,446	7,353,129
	66	328,422	7,353,288
	67	328,462	7,353,372
	68	328,506	7,353,420
	69	328,518	7,353,571
	70	328,494	7,353,958
	71	328,414	7,354,181
	72	328,291	7,354,325
	73	328,279	7,354,460
	74	328,275	7,354,584
	75	328,311	7,354,687
	76	328,127	7,355,373
	77	328,143	7,355,488
	78	328,342	7,355,911
	79	330,332	7,354,118
	80	330,510	7,353,941
	81	330,536	7,353,805
	82	330,537	7,353,773
	83	330,528	7,353,753
	84	330,503	7,353,731

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	85	330,217	7,353,749
	86	330,148	7,354030
Ash Dam (Schedule 1, Figure 2)	1	326,859	7,360,111
	2	326,931	7,359,995
	3	326,981	7,359,945
	4	327,005	7,359,920
	5	327,017	7,359,851
	6	327,038	7,359,678
	7	327,014	7,359,463
	8	326,994	7,359,302
	9	326,986	7,359,041
	10	326,980	7,358,822
	11	326,970	7,358,700
	12	326,930	7,358,524
	13	326,917	7,358,386
	14	326,902	7,358,180
	15	326,863	7,357,945
	16	326,842	7,357,797
	17	326,806	7,357,631
	18	326,776	7,357,517
	19	326,651	7,357,582

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	20	326,528	7,357,681
	21	326,368	7,357,812
	22	326,304	7,357,866
	23	326,208	7,358,270
	24	326,240	7,358,276
	25	326,310	7,358,456
	26	326,356	7,358,592
	27	326,375	7,358,602
	28	326,400	7,358,618
	29	326,444	7,358,644
	30	326,485	7,358,683
	31	326,509	7,358,708
	32	326,524	7,358,728
	33	326,523	7,358,756
	34	326,523	7,358,783
	35	326,523	7,358,821
	36	326,500	7,358,839
	37	326,395	7,358,918
	38	326,339	7,359,133
	39	326,357	7,359,198
	40	326,355	7,359,240

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	41	326,754	7,360,020
	42	326,829	7,360,095
Mineral Waste Disposal Facility (Schedule 1, Figure 3)	1	326,183	7,358,851
	2	326,154	7,358,784
	3	326,075	7,358,654
	4	326,116	7,358,606
	5	326,159	7,358,476
	6	326,167	7,358,431
	7	326,178	7,358,378
	8	326,199	7,358,301
	23	326,208	7,358,270
	24	326,240	7,358,276
	25	326,310	7,358,456
	26	326,356	7,358,592
	27	326,375	7,358,602
	28	326,400	7,358,618
	29	326,444	7,358,644
	30	326,485	7,358,683
	31	326,509	7,358,708
	32	326,524	7,358,728
	33	326,523	7,358,756

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	34	326,523	7,358,783
	35	326,523	7,358,821
	36	326,500	7,358,839
	37	326,395	7,358,918
	38	326,339	7,359,133
Asbestos Landfill (Schedule 1, Figure 4)	1	325,859	7,358,534
	2	325,867	7,358,512
	3	325,870	7,358,504
	4	325,892	7,358,483
	5	325,892	7,358,443
	6	325,891	7,358,439
	7	325,876	7,358,433
	8	325,884	7,358,400
	9	325,903	7,358,362
	10	325,877	7,358,350
	11	325,853	7,358,372
	12	325,835	7,358,411
	13	325,832	7,358,420
	14	325,831	7,358,476
	15	325,825	7,358,504
	16	325,828	7,358,505

Name of Residue disposal area	Coordinate Point Reference	Easting (GDA94)	Northing (GDA94)
	17	325,832	7,358,508
	18	325,835	7,358,518
	19	325,836	7,358,525

Table 12 Basic details of Residue disposal areas

Name of Residue Disposal Facility	Hazard Category	Maximum surface area of dam (ha)[2]	Maximum volume of dam (m^3)[3]	Maximum depth height of dam (m)[1]	Use of residue disposal facility
Red Mud **Dam**	High	1167	311,000,000	55	The permanent containment of residues and process liquor resulting from refining of bauxite and burning of fuel at the refinery, spoil containing acid sulphate soils from pipe inlet dredging, pond dredging or excavations conducted at the Red Mud **Dam** or refinery, and soil contaminated with process liquor from the QAL alumina refinery. Sea water is used as a transport agent to carry residues resulting from refining of bauxite to the Red Mud **Dam** via a pipeline. The containment of treated effluent from the Boyne Is**land** Tannum Sands (BITS) wastewater treatment facilities.
Ash **Dam**	Significant	131	13,300,000	16	The permanent containment of residues (bottom fly ash) from the combustion of coal from the QAL alumina refinery. Sea water is used as a transport agent to carry bottom fly ash to the Ash Pond. Sediments from dredging of the Neutralising Pond.
Mineral Waste Disposal Facility	N/A	17	2,100,000	24	The permanent containment of residues resulting from plant scale, **process contaminants**, tank bottom sludges, soil contaminated with process liquor, alumina hydrate, process or bauxite contaminated coal.
Asbestos **Land**fill	N/A	0.8385	N/A	16	The permanent storage of asbestos material removed from the QAL alumina refinery.

1. *Measured from the natural surface at the bottom of the **dam** wall to the surface of the crest of the **dam**.*
2. ***Maximum** surface area of **dam** (ha) is based on footprint of the residue areas. **Maximum** surface area of **dam** (ha) is measured by determining the area that falls within the outer perimeter of the Red Mud **Dam** (being delineated by the outside edge of the exterior roadways and natural embankments (as the case may be) that form the outer bound of the area where residues are contained and associated operational activities are conducted).*
3. *Volume is based on depth as AHD RL.*

Note: Sediments from dredging of the East and West Coal Stilling Ponds can be placed in Sand Pond 3.

Table 13 Hydraulic Performance of Regulated dams

Name of residue disposal areas assessed as a regulated dam	Spillway Capacity or Diversion Capacity (Levees) AEP (2)	Design storage allowance (Dams other than levees) AEP(1)	Mandatory reporting level (Dams other than levees) AEP(2)
Red Mud **Dam**	1:10000	**AEP** 1 in 50 for the 3-month wet season	**AEP** 1 in 50, 72 hour
Ash **Dam**	1:1000	NA	NA

1. *The **design storage allowance** on 1st November of each year for any high **hazard dam** containing hazardous waste **constructed** within the operational **land** must be equivalent to the run-off from a 1 in 50 **AEP** 3-month wet season plus the residue flow from the refinery and the sea water flow from South Trees Inlet less the volume discharged from the RMD discharge to South Trees Inlet.*
2. *The **mandatory reporting level** refers to the level below the **spillway** crest, either the **AEP** 1 in 50, 72-hour storm or the **AEP** 1 in 50 wave allowance, whichever is lower*

END OF ENVIRONMENTAL AUTHORITY