

# SUPPORTING INFORMATION

South32 Worsley Alumina Pty Ltd



LICENCE RENEWAL APPLICATION: 4504/1981/17  
ATTACHMENT 3B – SUPPORTING INFORMATION  
29 APRIL 2024



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## Document History and Status

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# 1. Introduction

South32 Worsley Alumina Pty Ltd (Worsley) operates the Worsley Alumina Refinery which is part of the Worsley Bauxite-Alumina Project (the Project) consisting of the Boddington Bauxite Mine, the Worsley Refinery (the refinery) and the Port Facility at Bunbury (Figure 1-1).

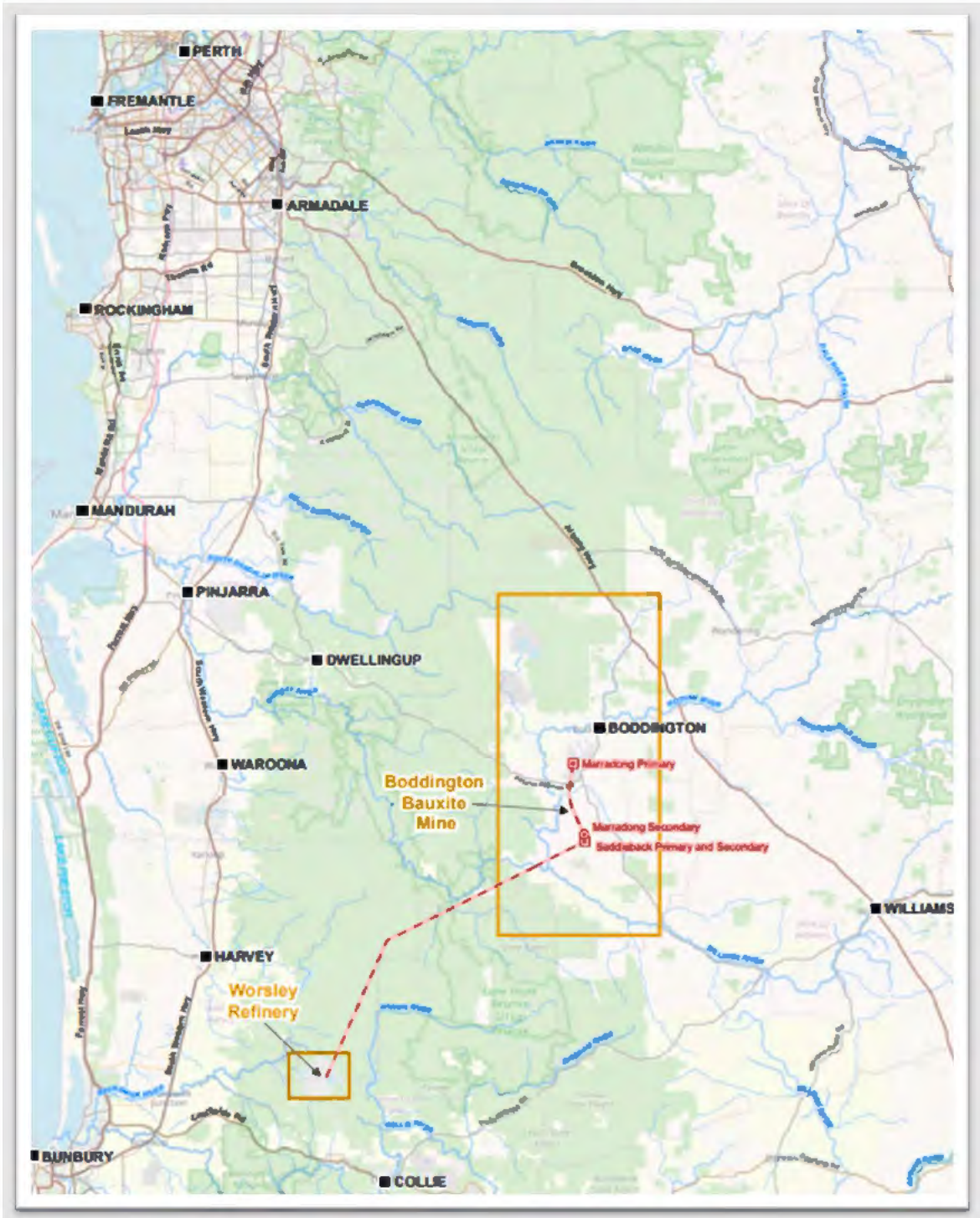


Figure 1-1: The Worsley Bauxite-Alumina Project

The refinery is located approximately 15 kilometres (km) north-west of Collie on the Darling Plateau within the Augustus (minor) and Brunswick (major) river water catchments and the Collie (minor) and Bunbury (major) airsheds. The surrounding area is principally State Forest with some broadscale farming properties, including isolated farmhouses. The nearest residence is approximately 7 km from the refinery boundary, and the nearest urban location is Allanson, located approximately 11 km south of the refinery.

Bauxite is mined from the Boddington Bauxite Mine and transported more than 50 km to the Refinery via an overland conveyor system for processing into Alumina powder, where it is then transported to the Bunbury Port for export. Alumina has been produced and exported from the Refinery since 1984, with current authorised Alumina production capacity at 4.7 Mtpa.

## 1.1 Approvals Background

The Project's mining, processing and associated operations are currently authorised under the Alumina Refinery (Worsley) Agreement Act 1973 (the Agreement Act) and Ministerial Statement 719 (as amended), issued under Part IV of the *Environmental Protection Act* (EP Act).

The refinery operates under licence (L4504/1981/17) issued under Part V of the EP Act and administered by the Department of Water and Environmental Regulation (DWER), whereby conditions contained in the licence relate to the prevention, reduction or control of emissions and discharges to the environment, and to the monitoring and reporting.

## 1.2 Purpose and Scope

This supporting document, together with the completed DWER Application Form, constitutes the application for administrative renewal of Licence L4504/1981/17. The administrative renewal is required because the Licence is due to expire on the 30 September 2024.

As part of this Licence renewal, the applicant would like to propose amending some of the current authorised prescribed premise categories as part of this Application.

Water quality and greenhouse gas emissions from the site are not included within the scope of this application as they are regulated under Ministerial Statement (719) (Part IV, EP Act).

Table 1-1 below provides an indication of where information required in the DWER Application Form is presented.

**Table 1-1: Where information required for the licence renewal is addressed**

Application form section	Renewal	Where information is addressed (this supporting document or application form)
Part 1: Application type	•	Application Form, Section 1.2 of Attachment 3B
Part 2: Applicant details	•	Application Form, Attachment 1A, Attachment 1B, Attachment 1C
Part 3: Premises details	•	Section 2.2 of Attachment 3B, Attachment 2

Application form section	Renewal	Where information is addressed (this supporting document or application form)
Part 4: Proposed activities	•	Section 3 of Attachment 3B
Part 5: Index of Biodiversity Surveys for Assessment and Index of Marine Surveys for Assessment	If required.	Not required
Part 6: Other DWER approvals	•	Application Form
Part 7: Other approvals and consultation	•	Application Form, Section 4 of Attachment 3B
Part 8: Applicant history	•	Application Form
Part 9: Emissions, discharges, and waste	•	Application Form, Section 5 of Attachment 3B, Attachment 6B
Part 10: Siting and location	•	Application Form, Section 7 of Attachment 3B
Part 11: Submission of any other relevant information	•	Application Form, Attachments 8A and 8B
Part 12: Category checklist(s)	•	Application Form, Attachment 9A, Attachment 9B
Part 13: Proposed fee calculation	•	Application Form, Attachment 10
Part 14: Commercially sensitive or confidential information	•	N/A
Part 15: Submission of application	•	Application Form
Part 16: Declaration and signature	•	Application Form
Attachment 1A: Proof of occupier status	•	Attachment 1A
Attachment 1B: ASIC company extract	•	Attachment 1B
Attachment 1C: Authorisation to act as a representative of the occupier	N/A	N/A
Attachment 2: Premises map/s	•	Attachment 2, of Attachment 3B
Attachment 3A: Environmental commissioning plan	N/A	Not required - no commissioning proposed
Attachment 3B: Proposed activities	•	Section 3 of Attachment 3B
Attachment 3C: Map of area proposed to be cleared (only applicable if clearing is proposed)	N/A	N/A
Attachment 3D: Additional information for clearing assessment	If required.	Not required
Attachment 4: Marine surveys (only applicable if marine surveys included in application)	N/A	N/A

Application form section	Renewal	Where information is addressed (this supporting document or application form)
Attachment 5: Other approvals and consultation documentation	N/A	N/A
Attachment 6A: Emissions and discharges	If required.	Attachment 6A
Attachment 6B: Waste acceptance	If required.	Application form, Section 6 of Attachment 3B
Attachment 7: Siting and location	•	Section 7 of Attachment 3B, Attachment 7
Attachment 8: Additional information submitted	If required.	Attachments 8A, 8B, 8C, 8D, 8E
Attachment 9: Category-specific checklist(s)	If required.	Attachment 9
Attachment 10: Proposed fee calculation	•	Attachment 10
Attachment 11: Request for exemption from publication	If required.	N/A: Application will be publicly notified.

## 2. Prescribed Premises Occupier and Categories

### 2.1 Occupier Details

The occupier for the purpose of this renewal application is:

South32 Worsley Alumina Pty Ltd

PO Box 344, Collie WA 6225

All correspondence pertaining to this application should be forwarded to the above address.

### 2.2 Prescribed Premises Details

The prescribed premises for the purpose of this licence renewal is located within Refinery Lease Area (RLA) M258SA (2,480.7 ha) (

Figure 2-1 and Attachment 2), which was granted under the Worsley State Agreement (Alumina Refinery (Worsley) Agreement Act 1973).

Key elements of the Refinery include:

- Processing Area - where Bauxite is processed into Alumina. The processing area is divided up into five main Bauxite processing areas in addition to other supporting functional areas.
- Bauxite residue disposal areas (BRDAs, also referred to as Tailing Storage Facilities) – where Bauxite processing residue (red sand and mud) is disposed of as a slurry. The BRDAs are also disposal areas for fly ash waste (disposed of as a slurry) from the power plants.
- Landfill – A Class I landfill that receives inert and small volumes of putrescible wastes.
- Northern Valley Pipe Head Dam (NVPHD): All residue and groundwater underdrains from Northern Valley BRDAs discharge by gravity to the NVPHD. The NVPHD collects rain runoff, decant liquor, and groundwater underdrain discharges, and pumps the combined “process water” to the RCL.
- Southern Valley Pipe Head Dam (SVPHD): All residue and groundwater underdrains from Southern Valley BRDAs discharge by gravity to the SVPHD. The SVPHD collects all underdrain discharges and pumps them to the RCL via sump.
- Solar Evaporation Ponds (SEPs): Temporary storage of oxalate is provided through SEPs. SEPs include SEP1, 2A, 3 and 4.
- Water Body 1 (WB1): This facility is primarily used for the storage of excess residue liquor that accumulates in the wet season and provides water balance to the RCL.
- Refinery Catchment Lake (RCL): The RCL receives residue liquor from the NVPHD, the SVPHD and the BRDAs. It is equipped with pumps and piping to transfer excess residue liquor to Water Body 1 (WB1) and to return the residue liquor to the Refinery.
- Freshwater Lake (FWL): The FWL has a roughly rectangular shaped main water body and north and south arms that extend northeast and southwest up the northern and southern valleys, respectively. The north and south arms extend to just below the NVPHD and SVPHD.



respectively. The lake stores clean run- off water from the water diversion trenches, and the surface run-off from the Southern Valley BRDA embankments. The embankment outer slope runoff does not contact process water and reports directly to the FWL.

**AERIAL PHOTO SHOWING PREMISES BOUNDARY AND KEY INFRASTRUCTURE AREAS**

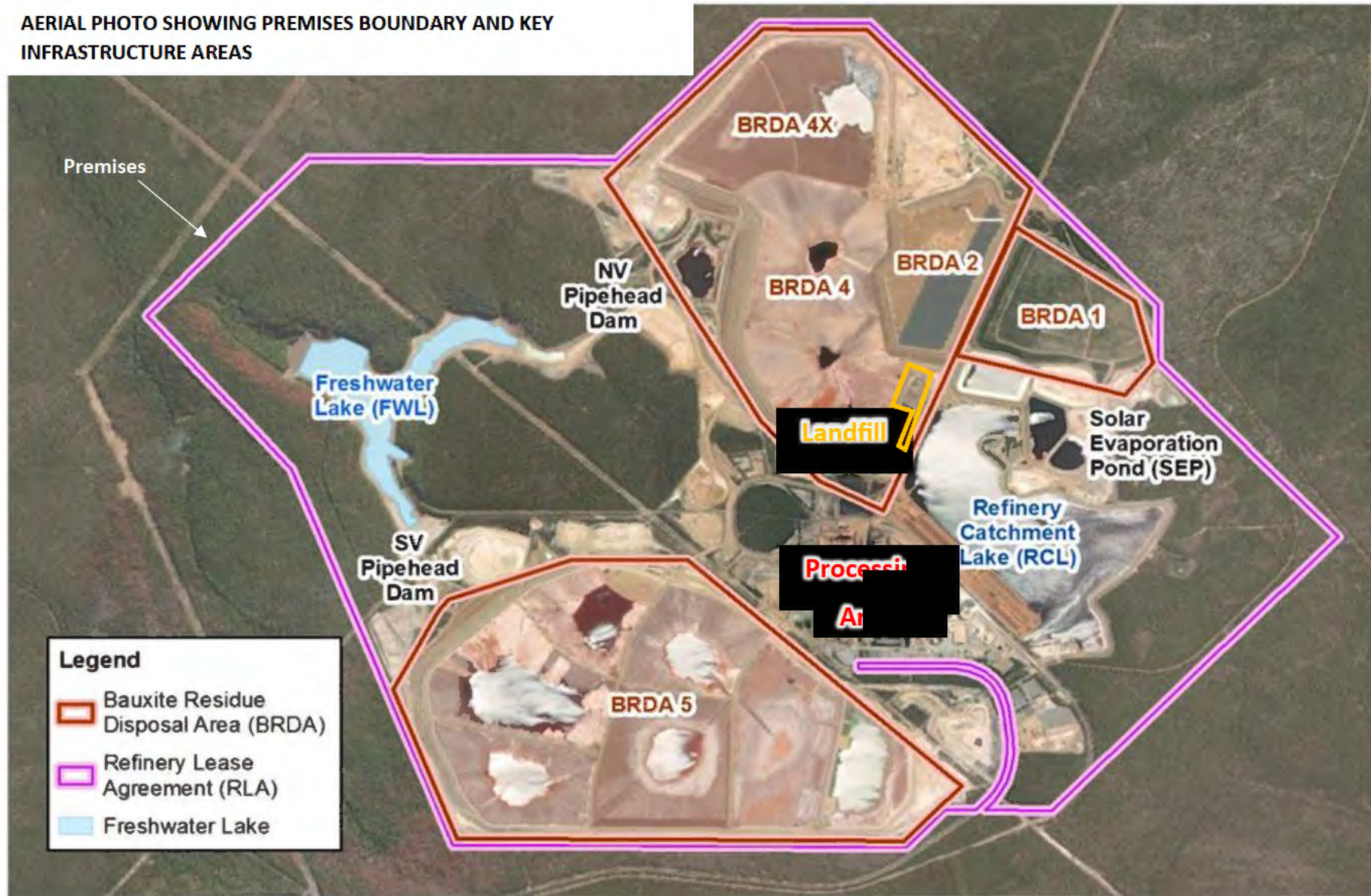


Figure 2-1: Prescribed premise area authorised under Licence 4504/1981/17

## 2.3 Prescribed Premises Categories

The prescribed premise categories currently approved under Schedule 1 of the *Environmental Protection Regulations (1987)* are presented in Table 2-1.

Table 2-1: Current prescribed categories/activities licensed under L4504/1981/17

Prescribed premises category description (Schedule 1, Environmental Protection Regulations 1987)	Assessed production / design capacity
Category 46 – Bauxite Refining	4.7 million tonnes per annual period assessed production capacity
Category 52 – Electrical Power Generation	260 Mega Watts per annual period design capacity
Category 53 – Fly Ash Disposal	110,000 tonnes per annual period assessed production capacity
Category 54 – Sewage Facility	270 cubic metres per day design capacity
Category 61 – Liquid Waste Facility	100 tonnes per annual period assessed production capacity
Category 63 – Class I Inert Landfill Site	15,000 tonnes per annual period assessed production capacity
Category 89 – Putrescible Landfill site	500 tonnes per annual period assessed production capacity

As part of this Licence Renewal, South32 would like to propose making some minor changes to their current prescribed activities authorized on site. Proposed amendments are presented in Category 61 (Liquid waste facility) is no longer required and has been removed from the new licence application.

Table 2-2 below.

Categories 5 and 67 are not new prescribed categories/activities but rather unspecified existing activities on the site. Specifically, category 5 is the disposal of Bauxite processing waste (sand and mud) into the BRDAs, which falls under 5 (c) where tailings are discharged into a containment cell or dam. Category 67 is currently an unspecified activity on the site where fuel (gas and coal) is used to produce steam or electricity.

Category 61 (Liquid waste facility) is no longer required and has been removed from the new licence application.

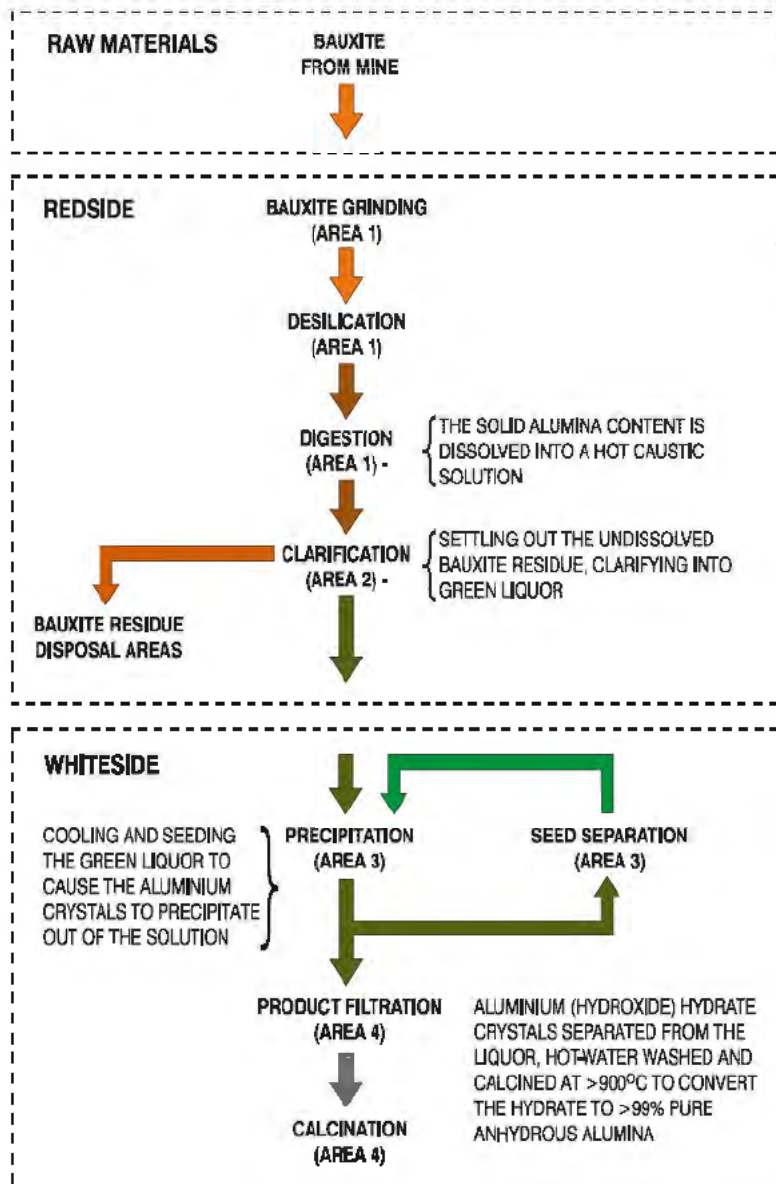
**Table 2-2: Proposed prescribed categories/activities for licence renewal**

Prescribed premises category description (Schedule 1, Environmental Protection Regulations 1987)	Assessed production / design capacity
Category 46 – Bauxite Refining	4.7 million tonnes per annual period assessed production capacity
Category 52 – Electrical Power Generation	232 Mega Watts per annual period design capacity
Category 53 – Fly Ash Disposal	102,000 tonnes per annual period assessed production capacity
Category 54 – Sewage Facility	270 cubic metres per day design capacity
Category 63 – Class I Inert Landfill Site	47,000 m <sup>3</sup> per annual period assessed production capacity
Category 89 – Putrescible Landfill site	500 tonnes per annual period assessed production capacity
Category 5 - Processing or beneficiation of metallic or non-metallic ore: premises on which - (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; (b) tailing from metallic or non-metallic ore are reprocessed; (c) Tailings from metallic or non-metallic ore are discharged into a containment cell or dam	18.5 Mtpa dry production capacity and 1.5 Mtpa for offsite reuse/recycling
Category 67 - Fuel burning: premises on which gaseous, liquid or solid fuel is burnt in a boiler for the supply of steam or in power generation equipment	Gas input: 44,300 kg/hour Coal input: 163,200 kg/hour

### 3. Proposed Activities

Bauxite is processed at the Refinery into Alumina powder via a four-stage Bayer process, as outlined in Figure 3-1, involves the following key elements:

- Grinding – Bauxite is delivered to the refinery via overland conveyor from the Boddington Bauxite operations. It then passes through a crushing/grinding circuit;
- Digestion – Crushed/ground bauxite is mixed with caustic at high temperature and pressure liberating odorous volatile organic compounds;
- Clarification – Washing, settlement and filtration of digested liquor (and diversion of “red mud” to BRDAs);
- Precipitation/Seed Preparation – The clarified liquor is cooled and seeded with precipitation of hydrated alumina crystals;
- Liquor Burning – Liquor and oxalate streams are passed through a high-temperature furnace to remove dissolved organic material and destroy oxalate.
- Calcination – heating of precipitated hydrate in a high-temperature furnace to produce calcined alumina (a fine white powder); and
- Bauxite Residue Disposal Area – Residual sand and mud (bauxite residue) from the process is pumped as an alkaline slurry to the residue drying area where excess caustic and liquor is collected and recycled through the process.



### Figure 3-1: General Bayer process train used at the Refinery

Bauxite for the Refinery is sourced from the Boddington Bauxite Mine (BBM) where it is transported via overland conveyor 50 km to the Worsley Refinery where is processed into hydrate and Alumina. The Alumina is then railed to the Bunbury Port for export. The general processing train from mine to port is shown in Figure 3-2.

The processing area (Figure 3-3) on the prescribed premises is organised into various areas of responsibility (Figure 3-4 and Figure 3-5) for different stages in the Alumina production process in addition to the various areas and facilities employed to support production processes at each stage (Figure 3-6 and [Error! Reference source not found.](#)). An operation overview on the infrastructure present and functions of the areas of responsibility is provided in **Attachment 8A**,

which has been summarized in

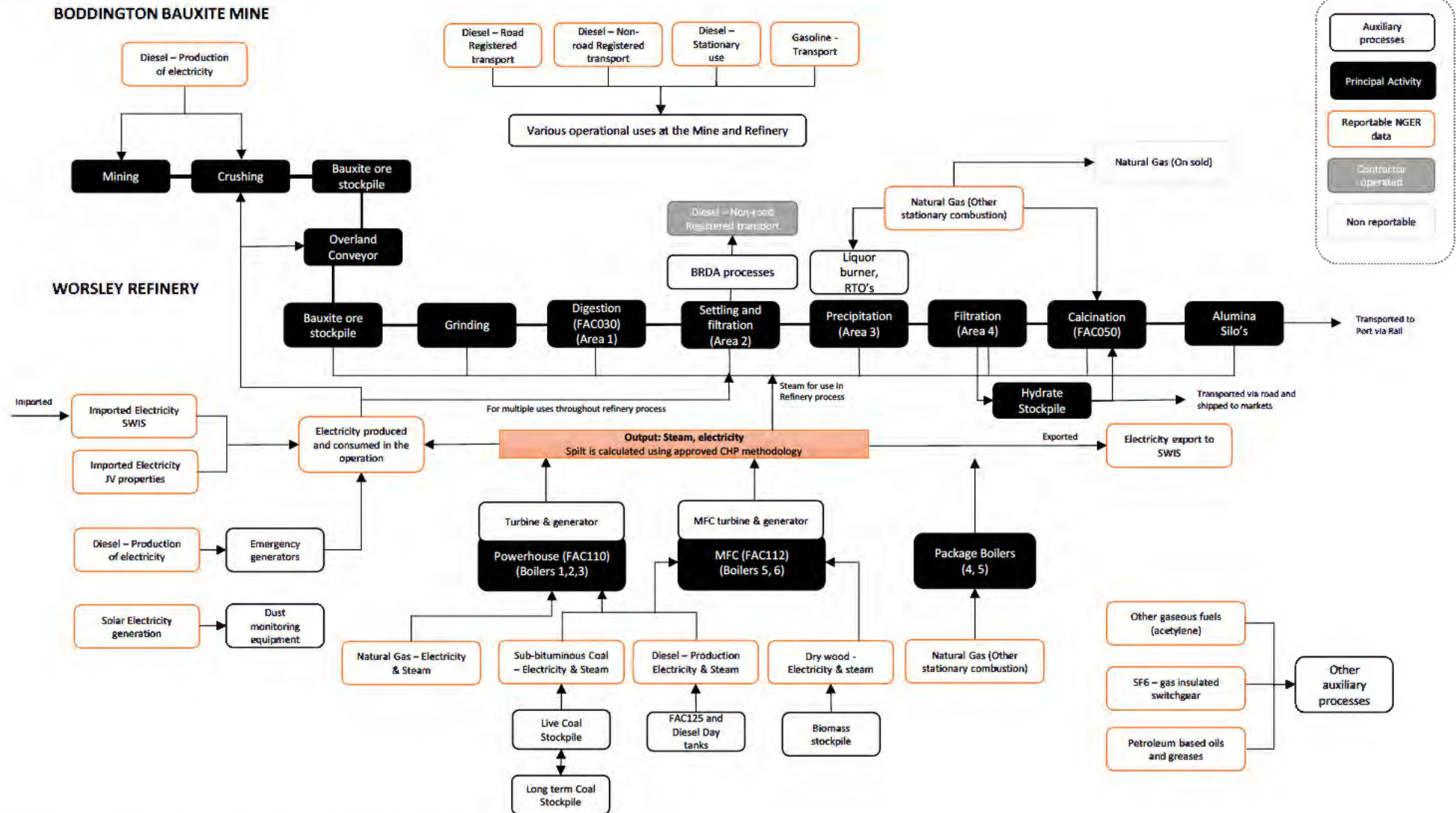


Figure 3-6: Detailed process flow and areas/facilities engaged at the Refinery



Table 3-1.

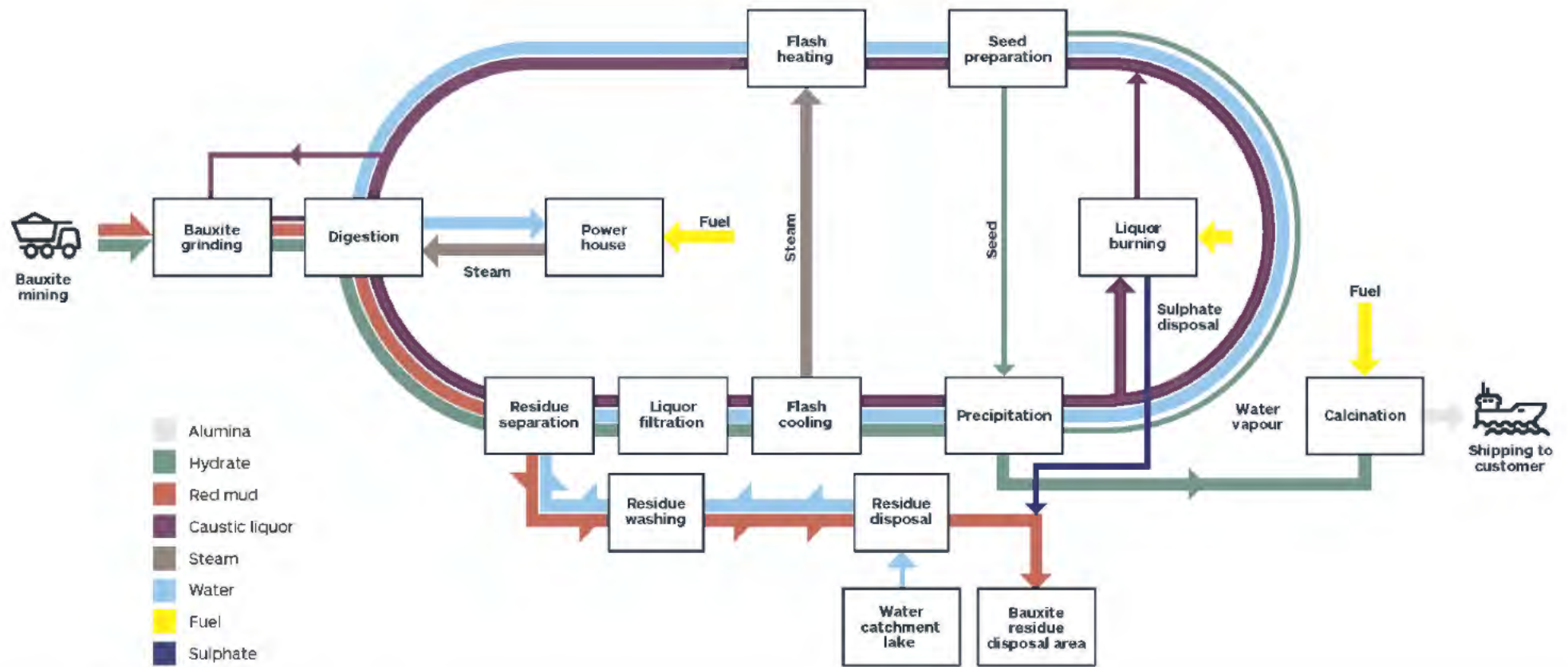


Figure 3-2: General process flow at the Refinery



Figure 3-3: Recent satellite image of the processing area on the prescribed premises

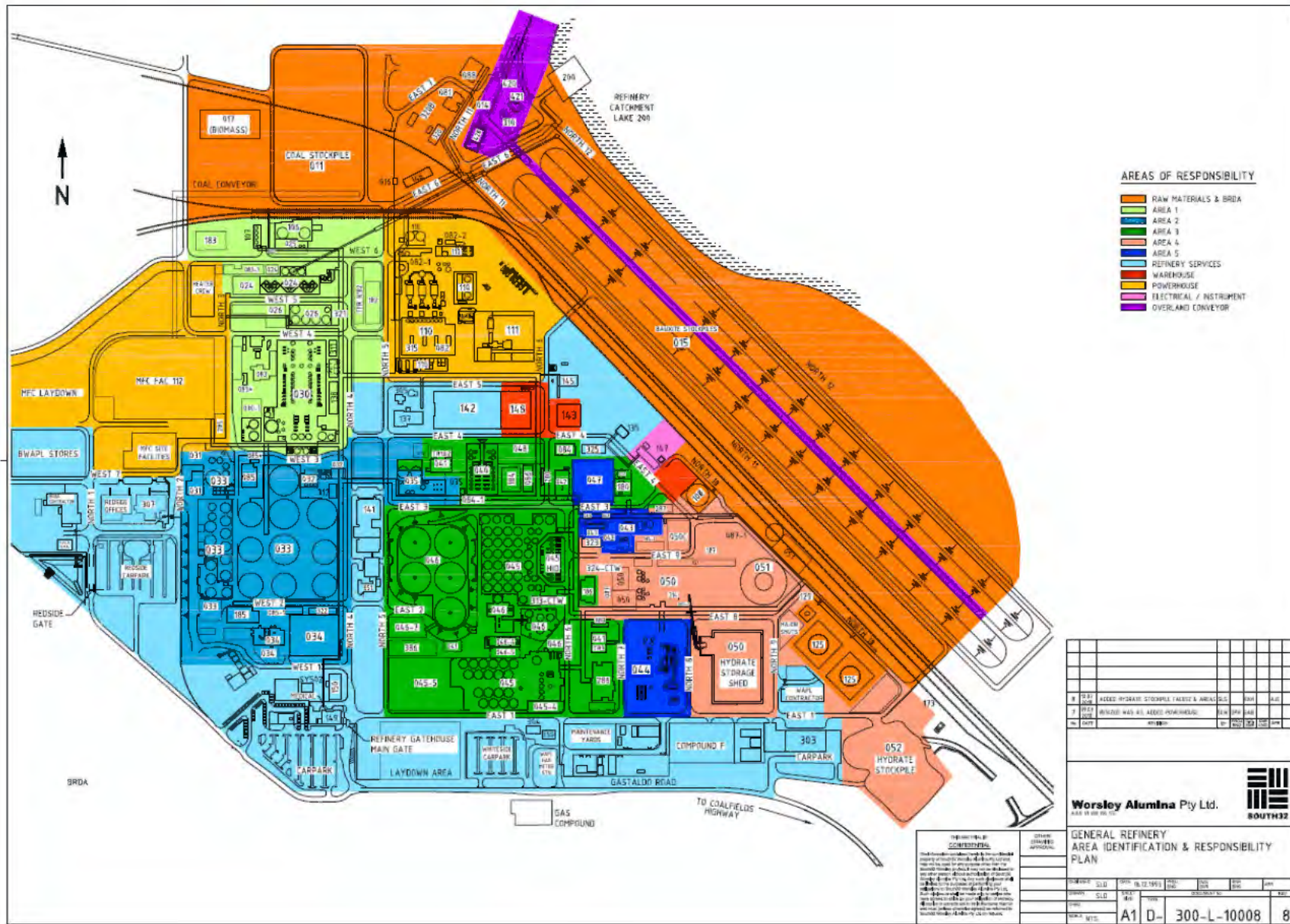


Figure 3-4: Processing area layout showing areas of responsibility

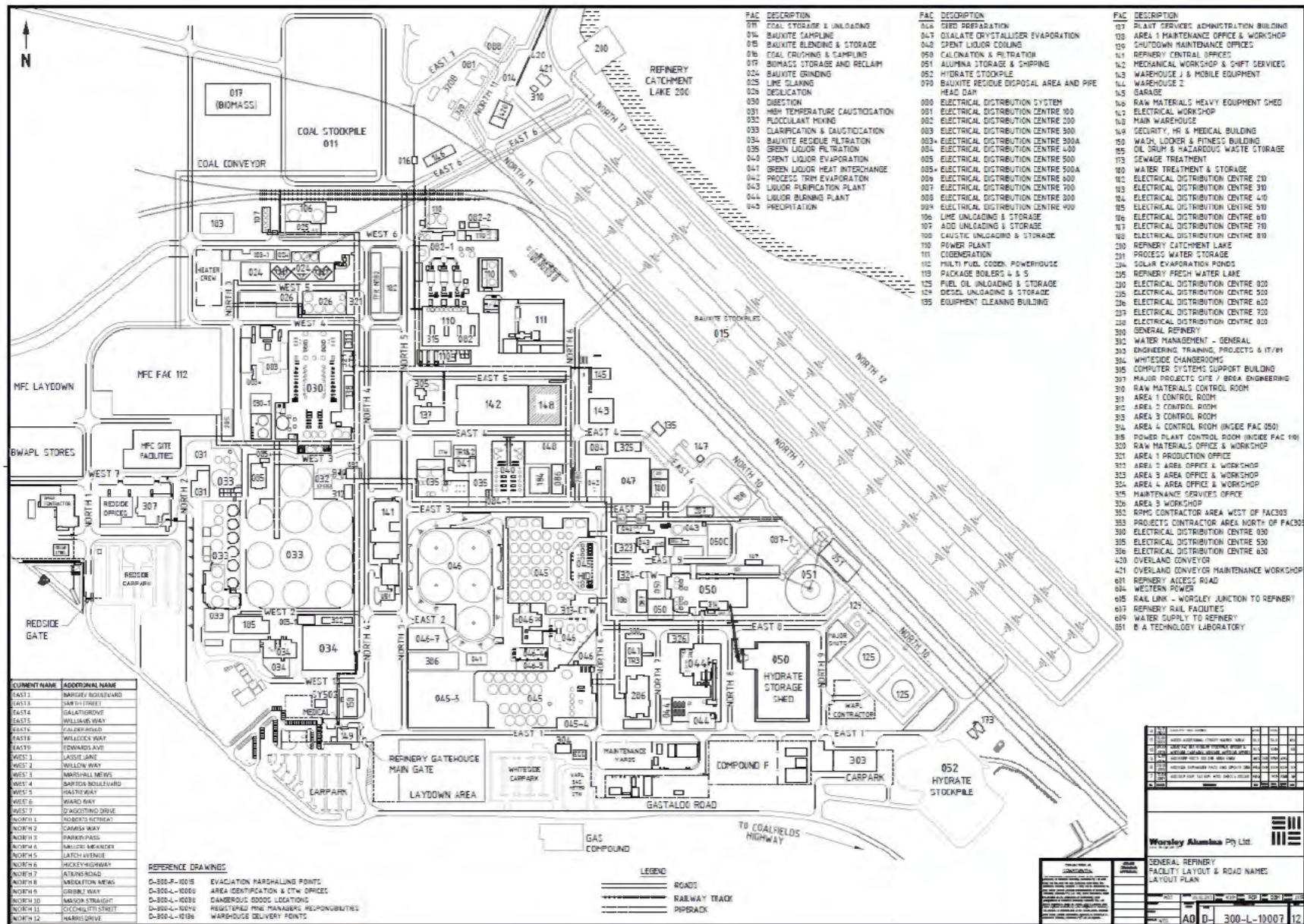


Figure 3-5: Processing area layout showing facilities

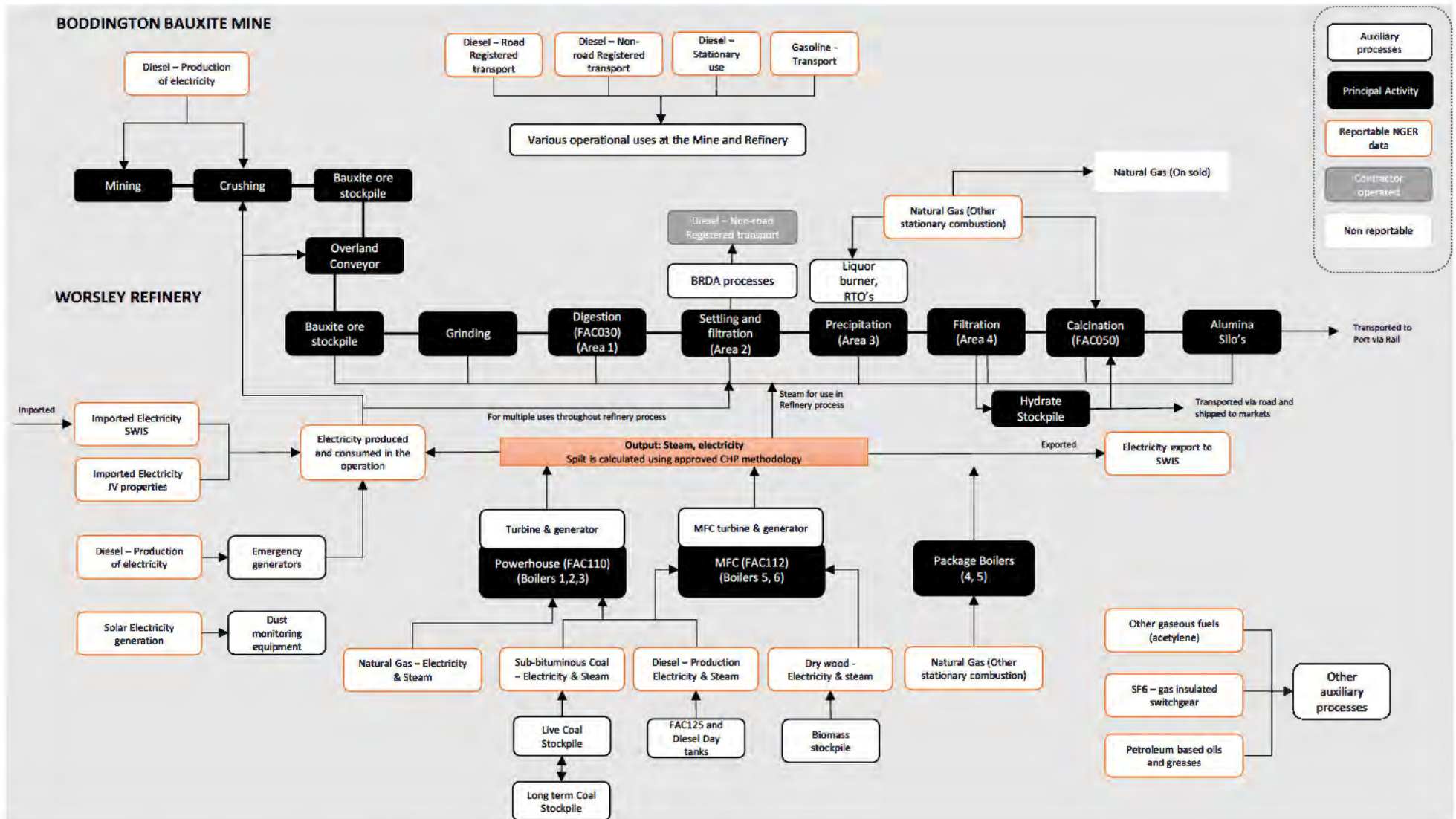


Figure 3-6: Detailed process flow and areas/facilities engaged at the Refinery

**Table 3-1: Designated areas of responsibility on the site with infrastructure/facilities within them**

Area of Responsibility	Facilities	Primary Function(s)
Raw Materials Area	015 Bauxite stockpiles 017 Biomass storage and reclaim 011 Coal stockpile 081 Electrical distribution centre 100 088 Electrical distribution centre 800 320/320B Raw material office and workshop 108 Caustic unloading and storage 125 Fuel unloading and storage 146 Raw materials heavy equipment shed 310 Raw materials control room	The Raw Materials Area receives, and stores materials required for the operation of the Refinery. Coal, diesel, lime and caustic soda are brought to the site by train.  Coal is used on the site to feed the coal fired power station (FAC 110 and FAC 112; Figure 3-5).  Diesel is used as to bring coal fired boilers up to operating temperature and stabilise boiler operation in MFC boilers 4 and 5 (FAC 112, Figure 3-5 when processing excessively wet coal.  Figure 3-5
Area 1	183 Electrical distribution centre 310 025 Lime slaking 106 Lime unloading and storage 083/083-1/083* Electrical distribution centres 024 Bauxite grinding 026 Desilication 030 Digestion 321 Area 1 production office 182 Electrical distribution centre 210	The principal function Area 1 is the Digestion Phase of the Bayer process (Figure 3-1) where Alumina in the Bauxite is dissolved in a hot caustic soda (NaOH) solution.  Bauxite mixed with hot caustic soda solution and ground in mills, undergoes a desilication process, and is then held in digester vessels operating at high temperature and pressure to dissolve the Alumina content of the Bauxite.  Lime slaking also occurs in Area 1, which plays a vital role in impurity removal and the production of filter aid in the Refinery.
Area 2	031 High temperature causticisation (HTC) 032 Flocculant storage and distribution 033 Clarification and causticisation 034 Bauxite residue filtration 185 Electrical distribution centre 510 322 Area 2 office and workshop	The primary functions of Area 2 are to:  Produce enriched liquor from digestion blowoff received from Area 1 via a clarification process (Figure 3-1) to remove impurities.  Recover caustic soda (NaOH) from Bauxite mud residue settled out in the settlers and discharge the remaining mud residue slurry to BRDAs.

Area of Responsibility	Facilities	Primary Function(s)
Area 3	040 Spent liquor evaporation 041 Green liquor heat interchange 042 Process trim evaporation 045 Precipitation tanks 046 Seed preparation 180 Water treatment plant and storage 186 Electrical distribution centre 610 286 Electrical distribution centre 620 313 Area 3 control room 323 Area 3 office and workshop 386 Electrical distribution centre 630	<p>The primary function of Area 3 is to produce hydrated Alumina crystals (hydrate) which is precipitated (Precipitation Phase) by cooling and seeding the liquor solution in mechanically agitated open-top tanks.</p> <p>Area 3 contains classification circuits where precipitated Alumina hydrate is separated into product, coarse and fine size fractions. Coarse and fine seed fractions are filtered before being returned as seed to the precipitation process.</p> <p>The liquor which is now depleted of alumina (spent liquor) is clarified in thickeners before passing through evaporators where a combination of steam from the powerhouse and vacuum is used to boil the liquor and increase the caustic soda concentration. Water vapour produced in the evaporators is condensed and reused within the Refinery.</p> <p>The concentrated spent liquor is used to cool the hot liquor entering precipitation, recovering heat before returning to Area 1.</p> <p>The water treatment plant is also located Area 3, whereby water sourced from the freshwater lake (FWL, Figure 2-1) is treated and used as potable water in the refinery.</p>
Area 4	050 Calcination and filtration units 051 Alumina storage and shipping Hydrate storage shed 087 286 Electrical distribution centre 700 129 Diesel unloading and storage 187 Electrical distribution centre 710 287 Electrical distribution centre 720 314 Area 4 control room 324 Area 4 office and workshop	<p>The primary function of Area 4 is to wash the precipitated Hydrate to recover caustic and then calcine (Calcination Phase, Figure 3-1) the hydrate at high temperatures (exceeding 1000°C) to form the final product aluminium oxide (Alumina) which is stored (Facility 051) before transport to Bunbury Port by train for shipment.</p> <p>Six calciners are located in Area 4 which discharge their furnace waste gas to atmosphere.</p> <p>Figure 2-1</p>
Area 5	043 Liquor purification plant (LPP) 044 Liquor burning plant (LB) 047 Oxalate evaporator	<p>The primary function of Area 5 is removing impurities (sulphate, sodium oxalate, and dissolved total organic carbon (TOC)) from the "spent Liquor".</p> <p>Oxalate is removed through crystallisation and filtration to produce "oxalate cake".</p>



Area of Responsibility	Facilities	Primary Function(s)
		<p>The oxalate filter cake and a side stream of spent liquor is passed through the liquor burner where it is treated at high temperatures (1000°C) for destruction. Sodium oxalate not treated in the liquor burning process is discharged to the SEPs ( Figure 2-1).</p> <p>The liquor burning process produces an odorous gas which is treated in thermal oxidisers and wet scrubbing before discharging to atmosphere.</p>
Refinery services	BWAPL Stores Contractor offices/workshops Carparks Laydown area 135 Equipment cleaning building 137 Plant services administration building 141 Refinery central offices 142 Mechanical workshop shift services 145 Garage 149 Security, HR, and medical building 150 Staff facilities Maintenance yards WAPL gas meter station Gas compound Compound F 305 Computer services support building 307 Major projects site/BRDA engineering 325 Maintenance services office 851 BA Technology refinery	
Warehouse	143 Warehouse J and mobile equipment 148 Main warehouse	

Area of Responsibility	Facilities	Primary Function(s)																		
Powerhouse	082 Electrical distribution centre 200 110 Power plant 111 Cogeneration plant (decommissioned) 112 MFC cogeneration plant 113 Packaged boilers 4 & 5 315 Power plant control room 112 Multi fuel cogeneration (MFC) powerhouse MFC site facilities MFC laydown area	<p>Alumina refining is an energy intensive process, and the Refinery relies on a mix of fuels to meet energy demand, which consists of coal, natural gas, and biomass (wood waste). The Refinery has reduced its reliance on coal by switching boilers to natural gas to meet energy demand. The majority of the fuel is used to meet thermal heat (steam) demand for the primary refining process while also generating electricity to power the site.</p> <p>There are three primary energy generating plants on the site:</p> <table border="1" data-bbox="884 488 2033 855"> <thead> <tr> <th data-bbox="884 488 1431 576">Power generating infrastructure</th> <th data-bbox="1431 488 1749 576">Power generating capacity and output</th> <th data-bbox="1749 488 2033 576">Fuel source</th> </tr> </thead> <tbody> <tr> <td data-bbox="884 576 1431 632">FAC 110 – Power Plant (TG1 to 4)</td> <td data-bbox="1431 576 1749 632">117 MWe electricity</td> <td data-bbox="1749 576 2033 632">Coal and natural gas</td> </tr> <tr> <td data-bbox="884 632 1431 687">FAC 110 – Power Plant (Boiler 1 to 3)</td> <td data-bbox="1431 632 1749 687">523 MWth heat output</td> <td data-bbox="1749 632 2033 687">Coal and natural gas</td> </tr> <tr> <td data-bbox="884 687 1431 743">FAC 112 – Multi-fuel Cogeneration Plant (Unit 5 &amp; 6)</td> <td data-bbox="1431 687 1749 743">116 MWe electricity</td> <td data-bbox="1749 687 2033 743">Coal and biomass</td> </tr> <tr> <td data-bbox="884 743 1431 799">FAC 112 – Multi-fuel Cogeneration Plant (Boilers 5 &amp; 6)</td> <td data-bbox="1431 743 1749 799">503 MWth (heat output)</td> <td data-bbox="1749 743 2033 799">Coal and biomass</td> </tr> <tr> <td data-bbox="884 799 1431 855">Fac 113 – Packaged Boilers 4 &amp; 5</td> <td data-bbox="1431 799 1749 855">154 MWth Heat output</td> <td data-bbox="1749 799 2033 855">Natural gas</td> </tr> </tbody> </table> <p>Note: Energy in table - the MW (energy) is the energy input to produce the steam</p> <p>Peak fuel consumption on the site will be:            Gas – 44 tonnes/hour            Coal – 163 tonnes/hour</p>	Power generating infrastructure	Power generating capacity and output	Fuel source	FAC 110 – Power Plant (TG1 to 4)	117 MWe electricity	Coal and natural gas	FAC 110 – Power Plant (Boiler 1 to 3)	523 MWth heat output	Coal and natural gas	FAC 112 – Multi-fuel Cogeneration Plant (Unit 5 & 6)	116 MWe electricity	Coal and biomass	FAC 112 – Multi-fuel Cogeneration Plant (Boilers 5 & 6)	503 MWth (heat output)	Coal and biomass	Fac 113 – Packaged Boilers 4 & 5	154 MWth Heat output	Natural gas
	Power generating infrastructure	Power generating capacity and output	Fuel source																	
FAC 110 – Power Plant (TG1 to 4)	117 MWe electricity	Coal and natural gas																		
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Fac 113 – Packaged Boilers 4 & 5	154 MWth Heat output	Natural gas																		
Electrical/instrument	147 Electrical workshop																			
Overland Conveyor	014 Bauxite sampling station 420 Overland conveyor 421 Overland conveyor maintenance workshop	Transports Bauxite from the Worsley Mine to the Refinery for processing.																		

Table 3-2: Key Site Infrastructure Associated with Prescribed Premises Activity Categories

Prescribed Category	Infrastructure	Receiving Inputs	Estimated Throughput	Outputs	Estimated Throughput
	<b>Processing infrastructure</b>				
52, 67	Power plants (FAC 110, FAC 112)	Coal Gas	127 t/hour 31 t/hour	Electricity and steam Gaseous stack emission	232 MW Electricity generation
67	Power plants (FAC 113)	Gas	13 t/hour	Steam Gaseous stack emission	154 MWth Heat output
46	Bauxite refining infrastructure	Bauxite	-	Alumina	4.7 Mtpa
54	Sewage treatment plant	Untreated sewage	270 m <sup>3</sup> /day	Treated wastewater to RCL	270 m <sup>3</sup> /day
	<b>Containment infrastructure</b>				
5, 53	Bauxite residue drying areas (BRDA)	Bauxite residue/Wet red mud Fly ash	18.5 dry Mt/year 102,000 t/year	Leachate to pipeline head dams	4,850 ML/year
	Refinery catchment lake (RCL)	Recirculated process cooling water from Refinery Residue liquor from Pipehead Dams Wastewater from Sewage Treatment Plant Rainfall collected on contaminated catchment Freshwater top up from Freshwater Lake or external supply	15,000 to 23,000 m <sup>3</sup> /hour. Average 17,700 m <sup>3</sup> /hour (recirculation) 8,700 to 18,900 ML/year (recirculation) 270 m <sup>3</sup> /day ~7,700 ML/year ~1,1000 ML/year	Evaporation and physical losses with tailings in BRDA's. Zero discharge from site.	
63, 89	Landfill	Inert waste Putrescible waste	47,000 m <sup>3</sup> /year 500 t/year	Leachate Landfill (negligible)	Unknown and not measured
46	Pipeline head dams (NPHD/SPHD)	Seepage from BRDAs	8,700 to 18,900 ML/year. Average is 13,600 ML/year.	Collected seepage to RCL	8,700 to 18,900 ML/year. Average is 13,600 ML/year.
	Solar evaporation ponds (SEPs 1- 4)	Sodium oxalate	82,000 – 105,000 t/year (wet)	Leachate	-

Prescribed Category	Infrastructure	Receiving Inputs	Estimated Throughput	Outputs	Estimated Throughput
			(Forecast FY25 to FY31)		
	Freshwater lake (FWL)	Uncontaminated surface water and groundwater from the refinery lease area	1280 to 6560 ML/year. Average is 3,800 ML/year.	Outflow water	Average 2,600 ML/year. Peak 5,400 ML/year.

## 4. Other Approvals and Consultation

### 4.1 State Agreement Act

Worsley Alumina currently operates under the *Alumina Refinery (Worsley) Agreement Act 1973* (Worsley State Agreement). The Worsley State Agreement provided the initial basis for the Project to proceed. Clause 5A of the Agreement under the Act required the Worsley Alumina Joint Venturers (WJVs) to submit a detailed Environmental Review and Management Programme (ERMP) for assessment and approval in order for project operations to begin. Reporting against the relevant Sections (c5A(3) & c16(10)) of the WSA is undertaken annually through submission of the Worsley 10YP and Annual Review process.

### 4.2 Mining Act 1978

BRDA 4X and 5 are governed under a single Crown Lease Agreement I154246 which effectively covers three separate areas inside the RLA. The western portion of the RLA is overlaid by part of Mining Lease M258SA, thus permitting mining activity within the overlapping zone.

### 4.3 Part IV Environmental Protection Act 1986 (EP Act)

Ministerial Statement 719 applies to the Refinery and the associated Boddington Bauxite Mine. In relation to the current application, Worsley Alumina is required to implement the Water Resource Management Plan for the protection and management of nearby proclaimed water resources and to give effect to a zero discharge to these natural resources, and thereby not diminish their environmental value or use.

The Refinery operations were assessed in a 2005 application which was subsequently approved by Ministerial Statement 719 (and several subsequent Section 45C applications and approvals). The Refinery has an approved production rate of 4.7Mtpa. Schedule 1 of MS 719 includes management limits for sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), particulates (PM<sub>10</sub>), and total volatile compounds (VOCs). These air emissions and associated targets and reporting are also currently regulated through the Environmental Protection Licence (L4504/1981/17) issued under Part V of the EP Act.

### 4.4 Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)

In June 2004, Worsley Alumina proposed to increase the production rate at the refinery from 3.5 Mtpa to 4.4 Mtpa (“Worsley Alumina Efficiency and Growth”), which included five additional mining areas: East Quindanning, Morgan’s, Hotham North Extension, Central and Brookton, this proposal was assessed under the EPBC Act through the Bilateral Agreement between the Commonwealth and the State of Western Australia. EPBC Act approval 2004/1566 was issued for the “Worsley Alumina Efficiency and Growth” aspects of the Project on 6 June 2007.