



Licence

Environmental Protection Act 1986, Part V

Licensee: Chichester Metals Pty Ltd

Licence: L8454/2010/2

Registered office: 87 Adelaide Terrace
EAST PERTH WA 6004

ACN: 109 264 262

Premises address: Christmas Creek Mine Site
Tenements E46/610, E46/612, M46/320, M46/321, M46/322, M46/323, M46/324, M46/325, M46/326, M46/327, M46/328, M46/329, M46/330, M46/331, M46/332, M46/333, M46/334, M46/335, M46/336, M46/337, M46/338, M46/339, M46/340, M46/341, M46/342, M46/343, M46/344, M46/345, M46/346, M46/347, M46/348, M46/349, M46/350, M46/351, M46/352, M46/353, M46/354, M46/355, M46/403, M46/406, M46/412, M46/413, M46/414, M46/415, M46/416, M46/417, M46/418, M46/419, M46/420, M46/421, M46/422, M46/423, M46/424, G46/7, L46/49, L46/56, L46/58, L46/86, L46/87, L46/106, L46/111 E46/566 and L46/66
MULGA DOWNS WA 6751
As depicted in Schedule 1

Issue date: Thursday, 20 August 2015

Commencement date: Monday, 24 August 2015

Expiry date: Saturday, 23 August 2036

Prescribed premises category

Schedule 1 of the *Environmental Protection Regulations 1987*

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore	50,000 tonnes or more per year	77,000,000 tonnes per annual period
6	Mine dewatering	50,000 tonnes or more per year	43,000,000 tonnes per annual period (injected)
52	Electric power generation	10 MW or more in aggregate (using a fuel other than natural gas)	56 MW
54	Sewage facility	100 cubic metres or more per day	1,040 cubic metres per day
57	Used tyre storage	100 tyres or more	2,000 tyres



64	Class II putrescible landfill	20 tonnes or more per year	10,000 tonnes per annual period
73	Bulk storage of chemicals	1,000 cubic metres in aggregate	15,183.1 cubic metres in aggregate

Conditions

This Licence is subject to the conditions set out in the attached pages.

Date signed: 8 July 2016

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Tim Gentle
A/Senior Manager (Resource Industries)

Officer delegated under section 20
of the *Environmental Protection Act 1986*



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Introduction

This Introduction is not part of the Licence conditions.

DER's industry licensing role

The Department of Environment Regulation (DER) is a government department for the state of Western Australia in the portfolio of the Minister for Environment. DER's purpose is to advise on and implement strategies for a healthy environment for the benefit of all current and future Western Australians.

DER has responsibilities under Part V of the *Environmental Protection Act 1986* (the Act) for the licensing of prescribed premises. Through this process DER regulates to prevent, control and abate pollution and environmental harm to conserve and protect the environment. DER also monitors and audits compliance with works approvals and licence conditions, takes enforcement action as appropriate and develops and implements licensing and industry regulation policy.

Licence requirements

This Licence is issued under Part V of the Act. Conditions contained within the Licence relate to the prevention, reduction or control of emissions and discharges to the environment and to the monitoring and reporting of them.

Where other statutory instruments impose obligations on the Premises/Licensee the intention is not to replicate them in the licence conditions. You should therefore ensure that you are aware of all your statutory obligations under the Act and any other statutory instrument. Legislation can be accessed through the State Law Publisher website using the following link:

<http://www.slp.wa.gov.au/legislation/statutes.nsf/default.html>

For your Premises relevant statutory instruments include but are not limited to obligations under the:

- *Environmental Protection (Unauthorised Discharges) Regulations 2004* – these Regulations make it an offence to discharge certain materials such as contaminated stormwater into the environment other than in the circumstances set out in the Regulations.
- *Environmental Protection (Controlled Waste) Regulations 2004* - these Regulations place obligations on you if you produce, accept, transport or dispose of controlled waste.
- *Environmental Protection (Noise) Regulations 1997* – these Regulations require noise emissions from the Premises to comply with the assigned noise levels set out in the Regulations.



You must comply with your licence. Non-compliance with your licence is an offence and strict penalties exist for those who do not comply.

Licence holders are also reminded of the requirements of section 53 of the Act which places restrictions on making certain changes to prescribed premises unless the changes are in accordance with a works approval, licence, closure notice or environmental protection notice.

Licence fees

If you have a licence that is issued for more than one year, you are required to pay an annual licence fee prior to the anniversary date of issue of your licence. Non payment of annual licence fees will result in your licence ceasing to have effect meaning that it will no longer be valid and you will need to apply for a new licence for your Premises.

Ministerial conditions

If your Premises has been assessed under Part IV of the Act you may have had conditions imposed by the Minister for Environment. You are required to comply with any conditions imposed by the Minister.

Premises description and Licence summary

The Christmas Creek Mine Site (Christmas Creek) is owned and operated by Chichester Metals Pty Ltd (Chichester Metals), a wholly owned subsidiary of Fortescue Metals Group Ltd (Fortescue). Christmas Creek is part of Fortescue's Pilbara Iron Ore and Infrastructure Project, comprising a series of iron ore mines located in the Pilbara region and related rail and port infrastructure for ore export through Port Hedland.

Christmas Creek is located approximately 111 km north east of Newman. Christmas Creek mine lies between 1 – 10 km north of the Fortescue Marsh, listed as a Nationally Important Wetland of Australia (Environment Australia 2001) and the largest wetland in the Pilbara.

Christmas Creek has been in operation since 2010. No significant communities are in the vicinity of the mine site and the nearest neighbours include:

- Roy Hill Station which is approximately 30 km southeast;
- Marillana Homestead which is approximately 41 km from the site;
- Roy Hill mine which is currently being developed adjacent to Christmas Creek on the south eastern side of the mine; and
- Cloudbreak Mine located immediately to the west.

The mine comprises a series of open pits, serviced by two ore processing facilities (OPFs) with mobile screening and crushing units supporting the OPFs. Tailings are generated from the OPFs and are deposited into tailings cells constructed from previously mined pits. Currently two tailings storage facilities (TSFs) are in operation; Windich and Vasse. Processed ore is transferred to rail and transported to Fortescue's port at Port Hedland.

The mine site sits over three main connected aquifers, the fresh-brackish Tertiary Detritals, brackish Marra Mamba formation and the hypersaline Oakover formation. Water supply is provided by groundwater abstraction from local borefields, both brackish and hypersaline in water quality, and is authorised by groundwater licences issued by the Department of Water. As approximately 70% of the ore body lies below the water table, mine dewatering provides a large amount of the water supply for Christmas Creek. Excess groundwater and process water (including tailings decant water) is returned to either the Marra Mamba or Oakover formation aquifers by bore reinjection, dependent on salinity.

Supplementary infrastructure at the mine site includes a putrescible landfill, two bioremediation areas, a diesel fuelled power station and two wastewater treatment plants (WWTP), one servicing the Construction Camp and the other the Operations Camp, known as the Construction Camp WWTP and Karntama WWTP, respectively.

Key emissions for Christmas Creek are the following:

- Fugitive dust emissions;



- Emissions to land from landfill activities;
- Emissions to air from the power station’s diesel gensets’ exhausts;
- Emissions to land from discharge to two separate irrigation areas for each WWTP’s effluent stream; and
- Emissions to groundwater from water produced during mine dewatering.

Risks that are associated with the Premises’ operations include:

- Contaminated stormwater discharged to surrounding land and surface water (ephemeral creeks draining to Fortescue Marsh);
- Reinjection of excess mine dewatering water to groundwater;
- Contingency dewater discharge to surface water (to nominated discharge points on ephemeral creeks draining to Fortescue Marsh);
- Seepage from TSFs;
- Failure of pipelines carrying saline water;
- Hydrocarbon contamination of land and/or groundwater from fuel facilities, workshops, bioremediation areas; and
- Contamination of land and groundwater from leachate and/or waste from the landfill.

This Licence is the result of an amendment sought by the Licensee to:

- Update the prescribed premises boundary to capture all dewatering and reinjection infrastructure;
- Approve the development of the new Flinders Strip 12 In-Pit TSF and Windich Above-Ground TSF;
- Increase the bulk fuel chemical storage volume specified on the Licence;
- Replacement of category 89 with category 64, to reflect the increase in tyre and other inert waste disposed in waste rock dumps and mining voids;
- Approval for construction of a sludge handling unit at the Karntama Village WWTP;
- Addition of conditions relating to emissions to groundwater and monitoring of such emissions to replace the requirement to implement the Water Management Scheme; and
- Inclusion of a 2MW capacity Caterpillar C175 generator on the Licence as an emission point to air.

The Licences and Works Approvals issued for the Premises are:

Instrument log		
Instrument	Issued	Description
W4623/2009/1	22/02/2010	Ore Processing Facility works approval
W4626/2010/1	22/02/2010	Construction Camp Wastewater Treatment Facility works approval
W4682/2010/1	28/06/2010	Putrescible Landfill works approval
W4643/2010/1	08/07/2010	Power Station of 28 MW capacity works approval
L8454/2010/1	23/08/2010	Licence issued for Christmas Creek Camp Wastewater Treatment Facility operation, category 54
W4724/2010/1	02/09/2010	Christmas Creek Village Wastewater Treatment Plant
W4733/2010/1	11/10/2010	Operations Camp Wastewater Treatment Facility works approval
L8454/2010/1	09/12/2010	Licence amendment to include putrescible landfill, category 89
W4739/2010/1	20/12/2010	Hydrogeological Investigations for Christmas Creek Water Management Scheme works approval
W4790/2010/1	20/12/2010	Vasse Tailings Storage Facility works approval
W4782/2010/1	17/01/2011	Hydrocarbon Storage works approval
W4924/2011/1	18/07/2011	Second Ore Processing Facility, Remote Crushing Hub and Overland Conveyor works approval



L8454/2010/1	10/11/2011	Licence amendment to authorise power station operation category 52, ore processing facility category 5, additional WWTP, Tailings Storage Facility (TSF) and supporting infrastructure
W4996/2011/1	19/12/2011	Christmas Creek Hillside East Borefield Extension works approval
W5001/2011/1	05/12/2011	Power station expansion to 54 MW capacity works approval
L8454/2010/1	12/03/2012	Licence amendment to include category 6 (dewatering) and category 73 (bulk storage of chemicals)
W5120/2012/1	05/07/2012	Additional bulk fuel storage works approval
W5210/2012/1	09/08/2012	Windich TSF works approval
W5309/2012/1	04/03/2013	Christmas Creek Water Management Scheme infrastructure works approval
W5363/2012/1	15/04/2013	Vasse above ground tailings storage facility works approval
L8454/2010/1	13/06/2013	Amendment initiated by Licensee to increase the capacities authorised in categories 5, 6, 52, 54 and 73.
L8454/2010/1	15/08/2013	Amendment initiated by Licensee to authorise increase in capacity of category 6 to 43 Mt/a
L8454/2010/1	12/12/2013	Amendment initiated by Licensee to construct and operate mobile crushing and screening facilities and operate Vasse TSF
W5425/2013/1	11/07/2013	Windich TSF 2 works approval
L8454/2010/2	20/08/2015	Licence reissue and amendment to add Windich TSF2 and update to new template Licence
L8454/2010/2	7/7/2016	Licence amendment for approval to construction the Flinders Strip 12 In-Pit TSF, Windich Above-Ground TSF and the Karntama Village WWTP sludge handling unit, update prescribed premises boundary, increase category 73 approved design capacity, replace category 89 with category 64, inclusion of conditions for the reinjection of mine dewater and removal of requirement to implement the Water Management Scheme, and inclusion of a 2 MW Caterpillar C175 generator as an emission point to air.

Severance

It is the intent of these Licence conditions that they shall operate so that, if a condition or a part of a condition is beyond the power of this Licence to impose, or is otherwise *ultra vires* or invalid, that condition or part of a condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within the power of this Licence to impose and are not otherwise *ultra vires* or invalid.

END OF INTRODUCTION



Licence conditions

1 General

1.1 Interpretation

1.1.1 In the Licence, definitions from the *Environmental Protection Act 1986* apply unless the contrary intention appears.

1.1.2 For the purposes of this Licence, unless the contrary intention appears:

'Act' means the *Environmental Protection Act 1986*;

'AHD' means the Australian height datum;

'annual period' means the inclusive period from 1 January until 31 December;

'AS 3580.1.1' means the Australian Standard AS 3580.1.1 *Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment*;

'AS 4323.1' means the Australian Standard AS4323.1 *Stationary Source Emissions Method 1: Selection of sampling positions*;

'AS/NZS 5667.1' means the Australian Standard AS/NZS 5667.1 *Water Quality – Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples*;

'AS/NZS 5667.4' means the Australian Standard AS/NZS 5667.4 *Water Quality – Sampling – Guidance on sampling from lakes, natural and man-made*;

'AS/NZS 5667.6' means the Australian Standard AS/NZS 5667.6 *Water Quality – Sampling – Guidance on sampling of rivers and streams*;

'AS/NZS 5667.10' means the Australian Standard AS/NZS 5667.10 *Water Quality – Sampling – Guidance on sampling of waste waters*;

'AS/NZS 5667.11' means the Australian Standard AS/NZS 5667.11 *Water Quality – Sampling – Guidance on sampling of groundwaters*;

'averaging period' means the time over which a limit is measured or a monitoring result is obtained;

'CEO' means Chief Executive Officer of the Department of Environment Regulation;

'CEO' for the purpose of correspondence means;
Chief Executive Officer
Department Administering the Environmental Protection Act 1986
Locked Bag 33
CLOISTERS SQUARE WA 6850
Email: info@der.wa.gov.au

'Clean Fill' has the meaning defined in the Landfill Definitions;

'freeboard' means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point;



'GLpa' means gigalitres per annum;

'HDPE' means high density polyethylene;

'Inert Waste Type 1' has the meaning defined in the Landfill Definitions;

'Landfill Definitions' means the document titled "Landfill Waste Classification and Waste Definitions 1996" published by the Chief Executive Officer of the Department of Environment as amended from time to time;

'Licence' means this Licence numbered L8454/2010/2 and issued under the Act;

'Licensee' means the person or organisation named as Licensee on page 1 of the Licence;

'mbgl' means metres below ground level;

'MW' means megawatts;

'NATA' means the National Association of Testing Authorities, Australia;

'NATA accredited' means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis;

'normal operating conditions' means any operation of a particular process (including abatement equipment) excluding start-up, shut-down and upset conditions, in relation to stack sampling or monitoring;

'NOx' means oxides of nitrogen, calculated as the sum of nitric oxide and nitrogen dioxide and expressed as nitrogen dioxide;

'Premises' means the area defined in the Premises Map in Schedule 1 and listed as the Premises address on page 1 of the Licence;

'putrescible waste' has the meaning defined in the Landfill Definitions;

'quarterly' means the 4 inclusive periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September, 1 October to 31 December;

'Schedule 1' means Schedule 1 of this Licence unless otherwise stated;

'Schedule 2' means Schedule 2 of this Licence unless otherwise stated;

'spot sample' means a discrete sample representative at the time and place at which the sample is taken;

'STP dry' means standard temperature and pressure (0°Celsius and 101.325 kilopascals respectively), dry;

'USEPA' means United States (of America) Environmental Protection Agency;

'USEPA Method 7E' means USEPA Method 7E - determination of nitrogen oxides emissions from stationary sources (instrumental analyzer procedure);

'USEPA Method 10' means USEPA Method 10 determination of carbon monoxide emissions from stationary sources (instrumental analyzer procedure);

'WWTP' means wastewater treatment plant; and

'µS/cm' means microsiemens per centimetre.



1.1.3 Any reference to an Australian or other standard in the Licence means the relevant parts of the standard in force from time to time during the term of this Licence.

1.1.4 Any reference to a guideline or code of practice in the Licence means the version of that guideline or code of practice in force from time to time, and shall include any amendments or replacements to that guideline or code of practice made during the term of this Licence.

1.2 Premises operation

1.2.1 The Licensee shall ensure that all pipelines or sections of pipelines containing tailings and pipelines or sections of pipelines conveying untreated sewage to the Karntama Village and Construction Camp Village WWTPs are either:

- (a) equipped with telemetry; or
- (b) equipped with automatic cut-outs in the event of a pipe failure; or
- (c) provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections.

1.2.2 The Licensee shall ensure that the waste material specified in Table 1.2.1 is only stored and/or treated within vessels or compounds listed in Table 1.2.1 and identified on the map of containment infrastructure in Schedule 1, in accordance with the requirements specified within Table 1.2.1.

Table 1.2.1: Containment infrastructure		
Storage vessel or compound	Material	Requirements
Windich TSF 1 Windich TSF 2 Vasse TSF Flinders Strip 12 In-Pit TSF	Tailings	<ul style="list-style-type: none"> • Maintain a minimum freeboard equivalent to that required to contain a 1 in 100 year storm event over 72 hours from the operational pond surface to lowest elevation of perimeter embankment • Install, maintain and operate a supernatant water collection and return system.
Baltic and Windich Settlement Ponds	Saline water	<ul style="list-style-type: none"> • HDPE liner; and • Minimum vertical freeboard of 200 mm
Crank, Windich and Codgers transfer ponds	Saline water	<ul style="list-style-type: none"> • HDPE liner; and • Minimum vertical freeboard of 200 mm
Ruby's, Ollie's, OPF, Elvis, Charlton, Eyre, M16, Randal, CCY2, Gatehouse, RCH2, Caspian, TN, CCY1, and Powerstation Turkeys nests	Saline or Brackish water	<ul style="list-style-type: none"> • HDPE liner; and • Minimum vertical freeboard of 200 mm
CCY1 Treatment Ponds 1, 2 and 3	Potentially hydrocarbon contaminated treated	<ul style="list-style-type: none"> • HDPE liner; and • Minimum vertical freeboard of 200 mm



	wastewater from the CCY1 oily water separator	
CCY2 Treatment Ponds 1 and 2	Potentially hydrocarbon contaminated treated wastewater from the CCY2 oily water separator	<ul style="list-style-type: none"> • HDPE liner; and • Minimum vertical freeboard of 200 mm

1.2.3 The Licensee shall:

- (a) undertake inspections as detailed in Table 1.2.2;
- (b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and
- (c) maintain a record of all inspections undertaken.

Table 1.2.2: Inspection of infrastructure

Scope of inspection	Type of inspection	Frequency of inspection
Tailings delivery pipelines	Visual integrity	Daily whilst operational
Tailings decant water return pipelines	Visual integrity	Daily whilst operational
Tailings storage facility embankment freeboard	Visual to confirm required freeboard capacity is available	Daily

1.2.4 The Licensee shall undertake annual water balance for the TSFs. The water balance shall as a minimum consider the following:

- (a) site rainfall;
- (b) evaporation;
- (c) tailings return water recovery volumes;
- (d) seepage recovery volumes; and
- (e) volumes of tailings deposited.

1.2.5 The Licensee shall ensure that where wastes produced on the Premises are not taken off-site for lawful use or disposal, they are managed in accordance with the requirements in Table 1.2.3.

Table 1.2.3: Management of waste

Waste type	Management strategy	Requirements
Sewage	Biological, physical and chemical treatment	1,040 m ³ /day cumulatively
Used tyres	Storage	<ul style="list-style-type: none"> • Not more than 2,000 used tyres shall be stored at the premises at any one time; • Used tyre stacks shall not exceed 500 tyres per stack and 5 m in height; • Used tyre stacks are to be stored no less than 6 m from any other tyre stacks; and • The waste tyre stockpile shall not exceed 1000 m² in area
	Burial in waste	<ul style="list-style-type: none"> • Tyres must be placed in cells of less than



	rock materials or completed mining voids	<p>1000 tyres and only in those locations shown on the Map of emission points in Schedule 1;</p> <ul style="list-style-type: none"> Cover of at least 1 m of waste rock will be placed over each cell; and Cell locations where tyres are to be buried will be surveyed and the latitude and longitude recorded
Inert Waste Type 1	Receipt, handling and disposal of waste by landfilling	<p><u>All waste types</u></p> <ul style="list-style-type: none"> No more than 10,000 tonnes per year of all waste types cumulatively shall be disposed of by landfilling; Disposal of waste by landfilling shall only take place within the landfill area shown on the Map of emission points in Schedule 1; Disposal of untreated timber and concrete in mining voids and waste rock facilities shall only occur at the locations shown on the Map of emissions points in Schedule 1; Waste shall be placed in a defined trench or within an area enclosed by earthen bunds; The active tipping area shall be restricted to a maximum linear length of 60 m; and Construction, operation and decommissioning of landfill cells can occur within the defined landfill area providing there is no waste within: <ul style="list-style-type: none"> 100 m of any surface water body; and 3 m of the highest level of the water table aquifer
Putrescible Waste		
Clean Fill and Bioremediated soils as described for Class II Waste within "Landfill Classification and Waste Definitions 1996 and as amended"		

Note 1: Requirements for landfilling tyres are set out in Part 6 of the *Environmental Protection Regulations 1987*.

Note 2: Additional requirements for the acceptance and landfilling of Controlled waste (including asbestos and tyres) are set out in the *Environmental Protection (Controlled Waste) Regulations 2004*.

1.2.6 The Licensee shall ensure that cover is applied and maintained on landfilled wastes in accordance with Table 1.2.4 and that sufficient stockpiles of cover are maintained on site at all times.

Waste Type	Material	Depth	Timescales
Putrescible waste	Inert and incombustible material	300 mm	As soon as practicable, but at least weekly, after deposit
All waste		1,000 mm	Within three months of the final waste load in each trench

Note 1: Additional requirements for the covering of tyres are set out in Part 6 of the *Environmental Protection Regulations 1987*.

1.2.7 The Licensee is to ensure that windblown waste within and outside the landfill area is collected on at least a monthly basis and returned to the active tipping area.

1.2.8 The Licensee shall ensure that the construction and operation of the mobile crushing and screening facilities is undertaken in accordance with the provisions outlined in the



document "Mobile Crushing and Screening Environmental Management Procedure – Chichester Operations" (Fortescue Metals Group Limited, 14 May 2014, CH-PR-EN-0001).

1.2.9 The Licensee shall ensure the limits specified in Table 1.2.5 are not exceeded.

Table 1.2.5: Production or design capacity limits ¹		
Category¹	Category description¹	Premises production or design capacity limit
5	Processing or beneficiation of metallic or non-metallic ore	77,000,000 tonnes per annual period
6	Mine dewatering	43,000,000 tonnes per annual period reinjected
52	Electric power generation	56 MW
73	Bulk storage of chemicals	15,183.1 cubic metres in aggregate

Note 1: *Environmental Protection Regulations 1987*, Schedule 1.

1.2.10 The Licensee shall construct the Windich Above-Ground TSF, Flinders Strip 12 In-Pit TSF and Karntama Village WWTP sludge handling unit in accordance with the documentation and specifications detailed in Table 1.2.6:

Table 1.2.6: Infrastructure to be constructed ¹	
Infrastructure	Specifications (design and construction)
<i>Windich Above-Ground TSF</i>	
1) Embankment construction	In accordance with, <i>Windich Above-Ground Tailings Storage Facility – Detailed Design</i> (SRK Consulting, October 2015)
2) Tailings delivery	Use of existing Windich TSF 1 and Windich TSF 2 tailings delivery pipelines and spigot arrangements
3) Supernatant Water Recovery	Use of the existing Windich TSF 1 and Windich TSF 2 water recovery pump, pipelines and turkey's nest
<i>Flinders Strip 12 In-Pit TSF</i>	
1) General	In accordance with, <i>Project Memo Flinders Strip 12 In-Pit Tailings Storage Facility</i> (SRK Consulting, February 2016)
2) Tailings delivery	Tailings delivery pipeline to connect to the existing Vasse tailings delivery pipeline and installation of six spigots along the TSF crest wall
3) Supernatant Water Recover	<ul style="list-style-type: none"> • Skid mounted pump with floating intake • Return water pipeline from the Flinders Strip 12 TSF to the Ore Processing Facility process water ponds
4) Groundwater monitoring bores	Groundwater monitoring bores FLM06, FLM07, FLM14 and CCE04MB
<i>Karntama Village WWTP sludge handling unit</i>	
1) Handling Unit	Comprising of the following: <ul style="list-style-type: none"> • Modular cool room to contain the Huber screw press, screen and auger; • 3m sea container to house skip bin for biosolids waste and separate screen waste bags; • Sludge receival station; • Polyaluminium chloride dosing system for sludge tanks

Note 1: Where the details and commitments of the documents listed in Condition 1.2.10 are inconsistent with any other condition of this Licence, the conditions of this Licence shall prevail.

1.2.11 The Licensee shall operate the Windich Above-Ground TSF, Flinders Strip 12 In-Pit TSF and Karntama Village WWTP Sludge Handling Unit in accordance with the conditions of this Licence, following submission of the compliance document required under condition 5.3.1.



2 Emissions

2.1 Point source emissions to air

2.1.1 The Licensee shall ensure that where waste is emitted to air from the emission points in Table 2.1.1 and identified on the map of emission points in Schedule 1, it is done so in accordance with the conditions of this Licence.

Table 2.1.1: Emission points to air			
Emission point reference [and location on Map of emission points]	Emission Point	Emission point height (m)	Source, including any abatement
A1 – A27	27 x 2 MW Cummins diesel genset	9.4	Diesel fired genset engine; low sulphur diesel fuel
A28	1 x 2 MW Caterpillar C175 genset	9.4	

2.2 Point source emissions to surface water

2.2.1 The Licensee shall ensure that where waste is emitted to surface water from the nominated contingency discharge points it is done so in accordance with the 'Dewatering Discharge Contingency' Procedure (Fortescue Metals Group Limited, 8 December 2014, CH-PR-EN-0003).

2.3 Point source emissions to groundwater

2.3.1 The Licensee shall ensure that where waste is emitted to groundwater from the emission points in Table 2.3.1 and identified on the map of emission points in Schedule 1, it is done so in accordance with the conditions of this Licence.

Table 2.3.1: Emissions to groundwater			
Emission point reference		Description	Source including abatement
<u>Saline Injection Zone</u>	<u>Brackish Injection Zone</u>	Direct injection below ground	Water from mine dewatering
SAI01	HSB42		
SAI01A	HSB43		
SAI02	HSB44		
SAI03A	HSB45		
SAI03B	HSB46		
SAI04	HSB47		
SAI04A	HSB48		
SAI04B	HSB49		
SAI05	HSB50		
SAI05B	HSB51		
SAI06	HSB52		
SAI07	HSB53		
SAI08	HSB54		
SAI09	HSB55		
SAI10	HSB56		
SAI11	HSB57		
SAI12	HSB58		
SAI12a	HSB59		
SAI12b	HSB60		
SAI13	HSB61		
SAI13A	HSB62		
SAI14	HSB63		



SAI14A SAI15 SAI15A SAI16 SAI16A SAI16B SAI17 SAI17B SAI18 SAI18B SAI19 SAI20 SAI20A SAI20B SAI21 SAI21A SAI21B SAI22 SAI22A SAI23 SAI23A SAI24 SAI25 SAI26 SAI27 SAI28			
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2.4 Emissions to land

2.4.1 The Licensee shall ensure that where waste is emitted to land from the emission points in Table 2.4.1 and identified on the map of emission points in Schedule 1, it is done so in accordance with the conditions of this Licence.

Table 2.4.1: Emissions to land		
Emission point reference	Description	Source including abatement
L1 – Karntama irrigation area	Pipe feeding irrigation area of 13 ha	Treated wastewater from Karntama WWTP
L2 – Construction Camp irrigation area	Pipe feeding irrigation area of 15 ha	Treated wastewater pipeline from Construction Camp WWTP

3 Monitoring

3.1 General monitoring

3.1.1 The Licensee shall ensure that:

- all water samples are collected and preserved in accordance with AS/NZS 5667.1;
- all wastewater sampling is conducted in accordance with AS/NZS 5667.10;
- all surface water sampling is conducted in accordance with AS/NZS 5667.4 or AS/NZS 5667.6 as relevant;
- all groundwater sampling is conducted in accordance with AS/NZS 5667.11; and
- all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured unless indicated otherwise in the relevant table.



- 3.1.2 The Licensee shall ensure that:
 - (a) monthly monitoring is undertaken at least 15 days apart;
 - (b) quarterly monitoring is undertaken at least 45 days apart; and
 - (c) annual monitoring is undertaken at least 9 months apart.
- 3.1.3 The Licensee shall ensure that all monitoring equipment used on the Premises to comply with the conditions of this Licence is calibrated in accordance with the manufacturer's specifications.
- 3.1.4 The Licensee shall, where the requirements for calibration cannot be practicably met, or a discrepancy exists in the interpretation of the requirements, bring these issues to the attention of the CEO accompanied with a report comprising details of any modifications to the methods.

3.2 Monitoring of point source emissions to air

- 3.2.1 The Licensee shall undertake the monitoring of a sample of six (6) emission points in Table 3.2.1 and identified on the map of emission points in Schedule 1, according to the specifications in that table, on a rotational basis such that all emission points are tested at least once within a 5 year period.

Table 3.2.1: Monitoring of point source emissions to air					
Emission point reference	Parameter	Units¹	Averaging period	Frequency	Method
A1- A28	Nitrogen oxides	mg/m ³ g/s	60 min	Annual	USEPA Method 7E
A1- A28	Carbon monoxide	mg/m ³ g/s	60 min	Annual	USEPA Method 10

Note 1: All units are referenced to STP dry and 15% O₂.

- 3.2.2 The Licensee shall ensure that sampling required under Condition 3.2.1 of the Licence is undertaken at sampling locations in accordance with the AS 4323.1.
- 3.2.3 The Licensee shall ensure that all non-continuous sampling and analysis undertaken pursuant to condition 3.2.1 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis.

3.3 Monitoring of point source emissions to surface water

- 3.3.1 The Licensee shall undertake the monitoring of point source emissions to surface water as per the 'Dewatering Discharge Contingency' Procedure (Fortescue Metals Group Limited, 8 December 2014, CH-PR-EN-0003).

3.4 Monitoring of point source emissions to groundwater

- 3.4.1 The Licensee shall undertake the monitoring in Table 3.4.1 according to the specification in that table.

Table 3.4.1: Monitoring of point source emissions to groundwater			
Emission point reference	Parameter	Units	Frequency
Saline and brackish reinjection emission points referenced in Table 2.3.1	Cumulative volume ¹	GLpa	Annually
	Volumetric flow rate ¹	m ³ /day	



CCSP001 (Hillside East Brackish Injection Borefield)	pH ²	-	Six monthly when reinjecting
	Electrical Conductivity	µS/cm	
	Total Dissolved Solids	mg/L	
	Total Suspended Solids	mg/L	
CCSP0011 and CCSP0015 (Saline Injection Borefield)	Major cations and anions – Sodium Potassium Calcium Magnesium Chloride Alkalinity Sulfate Nitrate	mg/L	
	Metals, Metalloids and Non-metals - Aluminium Antimony Arsenic Beryllium Boron Cadmium Chromium Cobalt Copper Iron Manganese Mercury Nickel Lead Selenium Silver Zinc	mg/L	

Note 1: Determined using water balance calculations consistent with the *Christmas Creek Groundwater Operating Strategy* (CC-PH-HY-0002)

Note 2: In-field non-NATA accredited analysis permitted.

3.5 Monitoring of emissions to land

3.5.1 The Licensee shall undertake the monitoring in Table 3.5.1 according to the specifications in that table.

Table 3.5.1: Monitoring of emissions to land			
Emission point reference	Parameter	Units	Frequency
L1, L2	Volumetric flow rate of effluent discharged to irrigation	m ³ /day	Monthly
	Volumetric flow rate of effluent discharged to dust suppression	m ³ /day	Monthly
	Biochemical Oxygen Demand	mg/L	Quarterly
	Total suspended solids	mg/L	Quarterly
	pH ¹	-	Quarterly
	Total Nitrogen	mg/L	Quarterly
	Total Phosphorus	mg/L	Quarterly
	<i>E. coli</i>	cfu/100mL	Quarterly

Note 1: In-field non-NATA accredited analysis permitted.



3.6 Process monitoring

3.6.1 The Licensee shall undertake the monitoring in Table 3.6.1 according to the specifications in that table.

Table 3.6.1: Process monitoring				
Emission point reference	Monitoring point location	Parameter	Units	Frequency
CCY1 and CCY2 treatment ponds	Final treated wastewater storage pond prior to reuse for dust suppression	Volumetric flow rate	m ³ /day	Monthly
		Total Recoverable Hydrocarbons	mg/L	
		Benzene, toluene, ethyl benzene, xylene	mg/L	
		Total Dissolved Solids	mg/L	

3.7 Ambient environmental quality monitoring

3.7.1 The Licensee shall undertake the monitoring in Table 3.7.1 according to the specifications in that table.

Table 3.7.1 Monitoring of ambient groundwater quality				
Monitoring point reference and location	Parameter	Units	Averaging period	Frequency
Windich Above-Ground Tailings Storage Facility				
WDM08 (786171 E, 7522569 N)	Standing water level	mbgl	Spot sample	Quarterly
	pH ¹	-	Spot sample	Quarterly
WDM12 (784780 E, 7521869 N)	Electrical conductivity	µS/cm	Spot sample	Quarterly
	Total Dissolved Solids	mg/L	Spot sample	Quarterly
WDM04 (785402 E, 7521244 N)	Major cations and anions – Sodium Potassium Calcium Magnesium	mg/L	Spot sample	Quarterly
WDM13 (786744 E, 7520716 N)	Chloride Sulfate			
CCM01A_I (785593 E, 7520772 N)				
CCM01A_S (785593 E, 7520772 N)	Dissolved metals, metalloids and non-metals – Aluminium Antimony Arsenic Beryllium Boron Cadmium Cobalt Chromium Copper Iron Manganese	mg/L	Spot sample	Quarterly



	Mercury Nickel Lead Selenium Silver Uranium Zinc			
Flinders Strip 12 In-Pit Tailings Storage Facility				
FLM06	Standing water level	mbgl	Spot sample	Quarterly
	pH ¹	-	Spot sample	Quarterly
FLM08	Electrical conductivity	µS/cm	Spot sample	Quarterly
FLM17	Total Dissolved Solids	mg/L	Spot sample	Quarterly
CCE04MB	Major cations and anions Sodium Potassium Calcium Magnesium Chloride Sulfate	mg/L	Spot sample	Quarterly
	Dissolved metals, metalloids and non-metals – Aluminium Antimony Arsenic Beryllium Boron Cadmium Cobalt Chromium Copper Iron Manganese Mercury Nickel Lead Selenium Silver Uranium Zinc	mg/L	Spot sample	Quarterly
Vasse Tailings Storage Facility				
VAM01 (780528 E, 7525182 N)	Standing water level	mbgl	Spot sample	Quarterly
	pH ¹	-	Spot sample	Quarterly
VAM02 (781048 E, 7525249 N)	Electrical conductivity	µS/cm	Spot sample	Quarterly
	Total Dissolved Solids	mg/L	Spot sample	Quarterly
VAM03 (781342 E, 7525217 N)	Major cations and anions – Sodium Potassium Calcium Magnesium	mg/L	Spot sample	Quarterly
VAM04 (781631 E, 7526182 N)				



	Chloride Sulfate			
	Dissolved metals, metalloids and non-metals – Aluminium Antimony Arsenic Beryllium Boron Cadmium Cobalt Chromium Copper Iron Manganese Mercury Nickel Lead Selenium Silver Uranium Zinc	mg/L	Spot sample	Quarterly
Mine dewater reinjection				
CCFMM01_S CCFMM01_D CCFMM02_S CCFMM02_D CCFMM03_S CCFMM03_D CCFMM04_S CCFMM04_D HSM29_D HSMB29_S SAM59_D SAM59_S SAM07_D SAM07_S SAM12_S SAM12_D SCX01_S SCX03_S SCX06 (All) SCX06_S SCX06_D	Standing water level	mbgl	Spot sample	Six monthly
	pH ¹	-	Spot sample	Six monthly
	Electrical conductivity	µS/cm	Spot sample	Six monthly
	Total Dissolved Solids	mg/L	Spot sample	Six monthly
	Major cations and anions – Sodium Potassium Calcium Magnesium Chlorine Alkalinity Sulfate Nitrate	mg/L	Spot sample	Six monthly
	Metals, metalloids and non-metals – Aluminium Antimony Arsenic Beryllium Boron Cadmium Cobalt Chromium Copper Iron Manganese Mercury Nickel Lead	mg/L	Spot sample	Six monthly



	Selenium Silver Zinc			
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Note 1: In-field non-NATA accredited analysis permitted.

4 Improvements

- 4.1.1 The Licensee shall complete the improvements in Table 4.1.1 by the date of completion in Table 4.1.1.
- 4.1.2 The Licensee, for improvements not specifically requiring a written submission, shall write to the CEO stating whether and how the Licensee is compliant with the improvement within one week of the completion date specified in Table 4.1.1.

Table 4.1.1: Improvement program		
Improvement reference	Improvement	Date of completion
IR3	<p>The Licensee shall undertake a review of the monitoring bore network near the Windich, Vasse and Flinders Strip 12 TSFs to determine the effectiveness of the current monitoring network to monitor groundwater mounding and seepage from the TSFs; and provide to the CEO a report which:</p> <ul style="list-style-type: none"> • documents the outcome of the review; • identifies measures required to improve the effectiveness of the monitoring network to monitor groundwater mounding and seepage from the TSFs; and • provides implementation timeframes. 	Four months from the date of issue of the amendment

5 Information

5.1 Records

- 5.1.1 All information and records required by the Licence shall:
- (a) be legible;
 - (b) if amended, be amended in such a way that the original and subsequent amendments remain legible or are capable of retrieval;
 - (c) except for records listed in 5.1.1(d) be retained for at least 6 years from the date the records were made or until the expiry of the Licence or any subsequent licence; and
 - (d) for those following records, be retained until the expiry of the Licence and any subsequent licence:
 - (i) off-site environmental effects; or
 - (ii) matters which affect the condition of the land or waters.
- 5.1.2 The Licensee shall complete an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions of the Licence, and any previous licence issued under Part V of the Act for the Premises for the previous annual period.
- 5.1.3 The Licensee shall implement a complaints management system that as a minimum records the number and details of complaints received concerning the environmental impact of the activities undertaken at the Premises and any action taken in response to the complaint.



5.2 Reporting

5.2.1 The Licensee shall submit to the CEO an Annual Environmental Report by 31 March each year. The report shall contain the information listed in Table 5.2.1 in the format or form specified in that table.

Table 5.2.1: Annual Environmental Report		
Condition or table (if relevant)	Parameter	Format or form¹
-	Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken	None specified
-	Update on the implementation of telemetric controls on the saline reinjection infrastructure, as detailed in the document <i>Saline Water Infrastructure – Implementation Plan (CC-RP-EN-0146, 30 June 2016)</i>	None specified
Table 2.1.1	Average percentage sulphur content of diesel fuel used	None specified
Table 2.4.1	L1 and L2 – representative photographs of the irrigation areas, summary of vegetation health and weed management (within the irrigation areas) implemented during reporting period	None specified
Table 3.2.1	Monitoring of emissions to air	None specified
3.3.1	Contingency discharge monitoring	None specified
3.4.1	Groundwater reinjection monitoring	None specified
Table 3.5.1	Monitoring of emissions to land and interpretation of results against plant design specifications	None specified
Table 3.6.1	Process monitoring results and interpretation of results	None specified
Table 3.7.1	Ambient groundwater monitoring results; and a comparison of results from the Windich, Vasse and Flinders Strip 12 TSFs groundwater monitoring bores against the site specific trigger values detailed in the document, <i>Life of Mine Geochemistry Programme – Site Specific Trigger Values (45-SY-EN-0001)</i> . Details of investigations conducted, including outcomes, environmental impacts and remedial actions, in relation to trigger exceedances and a discussion of any trends identified.	None specified
5.1.3 5.1.2	Compliance	Annual Audit Compliance Report (AACR)
5.1.4 5.1.3	Complaints summary	None specified

Note 1: Forms are in Schedule 2

5.2.2 The Licensee shall ensure that the Annual Environmental Report also contains:

- an assessment of the information contained within the report against previous monitoring results; and
- a list of any original monitoring reports submitted to the Licensee from third parties for the annual period and make these reports available on request.

5.3 Notification

5.3.1 The Licensee shall ensure that the parameters listed in Table 5.3.1 are notified to the CEO in accordance with the notification requirements of the table.



Table 5.3.1: Notification requirements			
Condition or table (if relevant)	Parameter	Notification requirement¹	Format or form²
Table 1.2.3 and 1.2.9	Breach of any limit specified in the Licence	Part A: As soon as practicable but no later than 5pm of the next usual working day. Part B: As soon as practicable	N1
1.2.10	The Licensee shall submit a compliance document to the CEO, following the construction of each of the Windich Above-Ground TSF, Flinders Strip 12 In-Pit TSF and Karntama Village WWTP sludge handling unit. The compliance document shall: (a) Certify that the works were constructed in accordance with the document "Licence Amendment Application Supporting Information – Christmas Creek (CC-AP-EN-0065); and (b) Be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company.	Prior to commencement of commissioning.	None specified
3.3.1	Contingency discharge	Within 3 days of cessation of the discharge	None specified
3.1.5	Calibration report	As soon as practicable	None specified

Note 1: Notification requirements in the Licence shall not negate the requirement to comply with s72 of the Act

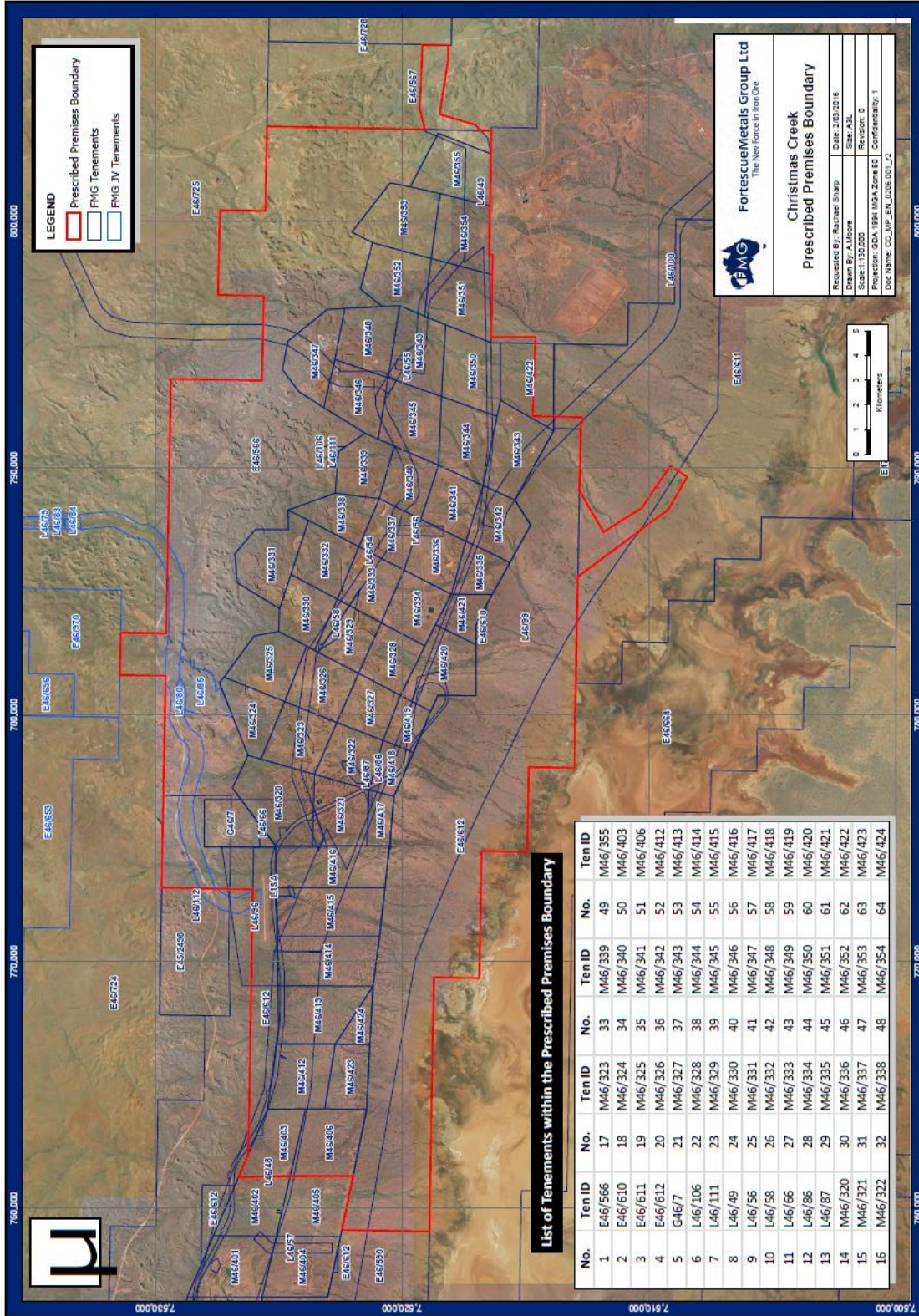
Note 2: Forms are in Schedule 2



Schedule 1: Maps

Premises map

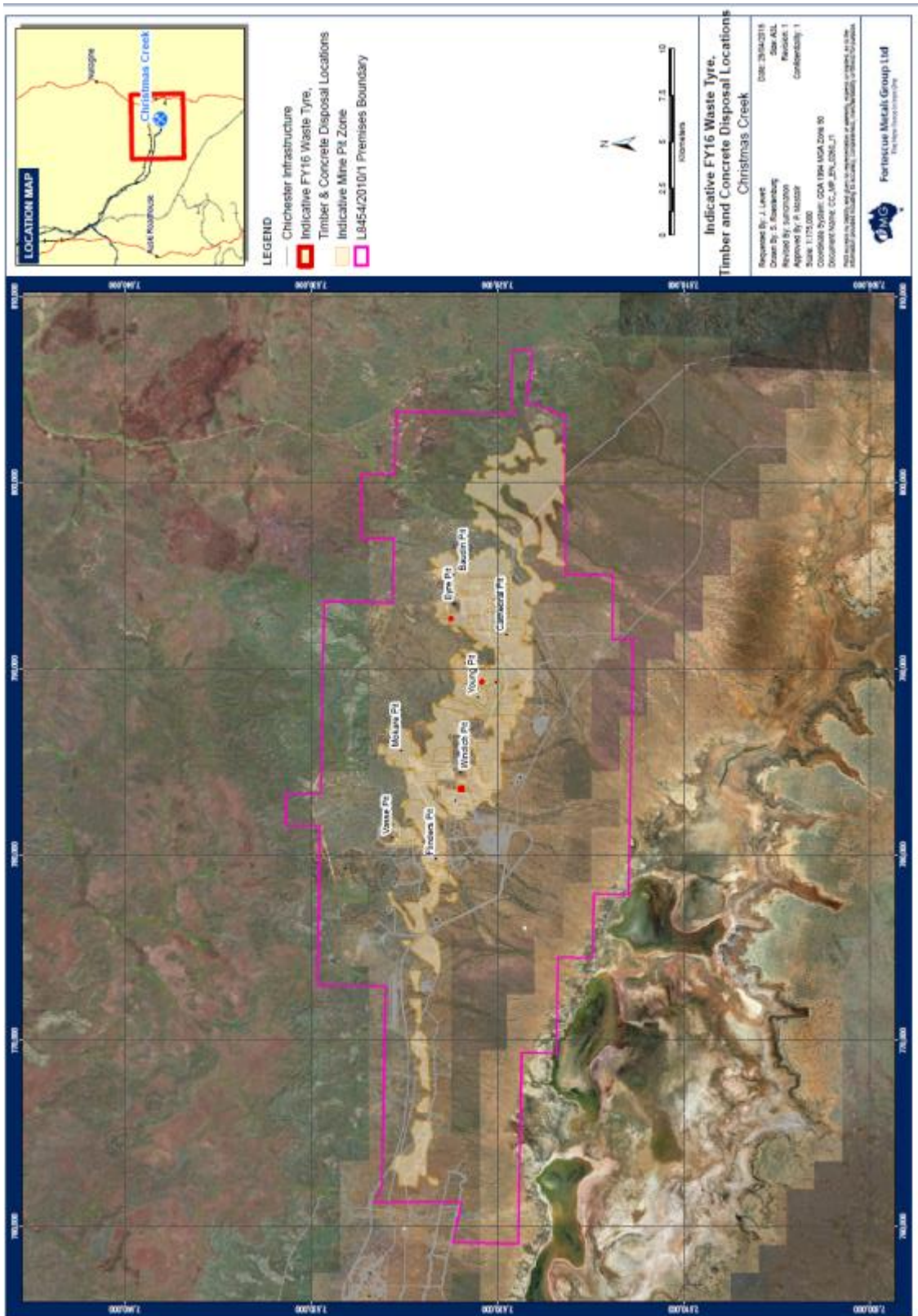
The Premises is shown in the map following. The red line depicts the Premises boundary.





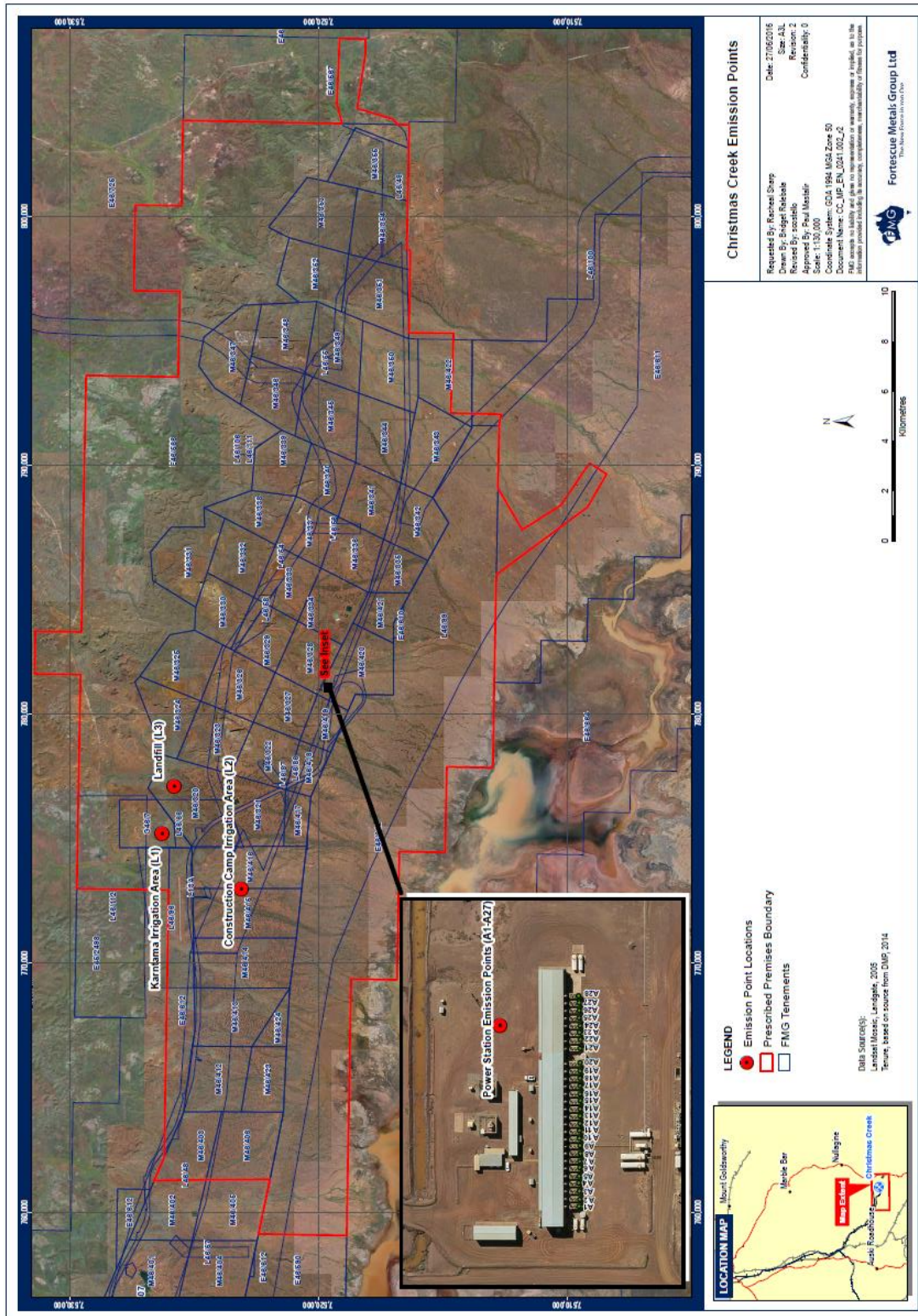
Maps of emission points and monitoring locations

The locations of the used tyres and construction waste disposal locations, defined in Table 1.2.3 are shown in the map below.



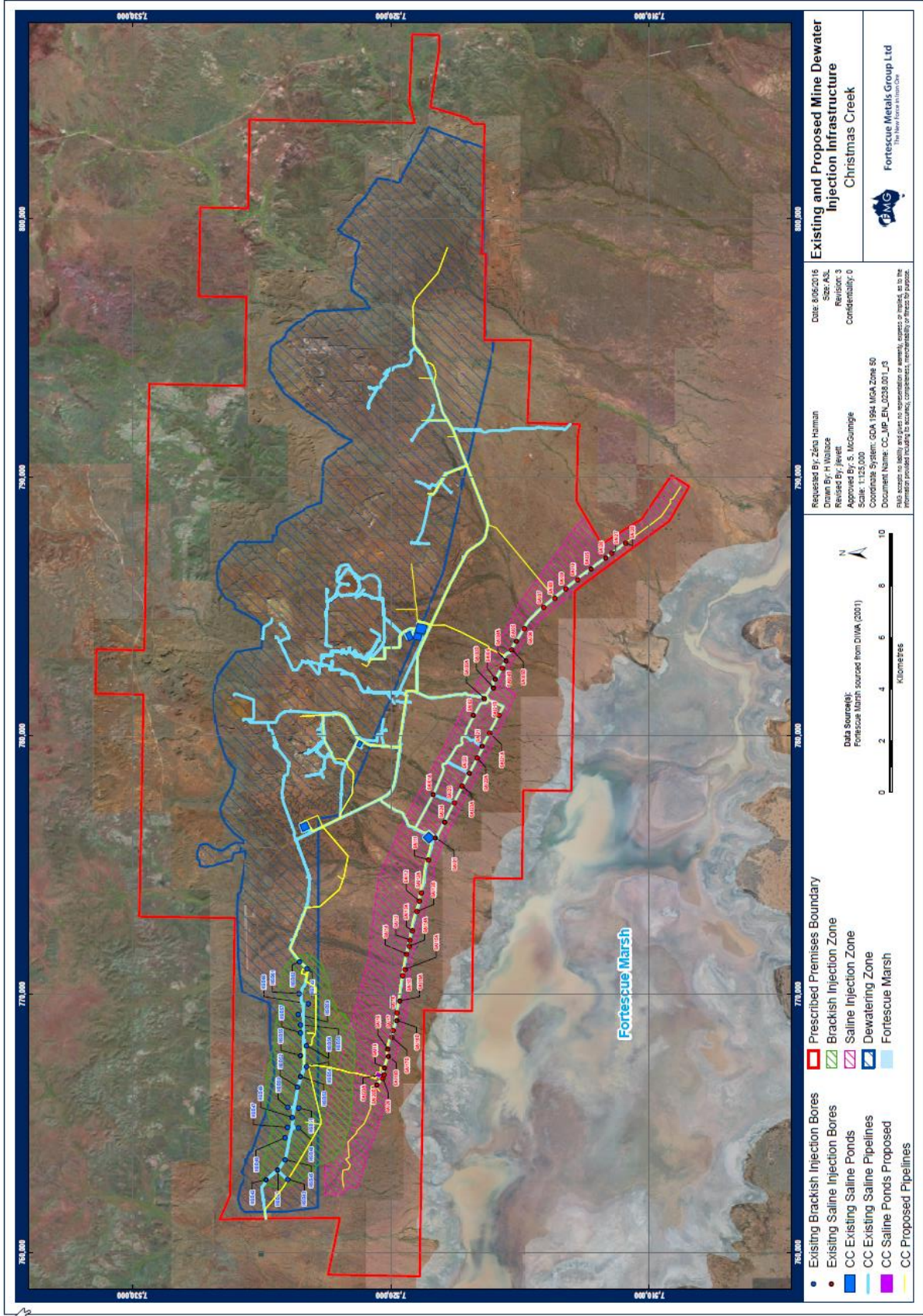


The locations of the emission points defined in Tables 2.1.1 and 2.4.1 and monitoring locations defined in Table 3.2.1 and 3.5.1 are shown in the map below





The locations of the emission points defined in Table 2.3.1 are shown in the map below.



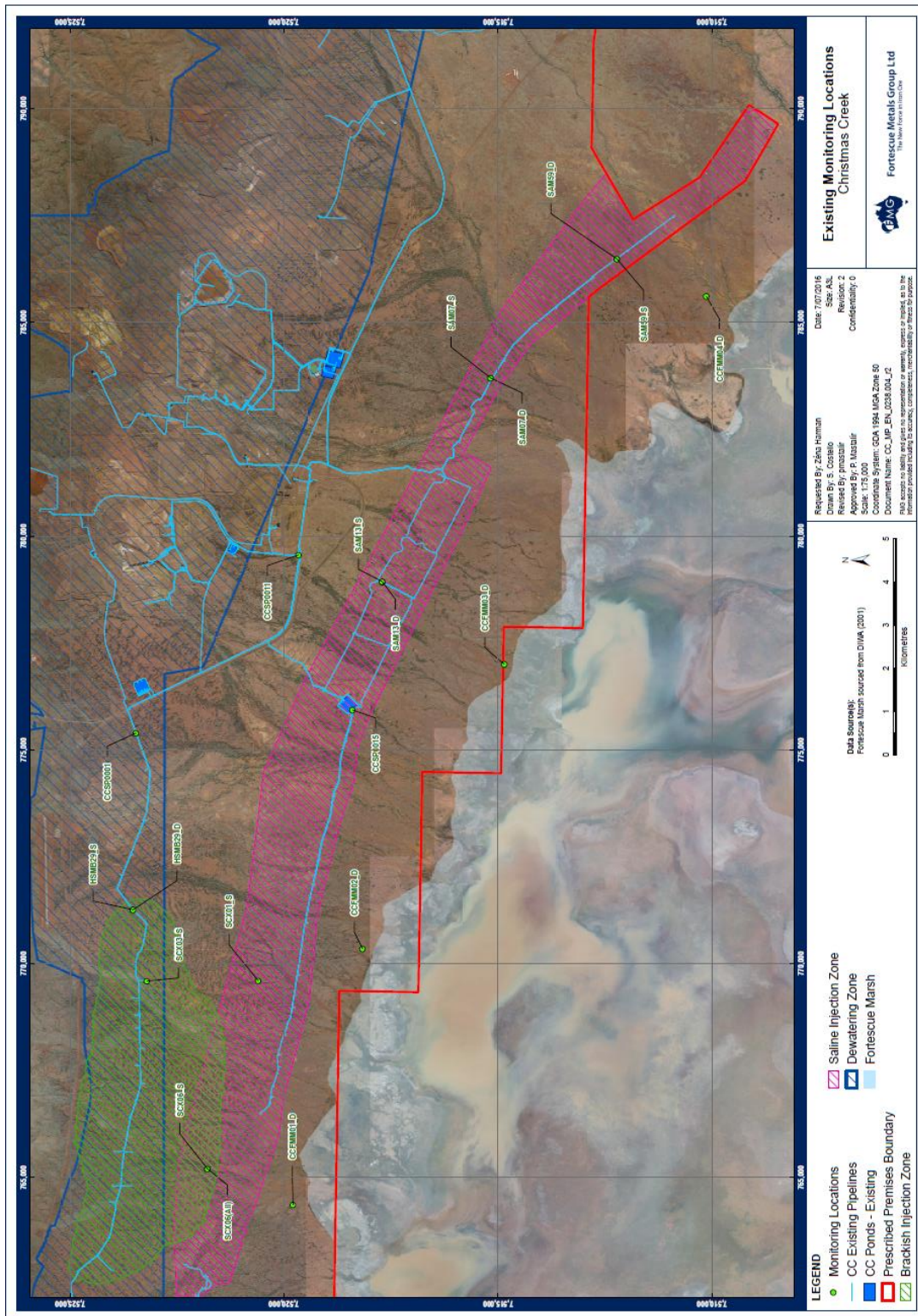


The locations of the TSF monitoring points defined in Table 3.7.1 are shown in the map below.





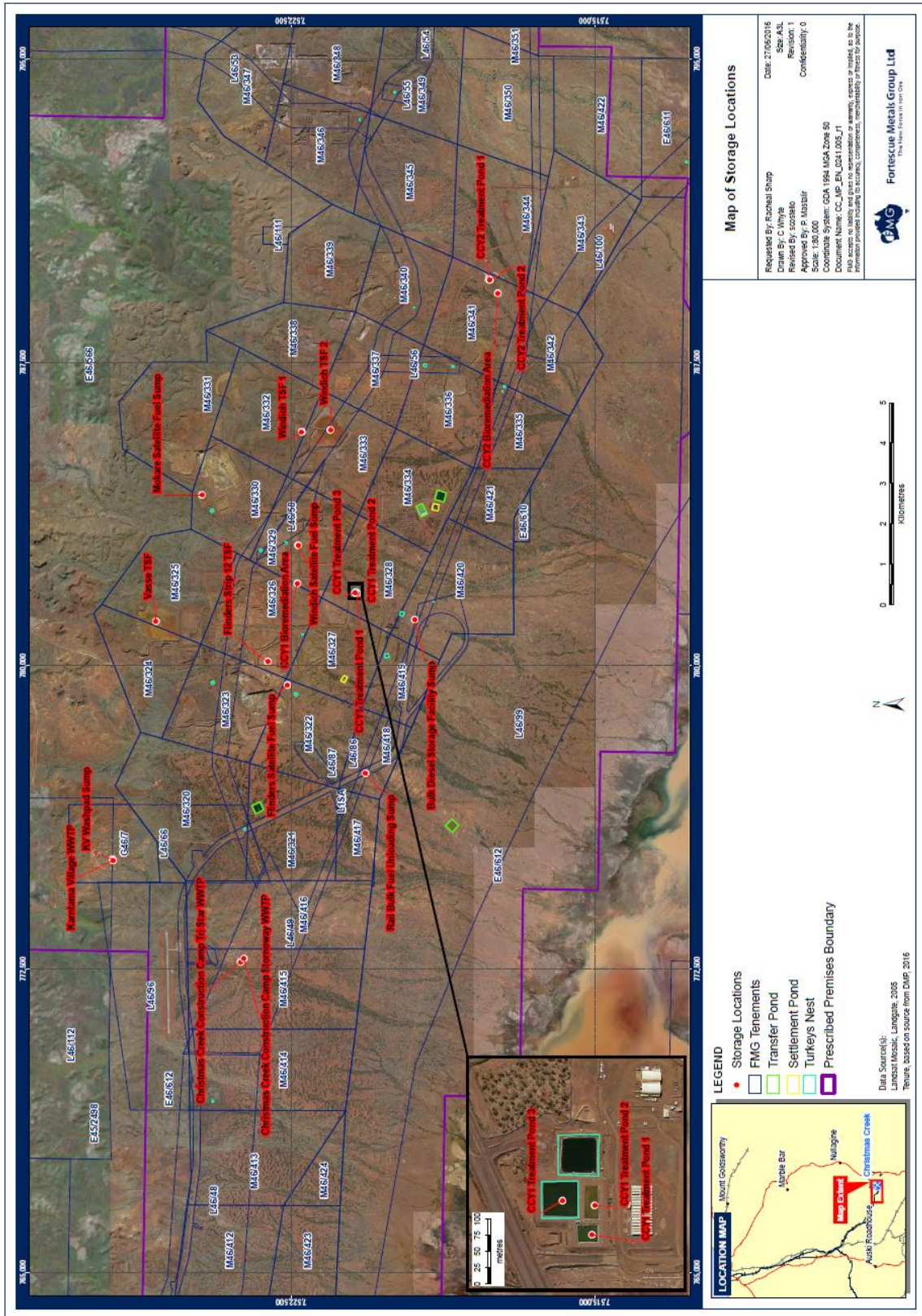
The locations of the monitoring locations defined in Tables 3.4.1 and 3.7.1 are shown below.





Map of containment infrastructure

The locations of the storage areas defined in Table 1.2.1 are shown below.





Schedule 2: Reporting & notification forms

These forms are provided for the proponent to report monitoring and other data required by the Licence. They can be requested in an electronic format.

ANNUAL AUDIT COMPLIANCE REPORT PROFORMA

SECTION A

LICENCE DETAILS

Licence Number:	Licence File Number:
Company Name:	ABN:
Trading as:	
Reporting period: _____ to _____	

STATEMENT OF COMPLIANCE WITH LICENCE CONDITIONS

1. Were all conditions of the Licence complied with within the reporting period? (please tick the appropriate box)

Yes Please proceed to Section C

No Please proceed to Section B

Each page must be initialled by the person(s) who signs Section C of this Annual Audit Compliance Report (AACR).

Initial:



SECTION B

DETAILS OF NON-COMPLIANCE WITH LICENCE CONDITION.

Please use a separate page for each Licence condition that was not complied with.

a) Licence condition not complied with:	
b) Date(s) when the non compliance occurred, if applicable:	
c) Was this non compliance reported to DER?:	
<input type="checkbox"/> Yes <input type="checkbox"/> Reported to DER verbally Date _____ <input type="checkbox"/> Reported to DER in writing Date _____	<input type="checkbox"/> No
d) Has DER taken, or finalised any action in relation to the non compliance?:	
e) Summary of particulars of the non compliance, and what was the environmental impact:	
f) If relevant, the precise location where the non compliance occurred (attach map or diagram):	
g) Cause of non compliance:	
h) Action taken, or that will be taken to mitigate any adverse effects of the non compliance:	
i) Action taken or that will be taken to prevent recurrence of the non compliance:	

Each page must be initialled by the person(s) who signs Section C of this AACR

Initial:



SECTION C

SIGNATURE AND CERTIFICATION

This Annual Audit Compliance Report (AACR) must only be signed by a person(s) with legal authority to sign it. The ways in which the AACR must be signed and certified, and the people who may sign the statement, are set out below.

Please tick the box next to the category that describes how this AACR is being signed. If you are uncertain about who is entitled to sign or which category to tick, please contact the licensing officer for your premises.

If the licence holder is		The Annual Audit Compliance Report must be signed and certified:
An individual	<input type="checkbox"/> <input type="checkbox"/>	by the individual licence holder, or by a person approved in writing by the Chief Executive Officer of the Department of Environment Regulation to sign on the licensee's behalf.
A firm or other unincorporated company	<input type="checkbox"/> <input type="checkbox"/>	by the principal executive officer of the licensee; or by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation.
A corporation	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	by affixing the common seal of the licensee in accordance with the <i>Corporations Act 2001</i> ; or by two directors of the licensee; or by a director and a company secretary of the licensee, or if the licensee is a proprietary company that has a sole director who is also the sole company secretary – by that director, or by the principal executive officer of the licensee; or by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation.
A public authority (other than a local government)	<input type="checkbox"/> <input type="checkbox"/>	by the principal executive officer of the licensee; or by a person with authority to sign on the licensee's behalf who is approved in writing by the Chief Executive Officer of the Department of Environment Regulation.
a local government	<input type="checkbox"/> <input type="checkbox"/>	by the chief executive officer of the licensee; or by affixing the seal of the local government.

It is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give information on this form that to their knowledge is false or misleading in a material particular. There is a maximum penalty of \$50,000 for an individual or body corporate.

I/We declare that the information in this annual audit compliance report is correct and not false or misleading in a material particular.

SIGNATURE: _____

SIGNATURE: _____

NAME:
(printed) _____

NAME:
(printed) _____

POSITION: _____

POSITION: _____

DATE: ____/____/____

DATE: ____/____/____

SEAL (if signing under seal)



Licence: L8454/2010/2
 Form: N1

Licensee: Chichester Metals Pty Ltd
 Date of breach:

Notification of detection of the breach of a limit.

These pages outline the information that the operator must provide.
 Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

Part A

Licence Number	
Name of operator	
Location of Premises	
Time and date of the detection	

Notification requirements for the breach of a limit	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Name	
Post	
Signature on behalf of Chichester Metals Pty Ltd	
Date	



Decision Document

Environmental Protection Act 1986, Part V

Proponent: Chichester Metals Pty Ltd

Licence: L8454/2010/2

Registered office: 87 Adelaide Terrace
EAST PERTH WA 6004

ACN: 109 264 262

Premises address: Christmas Creek Mine Site
Tenements E46/610, E46/612, M46/320, M46/321, M46/322, M46/323,
M46/324, M46/325, M46/326, M46/327, M46/328, M46/329, M46/330,
M46/331, M46/332, M46/333, M46/334, M46/335, M46/336, M46/337,
M46/338, M46/339, M46/340, M46/341, M46/342, M46/343, M46/344,
M46/345, M46/346, M46/347, M46/348, M46/349, M46/350, M46/351,
M46/352, M46/353, M46/354, M46/355, M46/403, M46/406, M46/412,
M46/413, M46/414, M46/415, M46/416, M46/417, M46/418, M46/419,
M46/420, M46/421, M46/422, M46/423, M46/424, G46/7, L46/49, L46/56,
L46/58, L46/86, L46/87, L46/106, L46/111 E46/566 and L46/66
MULGA DOWNS WA 6751

Issue date: Thursday, 20 August 2015

Commencement date: Monday, 24 August 2015

Expiry date: Saturday, 23 August 2036

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue an amended Licence. DER considers that in reaching this decision, it has taken into account all relevant considerations and the Licence and its conditions will ensure that an appropriate level of environmental protection is provided

Decision Document prepared by: Haley Brunel
Licensing Officer

Decision Document authorised by: Alana Kidd
Delegated Officer



Contents

Decision Document	1
Contents	2
1 Purpose of this Document	2
2 Administrative summary	2
3 Executive summary of proposal and assessment	3
4 Decision table	5
5 Advertisement and consultation table	15
6 Risk Assessment	17
Appendix A	18

1 Purpose of this Document

This decision document explains how DER has assessed and determined the application for a works approval or licence, and provides a record of DER’s decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER’s assessment and decision making under Part V of the *Environmental Protection Act 1986*. Other approvals may be required for the proposal, and it is the proponent’s responsibility to ensure they have all relevant approvals for their Premises.

2 Administrative summary

Administrative details		
Application type	Works Approval <input type="checkbox"/> New Licence <input checked="" type="checkbox"/> Licence amendment <input type="checkbox"/> Works Approval amendment <input type="checkbox"/>	
Activities that cause the premises to become prescribed premises	Category number(s)	Assessed design capacity
	5	77 million tonnes per year
	6	43 million tonnes per year (injected)
	52	56 MW using fuel other than natural gas
	54	1,040 cubic metres per day
	57	2,000 used tyres
	64	10,000 tonnes per annual period
	73	15,183.1 cubic metres in aggregate
Application verified	Date: N/A	
Application fee paid	Date: N/A	
Works Approval has been complied with	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
Compliance Certificate received	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	



Commercial-in-confidence claim	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Commercial-in-confidence claim outcome	N/A
Is the proposal a Major Resource Project?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Referral decision No: Managed under Part V <input type="checkbox"/> Assessed under Part IV <input checked="" type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Ministerial statement No: 707 & 871 EPA Report No: 1202 & 1402
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i>)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Department of Water consulted Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is the Premises within an Environmental Protection Policy (EPP) Area If Yes include details of which EPP(s) here.	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Is the Premises subject to any EPP requirements? If Yes, include details here, eg Site is subject to SO ₂ requirements of Kwinana EPP.	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

3 Executive summary of proposal and assessment

The Christmas Creek Mine Site (Christmas Creek) is owned and operated by Chichester Metals Pty Ltd (Chichester Metals), a wholly owned subsidiary of Fortescue Metals Group Ltd (Fortescue). Christmas Creek is part of Fortescue’s Pilbara Iron Ore and Infrastructure Project, comprising a series of iron ore mines located in the Pilbara region and related rail and port infrastructure for ore export through Port Hedland.

Christmas Creek is located approximately 111 km north east of Newman. Christmas Creek mine lies between 1 – 10 km north of the Fortescue Marsh, listed as a Nationally Important Wetland of Australia (Environment Australia 2001) and the largest wetland in the Pilbara.

Christmas Creek has been in operation since 2010. No significant communities are in the vicinity of the minesite and the nearest neighbours include:

- Roy Hill Station which is approximately 30 km southeast;
- Marillana Homestead approximately 41 km from the site;
- Roy Hill mine which is currently being developed adjacent to Christmas Creek on the south eastern side of the mine; and
- Cloudbreak Mine located immediately to the west.

The mine comprises a series of open pits, serviced by two ore processing facilities (OPFs) with mobile screening and crushing units supporting the OPFs. Tailings are generated from the OPFs and are deposited to tailings cells constructed from previously mined pits. Currently two tailings storage facilities (TSFs) are in operation, Windich and Vasse. Processed ore is transferred to rail and transported to Fortescue’s port at Port Hedland.



The mine site sits over three main connected aquifers, the fresh- brackish Tertiary Detritals, brackish Marra Mamba formation and the hypersaline Oakover formation. Water supply is provided by groundwater abstraction from local borefields, both brackish and hypersaline in water quality, and is authorised by groundwater licences issued by the Department of Water. As approximately 70% of the ore body lies below the water table, mine dewatering provides a large amount of the water supply for Christmas Creek. Excess groundwater is returned to either the Marra Mamba or Oakover formation aquifers by bore reinjection, dependent on salinity.

Supplementary infrastructure at the mine site includes a putrescible landfill, two bioremediation areas, a diesel fuelled power station and two wastewater treatment plants (WWTP), one servicing the Construction Camp and the other the Operations Camp, known as the Construction Camp WWTP and Karntama WWTP, respectively.

Chichester Metals has applied to amend Licence L8454/2010/2 to approve the construction of the new Flinders Strip 12 In-Pit TSF, Windich Above-Ground TSF and Karntama Village WWTP sludge handling unit. The Licensee has also requested that the following changes be implemented at the time of this amendment:

- Update the prescribed premises boundary to capture all dewatering and reinjection infrastructure;
- Increase the bulk fuel chemical storage volume specified on the Licence;
- Replacement of category 89 with category 64, to reflect the increase in tyre and other inert waste disposal in waste rock dumps and mining voids;
- Addition of conditions relating to emissions to groundwater and monitoring of such emissions to replace the requirement to implement the Water Management Scheme; and
- Inclusion of a 2MW capacity Caterpillar C175 generator on the Licence as an emission point to air.

The emissions and discharges associated with the construction and operation of the Flinders Strip 12 In-Pit TSF, Windich Above-Ground TSF and the Karntama Village WWTP sludge handling unit have been assessed. DER's assessment and decision making with respect to these works, and other changes proposed to the Licence at the time of this amendment, are documented in Section 4 of the Decision Document.



4 Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987* and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
General conditions	Conditions 1.1.5, 1.2.1, 1.2.2 and 1.2.3 (removed)	Guidance Statement <i>Setting conditions</i> (DER, October 2015) requires conditions imposed on Licences to be valid, enforceable, risk-based, outcome-based, site-specific and/or documented and justified. Conditions 1.1.5, 1.2.1, 1.2.2 and 1.2.3 have been removed from the Licence as they are not deemed to be valid or enforceable.	General provisions of the <i>Environmental Protection Act 1986</i> <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> Guidance Statement <i>Setting conditions</i> (DER, October 2015)
Premises operation	Condition 1.2.1 (previously 1.3.1) Condition 1.2.2 and 1.2.5 (updated)	Condition 1.2.1 has been updated to specify that the condition applies to pipelines or sections of pipelines containing tailings and effluent. Tailings return water is relatively good quality, being brackish and neutral pH; and poses minimal risk to the disturbed environment in which the pipelines are located. Condition 1.2.2 has been updated to include the Flinders Strip 12 In-Pit TSF and remove containment requirements relating to the bioremediation treatment cells and sumps at bulk fuel or satellite fuel facilities. The hydrocarbon contaminated waste requirements in Table 1.2.3 have also been removed. The risks associated with these facilities is low (detailed below).	Application supporting documentation General provisions of the <i>Environmental Protection Act 1986</i> <i>Environmental Protection (Unauthorised Discharges)</i>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>The limit for waste receipt, handling and disposal specified in Table 1.2.3 has been increased from 4,000 to 10,000 tonnes per annum, to capture the disposal of tyres and other inert waste in mining voids and waste rock facilities. The existing waste management specifications detailed in Table 1.2.3 of the Licence will also apply to the disposal of tyres and inert waste in mining voids and waste rock facilities.</p> <p><u>Emission Description</u> <i>Emission:</i> Runoff from the bioremediation treatment cells containing elevated concentrations of hydrocarbons and/or metals; and overflow of sumps at the fuel facilities possibly containing elevated concentrations of hydrocarbons and/or metals.</p> <p><i>Impact:</i> Contamination of soil, surface water and groundwater in the area, impacts to fauna and ecosystem disruption.</p> <p><i>Controls:</i> The bioremediation facility treatment cells are lined with HDPE liner and groundwater is located approximately 10 m below ground level. The site is located on flat terrain and at least 100 m from any water course. Pads have earthen bunding to prevent stormwater ingress and the site is inspected weekly to ensure it is being managed appropriately. A log book is maintained which records the date, volume, origin and known or likely contaminant material accepted for treatment.</p> <p>Fuel facility sumps are HDPE lined to collect potentially contaminated stormwater. The buried HDPE liner is covered by earthen bunding. No infrastructure is located in ephemeral creeks and design and location of new infrastructure aims to mitigate impacts to sheet flow. All fuel tanks are fitted with overflow warning alarms to prevent accidental spillage.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Minor</p>	<p><i>Regulations 2004</i></p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
	<p>Conditions 1.2.4</p> <p>Condition 1.2.9</p> <p>Conditions 1.2.10 and 1.2.11.</p>	<p><i>Likelihood: Rare</i> <i>Risk Rating: Low</i></p> <p><u>Regulatory controls</u> The general provisions of the <i>Environmental Protection Act 1986</i> with respect to the causing of pollution and environmental harm apply to the operation of these facilities, as does relevant subsidiary legislation, including the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p> <p>The facilities will be subject to regular DER inspections, during which the effectiveness of operational controls to prevent, abate, control and/or minimise pollution and environmental harm will be assessed.</p> <p>Based on the low risk associated with these facilities and the existing operational controls in place, no Licence conditions are required.</p> <p><u>Residual Risk</u> <i>Consequence: Minor</i> <i>Likelihood: Rare</i> <i>Residual Risk Rating: Low</i></p> <p>Condition 1.2.4 has been included and requires the Licensee to undertake an annual water balance for the TSFs. The application of this condition is justified further in Appendix A.</p> <p>Production/design capacity limits have been implemented under condition 1.2.9.</p> <p>Under this Licence amendment, the Licensee is seeking Works Approval for the construction of the Flinders Strip 12 In-Pit TSF, Windich Above-Ground TSF and a</p>	



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>sludge handling unit at the Karntama Village WWTP. Condition 1.2.10 has been included in the Licence and specifies the construction requirements for these works. Condition 1.2.11 authorises the operation of the new infrastructure in accordance with the conditions of the Licence following the submission of compliance documentation.</p> <p>DER's assessment of the emissions and discharges associated with the construction and operation of the Flinders Strip 12 In-Pit TSF, Windich Above-Ground TSF and Karntama Village WWTP sludge handling unit is detailed in Appendix A.</p>	
Point source emissions to air including monitoring	Conditions 2.1.1 and 3.2.1	<p>The Christmas Creek Power Station comprises of 27 x 2 MW generators which provide power for the mine site. The Licensee is seeking the inclusion of an additional emission point to air, being a 2 MW Caterpillar C175 genset, which has been operating at Christmas Creek under Works Approval W5001/2011/1 to determine the generators suitability for future use. The Caterpillar C175 genset will be permanently installed with the power station and operated in duty and standby modes similarly to the existing generators.</p> <p>Condition 2.1.1 has been updated to include the genset as an additional point source emission point to air.</p> <p>Condition 3.2.1 has been updated to require the monitoring of Nitrogen oxides and Carbon monoxide from the emission point. Monitoring results are required to be reported to DER via the Environmental Assessment Report for assessment.</p>	<p>Application supporting documentation</p> <p>Supporting documentation to W5001/2011/1</p>
Point source emissions to groundwater including	Conditions 2.3 and 3.4	<p>At the time of this amendment the Licensee is seeking to have the groundwater reinjection points and associated water quality monitoring requirements included in the Licence. Previously, the reinjection of mine dewater and monitoring requirements were included in the <i>Christmas Creek Water Management Scheme</i></p>	<p>Application supporting documentation</p> <p>General provisions of</p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
monitoring		<p>which was implemented through condition 2.3.1 of the Licence.</p> <p>Condition 2.3.1 has been updated to include each groundwater reinjection bore as a specified emission point to groundwater.</p> <p>Condition 2.4.1 has been updated to include specific requirements for the monitoring of water discharged (volume and quality), as opposed to referencing the <i>Christmas Creek Water Management Scheme</i>. Monitoring of emissions to groundwater was previously undertaken under condition 2.4.1 in accordance with the monitoring requirements of the Scheme document.</p> <p>Results will continue to be reported to DER in the Annual Environmental Report for assessment.</p>	<p>the <i>Environmental Protection Act 1986</i></p>
Emissions to land including monitoring	Condition 2.4.1	<p>Condition 2.4.1 has been updated to remove the biomax WWTP's that do not trigger the design or production capacity for sewage facilities under the <i>Environmental Protection Regulations 1987</i>. Under the Guidance Statement <i>Licensing and works approvals process</i> (DER, September 2015) these facilities are considered secondary activities and are not to be subject to licence conditions.</p> <p>The general provisions of the <i>Environmental Protection Act 1986</i> and subsidiary legislation, including the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> apply. The facilities may also be subject to DER inspections at which time operational controls will be evaluated.</p>	<p>Application and supporting information</p> <p>Guidance Statement <i>Licensing and works approvals process</i> (DER, September 2015)</p> <p>General provisions of the <i>Environmental Protection Act 1986</i></p> <p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i></p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
Monitoring general	Condition 3.1.3 (removed)	Guidance Statement <i>Setting conditions</i> (DER, October 2015) requires conditions imposed on Licences to be valid, enforceable, risk-based, outcome-based, site-specific and/or documented and justified. Noting the requirements of this guidance statement, condition 3.1.3 has been removed from the Licence.	Guidance Statement <i>Setting conditions</i> (DER, October 2015)
Fugitive emissions	N/A	<p><u>Emission Description</u> <i>Emission:</i> Fugitive dust emissions from the construction activities associated with the Windich Above-Ground and Flinders Strip 12 In-Pit TSF.</p> <p><i>Impact:</i> Deterioration of local air shed, including potential health impacts. Impacts to vegetation from dust deposition on foliage, restricting photosynthesis.</p> <p><i>Controls:</i> The site is subject to the <i>Mine and Rail Dust Management Plan</i> (FMG, August 2011). Construction activities will be short term, as will dust emissions generated as a result of the construction activities.</p> <p><u>Risk Assessment</u> <i>Consequence:</i> Minor <i>Likelihood:</i> Rare <i>Risk Rating:</i> Low</p> <p><u>Regulatory controls</u> Based on the low risk associated with dust emissions from construction activities, no Licence conditions are required. The general provisions of the <i>Environmental Protection Act 1986</i> apply and the site will be subject to DER inspections.</p> <p><u>Residual Risk</u></p>	<p>General provisions of the <i>Environmental Protection Act 1986</i></p> <p>Mine and Rail Dust Management Plan (August 2011, 45-PL-EN-0030)</p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><i>Consequence: Minor</i> <i>Likelihood: Rare</i> <i>Residual Risk Rating: Low</i></p>	
Odour	N/A	<p><u>Emission Description</u> <i>Emission:</i> Odour emitted from the operation of the sludge handling unit at Karntama Village WWTP.</p> <p><i>Impact:</i> Odour can result in a nuisance health impact. Roy Hill Station is the nearest receptor at ~18km away.</p> <p><i>Controls:</i> The sludge handling unit is enclosed. Wastewater is directed back through the WWTP and the biosolids waste will be stored in a sea container pending disposal.</p> <p><u>Risk Assessment</u> <i>Consequence: Minor</i> <i>Likelihood: Rare</i> <i>Risk Rating: Low</i></p> <p><u>Regulatory controls</u> Based on the low risk associated with odour and proposed operational controls, no Licence conditions are required. The general provisions of the <i>Environmental Protection Act 1986</i> apply and the site will be subject to DER inspections.</p> <p><u>Residual Risk</u> <i>Consequence: Minor</i> <i>Likelihood: Rare</i> <i>Residual Risk Rating: Low</i></p>	<p>Application and supporting information</p> <p>General provisions of the <i>Environmental Protection Act 1986</i></p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
Ambient quality monitoring	Condition 3.7.1	<p>TSFs The monitoring of ambient groundwater quality surrounding the TSFs is carried out to determine if groundwater is being impacted as a result of the deposition of tailings. The ambient groundwater monitoring requirements specified in condition 3.7.1 for the TSF have been updated to include additional monitoring associated with the new Flinders Strip 12 in-Pit TSF.</p> <p>Cobalt and uranium have been included in the analytical suite for the TSF groundwater monitoring as they are commonly detected in mine drainage under near-neutral conditions. Monitoring bores MDM06 and MDM07 have been removed from the Licence as these bores will be encapsulated and eventually buried beneath tailings material as the Windich Above-Ground TSF progresses.</p> <p>Results of the TSF groundwater monitoring will be reported in the Annual Environmental Report for assessment; and compared against the site specific trigger values which have been established for groundwater at the premises. Details of trigger exceedances, investigations, environmental impacts and remedial actions will also need to be detailed in the Annual Environmental Report. Site-specific triggers for groundwater quality will ensure that appropriate management actions are implemented to minimise impacts to sensitive receptors in the area.</p> <p>Mine dewater reinjection The ambient groundwater monitoring requirements associated with the reinjection of mine dewater have also been included on the Licence at the time of this amendment, to identify impacts to groundwater quality and water levels as a result of reinjection. Previously, ambient groundwater monitoring was carried out in accordance with the <i>Christmas Creek Water Management Scheme</i>, implemented under conditions 2.2.1 and 3.4.1 of the Licence.</p>	<p>Application and supporting information</p> <p>General provisions of the <i>Environmental Protection Act 1986</i>.</p> <p>Report and recommendations of the Environmental Protection Authority 1402, <i>Christmas Creek Water Management Scheme</i> (EPA, June 2011)</p> <p>Statement that a Proposal May be Implemented, Christmas Creek Water Management Scheme, Statement No. 871</p> <p><i>Christmas Creek Groundwater Operating Strategy</i> (CC-PH-HY-0002)</p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>Impacts to flora and vegetation through alteration of groundwater level and quality as a result of dewatering and reinjection was identified by the Environmental Protection Authority (EPA) as a key environmental factor, as described in Report 1402 for the Christmas Creek Water Management Scheme (EPA, June 2011). Ministerial Statement 871 was subsequently issued on 1 August 2011 and includes specific conditions relating to groundwater mounding to minimise impacts to Mulga vegetation and Samphire communities associated with the Fortescue Marsh.</p> <p>The EPA recognised that there was a low risk that water quality would be significantly impacted and that the Department of Water (DoW) is able to manage the issue through the approved Groundwater Operating Strategy. The <i>Christmas Creek Groundwater Operating Strategy</i> (CC-PH-HY-0002) has been prepared in accordance with the requirements of the Section 5C licence issued by DoW, pursuant to the <i>Rights in Water and Irrigation Act 1914</i>. The document outlines the planned operation of dewatering, injection and process water supply systems at the Christmas Creek Mine and the management systems employed to monitor and mitigate impacts.</p>	<p><i>Life of Mine Geochemistry Programme – Site Specific Trigger Values</i> (45-SY-EN-0001, 12 June 2015)</p>
Improvements	Condition 4.1.1	<p>Improvement conditions have been implemented through condition 4.1 of the Licence and relate to the implementation of telemetry or other controls on saline pipelines and water transfer ponds.</p> <p>Improvement IR1 has been removed from condition 4.1.1. The Licensee submitted the <i>Saline Water Infrastructure Environmental Improvement Assessment</i> (CC-RP-EN-0139, 31 December 2015) to DER by the due date of 31 December 2015, satisfying the requirements of IR1. The document included an implementation plan to install telemetric controls on pipelines identified within environmentally sensitive areas over the course of two years, being the FY17 and FY18. Under condition 5.2.1 the Licensee will be required to provide an update on these works in the Annual Environmental Report, to be submitted to DER for assessment.</p>	<p><i>Saline Water Infrastructure Environmental Improvement Assessment</i> (CC-RP-EN-0139, 31 December 2015)</p>



DECISION TABLE			
Licence section	Condition number	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>Improvement IR2 has also been removed from condition 4.1.1. On 30 June 2016 the Licensee submitted the <i>Saline Water Infrastructure – Implementation Plan</i> (CC-RP-EN-0146) to address the requirements of improvement IR2.</p> <p>Following a review of the groundwater monitoring at the Windich TSF, an improvement (IR1) requiring the Licensee to undertake a review of the monitoring bore network near the TSFs has been included in the Licence. The location of the groundwater monitoring bores, with the exception of WDM04, may be located too far from the toe of the expanded Windich TSF to clearly detect water level changes that may be associated with mounding of the water table beneath the facility. Bores WDM06 and WDM07 lie within the footprint of the proposed expanded Windich TSF and will eventually be covered by tailings. It is also noted that elevated concentrations of mercury have been detected in monitoring bore WDM07, and mercury has also been periodically detected in bores WDM04 and WDM06. Concentrations do not currently pose a risk to environmental receptors that may receive groundwater discharge or to nearby groundwater users.</p> <p>Noting the above, a review of the current network is required and, where necessary, new monitoring bores installed to more effectively monitor groundwater mounding and seepage from the TSF.</p>	
Licence duration	N/A	The Licence expiry date has been amended in accordance with the administrative notice issued 29 April 2016 relating to extension of Licence expiry dates.	Notice of Amendment of Licence Expiry Dates (DER, 29 April 2016)



5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
4 July 2016	Proponent sent a copy of draft instrument	<p><u>Licence</u></p> <p>Condition 1.2.1 – Interpretation/definition of effluent and applicability of conditions to tailings return water pipelines</p> <p>Table 1.2.1</p> <ul style="list-style-type: none"> • remove reference to seepage recovery and reword to allow decommissioning of Vasse TSF and water recovery infrastructure; • refer to water storage ponds/turkey's nest collectively. <p>Table 1.2.5 Remove word million from Category 6 and update category 73 volume to reflect revised capacity</p> <p>Table 2.3.1 Change bore ID to reflect location of replacement bore</p> <p>Table 3.4.1</p>	<p>Condition 1.2.1 has been updated to clarify what pipelines the requirements relate to, ie. tailings pipelines and pipelines conveying untreated sewage to the two main WWTPs on site. Tailings return pipelines have been removed as the return water is relatively good quality and are located in disturbed areas.</p> <p>Wording changed as per Licensee's suggestion.</p> <p>Individual names of infrastructure has been retained at the time of this amendment.</p> <p>Updated.</p> <p>Updated.</p>



Date	Event	Comments received/Notes	How comments were taken into consideration
		<ul style="list-style-type: none"> • change chlorine to chloride; and • change parameters to be consistent with Groundwater Operating Strategy. <p>Table 3.7.1</p> <ul style="list-style-type: none"> • Update Flinders bore ID and update figure in Licence; • Standing water level to be mbgl not m(AHD); • Revise analytical suite; <ul style="list-style-type: none"> • Substitute mine dewater injection monitoring bores and amend bore labels. <p>Table 4.1.1</p> <ul style="list-style-type: none"> • Change improvement reference to IR3 to avoid confusion with previous licence iterations IR1 and IR2. <p>Table 5.2.1</p> <ul style="list-style-type: none"> • Update reference to the document name relating to saline water infrastructure. 	<p>Updated. Updated.</p> <p>Updated.</p> <p>Updated.</p> <p>Additional analytes not removed. It has been identified that the analytes uranium and cobalt should be monitored when consideration is given to the metals and metalloids of environmental concern that are commonly detected in mine drainage under near-neutral pH conditions.</p> <p>Updated</p> <p>Updated.</p> <p>Updated.</p>



6 Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High



Appendix A

Premises operation

TAILINGS STORAGE FACILITIES

The Licensee currently operates TSFs at Christmas Creek that occupy mined out pit voids at Vasse and Windich. These facilities are approaching their constructed capacities and in order to maintain current ore processing operations, tailings storage capacity on site needs to be increased.

The Licensee proposes to construct additional storage at the Windich TSF and develop a new in-pit TSF in a mined out pit void referred to as Flinders Strip 12. The Windich TSF will continue to accept tailings material from OPF2 and the Flinders Strip 12 facility will accept waste from OPF1 currently being deposited in the Vasse TSF.

The geotechnical engineering design associated with the Windich Above-Ground TSF and Flinders Strip 12 TSF has been completed by SRK Consulting in accordance with the following guidelines:

- *Guidelines on Tailings Dams: Planning, Design, Operation and Closure* (ANCOLD, 2012);
- *Guidelines on the Safe Design and Operating Standards for Tailings Storage*, Department of Mines and Petroleum (DMP, 1999); and
- *Code of Practice for Tailings Storage Facilities in Western Australia* (DMP, 2013)

Windich TSF Above-Ground TSF

The Windich TSF currently consists of two in-pit TSFs, Windich TSF 1 (mining strips 8 and 9) and Windich TSF 2 (mining strips 10-13). Currently only Windich TSF 2 is operational as Windich TSF 1 is at capacity. The Licensee is proposing to incorporate the two facilities (TSF1 and TSF2) into one above ground TSF by constructing an embankment wall along the western and southern boundaries of the existing facilities. The new embankment wall will consist of mine waste material backfilled into the mine pit void downstream of the existing embankment walls.

The expansion into one TSF will be undertaken in two stages (depicted in Figure 1):

- Stage 1 – waste rock backfill in the adjacent pit will be utilised to raise the embankment wall at the western end of TSF1 by 7 metres to provide capacity for approximately 6 months of tailings production; and
- Stage 2 – further extension of the western embankment wall adjacent TSF2 and an additional embankment wall along the southern boundary of TSF2. Stage 2 will be undertaken in two phases:
 - Phase 1 – raise TSF2 embankment walls by 6 m utilising mine pit backfill in the downstream Windich mining strips; and
 - Phase 2 – a further raise of the embankment walls by 7 m.

The earthworks for the embankment wall will occur within disturbed mining areas hence no clearing of vegetation will be required.

Analysis undertaken by SRK Consulting indicates that mine backfill utilised for the TSF embankment Stage 1 is required to be a minimum distance of 20 m from the downstream raise toe to the backfill crest edge to produce suitable stability and safety factor of the embankment.

SRK Consulting has also provided detailed engineering specifications for the embankments to be constructed during Stage 2. The specifications provide guidance and instruction for the construction of the embankment walls to ensure the structure is stable and achieves the appropriate factor of safety detailed in the ANCOLD guideline.



The Licensee will utilise the existing tailings delivery infrastructure and spigot arrangements. The final sections of the delivery pipeline and spigots will be relocated to the crest of the new embankments as the raises are complete and continue to discharge into the TSF. The existing supernatant water recovery pumps and pipelines in place at Windich TSF2 will be utilised for the new above-ground TSF. The decant water will be pumped to the existing turkey's nest and then returned to the OPF process water circuit.

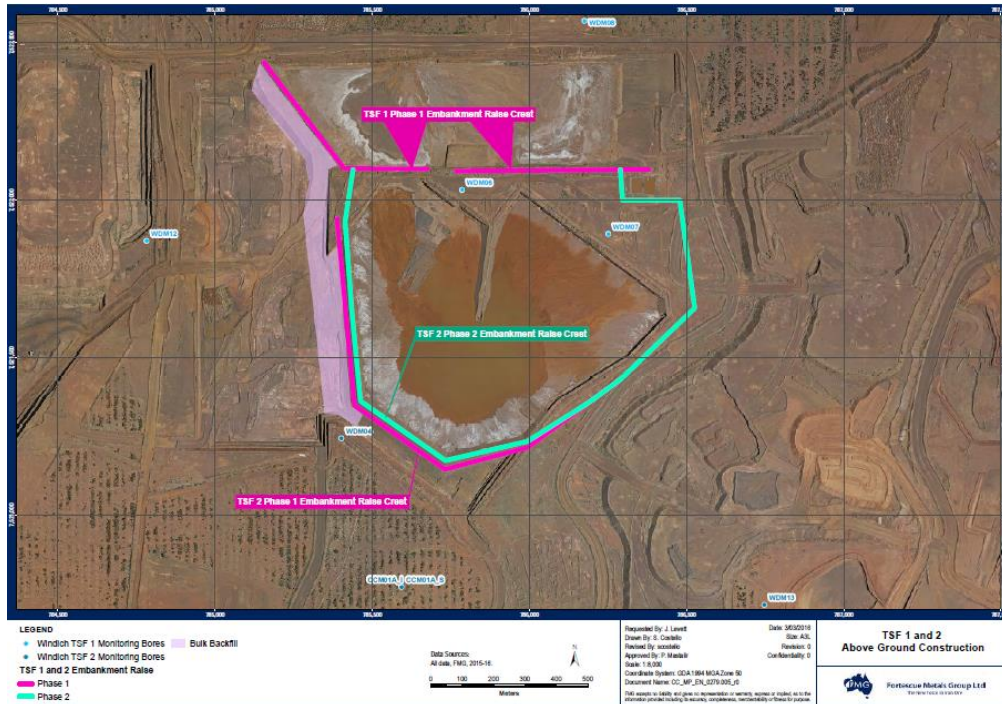


Figure 1. Staged construction of Windich Above-Ground TSF

On completion of Stage 2, the Windich Above-Ground TSF will have capacity for approximately 3 years of tailings production. Tailings deposition rates used in the Windich TSF design were 14,000 tonnes per day (TPD) at a density of 1.5 tonnes per cubic metre.

Flinders Strip 12 In-Pit TSF

The Licensee is also seeking approval for the development of a satellite in-pit TSF in the mined out pit void at Flinders Pit Strip 12, which has been backfilled to above the pre-mining water table. The mined out pit void is bound to the north, west and east by backfill mineral waste. The southern boundary of the TSF will be the pit wall. The proposed layout of the TSF is shown in Figure 2.

The construction of the Flinders Pit Strip 12 TSF will require the installation of:

1. Tailings delivery pipeline to connect to the existing Vasse tailings delivery pipeline;
2. Spigots along the TSF crest wall;
3. A return water pipeline from Flinders Strip 12 to the OPF; and
4. Installation of a mobile water pump with floating suction line.

SRK Consulting has determined that the Flinders Strip 12 TSF is inherently geotechnically stable as the TSF is to utilise a mine out pit void and no constructed embankment wall is required.

The Flinders Strip 12 TSF will be operated by depositing tailings from a pipeline located on the northern, western and eastern flanks of the pit. Containment to the south is provided by the pit walls. This strategy will control the supernatant pond along the southern flank where access is available via the existing pit ramp constructed in competent overburden material. Six deposition spigots are



required from the north and west, and three from the east to ensure that the tailings beach slopes towards the decant location and not into the corners.

The Flinders Strip 12 will utilise the existing Vasse TSF delivery pipeline. Installation of a section of pipeline that runs from the existing Vasse TSF pipeline and around the crest of the Flinders Strip TSF will be required. Water will be reclaimed using a skid-mounted pump with a floating intake. The pump will be progressively moved from the centre of the pit until the pond forms in the preferred location. The existing pit ramp to the south of the pit wall will be used to access the decant pond where the pump will be located.

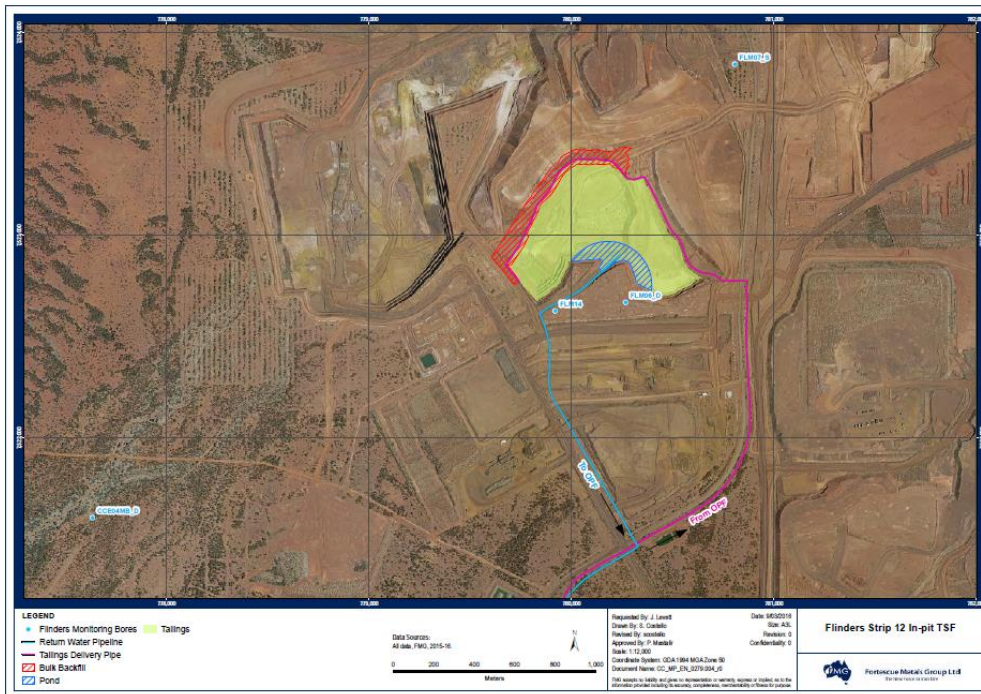


Figure 2. Flinders Strip 12 TSF layout

It is calculated that the Flinders Strip 12 TSF will have a capacity of 6.9 million tonnes (Mt) and an operational life of 16-17 months.

Normal Operation

Emission Description

Emission: Seepage from Windich Above-Ground TSF and Flinders Strip 12 TSF migrating to groundwater

Impact: Potential impacts to groundwater quality and groundwater levels (mounding).

Increasing the water level from seepage may impact on local vegetation, if it results in the growth medium becoming water logged. Mulga (*Acacia aneura*) is widespread in the surrounding mine site area and particularly prone to impacts from groundwater mounding. The TSF's are located approximately 10 km from the Fortescue Marsh.

Seepage may impact on groundwater quality by changing the salinity of the aquifer or increasing metals' concentration in underlying soils or groundwater. Previous information provided to DER indicates that the tailings seepage is expected to be approximately 9,000 mg/L, which reflects the upper salinity of the process water stream. Regional hydrogeological assessment has characterised the quality of the local aquifer system as being brackish with a TDS of up to 6,000 mg/L.



Elevated concentrations of mercury have been detected in monitoring bore WDM07, and mercury has also been periodically detected in bores WDM04 and WDM06.

Controls: The proposed TSFs are designed to meet ANCOLD and Department of Mines and Petroleum requirements, with a tailings beach being formed to reduce seepage during operations. Supernatant water will be recovered from the TSF and directed to the OPF for reuse in processing.

Approximately 40% of total seepage is expected to occur during the first three months of a TSF's operation before the floor has been covered by tailings in its entirety.

Though the seepage water quality exceeds the regional background water quality, the seepage is within the capture zone of mine pit dewatering borefields. While there is potential for localised mounding resulting from the operation of the TSFs, it is anticipated that the drawdown footprint created by mine pit dewatering activities will cause seepage to be abstracted by dewatering activities.

The mine dewatering program is expected to mitigate impacts of seepage by collecting any seepage through the production groundwater bores.

Risk Assessment

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate

Regulatory Controls

Condition 1.2.4 has been included on the Licence and requires the Licensee to undertake an annual water balance for the TSFs to assist in the identification of seepage, which may impact on groundwater levels and quality.

Ambient environmental monitoring has been included in Condition 3.7.1 to determine if seepage from the deposition of tailings is impacting on groundwater levels and water quality in the vicinity of the TSFs. The results of this monitoring will be reported to DER via the Annual Environmental Report, along with a comparison of results against the site-specific trigger values.

An Improvement requirement relating to the groundwater monitoring network at the TSFs has been implemented on the Licence, as described in the Improvement section in Table 4.

Residual Risk

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate

Abnormal and Emergency Operations

Emission Description

Emission: Overtopping of the TSF, rupture of the tailings and return water pipelines, releasing tailings or return water into the surrounding environment.

Tailings pipelines transfer tailings to the TSFs from the OPFs and tailings return lines transfer decant water back to the process plant.

Impact: Deterioration of surface water, soil and groundwater quality. A spill of tailings may impact on surrounding vegetation dependent on location. Localised soil contamination. Tailings decant water is of brackish salinity so does not represent as significant a risk.



Controls: Appropriate management and operation of the TSF's, including maintenance of a suitable freeboard. Removal of supernatant water is carried out as required. Regular visual inspections of tailings pipelines and TSFs to monitor freeboard.

Risk Assessment

Consequence: Moderate

Likelihood: Unlikely

Risk Rating: Moderate

Regulatory Controls

Condition 1.2.1 has been included in the Licence ensuring that systems are in place to monitor and isolate pipelines transferring environmentally hazardous materials are implemented and maintained. This requirement would apply to the tailings pipelines. Conditions 1.2.2 and 1.2.3 have been included in the Licence, requiring the Licensee to maintain an adequate freeboard on the TSFs and conduct daily visual integrity inspections of tailings, water return lines and the TSFs embankment freeboard.

Residual Risk Assessment

Consequence: Moderate

Likelihood: Rare

Risk Rating: Moderate

KARNTAMA VILLAGE WWTP SLUDGE HANDLING UNIT

The Licensee currently operates WWTPs at the Karntama Village and the Christmas Creek Construction Camp. The WWTPs discharge treated wastewater to nominated irrigation areas. Additionally the WWTPs also produce biological and chemical waste (sludge) which is periodically removed by vacuum truck and transported by a controlled waste carrier to a suitable disposal facility in Newman.

The Licensee is proposing to install a sludge handling unit at Karntama Village to locally treat the sludge, as opposed to having it transported offsite to Newman for disposal. The sludge handling unit will produce biosolids and wastewater. The biosolids will be disposed of within the existing landfill at Christmas Creek and the wastewater returned to the Karntama Village WWTP for treatment.

The handling unit will have a capacity of 70 kg/hour of dry solids or up to 5,000 litres per hour of liquid sludge waste. It is estimated that approximately 3,000 litres per day of sludge will be processed, resulting in approximately 320 tonnes of biosolids (at 60% solids) requiring disposal annually. The handling unit will return approximately 775 m³ of water back to the Karntama Village WWTP annually for treatment.

The unit will consist of the following components:

- sludge receipt station to accept trucked sludge;
- modular cool room to contain a Huber screw press, screen and auger;
- a 3 m sea container to house a skip bin for biosolids waste and separate screen waste bags;
- pumps and associated pipework to use existing sludge tanks at Karntama Village; and
- polyaluminium chloride (PAC) dosing system for sludge tanks.

Figure 3 depicts the piping and instrumentation diagram for the proposed sludge handling unit.

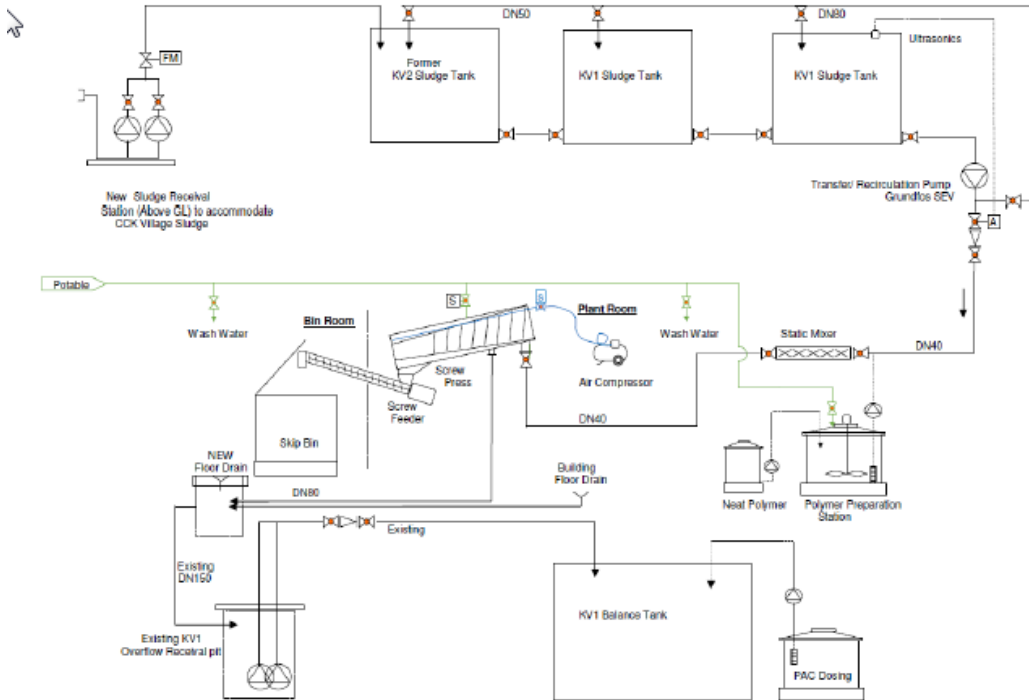


Figure 3. Sludge handling unit piping and instrumentation diagram

A sludge receiving station will be constructed to allow sludge to be delivered to the handling unit by vacuum truck tanker and pumped into the existing Karntama Village sludge tanks. The primary sources of sludge will be the Karntama and Construction Camp WWTPs and smaller Biomax systems located at Christmas Creek. Sludge from the Licensee's neighbouring Cloudbreak Iron Ore Mine, operating under Licence L8199/2007/2, may also be accepted for processing periodically. The Cloudbreak operations currently utilises a geo fabric bag system to treat sludge, which involves the drying of sludge waste in bags and subsequent disposal of the dried product in landfill. In the event that the geo fabric bags are not available, up to 60,000 m³ per month of sludge waste may be temporarily directed to the Christmas Creek operations for treatment through the sludge handling unit.

A PAC polymer will be used to aid in the separation of the sludge from water by coagulating dissolved organic matter and colloidal particles present in suspension. The coagulated particles will then be removed from the water in the screw press. The PAC polymer will be stored in 1,000 litre intermediate bulk containers (IBC), diluted with potable water and dosed into the existing Karntama Village sludge tanks. The IBCs will be stored in an appropriate bunded compound or bunded pallet within the PAC dosing area.

A Huber screw press, which utilises a combination of pneumatic pressure (compressed air) and physical pressure from the screw auger to compress the sludge material and extract the water. The extracted water will be returned to the Karntama Village WWTP balance tank via an existing overflow put and pump located within the Karntama Village WWTP. The water will be treated within the WWTP and discharged to the existing irrigation spray field.

Biosolids produced by the handling unit will be disposed of within the existing Christmas Creek putrescible landfill facility, in accordance with the *Landfill Waste Classification and Waste Definitions 1996*, as amended (DER, 2009). Once the handling unit is operational, Chichester Metals will undertake an assessment to determine if the biosolids are suitable for beneficial land use, in accordance with the *Western Australian Guidelines for Biosolids Management* (DER, 2012).



Emission Description

Emission: Discharge of sludge to the environment during transfer from the vacuum truck tanker to the sludge tanks.

Impact: Deterioration of surface water, soil and groundwater quality from the addition of nutrients and/or metals and metalloids.

Controls: The sludge receival station will be equipped with an inlet pipe with cam lock (or similar) connections to allow direct connection to the outlet of the vacuum truck with use of a flexible hose. The receival station will allow the sludge to be pumped directly into the Karntama Village WWTP sludge tank.

The receival station is located within the Karntama Village WWTP compound which is cleared and over 20 m from undisturbed areas. The sludge transfer is a manned task and any failures during transfers would be observed quickly reducing the severity of any spills/discharges. The receival station will be equipped with emergency stop buttons and isolating valves in the event of a spill/discharge.

Risk Assessment

Consequence: Insignificant

Likelihood: Rare

Risk Rating: Low

Regulatory Controls

The sludge handling unit presents a low risk; therefore no regulatory controls are required to be applied to the Licence. The general provisions of the *Environmental Protection Act 1986* and subsidiary legislation, including the *Environmental Protection (Unauthorised Discharges) Regulations 2004* apply. The facility may also be subject to DER inspections at which time operational controls will be evaluated.

Residual Risk Assessment

Consequence: Insignificant

Likelihood: Rare

Risk Rating: Low