# Permit

***Environmental Protection Act 1994***

## Environmental authority EPPR00926513

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

## Environmental authority number: EPPR00926513

**Environmental authority takes effect on 27 June 2024**

The anniversary date of this environmental authority is 15 September each year.

## Environmental authority holder(s)

| Name(s) | Registered address |
|---|---|
| RTA Yarwun Pty Ltd | 155 Charlotte St BRISBANE CITY QLD 4000 Australia |

**Environmentally relevant activity and location details**

| Environmentally relevant activity/activities | Location(s) |
|---|---|
| ERA 31 - Mineral processing 2: Processing, in a year, the following quantities of mineral products, other than coke (b) more than 100,000t | Lot 1 on RP911260, Lot 1 on SP144430, Lot 1 on SP144433, Lot 13 on RP620157, Lot 14 on SP147866, Lot 20 on SP115224, Lot 21 on SP103896, LOT 21 on SP115224, Lot 22 on SP103896, Lot 23 on SP103896, Lot 23 on SP115225, Lot 27 on SP115227, Lot 503 on SP144788, Lot 54 on SP137048, Lot 7 on SP145439, Lot 7 on SP147726, Lot 7 on SP177782, Lot 7 on SP228453, Lot 79 on CP911258, Lot 8 on SP218634, Lot 9 on SP147866, Lot 91 on SP122250 |
| ERA 50 - Mineral and bulk material handling 2: Loading or unloading 100t or more of bulk materials in a day or stockpiling bulk materials | Lot 1 on SP144433, Lot 14 on SP147866, Lot 21 on SP103896, Lot 22 on SP103896, Lot 23 on SP103896, Lot 502 on SP224189, LOT 502 on SP252988, Lot 6 on SP235022, Lot 7 on SP147726, Lot 8 on SP218634, Lot 9 on SP147866 |



Queensland Government

| Environmentally relevant activity/activities | Location(s) |
|---|---|
| ERA 16 - Extraction and Screening 2: Extracting, other than by dredging, in a year, the following quantity of material (c) more than 1,000,000t | Lot 1 on SP144430, Lot 503 on SP144788, Lot 7 on SP228453, Lot 8 on SP218634 |
| ERA 62 - Resource recovery and transfer facility operation 1: Operating a facility for receiving and sorting, dismantling, baling or temporarily storing- (c) category 2 regulated waste<br><br>ERA 62 - Resource recovery and transfer facility operation 1: Operating a facility for receiving and sorting, dismantling, baling or temporarily storing- (d) category 1 regulated waste | Lot 1 on SP144430, Lot 7 on SP228453, Lot 8 on SP218634 |
| ERA 15 - Fuel burning Using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour | Lot 1 on SP144430, Lot 7 on SP228453, Lot 8 on SP218634 |
| ERA 50 - Mineral and bulk material handling 1: Loading or unloading 100t or more of minerals in a day or stockpiling 50,000t or more of minerals (a) within 5km of the highest astronomical tide or 1km of a watercourse | Lot 1 on SP144433, Lot 14 on SP147866, Lot 21 on SP103896, Lot 22 on SP103896, Lot 23 on SP103896, Lot 502 on SP224189, LOT 502 on SP252988, Lot 6 on SP235022, Lot 7 on SP147726, Lot 8 on SP218634, Lot 9 on SP147866 |
| 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 1 on SP144430, Lot 502 on SP224189, LOT 502 on SP252988, Lot 7 on SP228453, Lot 8 on SP218634 |
| 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 1 on SP144430, Lot 502 on SP224189, Lot 7 on SP228453, Lot 8 on SP218634 |
| 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 1 on SP144430, Lot 502 on SP224189, Lot 7 on SP228453, Lot 8 on SP218634 |
| ERA 16 - Extraction and Screening 3: Screening, in a year, the following quantity of material (c) more than 1,000,000t | Lot 1 on SP144430, Lot 6 on SP235022, Lot 7 on SP228453, Lot 8 on SP218634 |
| ERA 14 - Electricity Generation 1: Generating electricity by using gas at a rated capacity of 10MW electrical or more | Lot 1 on SP144430, Lot 7 on SP228453, Lot 8 on SP218634 |

| Environmentally relevant activity/activities | Location(s) |
|---|---|
| ERA 60 - Waste disposal 1: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(a) (d) more than 200,000t | Lot 1 on SP144430, Lot 7 on SP228453, Lot 8 on SP218634 |
| 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 1 on SP144430, Lot 502 on SP224189, Lot 7 on SP228453, Lot 8 on SP218634 |

**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 contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (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 contaminated land (notice must be given within 20 business days)

that is causing, or is reasonably likely to cause, serious or material environmental harm.

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 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, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken 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.

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 environmental authority.

| T.Gibbs | 27 June 2024 |
|---|---|
| Signature | Date |

Teale Gibbs
Department of Environment, Science and Innovation
Delegate of the administering authority
*Environmental Protection Act 1994*

**Enquiries:**
Minerals Business Centre
Department of Environment, Science and Innovation
Phone: 07 4222 5352
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**Obligations under the *Environmental Protection Act 1994***

In addition to the requirements found in the conditions of this environmental authority, 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 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)

# Legislative Requirements and Conditions of Environmental Authority

## Condition

### General

G1 In carrying out the activities, all reasonable and practicable measures must be taken to prevent and/or to minimise the likelihood of environmental harm.

G2 Maintenance of measures, plant and equipment
The **holder** must:
(a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this **environmental authority**;
(b) maintain such measures, plant and equipment in a proper and efficient condition; and
(c) operate such measures, plant and equipment in a proper and efficient manner.

G3 Records
The **holder** must record, compile and keep all monitoring results and reports required by this **environmental authority** and present any monitoring results or reports to the **administering authority** when requested, including in an electronic form if requested.

G4 All records required by this **environmental authority** must be kept for at least five (5) years unless otherwise stated in this **environmental authority**.

G5 Environmental Management System
An Environmental Management System (EMS), that includes all the requirements of and conforms with AS/NZS ISO 14001:2004 (Environmental Management Systems - requirements with guidance for use) or more recent versions must be implemented that provides for the effective management of the actual and potential environmental impacts resulting from the carrying out of the activities. Documentation relating to the EMS must be kept.

G6 The **holder** must not implement or amend an EMS (including any associated environmental plan) in a manner that contravenes any condition of this **environmental authority**.

G7 Notification
The **holder** must notify the **administering authority** by telephone as soon as practicable, but within twelve (12) hours of becoming aware, of any emergency, event or incident which may:
(a) result 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
(b) have the potential to cause material or serious environmental harm.

*Note: The Pollution Hotline is the most appropriate after-hours contact.*

G8 All other releases of contaminants not in accordance 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 (of becoming aware of the release not being in accordance or reasonably expected to not be in accordance with the conditions of this environmental authority).

G9 Condition no longer required.

G10 Monthly compliance report
A monthly compliance report outlining the following must be submitted 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 (G7) and G8);
(b) complaint information as required by condition (C1) received in the month;

(c) 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 (G7) and (G8):

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 of 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.

G11 Monitoring
A **competent person(s)** must conduct any monitoring required by this **environmental authority**.

G12 Equipment calibration
All instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this **environmental authority** must be calibrated, and appropriately operated and maintained.

G13 Records must be kept of calibration data for all instruments, equipment and measuring devices used for measuring or monitoring in accordance with any condition of this **environmental authority** and submitted to the administrating authority when requested.

G14 Trained and experienced operator(s)
All persons engaged in the conduct of the activities, including but not limited to employee(s) and contract staff must:

(a) be trained in the procedures and practices necessary to:
    i. comply with the conditions of this **environmental authority**; and
    ii. prevent environmental harm during normal operation and emergencies;

(b) be under the close supervision of a trained person as required in (G14)(a); and
(c) maintain records of training required by this condition.

G15 The **holder** must develop a dispersion model and apply the modelling to any air emission incident that the **holder** reasonably considers (based on available information) may have caused, or has the potential to cause, serious or material environmental harm beyond the **site** boundary. The:

(a) modelling must have the capacity to report within two (2) hours of an incident; and
(b) modelling report must be made available to the **administering authority** within two (2) hours of the model results being available.

G16 Third Party Environmental Auditing
Compliance with conditions of this **environmental authority** must be audited within forty (40) days of completion of **commissioning** and every three (3) years thereafter and for the EMS required by condition (G5) must be audited within six (6) months of the date of this **environmental authority** and every three (3) years thereafter.

G17 The audit(s) required by condition (G16) must be conducted by a **suitably qualified third party auditor**, nominated by the **holder** and accepted by the **administering authority**.

G18 For the audit(s) required by condition (G16) the **holder** must submit a final version of the auditor's report to the **administering authority** within fourteen (14) days of receiving the audit report. The report must be accompanied by 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.

G19 The total financial cost of the audit(s) required in condition (G16) will be the responsibility of the **holder**.

G20 The **holder** must within a reasonable period of time agreed to in writing by the **administering authority** take steps to respond to any recommendations arising from the audit report, including:

(a) investigating any non-compliance issues identified;

(b) as soon as practicable, implementing measures or taking necessary action to ensure compliance with the **environmental authority**; and

(c) provide written advice to the **administering authority** regarding the above.

G21 Scale and intensity of use of the activities
The scale of the alumina refinery and associated ERA(s) authorised under this **environmental authority** is that scale and intensity indicated in the application information titled "RTA Yarwun Pty Ltd - Supporting Information for a MCU ERA development permit application – Environment report for expansion of the refinery dated February 2012, GHD" and the production of not more than 4.0 million tonnes of alumina per year.

**Condition**

**Acoustic**

N1 Noise release
All noise from the activities must not exceed an $L_{Aeq, adj}$, 1 hour value of 43 dB(A), when measured outside at any **nuisance sensitive place** other than those located on Lot 11 plan SP108408 and Lot 1 plan MPH32292.

N2 If the outside measured noise from activities exceeds an $L_{Aeq, adj, 1 hour}$ value of 44 dB(A), and noise complaints are received from residents at a **nuisance sensitive place** located on Lot 11 plan SP108408 and Lot 1 plan MPH32292, then remedial measures must be taken that are acceptable to those residents, or noise attenuation measures must be installed, to reduce measured noise levels at the relevant **nuisance sensitive place**(s) to a **maximum** $L_{Aeq, adj, 1 hour}$ value of 44 dB(A).

N3 Noise monitoring
When requested by the **administering authority**, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the **administering authority** to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of **environmental nuisance** at any sensitive or **commercial place**, and the results must be notified within fourteen (14) days to the **administering authority** following completion of monitoring. Monitoring must include:

(a) airblast overpressure (dB (Lin) Peak)-when relevant;

(b) $L_{Aeq, adj, 1 hour}$;

(c) $L_{A1, adj, 1 hour}$;

(d) the level and frequency of occurrence of any impulsive or tonal noise from the activities;

(e) atmospheric conditions including wind speed and direction and atmospheric stability;

(f) if there were any effects due to extraneous factors such as traffic noise;

(g) location, date and time of recording; and

(h) location of complainant (if relevant).

N4 The method of measurement and reporting of noise levels must comply with the latest edition of the **administering authority**'s Noise Measurement Manual.

N5 Blasting
A person must not conduct blasting if:
(a) the airblast overpressure is more than 115dB Z Peak for 4 out of any 5 consecutive blasts;
(b) the airblast overpressure is more than 120dB Z Peak for any blast;
(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.

N6 Within 5km of a **nuisance sensitive place** when blasting is carried out, a monitoring program must be implemented to measure air blast overpressure & vibration and when requested by the **administering authority**, airblast overpressure & vibration monitoring and recording must be undertaken to investigate any complaint of nuisance.

**Condition**
**Air**

A1 Weather Monitoring Program
A weather monitoring station must continually measure and record the following meteorological parameters:
(a) air temperature;
(b) relative humidity;
(c) wind direction;
(d) wind speed; and
(e) rainfall.

A2 Releases to the atmosphere
Contaminants must only be released to the atmosphere from the release points and in compliance with the limits identified in Schedule 3, Air - Table 1 (Source description).

A3 Contaminants must not be released to the atmosphere at a concentration or a mass emission rate calculated over the averaging period, as measured at a monitoring point, in excess of that stated in Schedule 3, Air - Table 2 (Contaminants release limits to air), with the exception of:
(a) a **cogeneration exemption**, relating to oxides of nitrogen; and
(b) a **boiler exemption**, relating to sulphur dioxide.

A4 Contaminants must be monitored not less frequently than as set out in Schedule 3, Air - Table 3 (Required release point determinations).

A5 Complaint monitoring
When requested by the **administering authority**, monitoring must be undertaken to investigate any dust, particulate matter, odour or other noxious/offensive environmental complaint of environmental nuisance caused by a release to the atmosphere 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 location of the monitoring;
(d) the methods and relevant standard to be complied with;
(e) any evaluation, inspection and review of potential dust, particulate matter, odour or other noxious/offensive emission sources and associated pollution control systems;

(f) any review and interpretation of monitoring results;
(g) any modelling required; and
(h) the date the results and analysis is to be submitted to the **administering authority**.

A6 If monitoring in condition (A5) indicates that **environmental nuisance** is caused or threatened from the activities, then the **holder** must as soon as practicable implement abatement measures such that the releases from the activities will not result in further **environmental nuisance**.

A7 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) all determinations must be made by a person or body registered by the **NATA** unless otherwise approved by the **administering authority**;
(b) monitoring provisions for the release points listed in Schedule 3, Air - Table 2 (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);
(c) all determinations of contaminant releases to the atmosphere must be made in accordance with methods prescribed in the most recent version of the **administering authority**'s Air Quality Sampling Manual or any other method approved by the **administering authority**;
(d) samples must be taken when emissions are expected to be **representative of actual operating conditions** for the sample frequency period; and
(e) during the sampling period, the following additional information must be gathered:
    i. process plant production rate at the time of sampling and detailed commentary on the stability and phasing of the processes leading up to (at least 24 hours) and through the time of sampling; and
    ii. raw materials used; and
    iii. production rates for the frequency period; and
    iv. any other factors that may influence air emissions (e.g. changes to auxiliary air supplies).

A8 Fuel burning
The only type of fuel to be burnt in the gas turbine (co-generation plant) is **natural gas**.

A9 Air Pollution Control Systems
The **holder** must maintain a current inventory of design data and maintenance requirements, including maintenance history for all air pollution control devices operated at the **site**.

A10 Where pollution control systems are installed to treat exhaust gases, dust and vapours from the activities:

(a) they must be maintained and operated in accordance with the manufacturer's operating instructions or manufacture's specifications;
(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) operational to detect filter medium breakthrough installed across the boundary of the active filter bags;
    ii. have a monitoring system including an alarm, installed and operating to alert of filter medium breakthrough, and

iii. be designed and maintained to treat flue gases at maximum rates when one cell is isolated.

(c) or flue gas desulphurisation, the equipment must monitor and record parameters that indicate effective performance, for example scrubber liquor pH and scrubber liquor pump recirculation; and

(d) a standby power supply system must be installed to ensure continuous operation of the air pollution control equipment.

A11 Where monitoring of air pollution control equipment indicates impaired operational performance, 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**.

A12 Condition no longer required.

A13 Condition no longer required.

A14 Dust and particulate matter nuisance
The release of dust and/or particulate matter resulting from the activities must not cause an **environmental nuisance** at any **nuisance sensitive place**.

A15 Odour nuisance
The release of noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) resulting from the activities must not cause any **environmental nuisance** at any **nuisance sensitive place**.

A16 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**

A17 Condition no longer required.

A18 The **holder** must conduct and document an assessment of actual ground level concentrations of sulphur dioxide released during a boiler exemption permitted under condition (A3), using the Gladstone Regional Air Monitoring Network, to ensure compliance with the relevant air quality objectives for SO2 specified in the Queensland Environmental Protection (Air) Policy 2008.

**Condition**
**Land**

L1 Except as otherwise authorised by condition (L2) activities on **site** must be conducted in a way that prevents any potential or actual release of contaminants to land.

L2 There must be no release of contaminants to land other than:

(a) Any **non-continuous spill** of process contaminants in areas identified in **Schedule 2 - Figure 1** known as the 'refinery first flush system' provided that removal of the process contaminants commences within 24 hours of the **holder** becoming aware of the **non-continuous spill**.

(b) Any non-continuous spill of process contaminants in areas identified in **Schedule 2 - Figure 5** provided that removal of the process contaminants commences within 24 hours of the **holder** becoming aware of the **non-continuous spill**.

(c) Any **non-continuous spill** of hydrocarbons provided that removal of the hydrocarbons commences within 24 hours of the **holder** becoming aware of the **non-continuous spill**.

(d) Seawater return spills not exceeding 100 litres.

(e) Thickener underflow or overflow where it is directed to the RMA via the designated channel as shown in **Schedule 2 - Figure 5**.

L3 Rehabilitation of extraction areas
As soon as practicable, but no later than 6 months after completing the extraction activities areas disturbed as a result of extractive and screening activities must be rehabilitated by:

(a) remediation of contaminated **land** caused by the **activity** in accordance with Environmental Protection Act 1994 requirements;

(b) undertaking works to establish a safe, **stable**, non-polluting landform similar to that of surrounding undisturbed areas (or other use as agreed with the landowner), including where relevant;
   i. removing any stockpiles;
   ii. re-establishing surface drainage lines;
   iii. minimising the potential for slumping, subsidence or erosion;
   iv. reinstating the **topsoil** if area is going to be revegetated;
   v. respreading any cleared vegetation; and
   vi. promoting establishment of vegetation of similar species composition and density of cover;

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

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

(e) 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**, the **holder** must only comply with part (c) and (d) of this condition.*

L4 The only contaminants permitted to be stored in the **Residue Management Area Dam** are residues resulting from handling and refining of bauxite, burning of fuel at and acid sulphate soils from the Rio Tinto Alcan Yarwun refinery and associated infrastructure in Yarwun.

L5 Residue Management Area Dams
The **hazard category** of the **Residue Management Area Dams** must be **determined** by a **suitably qualified and experienced person** at least once every two (2) years.

L6 Regulated Dams - Location
**Residue Management Area Dams** must be wholly located within the control points defined in Land— Table 1 (Location of Residue Management Area Dams).

**Land — Table 1 Location of Residue Management Area Dams**

| Name of Regulated Dam | Coordinates | MGA/GDA94 |
|---|---|---|
| Residue Management Area Dam 1 | North-West | 302837.943E 7360038.294N |
| | North- East | 304613.533E 7360501.200N |
| | South-East | 305951.024E 7357639.463N |
| | South-West | 303373.838E 7357797.158N |

L7 The Residue Management Area Dams must comply with the basic details in Land — Table 2 (Basic Details of Residue Management Area Dams).

**Land — Table 2 Basic Details of Residue Management Area Dams**

| Name of Regulated dam | Hazard Category | Maximum surface area of dam (ha) | Maximum volume of dam ($m^3$) | Maximum depth of dam (m)* | Use of dam |
|---|---|---|---|---|---|
| Residue Management Area Dam 1 | High | 411 ha | 87 Million $m^3$ | 55m | The permanent containment of residues resulting from refining of bauxite, burning of fuel at or acid |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | sulphate soils from the Rio Tinto Alcan Yarwun alumina refinery at Yarwun. |

*Notes:*

*i. Measured from the natural surface at the bottom of the dam wall to the surface of the crest of the dam.*

*ii. Maximum surface area of dam (ha) is measured by determining the area that falls within the outer perimeter of the Residue Management Area 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).*

L8 All **Residue Management Area Dam**s must meet the **hydraulic performance** criteria specified in Land — Table 3 (**Hydraulic Performance** of Residue Management Area Dams).

**Land — Table 3 Hydraulic Performance of Residue Management Area Dams**

| Name of Regulated dam | Spillway Capacity or Diversion Capacity (Levees) AEP (3) | Design Storage Allowance (Dams other than levees) AEP(1) | Mandatory Reporting Level (Dams other than levees) AEP(3) |
|---|---|---|---|
| Residue Management Area Dam 1 | PMF | AEP 1 in 50 for the 3 month wet season plus expected annual process inputs | AEP 1 in 50, 72 hour |

*Notes:*

*i. 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 process inputs for the 3 month wet season. Process inputs refers to the net volume of hazardous minerals, process waste and water, which are being permanently disposed of in the storage facility.*

*ii. The critical design storm has a duration that produces the peak discharge for the catchments.*

*iii. 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.*

L9 Regulated Dams - Certification and operation
The **Residue Management Area 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**.

L10 **Construction** works on the within the **Residue Management Area Dam**, including any modification or lift, must not be commenced unless the **holder** has submitted to the **administering authority** a copy of a **design plan**, together with the **certification** by a RPEQ that the design of the **dam** will deliver the performance stated in that submitted **design plan** and that **dam** it is compliant in all respects with this **environmental authority**.

L11 The **environmental authority holder** must submit:

(a) A copy of a set of 'as **constructed**' drawings to the **administering authority** 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**; and

(b) the drawings and **certification** in (L11)(a) to the **administering authority** prior to commencing operation of that component of the **Residue Management Area Dam** that was subject to modification or lift referenced in the **design plan** in condition (L10).

L12 An **operational plan** must be kept current for the **Residue Management Area**.

L13 Where an **operational plan** covers **decommissioning** and **rehabilitation**, those operations are to be consistent with the **design plan** for the **Residue Management Area** and the **rehabilitation** requirements of this **environmental authority**.

L14 The **holder** must notify the **administering authority** as soon as possible, but within 24 hours, of the level in the **Residue Management Area Dam** reaching the **mandatory reporting level (MRL)**.

L15 Residue Management Area – Annual inspection and report
The **Residue Management Area** must be inspected annually by a **suitably qualified and experienced person**.

L16 At each annual inspection, the condition and adequacy of all components of the **Residue Management Area Dam** must be assessed:

(a) against the most recent **hazard** assessment report and **design plan**;
(b) against recommendations contained in previous annual inspections reports;
(c) against recognised **dam** safety deficiency **indicators**;
(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 sediment, state of the containment barrier and the level of liquids in the dam.

L17 At each annual inspection, if a **mandatory reporting level** is required, it must be determined and marked on the **Management Area Dam**.

L18 A final assessment of adequacy of available storage in the **Residue Management Area 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 each dam assessed, **certified** by the **suitably qualified and experienced person** and including any recommended actions to be taken to ensure the integrity of the **Residue Management Area**; must be provided to the **administering authority** by 1 December each year.

L20 De**commissioning**
A De**commissioning** Strategy for the **Residue Management Area** must be documented and submitted to the **administering authority** at least five (5) years prior to the commencement of decommissioning the **Residue Management Area**.

L21 The **Residue Management Area** must be decommissioned in accordance with the De**commissioning** Strategy.

L22 On cessation of operation of a **Residue Management Area Dam**, that **dam** must be maintained so as to avoid environmental harm until that **dam** is decommissioned.

L23 Prior to the cessation of the activities, the **Residue Management Area Dam** must be decommissioned such that it either:

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

(b) is a **void** authorised by the **administering authority** to remain after **decommissioning**; and
(c) the dams contents is approved or authorised under relevant legislation for a **beneficial use**; and
(d) is compliant with the **rehabilitation** requirements of this **environmental authority**.

L24 Rehabilitation of the Residue Management Area Dam
The **holder** must in consultation with the **administering authority** develop, implement and submit to the **administering authority** a Final Land Use and **Rehabilitation** Plan for that part of the **Residue Management Area Dam** to be decommissioned at least five (5) years prior to such de**commissioning** commencing. The Plan must include, but is not limited to, the following:
(a) disturbance type;
(b) disturbance area;
(c) land use after operations cease;
(d) 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;
(e) species of vegetation to be planted for the **rehabilitation** program including revegetation acceptance criteria if applicable, taking into consideration the surrounding **land** use;
(f) receiving and run-off water standards; and post operations closure, maintenance and monitoring requirements;
(g) **indicators** for success; and
(h) keeping appropriate records of **rehabilitation** measures implemented including taking of photographs demonstrative or **rehabilitation** achieved and the preparation of annual **rehabilitation** progress reports.

L25 Any amendments to the **Rehabilitation** Plan are to be submitted to the **administering authority**.

L26 All areas significantly disturbed by residue disposal must be rehabilitated in accordance with the acceptance criteria, referred to in the report provided in condition (L24) and as modified by the **administering authority**.

L27 If no modifications are advised by the **administering authority** to the **holder** within twelve months of the receipt of the report by the **administering authority**, then the acceptance criteria referred to in the report will apply.

L28 Once the final **land** use and **rehabilitation** plan in implemented, the **holder** must submit an annual **rehabilitation** progress report to the **administering authority**. The report should be provided with by 1 April each year until the **environmental authority** is surrendered or the **administering authority** advises that this reporting is no longer required, (whichever is the earlier).

L29 Waste handling
All regulated waste removed from the **site** must be removed by a person that holds a current approval to transport such waste in accordance with the provisions of the Environmental Protection Act 1994 and sent to a facility that is permitted to accept such waste.

**Condition**
**Social**

C1 Complaint response
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 (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

C2 The **holder** or its representative must, when requested by the **administering authority**, reasonably cooperate with and participate in any community environmental liaison committee established in respect of either the **site** specifically, or the area where the **site** is located.

**Schedule W – Water**

**W1 Pipelines, diffusers and pump stations**

Except as otherwise authorised by this **environmental authority**, there must be no release of contaminants to waters.

**W2 Permitted contaminant release and discharge point(s)**

Contaminant(s) must only be released directly or indirectly to **waters** at the locations mentioned in Schedule 3, Water - Table 1 (Contaminants, sources and locations for releases to waters) and Schedule 2, Water – Figure 2 – (Release points and monitoring locations), in accordance with the contaminant release conditions and limits in Schedule 3, Water - Table 2 (Release limits and monitoring).

**W3 Release circumstances W1**

The discharge via release point W1 must be submerged such that the top of the diffuser is at least two (2) metres below Lowest Astronomical Tide (LAT).

**W4** All contaminants discharged via release point W1 must be released through suitable diffusers to achieve a **minimum** initial dilution of 1:54 within 100 metres of the diffusers under all circumstances.

**W5** Where more than one diffuser is installed to serve release point W1, the individual component diffusers must not overlap each other.

**W6 Volumes released**

The hourly discharge volume of contaminants released to **waters** from discharge location W1 must be measured and records kept. This data must be provided in the specified format to the **administering authority** when requested.

**W7** There must be no discharge of contaminants from the **Residue Management Area Dam** (RMD) to **waters** except the seawater return line discharge released to **waters** from discharge location W1.

**W8** Measurements of volumes released from W1 must be **determined** by an appropriate method with an accuracy of +/-5%, (e.g. a calibrated flow meter).

**W9** Monitoring of releases from W1 for pH and turbidity must involve instrumentation that is continuous, on-line and be able to be recorded and alarmed.

**W10** The **maximum** allowable saltwater intake must not exceed 3850m$^3$/per hour.

**W11** The **minimum** available storage to be provided for release points W2 and W3 (the first flush ponds) must be not less than the volume equivalent to twenty (20) millimetres of rainfall (per rainfall event) on the catchment served by each pond.

**W12 Release monitoring**

Monitoring of contaminants released to **waters** and water quality must be undertaken for the quality characteristics and parameters, at the monitoring point(s), and at the frequencies specified in Schedule 3, Water - Table 2 (Release limits and monitoring).

**W13** All determinations of water quality must be:

a) made in accordance with methods prescribed in the latest edition of the **administering authority**'s Monitoring and Sampling Manual; and

b) carried out on samples that are representative of the discharge; and

c) samples collected must be analysed by a **NATA certified** laboratory or as approved by the **administering authority** using an approved methodology with sufficient sensitivity (Limit of Reporting) to adequately demonstrate whether or not the water characteristic complies with the relevant release limit prescribed in Schedule 3, Water - Table 2 (Release limits and monitoring).

**W14** The pH of discharge **waters** from W3 (eastern first flush) and W2 (northern first flush) must be continually monitored.

**W15 Toxic substances (acute and chronic)**

Notwithstanding any other condition of this **environmental authority**, there must be no discharge of any contaminants to any **waters** that exhibit toxicity (expressed as a LOEC) to any relevant test organisms in Direct Toxicity Assessments (DTAs) at a wastewater concentration that can be achieved within 10 metres of the diffuser.

**W16 Direct Toxicity Assessment (DTA)**

The **holder** must undertake DTAs to quantify the toxicity of the wastewater discharge and demonstrate compliance with condition (W15), and to confirm there has been no unacceptable level of toxicity to the test organisms. The DTA must be undertaken as required by and in accordance with the following:

a) all DTAs must be carried-out and reviewed by a third party suitably qualified environmental aquatic ecotoxicologist(s) or other experts as required; and

b) a Routine Direct Toxicity Assessment (Routine DTA) must be undertaken every four (4) years; and

c) Where the toxicological risk assessment in condition (W17) determines that an increased toxicological effect may occur, a 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 water sample/s representative of the change. The scope and components of the DTA must comply with the procedure in condition (W19); and

d) an Event-based Direct Toxicity Assessment (Event-based DTA) must be undertaken wherever one or more specific trigger limits, indicated in Schedule 3, Water - Table 2 (Release limits and monitoring) for release point W1 are exceeded on four consecutive occasions as measured at the monitoring point W1. The Event-based DTA must be undertaken utilising indicator organisms sensitive to the change. 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; and

e) where successive DTA programs have identified specific test species as consistently the most sensitive for the purpose of detecting toxicity, then the suite of test species can be reduced to include only those test species. Any intention to change the numbers or types of toxicity tests used for DTA must be submitted to the **administering authority**.

**W17 Toxicological Risk Assessment**

A Toxicological Risk Assessment (TRA) must be undertaken to determine whether any proposed or accidental change to the process (including changes to inputs and/or treatment process) is **likely**[1] 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 30 days of the proposed or accidental change occurring. 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.

1. *likelihood of increased toxicological effect should be assessed using best professional judgment and supported by any available empirical or theoretical evidence. This may include changed chemical profile data at any stage of the effluent treatment process or independent expert judgement, such as that provided by a third party or government advisory agency through a process of compliance audit.*

**W18** All DTAs required by this **environmental authority** must comply with the DTA requirements mentioned in condition (W19).

**W19 DTA requirements**

The DTA must include all specific methods and protocols to determine whether concentrations of toxicants are acutely toxic outside the approved acute toxicity zone or chronically toxic outside the approved chronic toxicity zone to any organisms assessed in the DTA, including:

a) specific test organisms to be utilised for DTA testing, in accordance with Section 8.3.6.8 of the ANZECC 2000 Guidelines, to provide an accurate indication of acute and chronic toxic effects in the receiving waters, taking into consideration locally occurring species and the nature of any change being investigated;

b) the selection and characterisation of environmental waters for dilution of the combined waste streams;

c) characterisation of the wastewater stream, including potential toxicants present. This must include the toxicants of concern mentioned in Schedule 3, Water– Table 3 (Toxicants of concern for Direct Toxicity Assessment);

d) the nature of the contaminant(s);

e) acute and chronic DTA testing conducted on end-of-pipe wastewater discharged;

f) the mixing zone dilution effects likely to be provided by the discharge structure;

g) test/biological end points;

h) DTA end-points (including NOEC and LOEC);

i) quality assurance/quality control;

j) applicable Toxicity Identification Evaluation (TIE) procedures to be followed should the **administering authority** require such an evaluation; and

k) reporting of DTA procedure results promptly to the **administering authority**, which must include but not be limited to:

   i. NOEC for all bioassay results; and

   ii. LOEC for all bioassay results; and

   iii. all relevant sample collection information for the combined waste test sample and receiving **environment** dilution water; and

   iv. timing of combined waste test sample collection in relation to process performance; and

v. details of any manipulation of the combined waste test sample or receiving **environment** dilution water; and

vi. test sample and receiving **environment** dilution water delivery details; and

vii. results of the chemical analysis of the combined waste test sample for known toxicants of concern, receiving **environment** dilution water, and the test water (combined wastes/receiving water) for each of the dilutions; and

viii. time between test sample collection and commencement of the DTA, and

ix. interpretation of results.

**W20** The **holder** must submit a report which includes all requirements of (W19) and the results of DTA testing to the **administering authorit**y no more than twenty (20) days following the completion of the report.

**W21 Diffusers validation**

The **holder** must provide to the **administering authority** a Diffuser Modelling Validation Plan and implement the plan within six (6) months of the completion of **commissioning**. The monitoring plan must be undertaken when waste water flows are at **maximum** rates. The monitoring plan must have the following objectives:

a) to validate all modelling and investigations related to the diffuser; and

b) to confirm that expected dilutions predicted in design of the diffuser under specified flow conditions are met as a **minimum**.

**W22** The Diffuser Modelling Validation Plan required by condition (W21) must include but not be limited to) the following:

a) a description of the diffuser as installed;

b) a description of applicable receiving environmental value and sediment and water quality objectives to be achieved;

c) sampling of reference sites to determine the background concentration of relevant water quality parameters;

d) sampling of the water column in the plume to determine and confirm the extent of the acute and chronic toxicity zone;

e) investigate employing other approaches (e.g. dye-based diffuser validation techniques) where electrical conductivity-based methods are inconclusive;

f) sufficient samples must be collected to determine the temporal and spatial extent of the toxicity zones within the plume;

g) the methods for the collection and analysis of samples (including the Quality Assurance and Quality Control protocols adopted);

h) the methods of analysing the data and responding to the results; and

i) monitoring must be done by a **competent person**(s) in accordance with methods prescribed in the latest edition of the administering authorities Water Quality Sampling Manual, and carried out on representative samples.

**W23** The **holder** must consider any comments provided by the **administering authority** in relation to the Diffuser Modelling Validation Plan.

**W24** The **holder** must provide to the **administering authority** a Diffuser Validation Report not more than twenty (20) days after the receipt of results obtained from the Diffuser Modelling Validation Plan. The report must include:

a) the results of the monitoring required by the Diffuser Modelling Validation Plan;

b) any deviations and reasons for such deviations from methods stated in the diffuser modelling validation plan;

c) a determination on the validation of modelling and investigations undertaken;

d) a statement confirming that **minimum** expected dilutions predicted in design of the diffuser under specified flow conditions are met;

e) any resulting recommendations for changes that are necessary to minimise the likelihood of environmental harm and size of the initial mixing zone, if **minimum** dilutions are not achieved; and

f) any resulting recommendations for changes to the Receiving environment Monitoring Program.

**W25** A further diffuser validation program must be undertaken if the diffuser structures serving release point W1, once validated, undergo any significant modification of the diffuser structure, depth settings, increases in discharge volumes, or increases in toxicity of the wastewater occur or there is a significant change to local oceanographic conditions.

**W26 Receiving Environment Monitoring Program**

Within six (6) months of the commencement of this **environmental authority** a Receiving **Environment** Monitoring Program (REMP), focussing on near field and further field impacts, must be developed in consultation with the **administering authority** and then implemented. The program must be based on the outcomes of background environmental investigations, pertaining to the receiving **waters** (i.e. Port Curtis and connected waters) that address at least the following:

a) description of potentially affected receiving **waters** including key communities and background water and sediment quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);

b) description of applicable environmental values and sediment and water quality objectives to be achieved;

c) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving **environment** within which the REMP is proposed; and

d) water and sediment quality targets within the receiving **environment** to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP.

**W27** In relation to the Receiving **Environment** Monitoring Program required by condition (W26), a report, summarising the findings of the Receiving **Environment** Monitoring Program must be submitted to the **administering authority** annually.

**W28 Stormwater management**

There must be no release of stormwater that has been in contact with any contaminants at the **site** to any waters, other than in accordance with the conditions of this **environmental authority**.

**W29** Erosion and sediment control measures must be implemented and maintained to minimise on site erosion.

**W30** Condition no longer required.

**W31 Stormwater, Erosion and Sediment Control Plans**

A Stormwater, Erosion and Sediment Control Plan must be implemented and must include, but is not limited to the below:

a) the location of the discharge points;

b) prevention of incident storm water and storm water run-off from contacting wastes or contaminants;

c) diversion of uncontaminated stormwater away from areas where it may be contaminated by bulk products being loaded or unloaded, wastes, contaminants or other materials;

d) collection, treatment and disposal of all contaminated storm water run-off;

e) contaminated stormwater runoff and incident rainfall is collected and treated, reused, or released in accordance with the conditions of this **environmental authority**;

f) roofing or minimising the size of areas where contaminants or wastes are stored or handled;

g) revegetating disturbed areas as soon as practicable after the completion of works;

h) using alternate materials and or processes (such as dry absorbents) to clean up spills that will minimise the generation of contaminated waters;

i) erosion and sediment control structures are placed and maintained to minimise erosion of disturbed areas and prevent the contamination of any waters;

j) an inspection and maintenance program for the erosion and sediment control features;

k) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season months;

l) additional erosion and sediment control measures on slopes >10%;

m) surface water monitoring program designed to detect erosion and sediment runoff into **watercourses**; and

n) identification of remedial actions that would be required to ensure compliance with the conditions of this environmental authority.

**W32 IECA erosion and sediment control plan**

Any **significant earthworks** and **construction** project that will cause a disturbance to areas must have an implemented erosion and sediment control plan for that project that complies with the International Erosion Control Association (IECA) guidelines.

**W33** An erosion and sediment control plan in condition (W32) must be **certified** by a Certified Professional in Erosion and Sediment Control (CPESC) and submitted to the **administering authority** before commencement of the **significant earthworks** and **construction** project.

**W34** Each sediment basin referenced in the erosion and sediment control plan required by condition (W32) must have the capacity to contain and treat all the stormwater runoff from the 85th percentile 5 **day** rainfall depth of 32.8mm.

**W35** All discharges from W4, W10, W11, W11b, W12, W14, W15, W16, W17 and W17b must be reported to the **administering authority** within 24 hours or the next business day.

**W36** By 1 November each year, the **holder** must assess the capacity of W7, W8, W6, W3 and W2 sedimentation ponds and remove deposited sediment if required to achieve design storage allowance.

**W37** The **holder** must visually inspect the ponds, embankments and **spillway** within twelve (12) hours of each overflow event. The inspection must be to determine the effectiveness of the erosion and sediment control measures and integrity of these structures. The inspection must be documented and necessary actions taken to ensure the integrity of the system is maintained. Where the inspection cannot be carried out due to safe access issues, the

**administering authority** must be notified within twelve (12) hours of the overflow event and the inspection must be carried out as soon as safe to do so.

**W38 Groundwater**

The **holder** must not release contaminants to groundwater.

**W39** Groundwater quality and standing water level must be monitored:

a) at the locations defined in Schedule 3, Water – Table 4 (Alumina Refinery, Caustic Storage, and Residue Management Dam groundwater monitoring locations).

b) for the quality characteristics and at the frequency specified in Schedule 3, Water – Table 5 (Groundwater monitoring).

**W40** The **holder** must ensure a groundwater monitoring program is performed which complies with the following requirements:

a) the program must be able to determine the impacts of the activities on the groundwater quality in the underlying aquifer(s);

b) the program must include, but not be limited to, a sufficient number of bores installed at locations and depths which yield representative groundwater samples from at least the uppermost aquifer so as to:

i. detect any seepage of contaminants to groundwater from the site; and

ii. establish the quality of groundwater affected by any seepage of contaminants.

c) samples of groundwater must be taken from each bore required by Schedule 3, Water, Table 4 (Alumina Refinery, Caustic Storage, and Residue Management Dam groundwater monitoring locations) at least twice per year; and

d) the samples obtained in accordance with paragraph (c) of this condition must be analysed for the parameters listed in Schedule 3, Water– Table 5 (Groundwater Monitoring).

**W41** Records must be kept of the results of all determinations of the quality of groundwater for a period of at least fifteen (15) years and be made available to the **administering authority** upon request. Results must be presented in graphic form clearly showing variation of analyte concentration for each bore over time and median background concentrations. These records may be electronic.

**W42** If the groundwater monitoring required by condition (W39) and (W40) indicates contamination by an analyte which exceeds the **'trigger levels'** the **holder** must notify the **administering authority** as per condition (G7) and (G8) and complete an investigation report into:

a) the extent of contamination and its mobility characteristics;

b) the cause of the exceedance;

c) whether source(s) has been removed;

d) known depth to water table;

e) permeability of the strata on the site;

f) the potential for environmental harm;

g) identification of potential receptors;

h) provide the monitoring results;

i) provide ambient groundwater quality;

j) interpretation of analyses of any samples taken; and

k) proposed actions to prevent or minimise environmental harm.

**W43 Annual Groundwater Monitoring Report**

An annual monitoring report must be prepared each year and submitted to the **administering authority** by 1 April for the preceding year. The report must include but not be limited to:

a) any investigation report required by condition (W42);

b) details of the groundwater monitoring undertaken, including details of the sampling framework applied;

c) details of the groundwater analysis undertaken, and quality assurance and quality control measures applied;

d) a summary of the groundwater monitoring results obtained. Results must be presented in numerical and graphical form, showing relevant limits, and a comparison made with the previous twelve (12) months monitoring data; and

e) an interpretation, evaluation and explanation of the monitoring results and programs by a **specialist in the field** of water quality monitoring and assessment with determinations made as to any impacts on the **environment** and if so the level of environmental harm caused.

**W44** When not being sampled, monitoring bores must be sealed with a lockable cap.

**W45 Seawater intake**

The velocity of seawater being drawn in and around the mouth of the intake pipe structure located at Fisherman's Landing must never exceed 0.6m/s.

**W46** There must be no release of **waters** to the receiving **environment** which exhibits any visible hydrocarbon sheen.

**W47 Groundwater Expression Management – Northern Residual Management Area Dam**

The holder must prevent the expression of groundwater from the Residual Management Area Dam.

**W48** A Groundwater Expression Management Plan (GEMP) must be developed by an **appropriately qualified person** and implemented to ensure compliance with condition (W47).

**W49** The GEMP required by condition (W48) must, at a minimum:

a) ensure that potential risks due to groundwater rise at the **Residual Management Area Dam** 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 (W47-W51) have been achieved;

c) include the annual review, analysis and interpretation of the results by an **appropriately qualified person** of the monitoring data collected in accordance with condition (W39);

d) include notification procedures to ensure compliance with conditions (G7-G10).

**W50** The GEMP required by condition (W48) must be reviewed and updated by an **appropriately qualified person** each year to ensure compliance with condition (W49). Each annual GEMP review is to be submitted to the Administering Authority by 1 April for the preceding year.

**W51** The most recent version of the GEMP required by condition (W50) must be provided to the administering authority on request.

**W52** By **1 November 2020**, achieve the following minimum **stabilisation area** for catchments W2, W3, W7 and W8:

a) For catchment W7, a minimum **stabilisation area** of 95%.
b) For catchment W3, a minimum **stabilisation area** of 95%.
c) For catchment W2, a minimum **stabilisation area** of 50%.
d) For catchment W8, a minimum **stabilisation area** of 85%.

*Note 1: Refer to **Schedule 2 – Figure 4.***

**W53** By **1 November 2020**, the following erosion and sediment control requirements must be achieved:

a) For catchment W7;
   i. Implement a bitumen seal to the remaining 'Top Warehouse Road'.
   ii. Re-contour and construct road drains to divert runoff from the road away from unsealed areas into drains.
b) For catchment W3;
   i. Implement road drains and a bitumen seal to the 'stage 2 washer area'.
   ii. Implement at-source erosion controls to two unsealed laydown areas.
c) For catchment W2;
   i. Implement containment measures to the coal yard, including a bund around the coal stockpile, to prevent run-off and bypassing of the sediment pond.
d) For catchment W8;
   i. Reshape and revegetate unstable embankments.
   ii. Implement at-source erosion controls along stockpile road to reduce runoff into drains.
   iii. Implement a silt blanket and gabion rock baskets in the W8 Catchment pond.

*Note 1: Refer to **Schedule 2 – Figure 6**.*

## Definitions

Key terms and/or phrases used in this document are defined in this section and **bolded** throughout this document. Applicants 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 Environment and Heritage Protection or its successor.

**"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"** 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 Zealand Guidelines for Fresh and Marine Water Quality', volumes 1, 2 and 3, published by ANZECC and ARMCANZ in October 2000 or more recent versions.

**"background noise level"** means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90% of the measurement time period T of not less than 15 minutes, using Fast response.

**"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.*

**"best practice environmental management"** of an activity means the management of the activity to achieve an ongoing minimisation of the activity's environmental harm through cost-effective measures assessed against the measures currently used nationally and internationally for the activity. In deciding the best practice environmental management of an activity, regard must be had to the strategic planning by the person carrying out, or proposing to carry out, the activity, the administrative systems put into effect by the person, including staff training and monitoring and review of the systems, the public consultation carried out by the person, the product and process design and waste prevention, treatment and disposal.

'**boiler exemption'** means any of the following:

a) the period of any chemical clean that is performed on the desulphurisation plant, that does not exceed 24 hours unless otherwise agreed to by the administering authority, by circulating acid within the scrubbing vessels of the plant.
b) the period of any impaired operational performance of the desulphurisation plant that does not exceed 3 hours unless otherwise agreed to by the administering authority.
c) the period of any maintenance performed, that does not exceed 24 hours unless otherwise agreed to by the administering authority, which requires isolation of the desulphurisation plant or its components.

**"bund"** or **"bunded"** 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 bunded 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, bunds 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 dams, 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.

**"cogeneration exemption"** means any of the following:

a) "start-up period" while the cogeneration facility is being brought up to 'normal operation' following a period of 'inactivity' – This period can be no longer than 2 hours;
b) "shutdown period" while the cogeneration facility is being taken out of service from 'normal operation' to 'inactivity' - This period can be no longer than 2 hours;
c) "Islanding period" while the gas turbine is operating and supplying electricity only to RTA Yarwun operations;
d) "Extreme Weather Operation" where a cyclone warning of a category 2 or greater is issued by the Bureau of Meteorology (BOM) for the immediate area and the refinery is placed in 'cyclone mode', the gas turbine may be operated below 63.5% until 36 hours after the cyclone warning in raised or the category 2 or greater cyclone warning is cancelled;
e) "AER Directed – Reduced Generator Output" where the National Energy Market operator or any of its agents directs RTA Yarwun to reduce the output of the generator to below 63.5% MCR, for the purpose of power system security, then RTA Yarwun may operate at the directed level until such time as the NEM operator or agent lifts any restriction;
f) "Pipeline Directed – Reduced Generator Output", where the operator of the gas pipeline(s) that supplies the RTA Yarwun site or any of its agents issues RTA Yarwun with operational notices to reduce gas consumption to a level where the output of the generator is operated below 63.5% MCR then RTA Yarwun may operate at the directed level until such time as the pipeline(s) operator or agent lifts any restriction;
g) "Planed Major Shutdowns", where a major cogeneration plant shutdown is required by manufacturer's specifications to occur, a shutdown plan must be submitted to the administering authority outlining within the schedule where operation of the plant must be below 63.5% MCR to achieve successful re-**commissioning**. For the duration outlined in the shutdown period stack emissions; or
h) "Low Rate Operation of Cogeneration for Steam System Maintenance whilst Gas Turbine is Operational", operation of the gas turbine below 63.5% MCR for steam system maintenance is permitted for 120 hours each year, where the maximum duration of each individual maintenance period shall not exceed 10 hours.

**"commercial place"** means a work place used as an office or for business or commercial purposes, which is not part of the petroleum activities and does not include employees accommodation or public roads.

**"competent person(s)"** means a person(s) who has the appropriate skills, training and experience to conduct the monitoring.

**"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.

**"commissioning"** means the stage achieved once alumina production reaches 3 million tonnes per annum annualised for a period of one month.

**"dam"** means a land-based structure or a void that is designed to contain, divert or control flowable substances, 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.

**"day"** means a business day.

**"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 Queensland (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.

**"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.

**"environmental authority"** means this environmental authority as defined under the *Environmental Protection Act 1994*.

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

**"Dutch Intervention Guidelines target value"** means is the baseline concentration value below

which compounds and/or elements are known or assumed not to affect the natural properties of the soil as outlined in the most current version of the *Circular on target values and intervention values for soil remediation:* Ministry of Housing, Spatial Planning and Environment Directorate-General For Environmental Protection, Department of Soil Protection.

**"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; and
b) all natural and physical resources; and
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).

**"environmentally relevant activities"** is any activity mentioned in Schedule 2 Chapter 4 in 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; or
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.

**"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 substances.

**"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"** The holder of an environmental authority for a prescribed ERA is the person who made an application for the authority; or if a transfer application for the authority has been approved under chapter 5, part 9—the person to whom the transferred environmental authority has been issued.

**"hydraulic performance"** means the capacity of a regulated dam to contain or safely pass flowable substances 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.

**"inactivity"** means for the purposes of reducing risk related to the emission of NOx, when there is no ignited gas supply to the burners.

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

1. site specific documents for the water;
2. the '**QWQ guidelines**';
3. the 'AWQ guidelines';
4. other relevant documents published by a 'recognised entity'.

**"infrastructure"** means water storage dams, 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 dams other than water storage dams, waste dumps, voids, 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:

1. a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
2. 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 substances at any other times.

**"Lowest Astronomical Tide (LAT)"** The lowest tide level which can be predicted to occur under average meteorological conditions and under any combination of astronomical conditions.

**"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:

1. the runoff from a 72 hour duration storm at the AEP specified in the Table 5; or
2. a wave allowance at that AEP as estimated using a recognised engineering method.

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

**"Maximum Continuous Rating (MCR)"** means the maximum output that can be sustained continuously under normal conditions over a day. The maximum actual output can be higher

than the MCR.

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

**"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 1999 or more recent versions.

**"non-continuous spill"** means a single and isolated release of a contaminant to land that does not exceed 24 hours in duration and does not cause the potential for environmental harm.

**"normal operations"** means if the cogeneration facility is operating at a constant rate, whether or not it is operating at full capacity.

**"nuisance sensitive place"** means any of the following:

1. a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises;
2. library and educational institution (including a school, college and university;
3. childcare centre or kindergarten;
4. school or playground;
5. hospital, surgery or other medical institution;
6. protected area, or an area identified under a conservation plan under the *Nature Conservation Act 1992* as a critical habitat or an area of major interest;
7. marine park under the *Marine Parks Act 2004*;
8. 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
9. 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 period 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.

**"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:

1. a local government;
2. a public sector unit;

3. an agency of the Commonwealth or another State, however called, with similar functions to the functions of the chief executive;
4. a ministerial council established by the Council of Australian Governments;
5. the Commonwealth Scientific and Industrial Research Organisation;
6. a research centre completely or partly funded by the Commonwealth;
7. an Australian university;
8. a Queensland regional NRM body;
9. Healthy Waterways Limited ACN 137 943 554; and
10. 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 using the *Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland* (DME 1995).

**"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 Management Area Dam**" means a dam defined in Land – Table 1 (location of Residue Management Area Dams)

**"Residue Management Area"** means the land including fresh water dams surrounding the Residue Management Area Dam itself over Lot 1 on SP144430 and Lot 7 on SP228453.

**"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 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.

**"sensitive receptor"** means any of the following:

1. a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises;
2. library and educational institution (including a school, college and university;
3. childcare centre or kindergarten;
4. school or playground;
5. hospital, surgery or other medical institution;
6. protected area, or an area identified under a conservation plan under the *Nature Conservation Act 1992* as a critical habitat or an area of major interest;
7. marine park under the *Marine Parks Act 2004*;
8. 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;
9. a place used as a workplace, an office or for business or commercial purposes; or

10. and includes a place within the curtilage of such a place reasonably used by persons at that place.

**"shutdown"** refers to any circumstance where the cogeneration plant is not operating for a period of time longer than 15 minutes.

**"site"** means the land to which the environmental authority attaches.

**"significant earthworks"** includes the development of borrow pit areas. It does not include site preparatory works (in advance of construction) or investigations and testing necessary for purposes of preparing a design plan.

"**specialist in the field**" in reference to condition A8 of this environmental authority 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.

**"stabilisation area"** means a catchment area that has effective erosion and sediment source control measures implemented and maintained in accordance with the conditions of the environmental authority.

**"suitably qualified and experienced person"** in relation to dams 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:

1. knowledge of engineering principles related to the structures, geomechanics, hydrology, hydraulics, chemistry and environmental impact of dams; and
2. a total of five years of demonstrated expertise in the geomechanics of dams with particular emphasis on stability, geology and geochemistry, and
3. a total of five years of demonstrated expertise in three of the following categories:
    1. investigation and design of dams;
    2. construction, operation and maintenance of dams;
    3. hydrology with particular reference to flooding, estimation of extreme storms, water management or meteorology;
    4. hydraulics with particular reference to sediment transport and deposition, erosion control, beach processes;
    5. hydrogeology with particular reference to seepage, groundwater;
    6. solute transport processes and monitoring thereof;
    7. 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.

**"threatening processes"** means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation. For example, altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation.

**"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 damage 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 levels"** means an indicator for an environmental value is a physical, chemical, biological or other property that can be measured or decided in a quantitative way.

**"upon"** means one sample must be taken on release of a discharge event commencing. Where a discharge event has a duration of 24 hours or greater, samples must be taken daily for one week and once a week thereafter.

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

**"visible dust event"** means an event that results in a visible dust moving beyond the lot and plan where the relevant ERA 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 watercourses, bed and banks of a watercourse, dams, 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:

1. in a natural channel, whether artificially improved or not;
2. in an artificial channel that has changed the course of the watercourse; but, in any case, only:
    1. unless a regulation under paragraph (d), (e) or (f) declares otherwise-at every place upstream of the point (point A) to which the high spring tide ordinarily flows and reflows, whether due to a natural cause or to an artificial barrier;
    2. if a regulation has declared an upstream limit for the watercourse-the part of the river, creek or stream between the upstream limit and point A;
    3. if a regulation has declared a downstream limit for the watercourse-the part of the river, creek or stream upstream of the limit; or
    4. if a regulation has declared an upstream and a downstream limit for the watercourse-the part of the river, creek or stream between the upstream and the downstream limits.

**"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.

**"wetland"** means an area shown as a wetland on a 'Map of referable wetlands', a document approved by the chief executive (environment). A map of referable wetlands can be viewed at www.ehp.qld.gov.au.

## Schedules

### Schedule 1—Approved ERA locations

**Environmentally Relevant Activities**

| Location | | ERA 8 - 3 | ERA 8 - 4 | ERA 8 - 5 | ERA 14 - 1 | ERA 15 | ERA 16 - 2(d) | ERA - 16 (c) | ERA 31 - 2(b) | ERA 50 - 1(a) | ERA 50 - 2 | ERA 56 | ERA 60 -1(d) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lot | Plan | | | | | | | | | | | | |
| 503 | SP144788 | | | ✓ | | | | | | ✓ | ✓ | | |
| 502 | SP224189 | ✓ | ✓ | ✓ | | | | | | ✓ | ✓ | | |
| 1 | SP144433 | | | | | | | | ✓ | ✓ | ✓ | | |
| 23 | SP103896 | | | | | | | | ✓ | ✓ | ✓ | | |
| 22 | SP103896 | | | | | | | | ✓ | ✓ | ✓ | | |
| 21 | SP103896 | | | | | | | | ✓ | ✓ | ✓ | | |
| 14 | SP147866 | | | | | | | | ✓ | ✓ | ✓ | | |
| 9 | SP147866 | | | | | | | | ✓ | ✓ | ✓ | | |
| Gladstone - Mt Larcom Rd | | | | | | | | | ✓ | ✓ | ✓ | | |
| 8 | SP218634 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 6 | SP235022 | | | | | | ✓ | ✓ | | ✓ | ✓ | | |
| 7 | SP147726 | | | | | | | | | ✓ | ✓ | | |
| 7 | SP145439 | | | | | | | | ✓ | | | | |
| 54 | SP137048 | | | | | | | | ✓ | | | | |
| 1 | RP911260 | | | | | | | | ✓ | | | | |
| Lindherr Rd | | | | | | | | | ✓ | | | | |
| 27 | SP115227 | | | | | | | | ✓ | | | | |
| Calliope River Rd | | | | | | | | | ✓ | | | | |
| 79 | CP911258 | | | | | | | | ✓ | | | | |
| 23 | SP115225 | | | | | | | | ✓ | | | | |
| Halls Road | | | | | | | | | ✓ | | | | |
| 13 | RP620157 | | | | | | | | ✓ | | | | |
| 91 | SP122250 | | | | | | | | ✓ | | | | |
| Quarry Rd | | | | | | | | | ✓ | | | | |
| 21 | SP115224 | | | | | | | | ✓ | | | | |
| 20 | SP115224 | | | | | | | | ✓ | | | | |
| 7 | SP177782 | | | | | | | | ✓ | | | | |
| Unnamed Road | | | | | | | | | ✓ | | | | |
| 1 | SP144430 | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |
| 7 | SP228453 | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ |

### Schedule 2—Monitoring, maps and plans

**Figure 1 - Refinery Catchment Areas – First Flush Catchment**

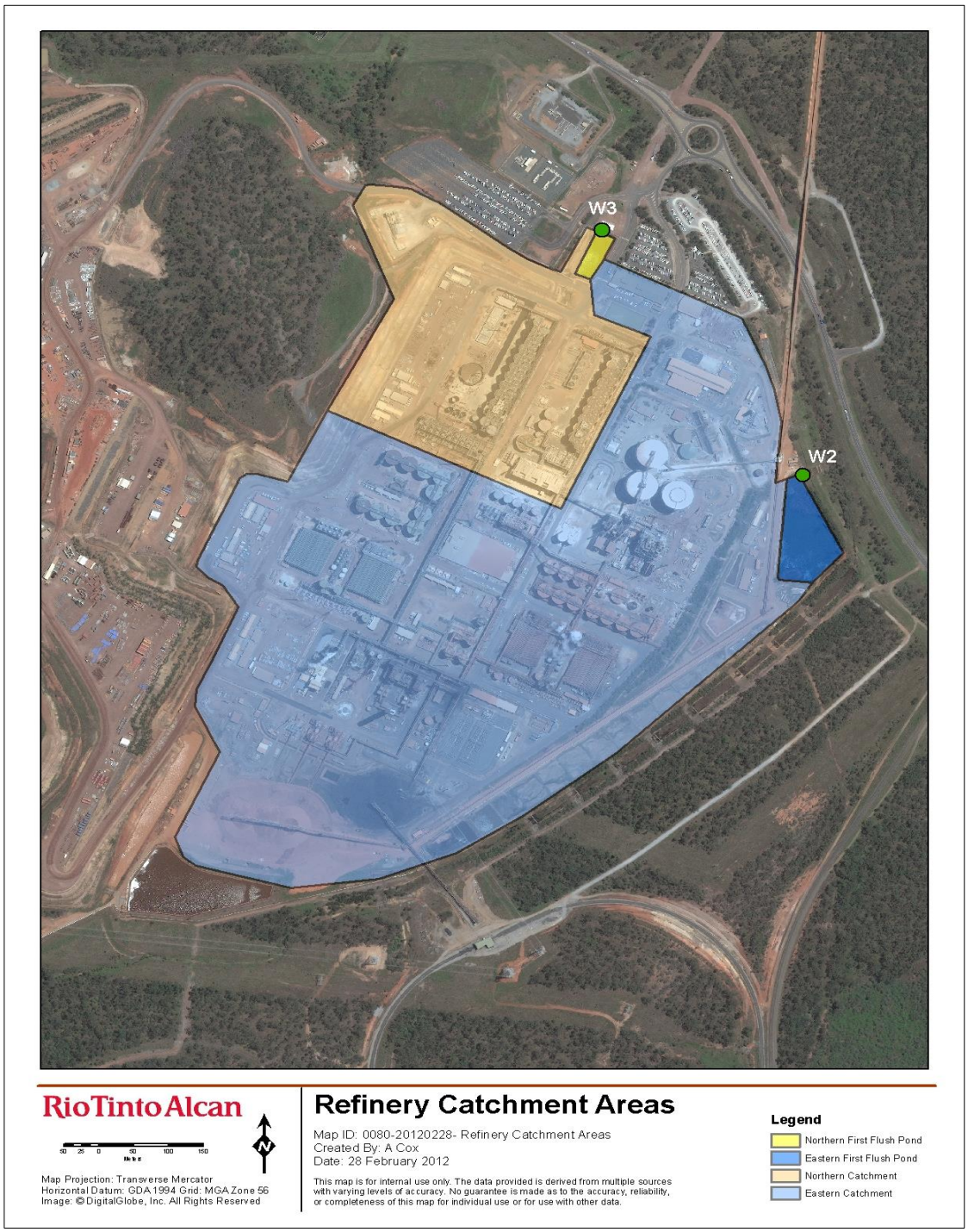


**Figure 2 – Release points and monitoring locations**



**Figure 3 – Groundwater expression area**
**(Removed as part of an agreed amendment on 05 June 2020)**

***Intentionally left blank.**

**Figure 4 – Refinery catchment areas.**

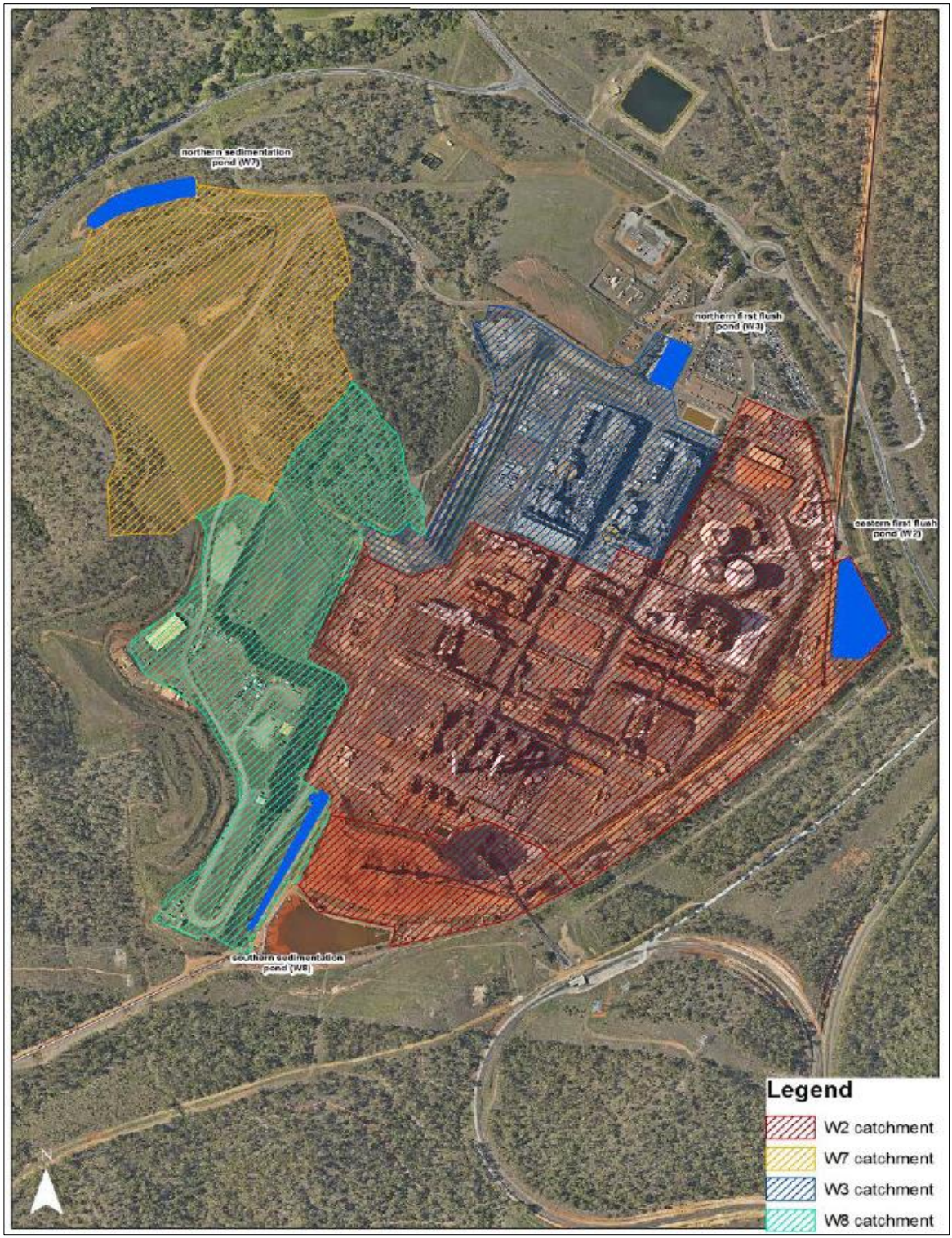


**Figure 5 – Condition L2 exemption areas RMA**

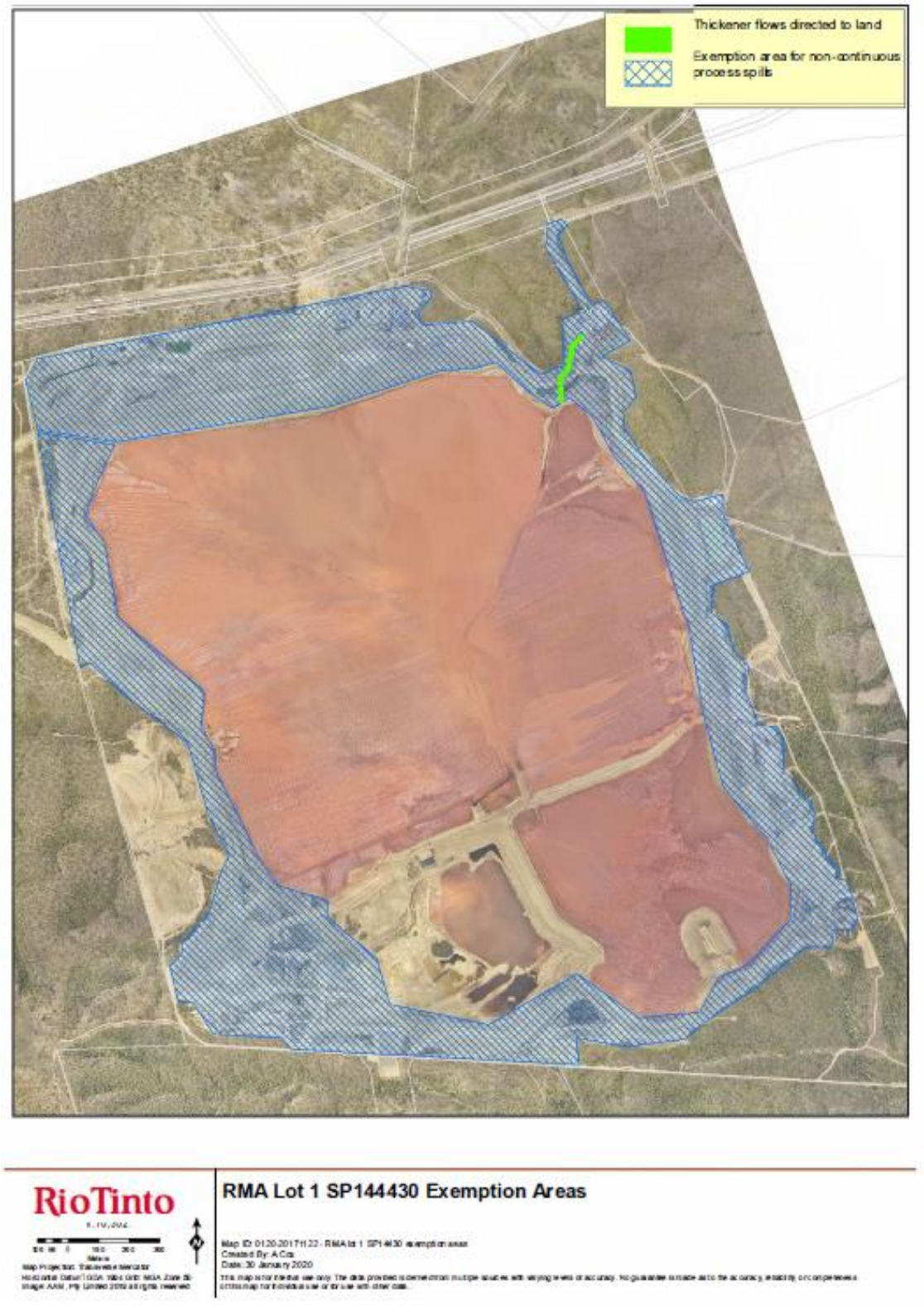
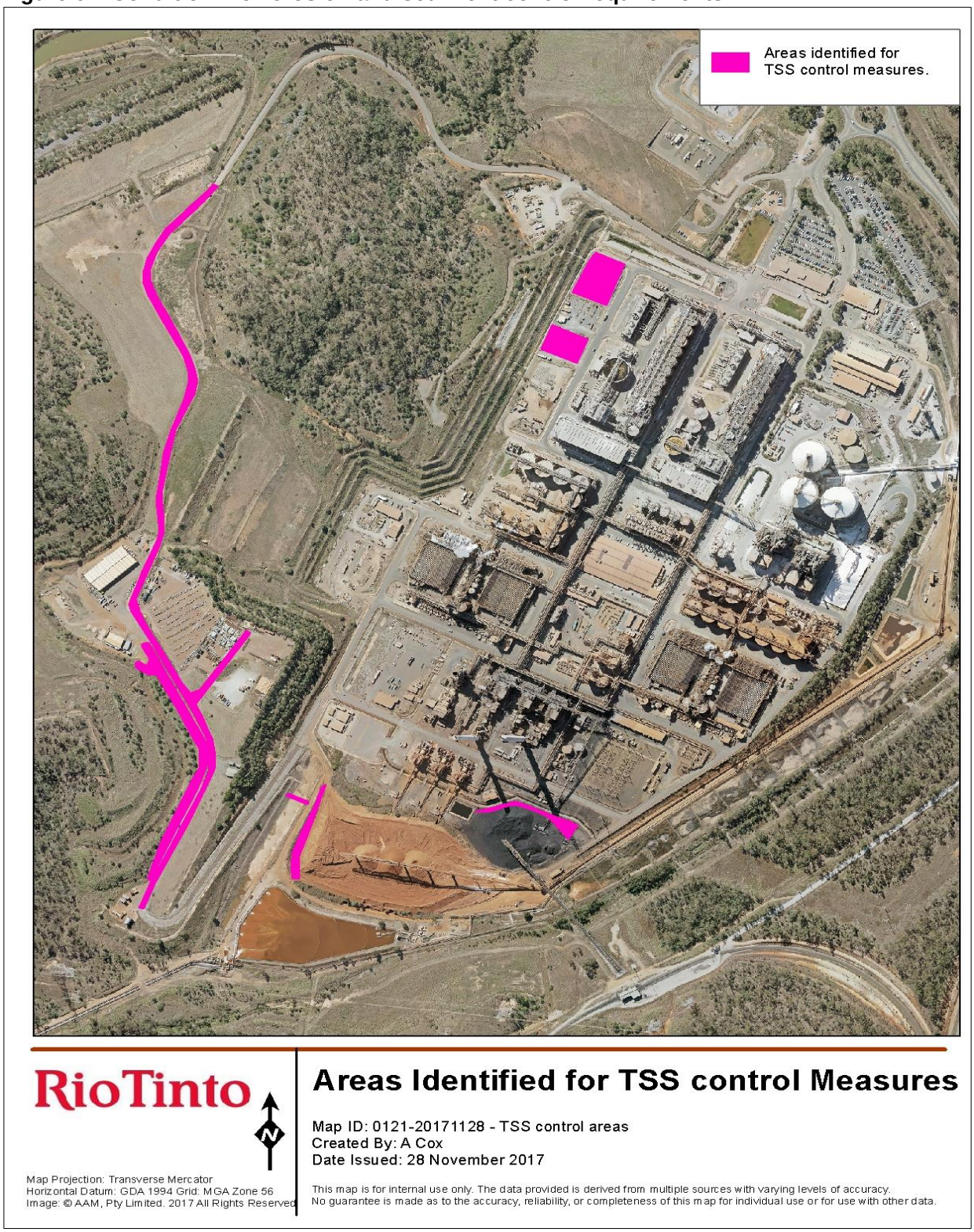


**Figure 6 – Condition W52 erosion and sediment control requirements**



## Schedule 3—Monitoring and release limits

### Air - Table 1 Source description

| Release point number | Source description | Minimum release height (metres - Australian Height Datum) | Minimum Efflux Velocity (metres/second)* | Minimum release temperature (degrees Celsius)* |
|---|---|---|---|---|
| B1 | Boiler 1 | 120 | 17 | 114 * |
| B2 | Boiler 2 | 120 | 17 | 114 * |
| B3 | Boiler 3 | 120 | 17 | 50 * |
| C1 | Calciner 1 | 60 | 17 | 130* |
| C2 | Calciner 2 | 60 | 17 | 130* |
| C3 | Calciner 3 | 60 | 17 | 130* |
| C4 | Calciner 4 | 60 | 17 | 130* |
| Cogen | Gas Turbine Stack | 50 | 20 | 149* |

*Notes:*
**__Minimum__ efflux velocities and temperature must be achieved when operating above 80% __Maximum Continuous Rating__ (MCR)*

### Air - Table 2 Contaminants release limits to air

| Release point | Contaminant release | Maximum concentration release limit | Maximum mass release limit | Averaging Period |
|---|---|---|---|---|
| B1 | Particulates | 50mg/Nm3 (dry) | 2.7g/s | 24 hour rolling average |
| | Oxides of Nitrogen | 500mg/Nm3 (dry) | 27g/s | 1 hour rolling average |
| | Sulphur Dioxide | 1450mg/Nm3 (dry) | 71g/s | 1 hour rolling average |
| | Mercury | 0.2mg/Nm3 (dry) | 0.009g/s | - |
| | Total volatile organic compounds (TVOC) as n-propane equivalent | 40mg/Nm3 (dry) | 1.8g/s | - |
| B2 | Particulates | 50mg/Nm3 (dry) | 2.7g/s | 24 hour rolling average |
| | Oxides of Nitrogen | 500mg/Nm3 (dry) | 27g/s | 1 hour rolling average |
| | Sulphur Dioxide | 1450mg/Nm3 (dry) | 71g/s | 1 hour rolling average |
| | Mercury | 0.2mg/Nm3 (dry) | 0.009g/s | - |
| | Total volatile organic compounds (TVOC) as n-propane equivalent | 40mg/Nm3 (dry) | 1.8g/s | - |
| B3 | Particulates | 50mg/Nm3 (dry) | 2.7g/s | 1 hour block average |

| Release point | Contaminant release | Maximum concentration release limit | Maximum mass release limit | Averaging Period |
|---|---|---|---|---|
| | Oxides of Nitrogen | 500mg/Nm3 (dry) | 27g/s | 1 hour rolling average |
| | Sulphur Dioxide | 205mg/Nm3 (dry) (desulphurisation)** | 10g/s** | 1 hour rolling average |
| C1 | Particulates | 100mg/Nm3 (dry) | N/A | 24 hour rolling average |
| | Oxides of Nitrogen | 200mg/Nm3 (dry) | N/A | 1 hour block average |
| | Total volatile organic compounds (TVOC) as n-propane equivalent | 40mg/Nm3 (dry) | N/A | - |
| C2 | Particulates | 100mg/Nm3 (dry) | N/A | 24 hour rolling average |
| | Oxides of Nitrogen | 200mg/Nm3 (dry) | N/A | 1 hour block average |
| | Total volatile organic compounds (TVOC) as n-propane equivalent | 40mg/Nm3 (dry) | N/A | - |
| C3 | Particulates | 100mg/Nm3 (dry) | | 24 hour rolling average |
| | Oxides of Nitrogen | 200mg/Nm3 (dry) | N/A | 1 hour block average |
| | Total volatile organic compounds (TVOC) as n-propane equivalent | 40mg/Nm3 (dry) | N/A | - |
| C4 | Particulates | 100mg/Nm3 (dry) | | 24 hour rolling average |
| | Oxides of Nitrogen | 200mg/Nm3 (dry) | N/A | 1 hour block average |
| | Total volatile organic compounds (TVOC) as n-propane equivalent | 40mg/Nm3 (dry) | N/A | - |
| Cogen | Oxides of Nitrogen | 70mg/Nm3 (dry) at 15% O2* | 27g/s* | 1 hour block average |

*Notes:*

**The **maximum** concentration release limit and **maximum** mass release limit for the Cogen release point do not apply during a '**cogeneration exemption**'.*

***The **maximum** concentration release limit and **maximum** mass release limit for Sulphur Dioxide at the B3 release point do not apply during a **'boiler exemption'**.*

| Release point number | Determination Required | Frequency* |
|---|---|---|
| B1 | Particulates | Continuous |
| | Oxides of Nitrogen | Continuous |
| | Sulphur Dioxide | Continuous |
| | Mercury | Quarterly |

| | | |
|---|---|---|
| | Total volatile organic compounds as n-propane equivalent | Quarterly |
| B2 | Particulates | Continuous |
| | Oxides of Nitrogen | Continuous |
| | Sulphur Dioxide | Continuous |
| | Mercury | Quarterly |
| | Total volatile organic compounds as n-propane equivalent | Quarterly |
| B3 | Particulates | Annually |
| | Oxides of Nitrogen | Continuous |
| | Sulphur Dioxide | Continuous |
| C1 | Particulates | Continuous |
| | Oxides of Nitrogen | Quarterly |
| | Total volatile organic compounds as n-propane equivalent | Annually (one calciner each quarter) |
| C2 | Particulates | Continuous |
| | Oxides of Nitrogen | Quarterly |
| | Total volatile organic compounds as n-propane equivalent | Annually (one calciner each quarter) |
| C3 | Particulates | Continuous |
| | Oxides of Nitrogen | Quarterly |
| | Total volatile organic compounds as n-propane equivalent | Annually (one calciner each quarter) |
| C4 | Particulates | Continuous |
| | Oxides of Nitrogen | Quarterly |
| | Total volatile organic compounds as n-propane equivalent | Annually (one calciner each quarter) |
| Cogen | Oxides of Nitrogen | Quarterly |

**Air - Table 3 Required release point determinations**

** Note: Sampling equipment must be operated at 85% of total operating capacity to allow for the performance of maintenance activities, and sampling frequency shall be subject to equipment outages for such purposes.*

**Water – Table 1 Contaminants, sources and locations for releases to waters**

| GPS locations for release point | Release Point Descriptor | Contaminants and source | Permitted Waters and locations for the release |
|---|---|---|---|
| 311606.000E 7362966.00N | W1 | Settled neutralised process effluent, boiler blowdown and stormwater runoff from the alumina plant Effluent Pond to be discharged via diffuser at W9. (W1 is upstream from W9) | Port Curtis via diffuser W9 at Fisherman's Landing wharf |
| 321333.6923E 7363022.587N | W2 | Discharge of stormwater runoff from Eastern 1st Flush Pond | Unnamed tributary of Boat Creek at the site boundary |

| GPS locations for release point | Release Point Descriptor | Contaminants and source | Permitted Waters and locations for the release |
|---|---|---|---|
| 312032.770E 7363636.204N | W3 | Discharge of stormwater runoff from Northern 1st Flush Pond | Unnamed tributary of Boat Creek at the site boundary |
| 304605.000E 7357736.00N | W4 | Discharge of diverted stormwater from the exterior of the RMA | Gravel Creek |
| 312921.913E 7367213.56N | W5 | Discharge of potentially alkaline contaminated stormwater from the Caustic Storage Facility located at Fisherman's Landing | Port Curtis via southern **bund** drain at Fisherman's Landing |
| 312911.2E 7367174.1N | W5a[1] | Water resulting from the neutralisation of residual caustic soda from the caustic bladders to be discharged via diffuser at release point W9, only once every five years unless otherwise agreed to by the administering authority[1]. | Port Curtis via diffuser W9 at Fisherman's Landing Wharf |
| 312838.354E 7367431.783N | W5b | Discharge of potentially alkaline contaminated stormwater from the Caustic Storage Facility located at Fisherman's Landing | Port Curtis via northern bund drain at Fisherman's Landing |
| 314032.7868E 7367213.568N | W6 | Stormwater and wash down water from wharf sediment **dam** containing alumina and bauxite wash down water from the wharf | Port Curtis via southern **bund** drain at Fisherman's Landing |
| 311130.811E 7367712.280N | W7 | Discharge of stormwater runoff from Northern Lay-down Area Sedimentation Pond | Unnamed tributary of Boat Creek to the south of Port Curtis Way |
| 311335.670E 7364313.383N | W8 | Discharge of stormwater runoff from Southern Lay-down Area Sedimentation Pond | Diversion gulley west of RTA 670 pond, to an unnamed tributary of Boat Creek south of Port Curtis Way adjacent the RTA Yarwun Refinery **site** northern boundary |
| 314389.785153E 7362954.722N | W9 | Contaminants and sources mentioned for W1 and W5a | Port Curtis via diffuser at Fisherman's Landing Wharf |
| 303685.3E 7360184.6N | W10 | Discharge of diverted stormwater from the exterior of the RMA | Unnamed ephemeral gully from northern boundary |
| 305162.1E 7359458.5N | W11 | Discharge of diverted stormwater from the exterior of the RMA – Only via overtopping of spillway | Unnamed ephemeral gully from eastern boundary |

| GPS locations for release point | Release Point Descriptor | Contaminants and source | Permitted Waters and locations for the release |
|---|---|---|---|
| 305135 E 7359543 N | W11b | Discharge of diverted stormwater from the exterior of the RMA | Unnamed ephemeral gully from eastern boundary |
| 303014.5E 7360083.8N | W12 | Discharge of diverted stormwater from the exterior of the RMA | Unnamed ephemeral gully from northern boundary |
| 303087.5E 7358786.2N | W13 | Discharge of diverted stormwater from the exterior of the RMA | Unnamed ephemeral gully from northern boundary of RMA 2 |
| 304047.6E 7357756.4N | W14 | Discharge of diverted stormwater from the exterior of the RMA | Gravel Creek |
| 301731.39E 7359633.59N | W15 | Discharge of diverted stormwater from RMA2 borrow operations | Unnamed ephemeral gully from northern boundary of RMA2 |
| 302757.17E 7360010.37N | W16 | Discharge of diverted stormwater from RMA2 borrow operations | Unnamed ephemeral gully from northern boundary of RMA2 |
| 300936E 7358824N | W17 | Discharge of stormwater from RMA2 borrow operations. | Unnamed ephemeral gully from northern boundary of RMA2 |
| 300793E 7359044N[2] | W17b | | |

*Notes:*

1. *The release of neutralised residual caustic soda from the caustic bladder at the release point W5a is only permitted when agreed to by the administering authority.*
2. *Once constructed, release point W17b, replaces release point W17 (and associated monitoring and release notification requirements).*

**Water – Table 2 Release limits and monitoring**

| Monitoring point | Release point | Quality characteristics | Release limit | | | | Minimum Monitoring frequency * |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Median | 80th percentile | Maximum | |
| Discharge pipe from alumina plant effluent pond | W1 | pH | 6.5 | | | 9.5 | Continuous |
| | | Total Suspended solids | | | | | Monthly |
| | | Turbidity | | | | 150 NTUs | Continuous |
| | | Aluminium (Filtered) | | | | 14**mg/L** | Monthly |
| | | Aluminium (Filtered) | | 5**mg/L** | | | Monthly based on a 12 months rolling average |

| Monitoring point | Release point | Quality characteristics | Release limit | | | | Minimum Monitoring frequency * |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Median | 80th percentile | Maximum | |
| | | Vanadium (µg/L – filtered) | | | | | Monthly |
| | | Gallium (µg/L – filtered) | | | | | |
| | | Molybdenum (µg/L – filtered) | | | | | |
| | | Alkalinity (**mg/L**), | | | | | |
| | | Total dissolved solids (**mg/L**), | | | | | |
| | | Dissolved Oxygen (**mg/L**) | | | | | |
| Eastern 1st Flush Pond at spillway | W2 | pH | 6.5 | | | 9 | Daily **upon** discharge |
| | | Total suspended solids | | | 163 **mg/L**[4] | | |
| | | Aluminium (Filtered) | | | | 3**mg/L** | Each release event |
| | | Vanadium (µg/L – filtered) | | | | | |
| | | Gallium (µg/L – filtered) | | | | | |
| | | Molybdenum (µg/L – filtered) | | | | | |
| | | Alkalinity (**mg/L**), | | | | | |
| | | Total dissolved solids (**mg/L**), | | | | | |
| | | Dissolved Oxygen (**mg/L**) | | | | | |
| Northern 1st Flush Pond at spillway | W3 | pH | 6.5 | | | 9 | Daily **upon** discharge |
| | | Total suspended solids | | | 163 **mg/L**[4] | | |
| | | Vanadium (µg/L – filtered) | | | | | Each release event |
| | | Aluminium (Filtered) | | | | 3**mg/L** | |
| | | Gallium (µg/L – filtered) | | | | | |
| | | Molybdenum (µg/L – filtered) | | | | | |
| | | Alkalinity (**mg/L**), | | | | | |
| | | Total dissolved solids (**mg/L**), | | | | | |
| | | Dissolved Oxygen (**mg/L**) | | | | | |

| Monitoring point | Release point | Quality characteristics | Release limit | | | | Minimum Monitoring frequency * |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Median | 80th percentile | Maximum | |
| RMA diversion drain south east (RMA 1) | For W4 | Total Suspended solids (TSS) | | | | 50**mg/L** [2] | Daily **upon** discharge |
| | | Turbidity | | | | 70NTU [1 2] | |
| Caustic storage facility at spillway | W5 | pH | 6.5 | | | 9 | Daily **upon** discharge |
| Discharge from caustic bladders | W5a | pH | 6.5 | | | 9.5 | Continuous |
| | | Total Suspended solids | | | | | Once during discharge |
| | | Turbidity | | | | 150 NTU | Continuous |
| | | Aluminium (Filtered) | | 5mg/L | | 14**mg/L** | Once during discharge |
| | | Vanadium (µg/L – filtered) | | | | | |
| | | Gallium (µg/L – filtered) | | | | | |
| | | Molybdenum (µg/L – filtered) | | | | | |
| | | Alkalinity (**mg/L**), | | | | | |
| | | Total dissolved solids (**mg/L**), | | | | | |
| | | Dissolved Oxygen (**mg/L**) | | | | | |
| Caustic storage facility – top of bladders | W5b | pH | 6.5 | | | 9 | Daily **upon** discharge |
| Sediment Pond at discharge to drain | W6 | pH | 6.5 | | | 9 | Daily **upon** discharge |
| | | Total suspended solids (TSS) | | | | Greater of 50**mg/L** or within 10% of TSS at background [3] | |
| Northern Lay-down Area Sediment Pond – | W7 | pH | 6.5 | | | 8.5 | Daily **upon** discharge |

| Monitoring point | Release point | Quality characteristics | Release limit | | | | Minimum Monitoring frequency * |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Median | 80th percentile | Maximum | |
| discharge to drain | | Total Suspended Solids (TSS) | | | 85 **mg/L**[4] | | |
| Southern Lay-down Area Sediment Pond – discharge to drain | W8 | pH | 6.5 | | | 8.5 | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | 163 **mg/L**[4] | | |
| Diffuser at Fisherman's landing wharf | W9 | | | | | | |
| RMA diversion drain north (RMA 1) | W10 | Turbidity | | | | *75 NTU* [1] [2] | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | | 50**mg/L** [2] | Daily **upon** discharge |
| RMA diversion drain east (RMA 1) | W11/ W11b | Turbidity | | | | *75 NTU* [1] [2] | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | | 50**mg/L** [2] | Daily **upon** discharge |
| RMA diversion drain north west (RMA 1) | W12 | Turbidity | | | | *75 NTU* [1] [2] | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | | 50**mg/L** [2] | Daily **upon** discharge |
| RMA diversion drain west (RMA 2) | W13 | Turbidity | | | | | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | | | Daily **upon** discharge |
| External Spillway Southern boundary of RMA, 200m downstream from RMA internal spillway (RMA 1) | W14 | Electrical conductivity | | | | 950µs/cm | Daily **upon** discharge |
| | | pH | 6.5 | | | 8.5 | |
| | | Turbidity | | | | 75 NTU[12] | |
| | | Total Suspended Solids (TSS) | | | | 50 mg/L[2] | |
| | | Vanadium (µg/L - filtered) | | | | | |

| Monitoring point | Release point | Quality characteristics | Release limit | | | | Minimum Monitoring frequency * |
|---|---|---|---|---|---|---|---|
| | | | Minimum | Median | 80th percentile | Maximum | |
| | | Aluminium (filtered) | | | | | Each release event |
| | | Gallium (µg/L - filtered) | | | | | |
| | | Molybdenum (µg/L - filtered) | | | | | |
| | | Alkalinity (mg/L) | | | | | |
| | | Total dissolved solids (mg/L) | | | | | |
| | | Dissolved Oxygen (mg/L) | | | | | |
| RMA2 Northern boundary | W15 | Turbidity | | | | *75 NTU* [1] [2] | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | | 50**mg/L** [2] | |
| RMA2 Northern boundary | W16 | Turbidity | | | | *75 NTU* [1] [2] | Daily **upon** discharge |
| | | Total Suspended Solids (TSS) | | | | 50**mg/L** [2] | |
| RMA2 Northern boundary | W17/W 17b | Turbidity | | | | *75 NTU* [1] [2] | Daily upon discharge |
| | | Total Suspended Solids (TSS) | | | | 50**mg/L** [2] | |

*Notes:*

1. *75 NTU to be used as an interim turbidity **maximum** limit for the release of sedimentation pond water in situations where there is an operational need to discharge from the sedimentation pond prior to a laboratory confirmed TSS result being available. The interim turbidity limit will remain in place until a correlated value is **determined** based on a **minimum** of 24 paired (measure from same sample bottle) data points for turbidity and TSS with a correlation coefficient R2 ≥0.7. The correlation must be developed from data representing TSS ranging from the Limit of Reporting (or ≤10**mg/L** TSS) to ≥50**mg/L**. Once a correlation has been developed in accordance with these requirements, the Turbidity Limit should be amended accordingly.*
2. *This limit is only required to be achieved during the controlled discharge (for example, de-watering activities from excavations and sediment basins) and upon any release that is within the 85th percentile 5 **day** rainfall depth of 32.8mm.*
3. *Background means water quality measured at an upstream location in receiving **waters** unaffected by the activities.*
4. *One of five consecutive samples measured at each release point, is permitted to exceed the release limit.*

*Note: Sampling equipment must be operated at 85% of total operating capacity to allow for the performance of maintenance activities, and sampling frequency shall be subject to equipment outages for such purposes.*

**Water – Table 3 Toxicants of concern for Direct Toxicity Assessment**

| Toxicant of Concern | | |
|---|---|---|
| **Metals and Metalloids** | | |
| Aluminium | Copper | Vanadium |
| Antimony | Lead | Zinc |
| Arsenic (total) | Mercury (total) | Molybdenum |
| Cadmium | Nickel | Gallium |
| Chromium (total) | Silver | - |
| Cobalt | Uranium | - |

**Water - Table 4 (Alumina Refinery, Caustic Storage, and Residue Management Dam groundwater monitoring locations)**

| Monitoring Point | MGA Coords (WGS84) Easting | MGACoords (WGS84) Northing | Surface RL (m)[1] |
|---|---|---|---|
| **Refinery** | | | |
| RGW5 | 312163.091 | 7363335.353 | 15.3 |
| RGW 10s | 312454 | 7363861.0 | 9.5 |
| **Caustic storage** | | | |
| CSGW1 | 312832.501 | 7367195.235 | 3.6 |
| CSGW3 | 312912.620 | 7367457.120 | 3.91 |
| CSGW6 | 312963.539 | 7367271.176 | 4.0 |
| **Reside Management Dam (RMD) Area** | | | |
| **RMD - North** | | | |
| 580-BH-31 | 303359.70 | 7360429.50 | 54.6 |
| 2018-MB-08 | 303098.30 | 7360134.00 | 63.8 |
| ALD1a | 303752.90 | 7360214.00 | 55.9 |
| ALD1b | 303752.90 | 7360213.50 | 55.9 |
| 580-BH-34 | 302401.90 | 7359865.50 | 71.6 |
| MB-08 | 303661.60 | 7360399.50 | 54.6 |
| **RMD - East** | | | |
| 580BH30 | 305147.447 | 7359435.455 | 77.5 |
| 580MB3001 | 305670.929 | 7358217.138 | 91.48 |
| **RMD - South** | | | |
| 580 ED1 | 304448.830 | 7357753.381 | 74.1 |
| **RMD - West** | | | |
| 580BH07 | 303132.260 | 7358783.861 | 83.5 |

1. *Surface RL measured to the nearest 10cm*

**Water - Table 5 Groundwater monitoring**

| Quality Characteristic Determination | Monitoring Points | Frequency |
|---|---|---|
| For Groundwater Samples | | |
| Water level<br>pH<br>Aluminium, Vanadium, Gallium, Molybdenum (µg/L - all filtered)<br>Fluoride<br>Alkalinity (**mg/L**)<br>Total dissolved solids (**mg/L**)<br>Dissolved Oxygen (**mg/L**)<br>Electrical conductivity (µS/cm)<br>Major ions **mg/L** – (calcium, magnesium, sodium, potassium, chloride, carbonate/bicarbonate and sulphate) | All bores listed in Schedule 3 – Table 4 (Alumina Refinery, Caustic Storage, and Residue Management Dam groundwater monitoring locations) | Twice per calendar year, not less than 4 months apart |

**END OF ENVIRONMENTAL AUTHORITY**