Government of Western Australia
Department of Water and Environmental Regulation

Licence

Environmental Protection Act 1986, Part V

Licensee: FMG Solomon Pty Ltd

Licence: L8464/2010/2

Registered office: 87 Adelaide Terrace
EAST PERTH WA 6004

ACN: 128 959 179

Premises address: Solomon Mine
M47/1409, M47/1413, M47/1431, L47/293, L47/294, L47/360, L47/363, L47/392 and portion of L47/296, L47/361, and L47/381
MT SHEILA WA 6751
As depicted in Schedule 1

Issue date: Thursday, 15 October 2015

Commencement date: Sunday, 18 October 2015

Expiry date: Friday, 17 October 2025

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	Not more than 95,300,000 tonnes per annual period
54	Sewage facility	100 cubic metres or more per day	Not more than 1,178 cubic metres per day
57	Used tyre storage (general)	100 tyres or more	2,500 tyres
61	Liquid waste facility	100 tonnes or more per year	110,000 tonnes per annual period
62	Solid waste depot	500 tonnes or more per year	6,000 tonnes per annual period
64	Class II putrescible landfill site	20 tonnes or more per year	14,000 tonnes per annual period
73	Bulk storage of chemicals	1,000 cubic metres in aggregate	Not more than 9,500 cubic metres in aggregate

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

Date signed: 18 January 2018
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Alana Kidd
Manager Licensing – 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.

As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER).

DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation.

DWER's industry licensing role
DWER is a government department for the state of Western Australia in the portfolio of the Minister for Environment. DWER's purpose is to advise on and implement strategies for a healthy environment for the benefit of all current and future Western Australians.

DWER has responsibilities under Part V of the *Environmental Protection Act 1986* (the Act) for the licensing of prescribed premises. Through this process DWER regulates to prevent, control and abate pollution and environmental harm to conserve and protect the environment. DWER 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
FMG Solomon Pty Ltd (Licensee) operates the Solomon Mine (Premises) located in the Pilbara region of Western Australia, approximately 54 kilometres (km) north of Tom Price and 12km north-west of Karijini National Park.

The nearest sensitive receptors to the Premises are Hamersley Station, located approximately 33km south-west and Hamersley Gorge, located within Karijini National Park, approximately 13km south, south-east of the Premises. Hamersley Gorge is a popular tourist precinct used for recreational activities.

The Premises is located at the headwaters of the Millstream Catchment. The western portion of the Kings mining area is situated within the Millstream Water Reserve, which is a Priority 2 Public Drinking Water Source Area (PDWSA). Mining, including the operation of tailing storage facilities (TSFs) for tailings from physical separation processes, is considered compatible in Priority 2 areas, as detailed in the Water Quality Protection Note 25 *Land compatibility tables for public drinking water source areas* (Department of Water, 2016). The TSF is not located within the PDWSA.

The Premises currently consists of several iron ore mining areas including Firetail North and South, Valley of the Kings (Kings), Valley of the Queens (Queens), Trinity and Zion.

Mining is undertaken using standard open cut methods, with overburden and waste stored in external waste dumps and/or backfilled to the mined out pit. Ore processing is undertaken using permanent and/or mobile ore processing facilities (OPF). Tailings produced from the beneficiation of ore through the Kings OPF wet processing circuit are deposited into the Kings Valley TSF. The mining operation is supported by ancillary infrastructure including accommodation village wastewater treatment plants (WWTP), inert and putrescible landfills, used tyre storage areas, a bioremediation facility, bulk and satellite fuel storage areas, workshops and administration buildings.

The Licensee also accepts liquid waste from the Solomon Power Station, occupied by TEC Pipe Pty Ltd. This liquid waste comprises of treated wastewater from a reverse osmosis plant, oil water separator and cooling tower blowdown. The Licensee reuses this treated wastewater for dust suppression across the Premises.

Oily water separators (OWS) are operated at the Bulk Fuel Facility, Rail Fuel Siding, Castle Camp Washdown Bay, Trinity Fuel Farm, Kings Fuel Farm, Firetail Fuel Farm and Kings OPF for the treatment of potentially contaminated water prior to discharge to the environment.

The Premises is currently operating under Ministerial Statement 1062 under Part IV of the Act.

The Licences and works approvals issued for the Premises are:

Instrument log		
Instrument	**Issued**	**Description**
W4645/2010/1	22 April 2010	Works approval for construction of Castle Camp WWTP
L8464/2010/1	14 October 2010	New licence for Castle Camp WWTP
W4846/2010/1	3 March 2011	Works approval for Castle Camp upgrade to category 54
W4881/2011/1	3 November 2011	Works approval for Dally Camp WWTP
W4900/2011/1	23 June 2011	Works approval for Direct Shipping Ore Processing Plant
W4930/2011/1	4 August 2011	Works approval for Mobile Crushing Plant
W4932/2011/1	4 August 2011	Works approval for Stockyard Mobile Crushing Plant
W4940/2011/1	4 August 2011	Works approval for Ellie Camp WWTP
W5088/2011/1	9 February 2012	Works approval for Kangi Camp WWTP and waste transfer station
L8464/2010/1	9 February 2012	Licence amendment increase capacity
W5110/2011/1	3 November 2011	Works approval for Processing plant and tailings facility
L8464/2010/1	14 June 2012	Licence amendment increase capacity
W5192/2012/1	19 July 2012	Works approval for Bulk fuel facility
W5246/2012/1	1 November 2012	Works approval for Central Facilities Infiltration trench
L8464/2010/1	21 February 2013	Licence amendment add category 5, 12 and 73
W5407/2013/1	7 July 2013	Works approval for an additional Ore Mobile Crushing Facility
W5429/2013/1	29 August 2013	Landfill and Waste Transfer Station
L8464/2010/1	5 December 2013	Licence amendment increase capacity category 5 and update the licence template
W5690/2014/1	25 September 2014	Works approval for construction of three OPFs (two at Kings and one at Firetail)
L8464/2010/1	12 February 2015	Licence amendment to increase capacity of categories 5 and 73, and add category 64
L8464/2010/1	23 April 2015	Licence amendment to include categories 57 and 61
L8464/2010/2	15 October 2015	Licence renewal and amendment to upgrade Dally Camp WWTP, include discharges from OWS as emissions to land, change the TSF monitoring requirements and update the prescribed premises boundary
L8464/2010/2	2 June 2016	Licence amendment for works approval to construct landfill and waste transfer station
L8464/2010/2	15 May 2017	Licence amendment to approve TSF embankment lift, remove OWS discharge and monitoring locations, increase category 57 and 73 approved design capacities and include additional inert waste disposal location
L8464/2010/2	19 June 2017	Licence amendment to remove the Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAC) monitoring requirements from Tables 2.2.2, 3.2.1 and 3.4.1
L8464/2010/2	18 January 2018	Licence amendment to remove ambient groundwater monitoring bore GQ8 (WF-MB001S) at the landfill from Table 3.5.1

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;*

'Annual Audit Compliance Report' means a report in a format approved by the CEO as presented by the Licensee or as specified by the CEO from time to time and published on the Department's website;

'Annual Period' means a 12 month period commencing from 1 January to 31 December in the same year;

'AS/NZS 2031' means the Australian Standard AS/NZS 2031 *Selection of containers and preservation of water samples for microbiological analysis*;

'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 5667.10' 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*;*

'CEO' for the purposes of notification:
Director General
Department Administering the Act
Locked Bag 33, Cloisters Square
PERTH WA 6850
info@dwer.wa.gov.au;

'cfu/100mL' means colony forming units per 100 millilitres;

'clean fill' has the meaning defined in the Landfill Definitions;

'Department' means the department established under section 53 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the Act;

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

'HDPE' means high density polyethylene;

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

'Inert Waste Type 2' 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 L8464/2010/2 and issued under the Act*;*

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

'mAHD' means metres Australian Height Datum;

'mbgl' means metres below ground level;

'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;

'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 and 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;

'six monthly' means the 2 inclusive periods from 1 January to 30 June and 1 July to 31 December in the same year;

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

'TSF' means tailings storage facility;

'usual working day' means 0800 – 1700 hours, Monday to Friday excluding public holidays in Western Australia;

'WWTP' means wastewater treatment plants; 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 are either:
(a) equipped with telemetry; or
(b) equipped with automatic cut-outs in the event of a pipe failure; and/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 the vessels or compounds provided with the infrastructure detailed in Table 1.2.1.

Table 1.2.1: Containment infrastructure

Containment cell or dam number(s)	Material	Infrastructure requirements
TSF1	Tailings	• Maintain a minimum freeboard of 500mm as measured from the operational pond surface to lowest elevation of perimeter embankment • Provide additional sufficient freeboard to minimise the likelihood of erosion of the embankments by wave action • Install and maintain a seepage collection and recovery system
TSF1 Gravity Decant Water Storage Pond	Tailings supernatant liquor/ decant liquor/ tailings leachate/ seepage	• HDPE Liner • Maintain vertical freeboard of 300mm

1.2.3 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 1.2.2.

Table 1.2.2: Management of waste

Waste type	Management strategy	Requirements[1,2]
Sewage	Biological and physical	Not to exceed 1,178m^3/day
Treated wastewater	Chemical treatment (disinfection) prior to onsite irrigation	Not applicable
Sewage sludge	Storage (enclosed tanks) and sludge press	Not applicable
Used tyres	Storage	• Not more than 2,500 used tyres shall be stored at the Premises at any one time • Used tyres shall not be stored closer than 6m from any other tyre stack
Clean fill	Receipt, handling and disposal by landfilling	• No more than 14,000 tonnes per year (combined with Inert Waste Type 2) shall be disposed of by landfilling • Disposal of waste by landfilling shall only take place within the prescribed premises in the locations as shown in the Map of disposal points in Schedule 1 • Waste shall be placed in a defined trench or within an area enclosed by earthen bunds • All disposal locations are to be surveyed and the latitude and longitude recorded • The separation distance between the base of the landfill and the highest groundwater level shall not be less than 2m
Inert Waste Type 1	Receipt, handling and disposal by landfilling	<u>Untreated wood</u> • Disposal of Untreated Wood is to be to the

Table 1.2.2: Management of waste		
Waste type	**Management strategy**	**Requirements[1,2]**
Putrescible waste		Solomon Landfill, Firetail North Waste Dump, Firetail Waste Wood Disposal Area and Kings Waste Dump (as depicted in the map of disposal points in Schedule 1)
Inert Waste Type 2		Burial of waste shall only take place within the prescribed premises in the Solomon Landfill, Kings Pit, Kings Waste Dump, Firetail South Waste Dump, Firetail South Pit, Firetail North Pit, Trinity Waste Dump and Trinity Mine Pit as shown in the Map of disposal points in Schedule 1 Cell locations where tyres and other waste rubber are to be buried will be surveyed and the latitude and longitude recorded

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*.

1.2.4 The Licensee shall ensure that the irrigation of treated wastewater meets the following:
- (a) no irrigation generated run-off, spray drift or discharge occurs beyond the boundary of the designated irrigation areas, as identified in the map of emissions points (L1 and L2) depicted in Schedule 1;
- (b) wastewater is evenly distributed over the irrigation area;
- (c) no soil erosion occurs;
- (d) irrigation does not occur on land that is waterlogged; and
- (e) a healthy vegetation cover is maintained over the wastewater irrigation areas.

1.2.5 The Licensee shall ensure that cover is applied and maintained on landfilled wastes in accordance with Table 1.2.3 and that sufficient stockpiles of cover are maintained on site at all times.

Table 1.2.3: Cover requirements [1]			
Waste Type	**Material**	**Depth**	**Timescales**
Clean fill Inert Waste Type 1	No cover required		
Inert Waste Type 2	Inert and incombustible material	Sufficient to ensure waste is totally covered and no waste is left exposed	At least weekly
Putrescible waste			
		1,000mm	Within 3 months of achieving final waste contours

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

1.2.6 The Licensee shall:
(a) undertake inspections as detailed in Table 1.2.4;
(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 1.2.4 Inspection of infrastructure

Scope of inspection	Type of inspection	Frequency of inspection
Tailings pipelines	Visual integrity	Daily
Tailings return water lines	Visual integrity	Daily
TSF1 embankment freeboard	Visual to confirm required freeboard capacity is available	Daily

1.2.7 The Licensee shall undertake an annual water balance for the TSF. 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.

1.2.8 The Licensee shall construct the TSF embankment lift in accordance with the requirements specified in the infrastructure requirements detailed in Table 1.2.5. The Licensee must not depart from the design and construction requirements specified in Table 1.2.5 except:
(a) where such departure is minor in nature and does not materially change or affect the infrastructure; or
(b) where such departure improves the functionality of the infrastructure and does not increase risks to public health, public amenity or the environment;
and all other conditions in this Licence are still satisfied.

Table 1.2.5: Infrastructure requirements

Infrastructure	Requirements (Design and construction)
TSF embankment lift	• Designed to contain rainfall associated with a 1 in 100 year, 72 hours storm event and maintain a 500mm freeboard • Staged embankment lift up to Relative Level 605mAHD, and length of 1,100m
Tailings delivery	• Steel or HDPE pipeline from the Kings Ore Processing facility • Spigots located along TSF embankment
Decant facility	• Use of existing gravity decant tower • Two additional decant towers and/or skid mounted pumps with floating intakes

Note 1: Where the details and commitments of the documents listed in condition 1.2.8 are inconsistent with any other condition of this Licence, the conditions of this Licence shall prevail.

1.2.9 The Licensee shall operate the TSF, following the embankment lift, in accordance with the conditions of this Licence, following submission of the compliance documents required under condition 4.3.1.

1.2.10 The Licensee shall ensure the limits specified in Table 1.2.6 are not exceeded.

Table 1.2.6 Production or design capacity limits		
Category[1]	**Category description[1]**	**Premises production or design capacity limit**
5	Processing or beneficiation of metallic or non-metallic ore	95,300,000 tonnes of ore per annual period
61	Liquid waste facility	110,000 tonnes per annual period
62	Solid waste depot	6,000 tonnes per annual period
73	Bulk storage of chemicals	9,500 m^3 in aggregate

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

1.2.11 The Licensee shall maintain the following infrastructure to ensure that stormwater from operational areas is diverted for treatment prior to disposal or discharge:
- (a) sediment basins at the Sizing Hubs, Kings and Firetail Ore Processing Facilities, Direct Shipping Ore Processing Plant, Rail Stockyard and Mobile Crushing Facilities;
- (b) diversion drain to the north-east of the stockyard; and
- (c) drains and sealed collection sumps around satellite fuel facilities and maintenance workshops, excluding roofed and bunded facilities.

2 Emissions

2.1 General

2.1.1 The Licensee shall record and investigate the exceedance of the limit specified in condition 2.2.2 of this licence.

2.2 Emissions to land

2.2.1 The Licensee shall ensure that where waste is emitted to land from the emission points in Table 2.2.1 and identified on the map of emission points in Schedule 1 it is done so in accordance with the conditions of this Licence.

Table 2.2.1: Emissions to land		
Emission point reference and location on Map of emission points	**Description**	**Source including abatement**
L1	Discharge of treated wastewater to irrigation field	Effluent from Castle/Dally Camp WWTP
L2	Discharge of treated wastewater to irrigation field, onsite dust suppression and landscape irrigation	Effluent from Kangi Camp WWTP
L3	Discharge of treated wastewater	Bulk Fuel Facility oily water separator

2.2.2 The Licensee shall not cause or allow emissions to land greater than the limits listed in Table 2.2.2.

Table 2.2.2: Emission limits to land			
Emission point reference	**Parameter**	**Limit (including units)**	**Averaging period**
L3 (Oily water separator emission to land)	Total Recoverable Hydrocarbons	15 mg/L	Spot sample (when flowing)

3 Monitoring

3.1 General monitoring

3.1.1 The Licensee shall ensure that:
(a) all water samples are collected and preserved in accordance with AS/NZS 5667.1 unless otherwise indicated;
(b) all wastewater sampling is conducted in accordance with AS/NZS 5667.10;
(c) all groundwater sampling is conducted in accordance with AS/NZS 5667.11;
(d) all microbiological samples are collected and preserved in accordance with AS/NZS 2031; and
(e) 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;
(c) six monthly monitoring is undertaken at least 5 months apart; and
(d) 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 emissions to land

3.2.1 The Licensee shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of emissions to land

Monitoring point reference	Parameter	Units	Averaging period	Frequency
L1 - L2	Cumulative volume of treated wastewater discharged from each WWTP	m^3	Cumulative monthly	Continuous
	pH[1]	pH units	Spot sample	Quarterly
	5-Day Biochemical Oxygen Demand	mg/L		
	Total Suspended Solids			
	Total Nitrogen			
	Total Phosphorus			
	E.coli	cfu/100mL		
L3	Total recoverable hydrocarbons	mg/L	Spot sample (when flowing)	Quarterly

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

3.3 Monitoring of inputs and outputs

3.3.1 The Licensee shall undertake the monitoring in Table 3.3.1 according to the specifications in that table.

Table 3.3.1: Monitoring of inputs and outputs

Input/Output	Parameter	Units	Averaging Period	Frequency
Waste Inputs	Volume of Inert Waste Type 1, Inert Waste Type 2 (tyres/rubber waste and conveyor belts) and Putrescible waste	tonnes	Each load	Cumulative monthly total

3.4 Process monitoring

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

Table 3.4.1: Process monitoring

Monitoring point reference	Process description	Parameter	Units	Limit	Frequency	Method
TSF1	Tailings delivery to TSF	Volume and mass of tailings deposited into the TSF	m^3 and tonnes	N/A	Continuous	None specified
	TSF return line	Volumes of water recovered from the TSF	m^3 and kL			
	Stormwater discharge line to Kangeenarina Creek	Volume of water discharged to creek	m^3 and kL			
		Total dissolved solids Major cations and anions - Na, K, Ca, Mg, Cl, SO_4 Dissolved metals – As, Cd, Co, Cr, Cu, Hg, Ni, Pb, Se, Zn	mg/L		At commencement of discharge event and weekly thereafter while discharge is occurring	
L3 (Treated wastewater holding tanks)	Treated wastewater from oily water separators used for dust suppression	pH[1]	pH units	N/A	Quarterly	None specified
		Total Dissolved Solids	mg/L	N/A		
		Total Recoverable Hydrocarbons	mg/L	15		
L4 (Stockyard TK901 Storage Tank)	Treated wastewater accepted on site from the Solomon Power Station and used for dust suppression	Cumulative volume	m^3	N/A	Cumulative monthly	Continuous
		pH[1]	pH units	N/A	Quarterly	None specified
		Total Dissolved Solids	mg/L	<5,000		
		Total Recoverable Hydrocarbons	mg/L	<15		

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

3.5 Ambient environmental quality monitoring

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 ambient groundwater quality

Monitoring point reference and location[2]	Parameter	Units	Averaging period	Frequency
GQ1 and GQ2 (Bulk Fuel Facility groundwater monitoring bores)	Standing water level	mAHD mbgl	Spot sample	Six monthly
	Total Recoverable Hydrocarbons	mg/L		
GQ3 GQ4 GQ5 GQ6 GQ7 (TSF1 groundwater monitoring bores)	Standing water level	mAHD		Quarterly
	pH[1]	pH units		
	Electrical Conductivity	µS/cm		
	Total Dissolved Solids	mg/L		
	Major cations and anions - Na, K, Ca, Mg, Cl, SO_4	mg/L		
	Dissolved metals – As, Cd, Co, Cr, Cu, Hg, Ni, Pb, Se, Zn	mg/L		
GQ9 (WF-MB001D) GQ10 (WF-MB002D) (Landfill monitoring bores)	Standing water level	mbgl		Quarterly
	pH[1]	pH units		
	Electrical Conductivity	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Recoverable Hydrocarbons	mg/L		
	As, Cd, Cr, Cu, Hg, Pb, Ni, Zn	mg/L		
	Nitrate	mg/L		
	Total Phosphorus	mg/L		

Note 1: In-field non-NATA accredited analysis permitted.
Note 2: No sample required if bore is dry.

4 Information

4.1 Records

4.1.1 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 4.1.1(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.

4.1.2 The Licensee must submit to the CEO by the 31 March each year an Annual Audit Compliance Report indicating the extent to which the Licensee has complied with the conditions in this Licence for the Annual Period.

4.1.3 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.

4.1.4 The Licensee shall record and maintain a permanent record of all disposal sites authorised under condition 1.2.3.

4.2 Reporting

4.2.1 The Licensee shall submit to the CEO an Annual Environmental Report by the 31 March each year. The report shall contain the information listed in Table 4.2.1 in the format or form specified in that table.

Table 4.2.1: Annual Environmental Report

Condition or table (if relevant)	Parameter	Format or form
-	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
Table 1.2.2	Untreated wood, used tyre and other waste rubber disposal locations	None specified
1.2.7	TSF annual water balance	None specified
Tables 2.2.2 and 3.4.1	Limit exceedances	None specified
Table 3.2.1	Monitoring of emissions to land, including an interpretation of results against plant design specifications for L1 and L2	None specified
Table 3.3.1	Monitoring of inputs and recording of quantities of waste disposed of at each site	None specified
Table 3.4.1	Mass of tailings deposited into TSF1, recovered water and recovered seepage water	None specified
	L3 monitoring results – treated wastewater used for dust suppression	
	L4 monitoring results – water accepted from Solomon Power Station used for dust suppression	
Table 3.5.1	Ambient groundwater monitoring results, and for GQ3 to GQ6 (TSF monitoring bores) a comparison of results against the site specific trigger values detailed in the document, *Life of Mine Geochemistry Programme – Site Specific Trigger Values* (45-SY-EN-0001). 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
4.1.2	Compliance	None specified
4.1.3	Complaints summary	None specified

4.2.2 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 Licence limits.

4.2.3 The Licensee shall submit the information in Table 4.2.2 to the CEO according to the specifications in that table.

Table 4.2.2: Non-annual reporting requirements				
Condition or table (if relevant)	**Parameter**	**Reporting period**	**Reporting date (after end of the reporting period)**	**Format or form**
-	Copies of original monitoring reports submitted to the Licensee by third parties	Not Applicable	Within 14 days of the CEO's request	As received by the Licensee from third parties

4.3 Notification

4.3.1 The Licensee shall ensure that the parameters listed in Table 4.3.1 are notified to the CEO in accordance with the notification requirements of the table.

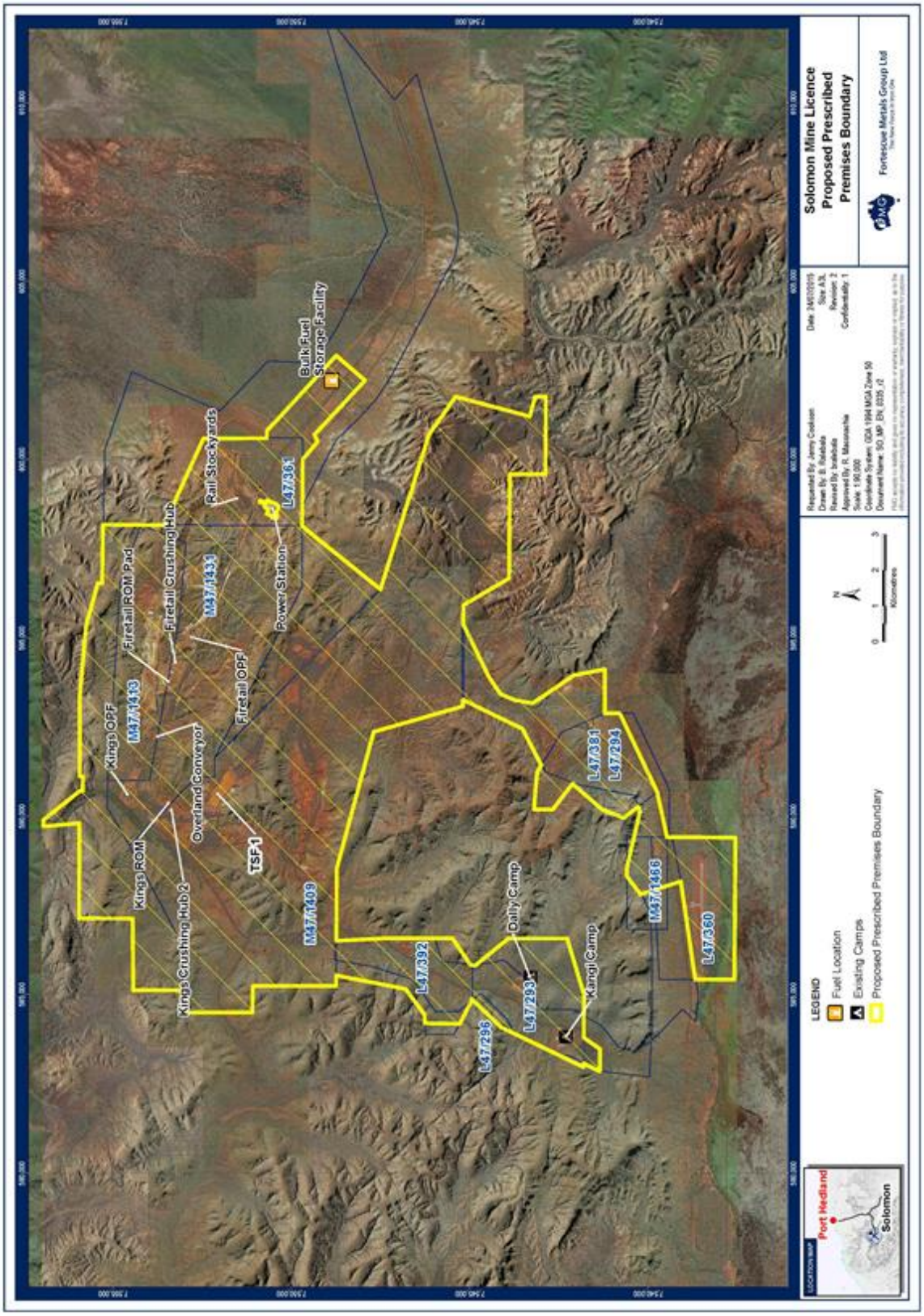
Table 4.3.1: Notification requirements			
Condition or table (if relevant)	**Parameter**	**Notification requirement[1]**	**Format or form[2]**
-	Breach of any limit specified in the Licence	Part A: As soon as practicable but no later than 5pm of the next usual working day. Part B: As soon as practicable	N1
1.2.8	The Licensee shall submit a compliance document to the CEO, following the construction of the TSF embankment lift. The compliance document/s shall: (a) be certified by a suitably qualified engineer and certify that the works were constructed in accordance with the construction requirements specified in Table 1.2.5; (b) provide a list of departures from the specified works certified by a suitably qualified engineer; and (c) be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company	Within one month of completion of construction	None specified
3.1.4	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

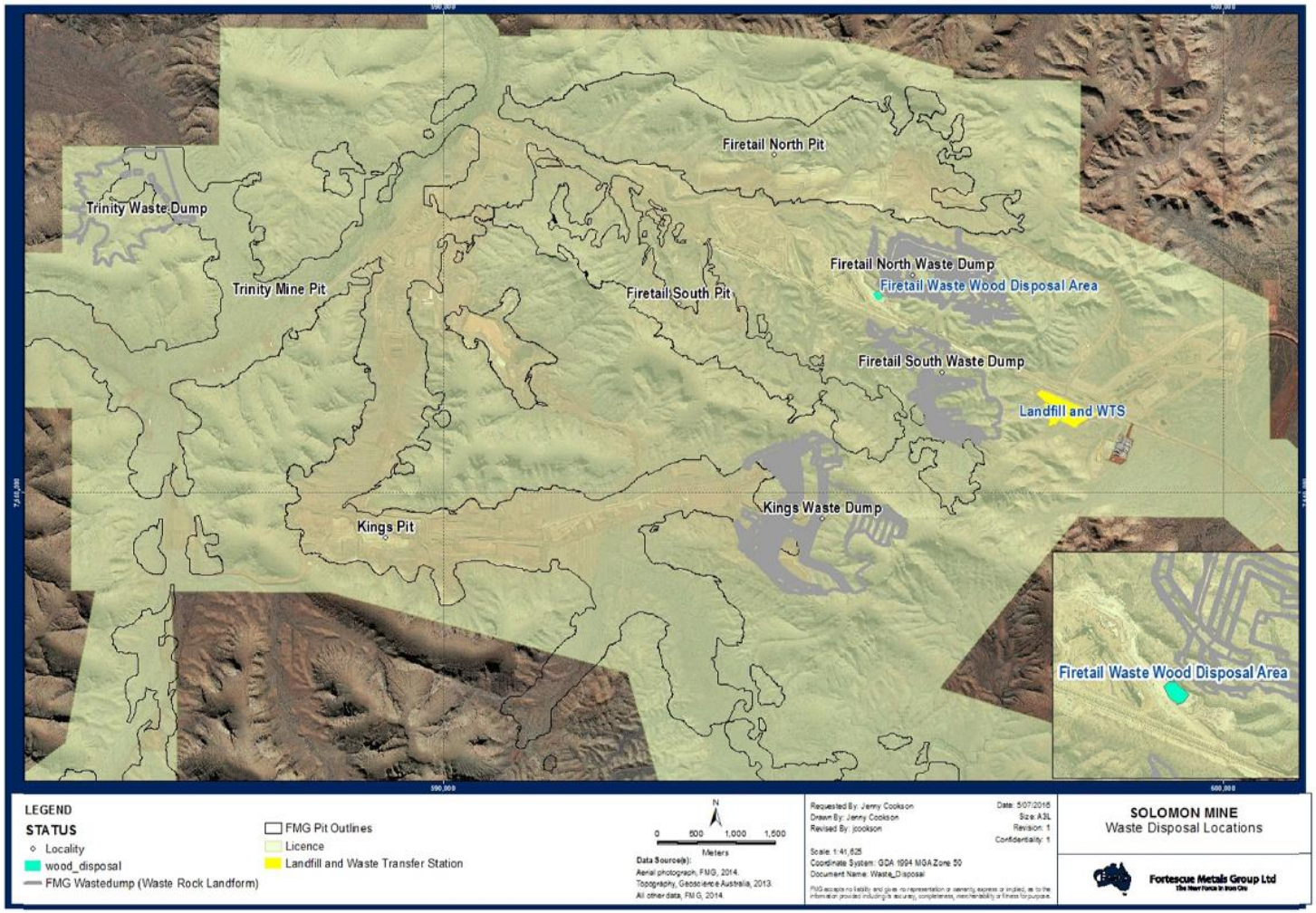
Premises map

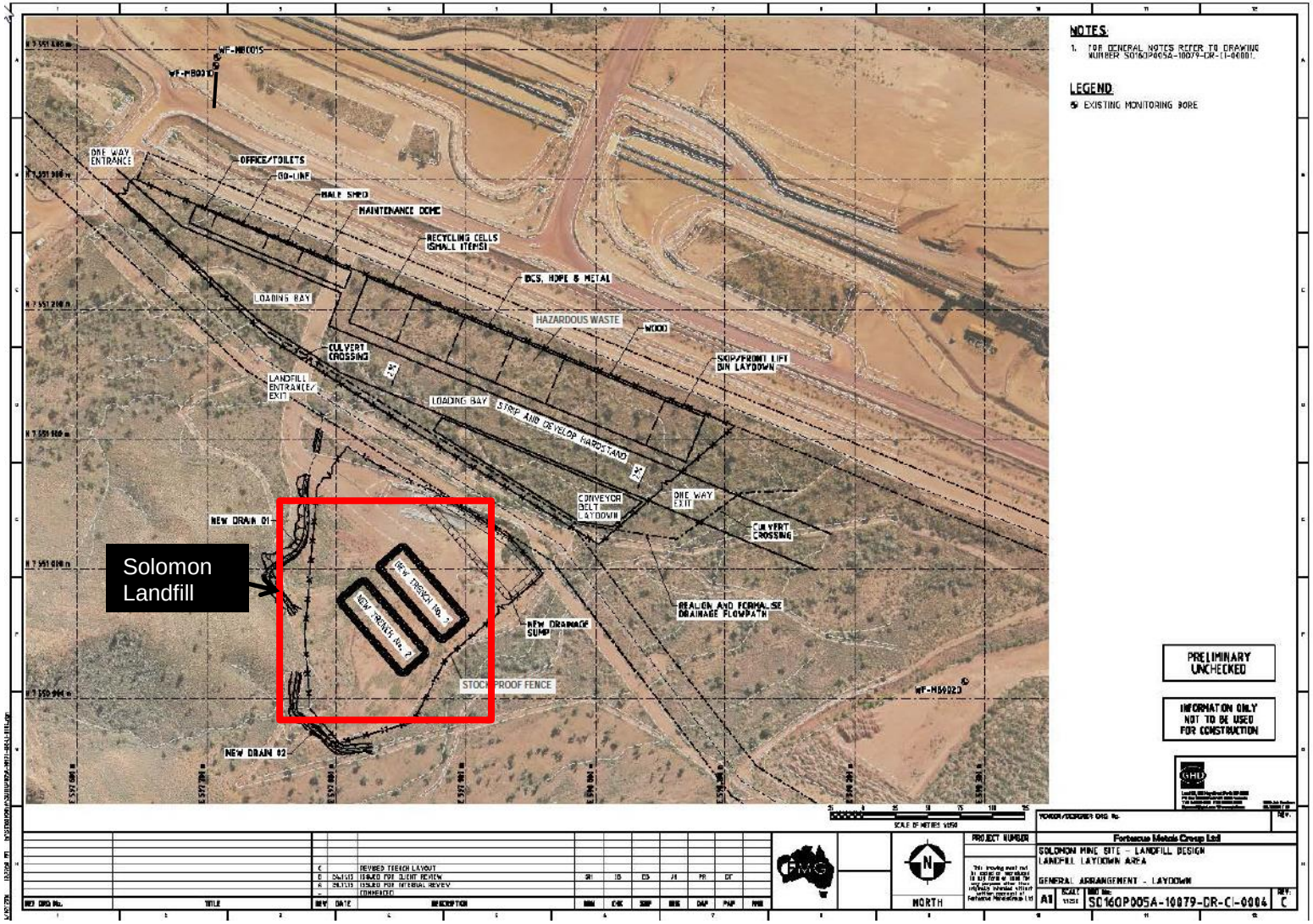
The Premises is shown in the map below. The yellow line depicts the Premises boundary.



Map of Inert and Putrescible Waste Disposal Pits

The used tyre and other waste rubber disposal sites as per Table 1.2.2 are shaded grey in the figure below. Firetail North Waste Dump and Firetail Waste Wood Disposal Area are for the disposal of untreated timber. The Solomon Putrescible Landfill and Waste Transfer Station is shaded yellow in the figure below.

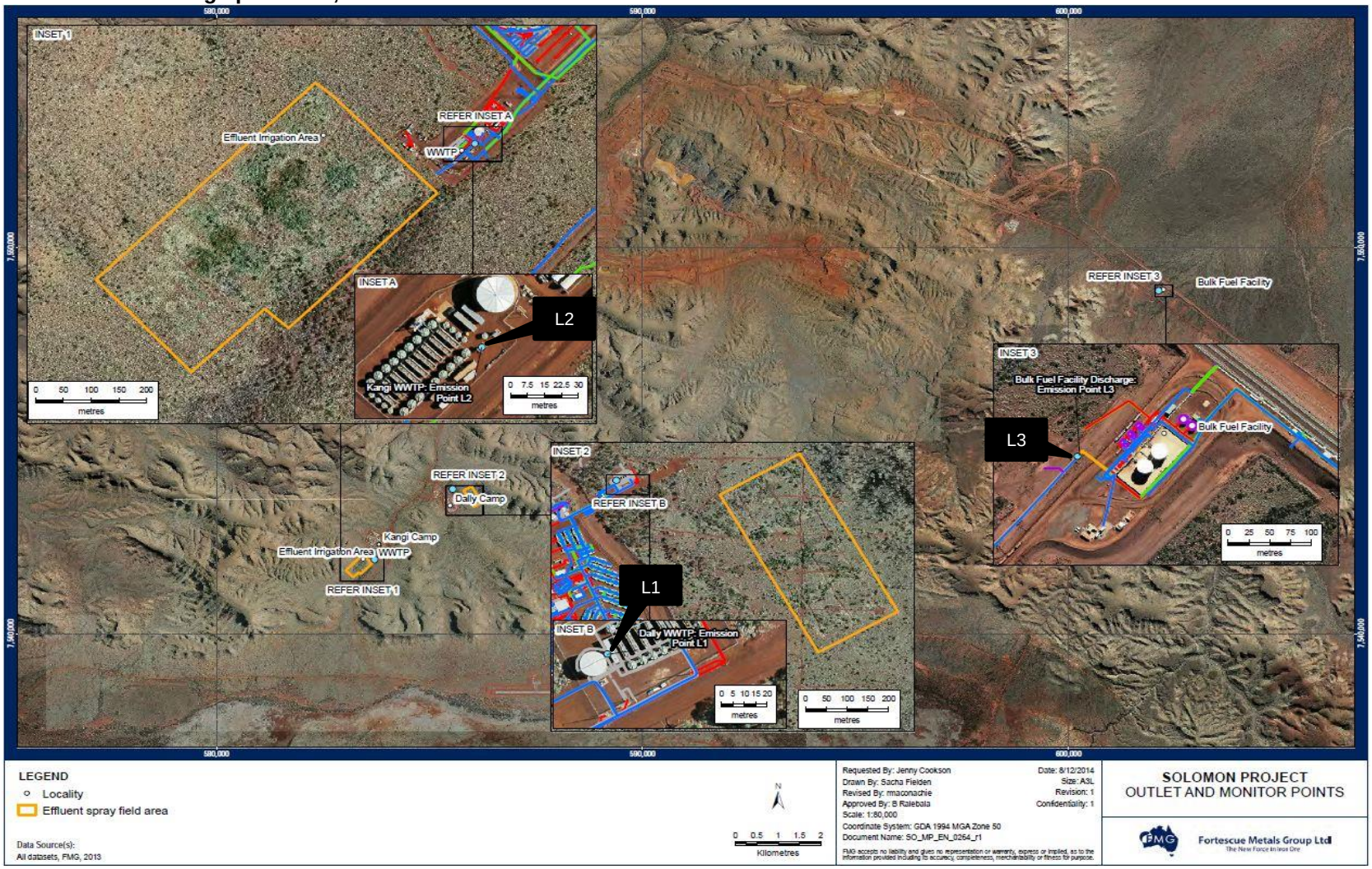



NOTES:
1. FOR GENERAL NOTES REFER TO DRAWING NUMBER SC160P005A-10079-DR-CI-0001.
LEGEND
EXISTING MONITORING BORE
ONE WAY ENTRANCE
OFFICE/TOILETS
GO-LINE
MAINTENANCE DOME
RECYCLING CELLS (SMALL ITEMS)
DCS, HDPE & METAL
LOADING BAY
HAZARDOUS WASTE
WOOD
CULVERT CROSSING
SKIP/FRONT LIFT BIN LAYDOWN
LANDFILL ENTRANCE/ EXIT
LOADING BAY
STRIP AND DEVELOP HARDSTAND
CONVEYOR BELT LAYDOWN
ONE WAY EXIT
CULVERT CROSSING
NEW DRAIN 01
Solomon Landfill
NEW TRENCH No. 2
NEW TRENCH No. 1
REALIGN AND FORMALISE DRAINAGE FLOWPATH
RPM DRAINAGE SUMP
STOCK PROOF FENCE
NEW DRAIN 02
WF-MB0023
PRELIMINARY UNCHECKED
INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION
NORTH
Fortescue Metals Group Ltd
SOLOMON MINE SITE - LANDFILL DESIGN
LANDFILL LAYDOWN AREA
GENERAL ARRANGEMENT - LAYDOWN
SC160P005A-10079-DR-CI-0004
REVISED TRENCH LAYOUT
ISSUED FOR CLIENT REVIEW
ISSUED FOR INTERNAL REVIEW
COMMENCED

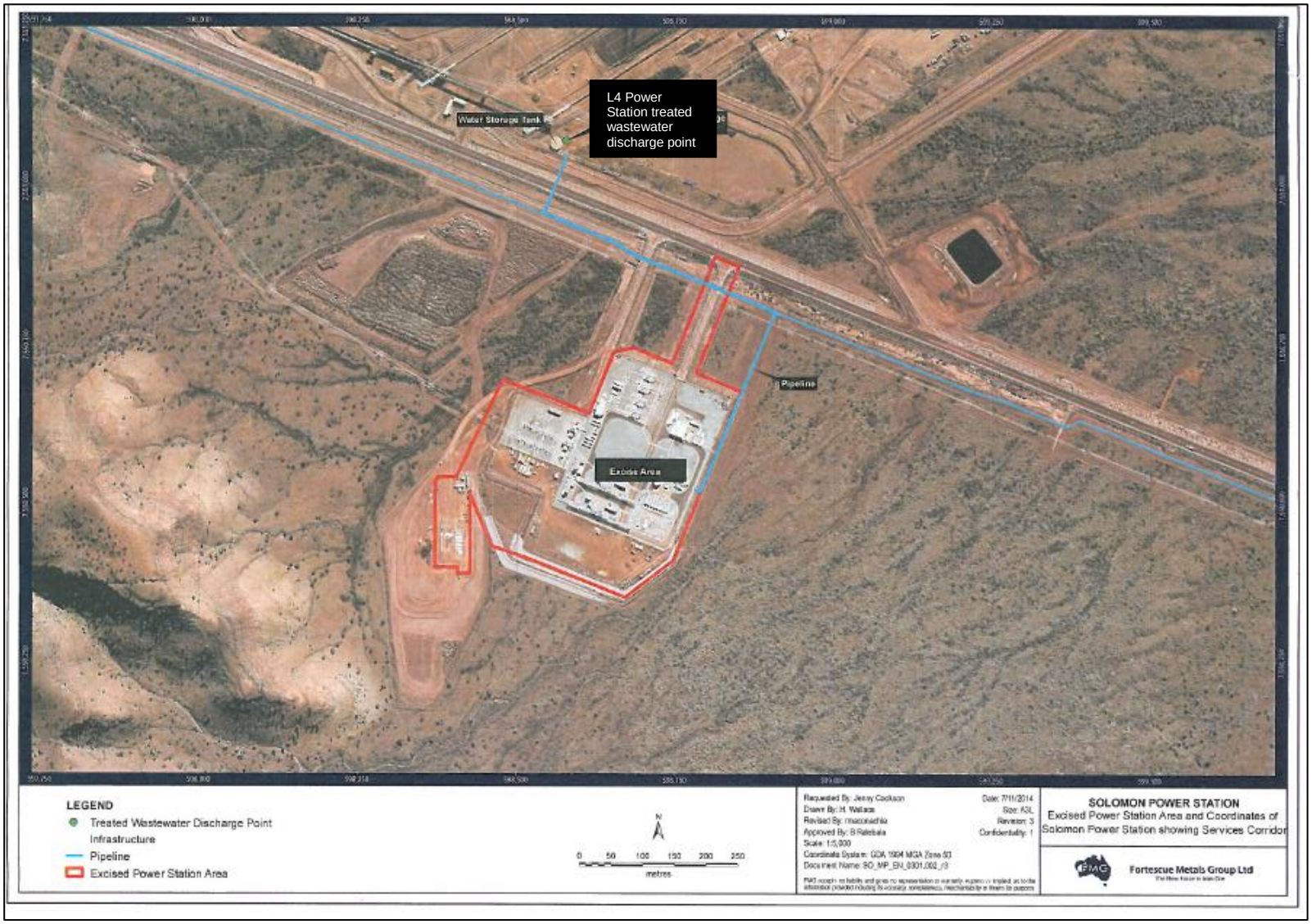
Map of emission points and monitoring locations

The location of the emission and monitoring points defined in Table 2.2.1 and 3.2.1 are shown below:

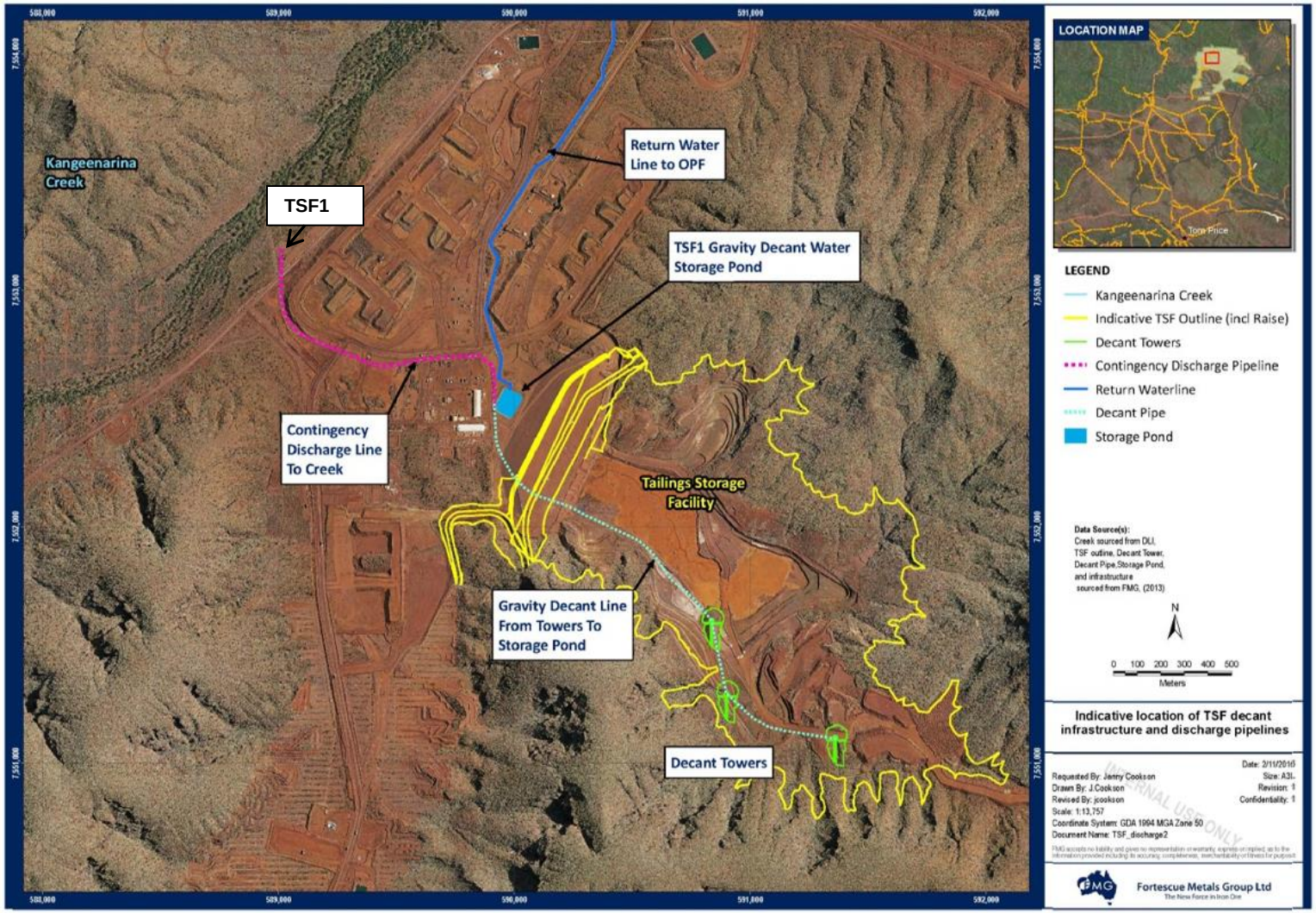
Location of discharge points L1, L2 and L3



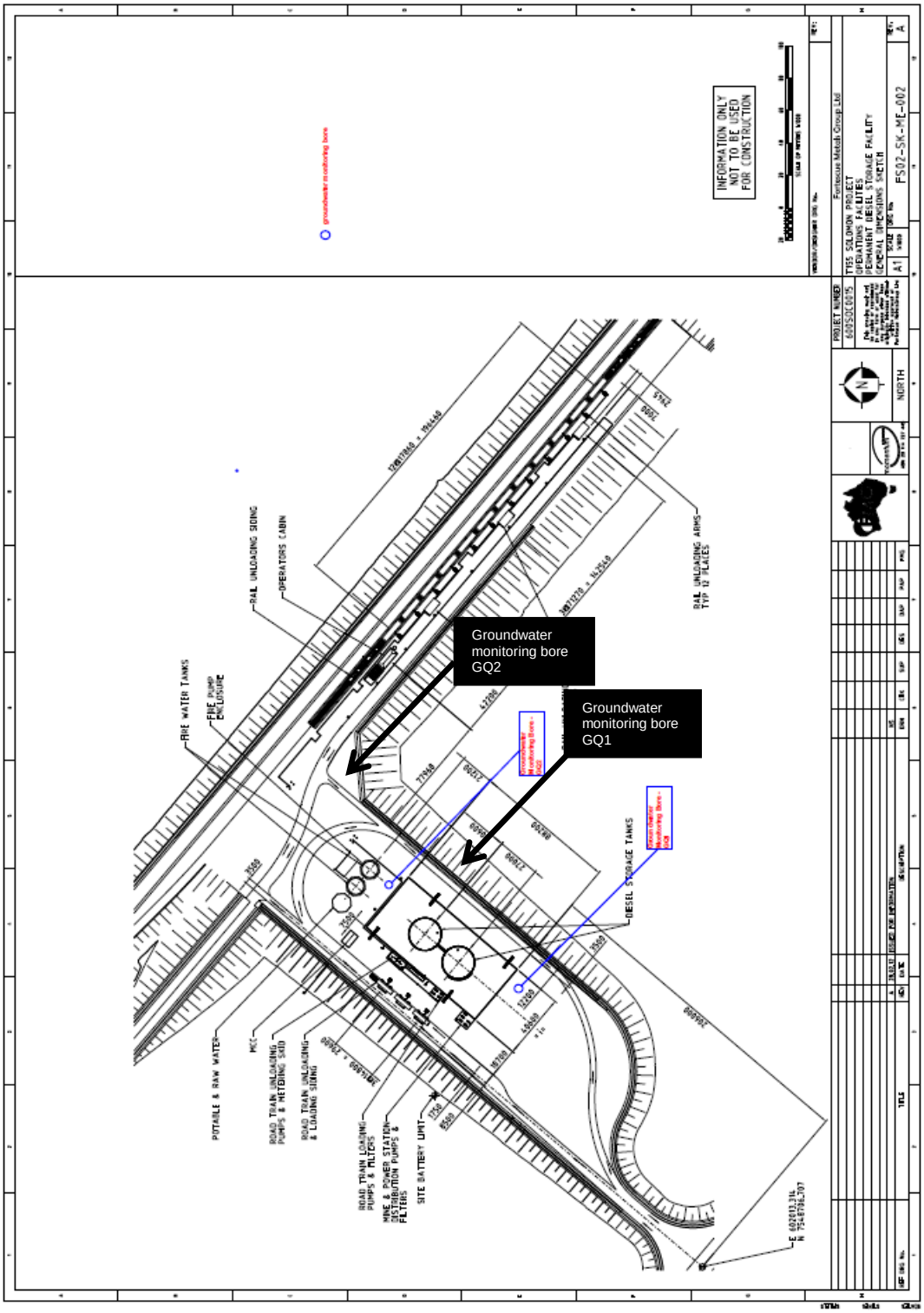
The location of the monitoring point L4 defined in Table 3.4.1 is shown below:

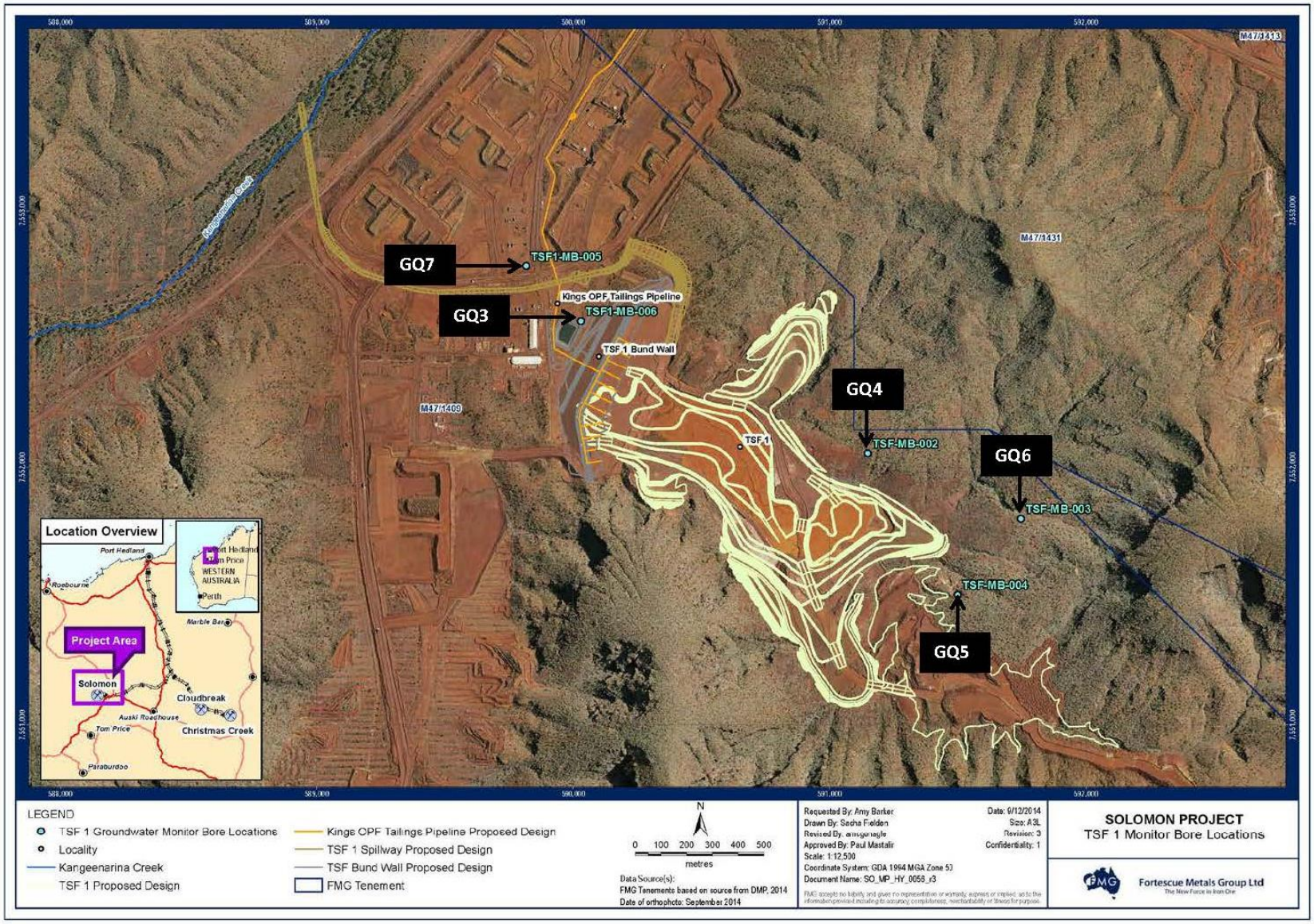


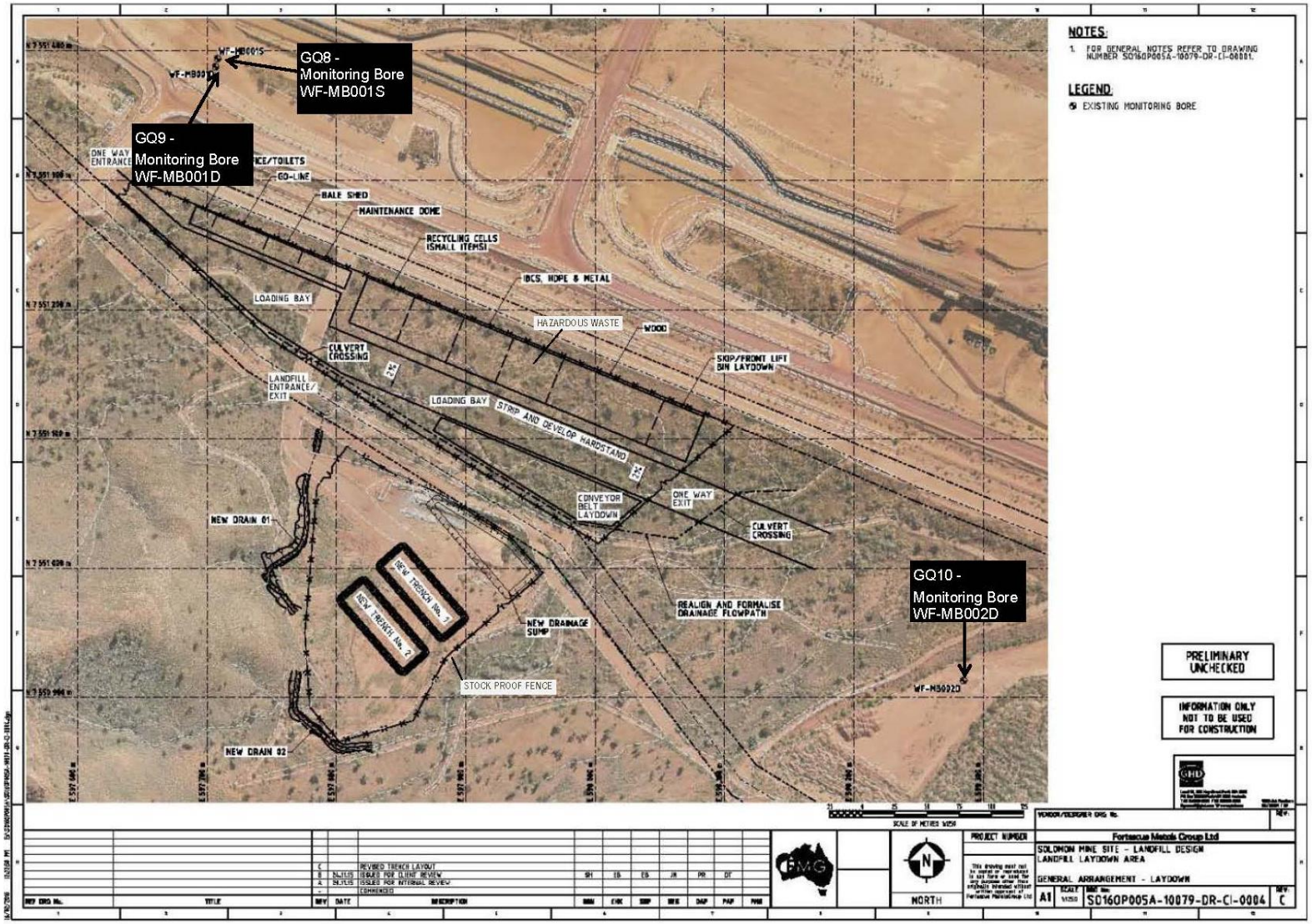
The tailings decant infrastructure as defined in Table 1.2.1 and the process monitoring location TSF1 as defined in Table 3.4.1 are shown below:



The locations of the monitoring points defined in Table 3.5.1 are shown in the three following figures.




GQ7
TSF1-MB-005
GQ3
TSF1-MB-006
Kings OPF Tailings Pipeline
TSF 1 Bund Wall
GQ4
TSF-MB-002
GQ6
TSF-MB-003
TSF-MB-004
GQ5
TSF 1
M47/1409
M47/1431
M47/1413
Location Overview
Project Area
Solomon
Cloudbreak
Christmas Creek
Port Hedland
Roebourne
Marble Bar
Auski Roadhouse
Tom Price
Paraburdoo
Perth
WESTERN AUSTRALIA
LEGEND
TSF 1 Groundwater Monitor Bore Locations
Locality
Kangeenarina Creek
TSF 1 Proposed Design
Kings OPF Tailings Pipeline Proposed Design
TSF 1 Spillway Proposed Design
TSF Bund Wall Proposed Design
FMG Tenement
0 100 200 300 400 500
metres
Data Source(s):
FMG Tenements based on source from DMP, 2014
Date of orthophoto: September 2014
Requested By: Amy Barker
Drawn By: Sacha Fielden
Approved By: Paul Mastalir
Scale: 1:12,500
Coordinate System: GDA 1994 MGA Zone 50
Document Name: SO_MP_HY_0058_r3
Date: 6/12/2014
Size: A3L
Revision: 3
Confidentiality: 1
SOLOMON PROJECT
TSF 1 Monitor Bore Locations
Fortescue Metals Group Ltd


GQ8 - Monitoring Bore WF-MB001S
GQ9 - Monitoring Bore WF-MB001D
GQ10 - Monitoring Bore WF-MB002D
WF-MB001S
WF-MB001D
WF-MB002D
ONE WAY ENTRANCE
ICE/TOILETS
GO-LINE
BALE SHED
MAINTENANCE DOME
RECYCLING CELLS (SMALL ITEMS)
IBCS, HDPE & METAL
LOADING BAY
HAZARDOUS WASTE
WOOD
CULVERT CROSSING
LANDFILL ENTRANCE/ EXIT
SKIP/FRONT LIFT BIN LAYDOWN
LOADING BAY
STRIP AND DEVELOP HARDSTAND
CONVEYOR BELT LAYDOWN
ONE WAY EXIT
CULVERT CROSSING
NEW DRAIN 01
NEW TRENCH No. 1
NEW TRENCH No. 2
NEW DRAINAGE SUMP
REALIGN AND FORMALISE DRAINAGE FLOWPATH
STOCK PROOF FENCE
NEW DRAIN 02
NOTES:
1. FOR GENERAL NOTES REFER TO DRAWING NUMBER SD160P005A-10079-DR-CI-00001.
LEGEND
EXISTING MONITORING BORE
PRELIMINARY UNCHECKED
INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION
Fortescue Metals Group Ltd
SOLOMON MINE SITE - LANDFILL DESIGN
LANDFILL LAYDOWN AREA
GENERAL ARRANGEMENT - LAYDOWN
SD160P005A-10079-DR-CI-0004
NORTH

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.

Licence: L8464/2010/2 Licensee: FMG Solomon Pty Ltd
Form: N1 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	

Part B

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident.	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission.	
The dates of any previous N1 notifications for the Premises in the preceding 24 months.	

Name	
Post	
Signature on behalf of FMG Solomon Pty Ltd	
Date	

Government of Western Australia
Department of Water and Environmental Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: FMG Solomon Pty Ltd

Licence: L8464/2010/2

Registered office:	87 Adelaide Terrace EAST PERTH WA 6004
ACN:	128 959 179
Premises address:	Solomon Mine M47/1409, M47/1413, M47/1431, L47/293, L47/294, L47/360, L47/363, L46/392 and portion of L47/296, L47/361 and L47/381 MT SHEILA WA 6751
Issue date:	Thursday, 15 October 2015
Commencement date:	Sunday, 18 October 2015
Expiry date:	Friday, 17 October 2025

Decision

Based on the assessment detailed in this document the Department of Water and Environmental Regulation (DWER) has decided to issue an amended licence. DWER considers that in reaching this decision, it has taken into account all relevant considerations.

Decision Document prepared by:	Sonya Poor Licensing Officer
Decision Document authorised by:	Alana Kidd Delegated Officer

Contents

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Appendix B 35
Appendix C 38
Appendix D 40
References 43

1 Purpose of this Document

This decision document explains how DWER has assessed and determined the application and provides a record of DWER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DWER'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

<table>
<tr><th colspan="3">Administrative details</th></tr>
<tr><td>Application type</td><td colspan="2">Works Approval ☐
New Licence ☐
Licence amendment ☒
Works Approval amendment ☐</td></tr>
<tr><td rowspan="8">Activities that cause the premises to become prescribed premises</td><td>Category number(s)</td><td>Assessed design capacity</td></tr>
<tr><td>5</td><td>Not more than 95,300,000 tonnes per annual period</td></tr>
<tr><td>54</td><td>Not more than 1,178 cubic metres per day</td></tr>
<tr><td>57</td><td>2,500 tyres in total</td></tr>
<tr><td>61</td><td>110,000 tonnes per annual period</td></tr>
<tr><td>62</td><td>6,000 tonnes per annual period</td></tr>
<tr><td>64</td><td>14,000 tonnes per annual period</td></tr>
<tr><td>73</td><td>Not more than 9,500 cubic metres in aggregate</td></tr>
<tr><td>Application verified
Application fee paid</td><td colspan="2">Date: 12/10/2017
Date: 16/10/2017</td></tr>
</table>

Works Approval has been complied with Compliance Certificate received	Yes☐ No☐ N/A☒ Yes☐ No☐ N/A☒	
Commercial-in-confidence claim	Yes☐ No☒	
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes☒ No☐	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*?	Yes☒ No☐	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☒
Is the proposal subject to Ministerial Conditions?	Yes☒ No☐	Ministerial statement No: 1062 EPA Report No: 1588
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes☐ No☒ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒ If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes☐ No☒ If Yes, include details here, eg Site is subject to SO_2 requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

The Solomon Mine (Premises) is operated by FMG Solomon Pty Ltd (Licensee), a wholly owned subsidiary of Fortescue Metals Group Ltd (FMG). The Premises has been assessed as a “prescribed premises” as it meets the requirements of categories 5, 54, 57, 61, 62, 64 and 73 activities under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations). The Premises has been in operation since 2010.

Mining is undertaken using standard open cut methods, with overburden and waste stored in external waste dumps and/or backfilled to the mined out pit. Ore processing is undertaken using permanent and/or mobile ore processing facilities (OPF). The Premises currently consists of several iron ore mining areas including Firetail North and South, Valley of the Kings (Kings), Valley of the Queens (Queens), Trinity and Zion.

Tailings produced from the beneficiation of ore through the Kings OPF wet processing circuit are deposited into the Kings Tailings Storage Facility (TSF).

The Premises is supported by ancillary infrastructure including accommodation village wastewater treatment plants (WWTP), inert and putrescible landfills, used tyre storage areas, a bioremediation facility, bulk and satellite fuel storage areas, workshops and administration buildings.

The Licensee also accepts liquid waste from the Solomon Power Station, occupied by TEC Pipe Pty Ltd.
The Premises is located approximately 54 kilometres (km) north of Tom Price and 12 km north west of Karijini National Park in the Pilbara region of Western Australia as shown in Figure 1.

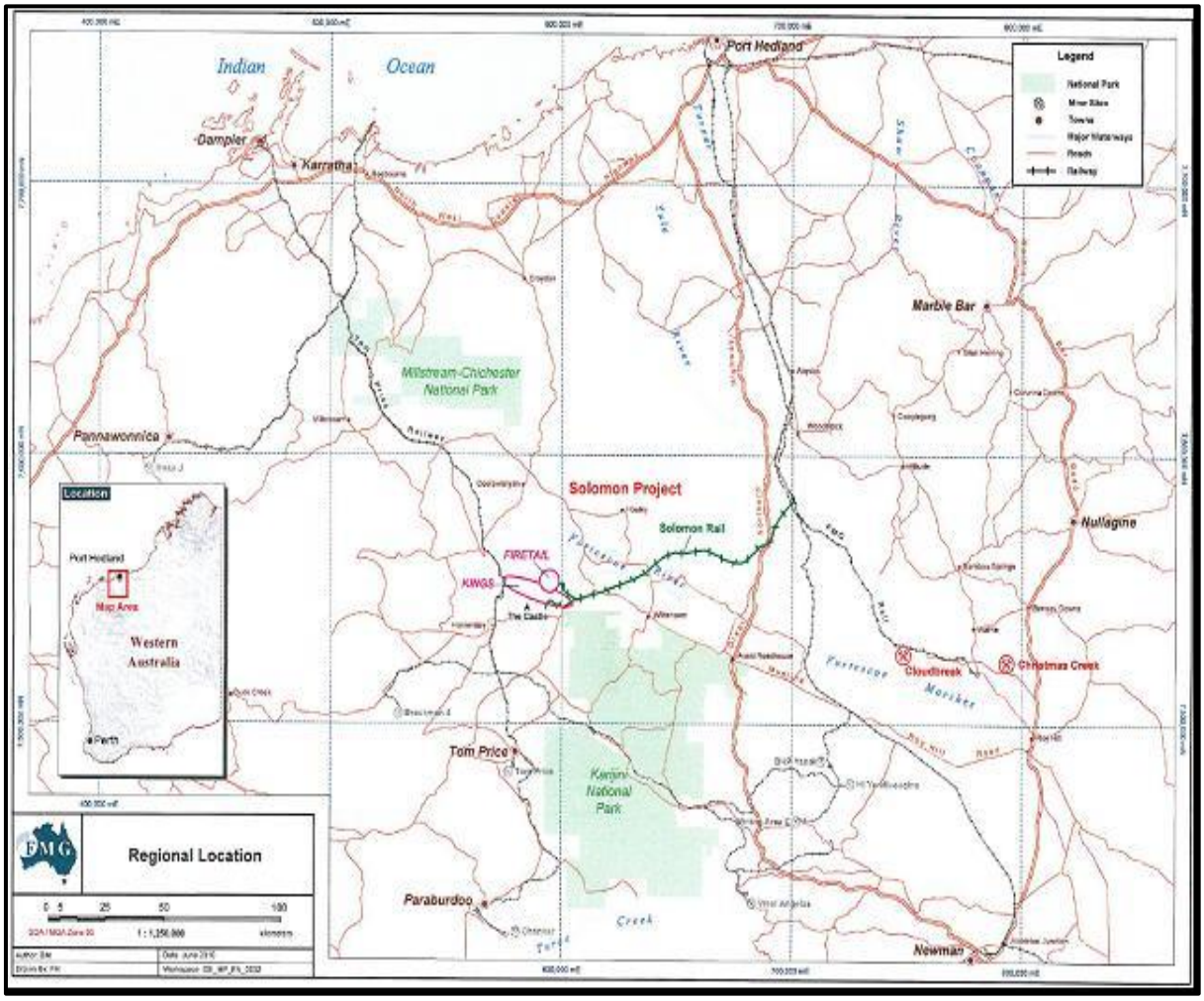

Figure 1: Regional location

Premises description
The Licence is regulated for category 5, 54, 57, 61, 62, 64 and 73 activities as defined in Schedule 1 of the EP Regulations and as described below:

Category 5 – Processing or beneficiation of metallic or non-metallic ore
OPF and TSF
Mining at the Premises is conventional open pit method of drill and blast followed by load and haul. The Run of Mine (ROM) ore from each mining area is blended at a number of separate crushing hubs to ensure consistent mixing of ore and reduce ROM ore to 250 millimetres (mm) from a top lump size of 1,800 mm. Once the ore is crushed it is transported to either the Firetail or Kings OPF via an overland conveyor, which are designed to produce approximately 25 million tonnes per annum (Mtpa) and 48 Mtpa of produce ore respectively.

The ore is processed further at the OPFs using a grinding and gravity separation method. The OPFs operate in a similar manner and comprise of wet scrubbers, secondary and tertiary crushers, desand plant, jig plant (Firetail OPF only) and associated screens and conveyors.
The undersize fraction (<1 mm) is sent to the desand plant for removal of liberated gangue particles through gravity separation to produce an upgraded concentrate. The final concentrate from the desand plant is discharged onto the final product conveyor, while tailings are pumped to the TSF (discussed further in Appendix A) via the thickener.

A flocculent, Magnafloc 336, is added to the feed slurry entering into the thickener tank at the Firetail and Kings OPFs. Flocculated particles settle to the bottom and are pumped to the TSF, while the clarified water overflows the top of the thickener and into the process water system for reuse within the OPFs.

Processed ore is transported by conveyor to the rail stockyard, which consists of four stockpile 'pods' of approximately 130,000 tonnes each, as well as two stackers, conveyors and a reclaimer. From the stockpiles the ore is reclaimed and loaded onto trains and transported to the Licensee's Port Hedland Port facility (Anderson Point Materials Handling Facility), for export.

Direct Shipping Ore Processing Plant (DSOPP)
The Licensee also operates the Direct Shipping Ore Processing Plant (DSOPP) at the Premises, with a design capacity of 3.6 Mtpa. The DSOPP is comprised of a ROM stockpile, primary crusher, fixed rock breaker, tertiary cone crusher, product screening, product stockpile and oversize stockpiles.

Mobile Crushing Facilities (MCF)
Four MCF are also operated at the Premises as part of an additional ore program. In aggregate, these four facilities have a design capacity of 18.7 Mtpa.

Mine dewatering of the Channel Iron Deposits (CID) is required to access ore below the water table. Mine dewater is used onsite for processing and dust suppression. There are no specified emission points from which mine dewater is discharged to the environment, as such, the activity does not trigger category 6 (mine dewatering) under Schedule 1 of the EP Regulations.

<u>Category 54 – Sewage facility</u>
The Licensee operates two WWTPs at the Premises to treat wastewater produced from the site's two accommodation villages. The Castle/Dally Camp WWTP and Kangi Camp WWTP have a combined treatment capacity of 1,178 cubic metres (m^3) per day (m^3/day). Treated wastewater from the WWTPs is disposed of via irrigation to two separate irrigation areas, or used for dust suppression throughout the Premises.

The WWTPs are sequence batch reactor (SBR) treatment trains. The process follows the SBR methodology of wastewater treatment, comprising of balance tanks, SBR treatment trains (anaerobic tanks, anoxic tanks, aeration tank and a classifier tank).

A sludge press has also been installed at the Kangi Camp WWTP. Sludge is conveyed from the sludge tanks to the polymer preparation station comprising a 200 litre (L) storage tank and dosing pump. The sludge is then conveyed to the screw press. As sludge enters the press, filtrate is drained and pressure is applied to the sludge to create a sludge cake. The filtrate discharged from the press is recirculated through the WWTP. Approximately 13.2 kilolitres of filtrate is recirculated through the WWTP per annum. Approximately 26.8 m^3 of sludge cakes are produced and require disposal per annum. The sludge cakes are temporarily stored in a skip bin prior to disposal. The cakes meet the description of biosolids in the *Landfill Waste Classifications and Waste Definitions 1996* so are suitable for disposal in Class I landfills.

Category 57 - Used tyre storage
The Licensee stores up to 2,500 tyres at the Premises at any one time.

Category 61 - Liquid waste facility
The Licensee accepts liquid waste from the Solomon Power Station, occupied by TEC Pipe Pty Ltd. This liquid waste comprises of treated wastewater from a reverse osmosis plant, oily water separator and cooling tower blowdown.

Treated wastewater is pumped from a wastewater storage tank at the Solomon Power Station via an underground pipeline to a wastewater storage tank located at the Licensee's stockyards. Treated wastewater is collected from this tank by water trucks and used for dust suppression on roads and stockpiles across the Premises. Up to 110,000 tonnes of liquid waste per annum is accepted onto the Premises.

Category 62 – Solid waste depot
A waste transfer station has been constructed at the Premises to allow separation and temporary storage of up to 6,000 tonnes per annum of waste and recyclable material generated by construction and operation activities at the Premises.

Hazardous wastes, recyclables and non-recyclable waste streams are accepted at the waste transfer station for temporary storage prior to disposal or recycling. Hazardous waste storage at the waste transfer station are lined with high density polyethylene (HDPE) and stored in accordance with the *Chemical and Hydrocarbon Management Plan*. The waste transfer station inputs and outputs are described in Table 1.

Table 1: Waste transfer station inputs and outputs

Type		Approximate volumes of key wastes (tonnes/annum)	Approximate Input/output Volume (tonnes/annum)	Output Destination
Hazardous wastes:	Chemicals and hydrocarbons (including oily rags, batteries and waste oil), asbestos, medical waste, fluorescent lighting tubes.	Batteries: 60 Oil: 750	1,000	Licensed hazardous waste facility
Recyclables:	Paper, glass, plastic, scrap metal, wood, empty IBC (Intermediate bulk containers), fire extinguishers, HDPE liner, conveyor belts and waste rubber, empty ANFO bags.	Paper: 150 Plastic: 20 Scrap metal: 800 Wood: 1800 IBC: 15 HDPE: 60 Rubber: 550 ANFO bags: 50	4,000	Recycling and/or scrap metal facility
Non-recyclable waste streams	Putrescible waste and non-hazardous inert waste. Including some untreated wood, waste rubber, tyres.	Tyres: 800	1,000	Onsite landfill facility or in mined out pits or waste dumps.

The facility includes maintenance, office and ablution blocks and a bale shed for the baling of waste. Within the waste transfer station, separate areas are demarcated for the different waste types, with each area labelled. Storage areas for scrap metal, wood, conveyor belts, Intermediate Bulk Containers and smaller recyclable items are uncovered, while dispersible recyclable material (e.g. paper, plastic) are enclosed.

Non-recyclable waste streams may be taken to the waste transfer stations for sorting and temporary storage after which waste suitable for disposal onsite is disposed either at the landfill or in mined out pits and waste dumps. Recyclable and hazardous (controlled) waste is collected from the waste

transfer station for disposal off site as required. Controlled waste transport is conducted by a licensed controlled waste contractor.

Areas for the temporary storage of chemical and hydrocarbon waste materials, and hazardous waste, are lined with HDPE or concrete with a permeability of 1 x 10^{-9} metres per second (m/s) or less, and are uncovered. The bunded area has a minimum capacity of 110% of the largest container stored within it, or 25% of the volume of all containers, whichever is the larger. Spill response equipment is in place to address any chemical or hydrocarbon spills which may occur in this area.

Asbestos is managed in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004*. It is temporarily stored at the waste transfer station prior to disposal at a licensed disposal facility. It is separated from other wastes and wrapped or contained in a manner that prevents asbestos fibres entering the atmosphere. Storage is either within a waste skip bin with a lid, or an enclosed shipping container.

On completion of use, the waste transfer station will also be closed and rehabilitated in accordance with the Premises Mine Closure Plan, required by condition 15 of Ministerial Statement (MS) 1062.

Category 64 - Putrescible/Inert Landfills

The Licensee currently disposes of up to 14,000 tonnes per annum of waste at a number of disposal locations within the Premises. There are three major waste streams produced at the Premises, including solid waste (clean fill, inert waste type 1 and inert waste type 2, putrescible waste), recyclables and hazardous or controlled wastes.

Waste not meeting the requirements for a Class II landfill, as described in the *Landfill Waste Classification and Waste Definitions 1996*, is stored temporarily for collection and disposal off-site, with the exception of contaminated soil, which is disposed at the Licensee's onsite soil bioremediation facility or removed off-site to a licensed facility for disposal.

The disposal of untreated wood is restricted to the Solomon Landfill, Firetail North Waste Dump, Firetail Waste Wood Disposal Area and the Kings Waste Dump. Tyres and other rubber waste are disposed of in the Solomon Landfill, Kings Pit, Kings Waste Dump, Firetail South Waste Dump, Firetail South Pit, Firetail North Pit, Trinity Waste Dump and Trinity Mine Pit.

Category 73 – Bulk storage of chemicals

The Licensee currently operates a bulk fuel storage facility (BFSF) at the Premises which comprises of two 3.25 million litre vertical diesel storage tanks, with a combined storage capacity of 6.5 million litres. The key components of the BFSF include a rail offloading station, road tanker offloading station and the diesel tank storage area.

The Licensee also operates a number of smaller fuel storage facilities at the Premises which have a combined storage volume of 1,221 m^3.

Location and siting

Sensitive land uses

The nearest sensitive receptors to the Premises is Hamersley Station, located approximately 33 km south-west and Hamersley Gorge (a popular tourist precinct used for recreational activities) located within Karijini National Park is approximately 13 km south, south-east of the Premises.

The workforce for the Premises operates on a fly-in/fly-out basis and is housed at the accommodation villages located within the prescribed premises boundary. As the accommodation villages are operated by the Licensee, they are not considered by DWER to be a sensitive land use or receptor for

the purpose of assessing the risks of emissions and discharges associated with the operation of the prescribed activities.

Specified Ecosystems

The *Guidance Statement: Environmental Siting* describes specified ecosystems as areas of high conservation value and special significance that may be impacted as a result of activities or emissions and discharges from prescribed premises. The specified ecosystems relevant to the Premises are identified below:

The Premises is located at the headwaters of the Millstream Catchment. The western portion of the Kings mining area is situated within the Millstream Water Reserve, which is a Priority 2 Public Drinking Water Source Area (PDWSA). Mining, including the operation of TSFs for which tailings from physical separation processes is considered compatible in Priority 2 areas, is detailed in the Water Quality Protection Note 25: *Land compatibility tables for public drinking water source areas*. The TSF is not located within the PDWSA.

The Premises exists within the Proclaimed Pilbara Groundwater and Pilbara Surface Water Areas under the *Rights in Water and Irrigation Act 1914* (RIWI Act).

The BFSF is located approximately 10 km north of Karijini National Park which is managed by the Department of Biodiversity, Conservation and Attractions.

The Fortescue Marsh a Priority 1, Priority Ecological Community (PEC) and nationally important wetland is located approximately 35 km east of the Premises.

The Priority 1, PEC of the Brockman Iron cracking clay communities of the Hamersley Range (DBCA, 2017a) and the Themeda Grasslands a Threatened Ecological Community (TEC) (DBCA, 2016) are located approximately 1 km south of the Premises.

Lepidium catapycnon (previously a Declared Rare Flora, now a Priority 4 Flora) (DBCA, 2017b) is located within the Premises.

Vegetation and flora

The Premises lies within the Fortescue Botanical District of the Eremaean Botanical Province. The vegetation of this province is typically open, and frequently dominated by spinifex, wattles and occasional Eucalypts.

FMG, 2016 states that six priority flora species have been recorded within the Premises including:

- *Gompholobium karijini* (Priority 2);
- *Acacia effusa* (Priority 3);
- *Acacia daweana* (Priority 3);
- *Indigofera gilesii subsp. gilesii* (Priority 2);
- *Eremophila magnifica subsp. magnifica* (Priority 4); and
- *Goodenia nuda* (Priority 4).

Terrestrial Fauna

FMG, 2016 states that conservation significant fauna species that have been found in the area include:

- Northern Quoll (Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and Schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2016*);
- Pilbara Olive Python (Vulnerable under the EPBC Act and Schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2016*);

- Fork Tailed Swift (Migratory);
- Rainbow Bee-eater (Priority 5);
- Pebble-mound Mouse (Priority 4);
- Ghost Bat (Vulnerable under the EPBC Act and Schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2016*); and
- Blind snake (Priority 1).

Geology and soils

The Premises is located within the Hamersley Basin, which overlies the older Pilbara craton. The Hamersley Range extends across the central Pilbara from the north-west to the south-east. It is a large plateau approximately 400 km in length, ranging in width from 32 to 64 km; and consists of mostly banded iron formation, pelite (metamorphosed siltstone), chert and dolomite. Stony soils with shallow red loams and some red-brown non-cracking clays and red loamy earths cover much of the area.

The Brockman Iron Formation (BID) is the dominant lithology of the hills, plateaux and outcrops in the Premises area; with outcrops in the area consisting of the Dales Gorge, Whaleback Shale and Joffre members of the BID. The Mt McRae Shale overlies these members and outcrops at the surface within the valley floor of the Firetail anticline. The Mt McRae shale visible at surface is weathered and is geochemically dissimilar from potentially acid forming units found at depth.

Large paleochannels, one to two kilometres in width and tens of kilometres long, are incised into the bedrock. During the tertiary period weathering and erosion of iron-rich surrounds deposited iron rich material into these channels (CID) and this material has subsequently been buried and preserved. The younger Detrital Iron Deposits (DID) overlying the CID has been eroded from iron rich materials.

The Solomon iron ore deposits comprise all three of the deposits described above, being BID, CID and DID. The BID and DID are generally above the water table, with the CID being generally below the water table.

Regional hydrology

The primary aquifer in the Premises area is associated with the Lower CID unit. Regional bedrock groundwater flow direction is from south to north, with the water table an average of more than 50 m below the surface. Groundwater quality is fresh to marginal, with total dissolved solids (TDS) ranging from 200 mg/L to 1,000 mg/L.

The Premises is located within the Lower Fortescue River Watershed which has an intermittent flow pattern resulting in river and creeks being dry for most of the year. Following significant rainfall, channels in the region carry large volumes of water with peak flows usually occurring within 24 hours of the rainfall event.

Three streams traverse operational areas of the Premises: Zalamea (South East flow), Kangeenarina (Central flow) and Queens (West flow). The western boundary of the Premises is formed by Weelumurra Creek.

Meteorology

The Pilbara has an arid climate with two distinct seasons; a pronounced dry spell between August and October; and a wet season between December and March, continuing through until June and accounting for most of the average annual rainfall. The average yearly evaporation rate of 3,000 mm exceeds the average yearly rainfall of 457.9 mm. The region is characterised by low and variable rainfall, generally resulting from local thunderstorms and occasional high intensity cyclonic events.

Clearing
Clearing is not authorised under this Licence. The clearing of native vegetation is authorised under MS 1062.

Part IV of the EP Act

Report 1386
The proposal to develop two new mines within the Solomon Project and to construct a 127 km railway for the new mines eastwards to the existing FMG railway, developed the Report and Recommendations of the Environmental Protection Authority (EPA) Report 1386, which resulted in MS 862 being issued on 20 April 2011.

The EPA determined that the following were key environmental factors relating to the proposal:
- Flora and Vegetation;
- Groundwater;
- Surface Water;
- Vertebrate Fauna;
- Invertebrate fauna; and
- Mine Closure and Rehabilitation.

MS 862
MS 862 had conditions relating to the following:
- Priority Species and Significant Vegetation – Mine Site;
- Priority Species – Rail Corridor;
- Weeds;
- Rehabilitation;
- Surface Water;
- Groundwater;
- Vertebrate Fauna;
- Troglofauna;
- Mine Plan and Conceptual Closure Strategy; and
- Final Closure and Decommissioning Plan.

Report 1588
The proposal to expand the Solomon Iron Ore Mine Project in order to sustain production for an additional 30 years from 2016 developed the Report and Recommendations of the EPA - Report 1588.

The EPA identified the following key environmental factors during the course of its assessment:
- Flora and Vegetation – impacts to conservation significant flora and vegetation as a result of large-scale clearing of native vegetation, and impacts to Groundwater Dependent Ecosystems as a result of groundwater abstraction for water supply purposes;
- Terrestrial Fauna – impacts to terrestrial fauna species as a result of clearing of habitat including riparian vegetation and permanent pools in Zalamea Creek;
- Subterranean Fauna – loss of habitat for subterranean fauna species as a result of groundwater abstraction and excavation of mine pits;
- Hydrological Processes – impacts to springs and pools including Hamersley Gorge and Weelumurra pools as a result of groundwater abstraction for water supply purposes;
- Inland Waters Environmental Quality – impacts to groundwater quality as a result of in-pit tailings storage within the Millstream PDWSA and potential for disturbance or dewatering of lignite in the Queens area resulting in impacts to Weelumurra Creek ;

- Rehabilitation and Decommissioning (Integrating factor) – potential impacts to the above environmental factors if rehabilitation or decommissioning are unsuccessful; and
- Offsets (Integrating factor) – use of offsets to counterbalance the significant residual impact associated with clearing of 12,146 hectares (ha) of native vegetation in 'good to excellent' condition, loss of habitat for conservation significant fauna, clearing of riparian vegetation and clearing of 6 ha PEC.

MS 1062
MS 1062 was signed by the Minister for Environment on 3 October 2017 and supercedes MS 862.

MS 1062 has the following conditions relating to the Mine:

- Baseline surveys – Groundwater and surface water dependent vegetation and permanent pools;
- Inland waters environmental quality – lignite studies;
- Management-based Condition Environmental Management Plans;
- Flora and Vegetation – conservation significant flora species and vegetation;
- Flora and Vegetation – weeds;
- Flora and Vegetation – groundwater and surface water dependent vegetation and water levels;
- Inland waters environmental quality – prevent impacts to groundwater from exposure or interaction with Lignite;
- Terrestrial Fauna – conservation significant fauna;
- Hydrological Processes – groundwater drawdown within Karijini National Park;
- Subterranean Fauna;
- Rehabilitation and Closure – rehabilitation and decommissioning of the mine and borefield; and
- Offsets – mine and borefield.

Other Approvals
EPBC Act
The Solomon Project was referred to the Commonwealth government for assessment in relation to Matters of National Environmental Significance. Approval for the Solomon Project was issued by the Federal Minister for the Environment on 28 April 2011 (EPBC 2010/5567).

The Solomon Iron Ore Project – Sustaining Production proposal was also referred to the Commonwealth Department of Environment (DoE). The proposal was determined to be a controlled action under the EPBC Act on 18 August 2014 (EPBC 2014/7275) as it may impact on listed threatened species and communities.

RIWI Act
Groundwater abstraction is undertaken to enable the mining of ore below the water table and provide mine site water supply. Groundwater is abstracted in accordance with the 5C licences issued under the RIWI Act.

Mining Act 1978
The Department of Mines, Industry Regulation and Safety (DMIRS) administers and regulates the activities of the mining industry under the provisions of the *Mining Act 1978*. The Licensee has advised (FMG, 2016) that staged Mining Proposals have been submitted under the *Mining Act 1978*.

This amendment – January 2018
A licence amendment application was submitted by the Licensee on 3 October 2017 to remove a landfill ambient monitoring bore (GQ8, WF-MB001S) at the Premises.

During this amendment the following changes have also been made to the Licence:

- Administrative changes;
- Definitions updated;
- Removal of ambient monitoring bore GQ8 (WF-MB001S) from Table 3.5.1; and
- Inclusion of a footnote to Table 3.5.1 to read “no sample if bore is dry”.

DWER’s assessment and decision making with respect to emissions and discharges associated with the operation of the Premises are described in section 4 of this document.

4 Decision table

All applications are assessed in line with the EP Act, EP Regulations and *Guidance Statements: Decision Making and Risk Assessments*. 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 1.1.1 - 1.1.4.	Definitions for terms used in the Licence as specified under condition 1.1.1 and 1.1.2. Conditions 1.1.3 and 1.1.4 refers to references made to Australian or other standards and codes of practice meaning the relevant parts and version of that standard, guideline or code of practice. During the January 2018 amendment the definitions for 'Annual Period', 'CEO for the purposes of notification', 'Department' 'clean fill', and 'putrescible waste' have been updated and definitions for mAHD and µS/cm have been included.	General provisions of the EP Act. *Environmental Protection (Unauthorised Discharges) Regulations 2004.*
Premises operation	Conditions 1.2.1 – 1.2.11.	The OPFs, TSF, DSOPP and MCF meet the description and production or design capacity of a Category 5 prescribed premises, as defined in Schedule 1 of the EP Regulations. Dust and noise associated with the OPFs and MCF has been assessed in the relevant sections of this document. The Licensee also operates a number of facilities that meet the description or design capacity of categories under Schedule 1 of the EP Regulations. The location of DWER's assessment and decision making on the operation of these facilities is shown below: • Category 5: TSF as detailed in Appendix A (Premises operation); • Category 54: WWTPs as detailed in Appendix A (Premises operation) and Appendix B (emissions to land including monitoring); • Category 57: used tyre storage as detailed in Appendix A (Premises operation); • Category 61: Solomon Power Station – liquid waste as detailed in Appendix D (Process monitoring); • Category 64: putrescible/inert landfills as detailed in Appendix A	General provisions of the EP Act. *Environmental Protection (Unauthorised Discharges) Regulations 2004.*

DECISION TABLE			
Licence section	**Condition number**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		(Premises operation); and • Category 73: bulk and satellite fuel facilities as detailed in Appendix A (Premises operation). Stormwater management, the heavy machinery and vehicle wash-down facility (HVWF) and the bioremediation facility are also detailed and assessed within Appendix A.	
Emissions general	Condition 2.1.1.	Condition on Licence requiring the Licensee to record and investigate the exceedance of any descriptive or numerical limit.	N/A.
Point source emission to air including monitoring	N/A.	No point source emissions to air are expected from the operation of the Premises.	N/A.
Point source emissions to surface water including monitoring	N/A.	No point source emissions to surface water are expected from the operation of the Premises.	General provisions of the EP Act. MS 1062.
Emissions to land including monitoring	Conditions 2.2.1, 2.2.2 and 3.2.1.	DWER's assessment and decision making for the irrigation of treated wastewater from the WWTPs and the discharge of treated wastewater from the BFSF OWS and satellite fuel facilities OWS are detailed in Appendix B.	General provisions of the EP Act. *Environmental Protection (Unauthorised Discharges) Regulations 2004.*
Point source emissions to groundwater including monitoring	N/A.	No point source emissions to groundwater are generated by the operations at the Premises.	N/A.

DECISION TABLE			
Licence section	**Condition number**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
Fugitive emissions	N/A.	DWER's assessment of fugitive dust emissions associated with the operation of the Premises is detailed in Appendix C.	General provisions of the EP Act.
Odour	N/A.	Emission Description *Emission:* Odour emissions as a result of decomposing putrescible material at the putrescible landfill and operation of the WWTPs. *Impact:* Impacts to amenity of sensitive receptors, vermin attracted. *Controls:* The landfill and waste transfer station are located 34 km from the nearest pastoral homestead (Hamersley Station) and approximately 13 km from Hamersley Gorge. Waste will be covered at least weekly. Process controls and maintenance procedures are in place for the WWTPs. Should odour complaints be received, they will be logged as an incident and investigated. Further actions to reduce odour emissions may be implemented, including increasing the frequency of waste removal from site and improving waste container handling. Risk Assessment *Consequence:* The closest sensitive receptors are Hamersley Gorge and Hamersley Station. The amenity and health impacts from odour emissions to these receptors would be minimal. Therefore, the consequence is slight. *Likelihood:* Amenity and health impacts from odour emissions will occur in exceptional circumstances. Therefore, the likelihood of the consequence is rare. *Overall Risk Rating:* Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall	General provisions of the EP Act.

DECISION TABLE			
Licence section	**Condition number**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		rating of risk for odour emissions to be **low**. Regulatory Controls No specified conditions relating to odour are imposed on the Licence. The general provisions of the EP Act apply.	
Noise	N/A.	Emission Description *Emission:* Noise and vibrations from operation of equipment and vehicles. *Impact:* Impacts to amenity of sensitive receptors. *Controls:* The Premises is located over 30 km from the nearest pastoral homestead (Hamersley Station) and approximately 10 km from the boundary of Karijini National Park. The Licensee uses low noise equipment where practical to minimise noise during operation; crushers, engines and screening operations are enclosed/screened for safety, which also reduce noise emissions from the equipment. A noise and vibration modelling study was undertaken to determine noise impacts associated with the entire Premises (operation of rail lines, processing facilities, blasting activities, power station and other mining operations). The modelling indicated that the maximum noise impact from all mining activities at the Premises will be 9dBLA_{10} at Hamersley Gorge (the nearest sensitive receptor), which comply with the requirements set out in the *Environmental Protection (Noise) Regulations 1997*. Accordingly, negligible impacts to the amenity of the nearest human receptors are anticipated to occur as a result of noise emissions from operation of equipment and vehicles onsite.	*Environmental Protection (Noise) Regulations 1997.* General provisions of the EP Act.

DECISION TABLE			
Licence section	**Condition number**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		Risk Assessment *Consequence:* The closest sensitive receptors are Hamersley Gorge and Hamersley Station located 13 km and 33 km from the Premises respectively. The impact of noise emissions from the Premises would result in minimal impacts to amenity for these receptors, based on distance. Therefore, the consequence is slight. *Likelihood:* Amenity impacts from noise emissions will occur in exceptional circumstances. Therefore, the likelihood of the consequence is rare. *Overall Risk Rating:* Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for noise emissions to be **low**. Regulatory Controls No specified conditions relating to noise emissions are imposed on the Licence. The provisions of the *Environmental Protection (Noise) Regulations 1997* apply.	
Monitoring general	Conditions 3.1.1 - 3.1.4.	Conditions on Licence to ensure monitoring is carried out in accordance with the relevant standards, at appropriate intervals, submitted to and tested by a National Association of Testing Authorities (NATA) accredited laboratory for analysis and the monitoring equipment is appropriately maintained and calibrated. These conditions ensure that results of monitoring conducted as a requirement of this Licence and reported to DWER in the AER for review are accurate and reliable.	AS/NZS 2031. AS/NZS 5667.1. AS/NZS 5667.10. AS/NZS 5667.11.
Monitoring of inputs and outputs	Condition 3.3.1.	The Delegated Officer has imposed the requirement to monitor the volume of waste accepted to the landfill facilities on the Premises.	N/A.
Process monitoring	Condition 3.4.1.	DWER's assessment and decision making with respect to the process monitoring requirements for the TSF, use of treated wastewater for dust	General provisions of the EP Act.

DECISION TABLE			
Licence section	**Condition number**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		suppression and the contingency discharge of stormwater from the TSF decant line to Kangeenarina Creek is detailed in Appendix D.	
Ambient environmental quality monitoring	Condition 3.5.1.	Ambient groundwater monitoring at the BFSF, TSF and in the vicinity of the landfill and waste transfer station are implemented via condition 3.5.1 to identify impacts to groundwater as a result of the operation of these facilities. TSF monitoring bores are required to be sampled quarterly and tested for water levels; cations and anions; and dissolved metals to determine if groundwater levels and water quality is being impacted as a result of seepage from the TSF (refer also to Appendix A - TSF). The results of this monitoring is to reported in the AER including a comparison of groundwater monitoring results against the site specific trigger values detailed in the document *Life of Mine Geochemistry Programme – Site Specific Trigger Values (45-SY-EN-0001)*. The groundwater at the putrescible landfill is approximately 50 mbgl and the closest potable water groundwater bore is approximately 10 km from the landfill. However, the landfill capacity and operating life has increased significantly due to design changes. Groundwater monitoring at the landfill has been imposed through condition 3.5.1 to identify leachate impacts. **January 2018 amendment** The Licensee has stated (FMG, 2017) that "*It has been identified that the shallow bore located upstream of the Landfill (GQ8, WF-MB001S) is dry, and will continue to be dry due to the depth of the groundwater table in the area. It is therefore not suitable for ongoing water quality monitoring. The upstream groundwater quality will continue to be appropriately monitored using only GQ9 (WF-MB001D), without the need for drilling of additional bores*". The Delegated Officer notes that the two bores upstream of the Landfill (GQ8 and GQ9) are both at the same location though target different groundwater depths. Based on this, the Delegated Officer has removed the requirement to monitor GQ8, WF-MB001S from the Licence with upstream groundwater quality	General provisions of the EP Act. MS 1062. FMG, 2017.

DECISION TABLE			
Licence section	**Condition number**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
		monitoring being achieved through GQ9, WF-MB001D. The Licensee has also requested that a footnote be added to Table 3.5.1 specifying *"No sample required if bore is dry"* to avoid potential non-compliances if the monitoring bores are dry due to the depth to the groundwater table.	
Meteorological monitoring	N/A.	No specified conditions relating to meteorological monitoring are included in this Licence.	N/A.
Improvements	N/A.	No improvement conditions are included in this Licence.	N/A.
Information	Conditions 4.1.1 - 4.1.4, 4.2.1 - 4.2.3 and 4.3.1.	Conditions 4.1.1 to 4.1.1 on the Licence relate to record keeping, submission of an Annual Audit Compliance Report, complaints management and maintaining records of landfill locations. Conditions 4.2.1 and 4.2.2 require the submission of an AER; including a summary of results against previous monitoring results and Licence limits. Condition 4.3.1 specifies the notification requirements for the Licence, including breach of a licence limit and submitting compliance documentation following construction of infrastructure approved under amendments to Licence L8464/2010/2.	N/A.
Licence duration	N/A	The Licence expires on Friday, 17 October 2025.	*Guidance Statement: Licence duration*.

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
11/12/2017	Licensee provided with draft licence and decision document for comment	The Licensee provided comments (FMG, 2018) on the draft Licence on 10 January 2018. <u>Condition 1.2.2, Table 1.2.1</u>: The Licensee has stated the following: • The HVWF is constructed of concrete with a permeability of less than 1 x 10^{-9} m/s, rather than lined with HDPE; • Drainage infrastructure at the Premises is designed and managed in accordance with the *Surface Water Management Plan*; and • The HVWF was constructed for a 5-year ARI, with a 300 mm freeboard. The Licensee considers the risk associated with the activity as low, rather than medium and considers that the freeboard condition is not necessary to ensure prevention of unacceptable environmental impacts based on: • HVWF located at least 1 km from the closest surface watercourse; • The depth to groundwater within the vicinity of the HVWF is greater than 10 mbgl; • Treated wastewater is stored in enclosed tanks and used for dust	Table 1.2.1 – containment infrastructure has been updated to remove the HVWF including the infrastructure requirements for freeboard. Appendix A of the Decision Document for the HVWF has been updated to include the controls listed in FMG, 2018. Based on these controls the Risk Assessment has been re-assessed with an overall risk rating of low. The Delegated Officer is not imposing any specified conditions for the HVWF ponds. The general provisions of the EP Act with respect to the causing of pollution and environmental harm apply and discharges of hydrocarbons may be subject to the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

Date	Event	Comments received/Notes	How comments were taken into consideration
		suppression or OPF water supply; and • The regular and ongoing use of the treated water ensures adequate capacity is retained in the wastewater sumps. <u>Condition 3.4.1, Table 3.4.1 for L4</u>: The Licensee requests that 'flow rate' be changed to 'cumulative volume'. <u>Condition 4.2.1, Table 4.2.1 for Compliance (4.1.2)</u>: The License has requested the format be changed to "none specified".	The 'flow rate' has been changed to 'cumulative volume' with the frequency now cumulative monthly and method as continuous. The format for condition 4.1.2 in Table 4.2.1 has been changed to "none specified". The Licensee should note the following: • Definition for Annual Audit Compliance Report in the Licence; and • *Guideline: Annual Audit Compliance Reports*.

6 Risk Assessment

Note: This matrix is taken from the Guidance Statement Risk Assessments

Table 2: Emissions Risk Matrix

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

Appendix A

Stormwater management

Emission Description

Emissions: Potentially contaminated and sediment laden stormwater from the landfilling operations, waste transfer station, bioremediation facility, treated wastewater irrigation areas, work areas (ROM, OPFs, workshops) and fuel storage areas.

Impact: Contamination of surrounding land and surface water drainage systems. Potential impacts on ecology of surface water from the addition of nutrients, heavy metals and/or hydrocarbons. Increased turbidity of surface water and sedimentation impacting aquatic biota and ecosystems.

Potential impacts to the Millstream Water Reserve, a Priority 2 PDWSA.

Controls: Surface water management at the sizing hubs, OPFs and rail stockyard, include the following:

- Key infrastructure located above the 100 year floodplain and/or protection in a 1 in 100 year rainfall event;
- Separation of clean and potentially contaminated stormwater using diversion measures;
- All potentially contaminated stormwater is directed to sedimentation basins or sediment traps prior to release; and
- Diversion drain to the north-east of the stockyard captures clean stormwater and directs it around the stockyard.

The following stormwater and surface water management measures have been implemented at the DSOPP:

- Perimeter drain and sediment traps located around the pit and stockpiles;
- Rock lined drains to ensure excess runoff is directed to sediment traps;
- Perimeter bunding (where practical) and internal drainage water from rainfall retained around ore stockpiles;
- Internally draining pit with rainwater collected for dust suppression purposed; and
- Runoff from stockpiles diverted to sediment trap.

The following management measures have been implemented at the MCF to manage stormwater:

- Potentially contaminated stormwater is contained and appropriately treated prior to disposal;
- The site has been graded to ensure that all stormwater, wash-down and spillage water runoff is directed to a collection and settling sump, where it is recycled for dust suppression purposes;
- MCF are contained within an earthen perimeter bund; and
- Runoff from stockpiles is diverted to the settling sump.

The landfill has a perimeter drainage channel and a drainage sump captures any potentially contaminated stormwater. This sump has been designed to prevent the discharge of stormwater from approximately a 1 in 20 year rainfall event.

The landfill and waste transfer station are located greater than 100 m from the nearest surface water feature and outside of the 1 in 100 year average return interval (ARI) flood plain. Surface water in the area consists of episodic drainage. The waste transfer station is inspected on a regular basis, and before anticipated significant rainfall events.

The following measures have been implemented at the fuel storage areas to minimise stormwater contamination from occurring:

- Concrete bunding to capture any spills during refuelling of light vehicles at some facilities;
- Drainage of oily water from the central facilities fuel storage area to a lined evaporation pond; and
- Spill grates collect stormwater runoff from around the tanks. Grates are inspected daily and pumped out as required.

Hydrocarbon storage areas across the Premises are appropriately bunded and potentially contaminated stormwater is diverted to oily water separators (OWS) for treatment prior to discharge. The OWS have been designed to treat wastewater to achieve a total recoverable hydrocarbon (TRH) concentration of less than 5 mg/L. The Licensee has installed and maintains OWS at the BFSF, Rail Fuel Siding, Castle Camp Washdown Bay, Trinity Fuel Farm, Kings Fuel Farm, Firetail Fuel Farm and the Kings OPF facility to treat potentially contaminated stormwater prior to discharge.

The Licensee has developed and implements the *Surface Water Management Plan* at the Premises, the objectives being:

- Maintain integrity of flow paths and water quantities to protect surface water dependent ecological systems;
- Minimise excessive turbidity and downstream sedimentation caused by erosion;
- Prevent and minimise impacts to surface water quality;
- Minimise impact of storm surge and flooding; and
- Monitor and report sufficiently to demonstrate compliance and enable management to make informed decisions than minimise environmental impacts to surface water dependent ecological systems.

Risk Assessment

Consequence: The Millstream Water Reserve has been identified as a sensitive receptor based on proximity to the Premises. The impact to the Millstream Water Reserve from stormwater runoff within and from the Premises could result in low level off-site impacts at a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls (stormwater diversion, bunding, sediment basins), impacts to sensitive receptors from the discharge of contaminated and/or sediment laden stormwater will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for discharges of contaminated and/or sediment laden stormwater to the environment to be **medium**, subject to regulatory control.

Regulatory Controls

Condition 1.2.11 specifies the infrastructure to be maintained to ensure stormwater is appropriately managed. The requirements of this condition are consistent with the existing Licensee controls considered by the Delegated Officer in the risk assessment for stormwater.

Bulk and satellite fuel facilities

Emission Description

Emission: Seepage of hydrocarbons to soil or groundwater from leaking bulk and satellite fuel facilities. Hydrocarbon spills outside of engineered containment infrastructure during refuelling and fuel transfer activities.

Impact: Soil contamination, impacts to surface water ecosystems, groundwater dependant ecosystems and terrestrial ecosystems from addition of hydrocarbons and other chemicals.

Controls: The Licensee has implemented the following measures to manage hydrocarbon/chemical storage on the Premises:

- The structural steel used to construct the tanks comply with requirements of AS/NZS 3678:2011;
- Diesel storage tanks, including pumps and pipe work, are located in a concrete bunded area designed to comply with requirements of AS 1940:2017;
- The tanks are fitted with Radar level transmitters in the roof with alarms to indicate high level which shut down the offload pumps;
- The tanks contain back-up overflow pipes extending down the tank side to direct any excess diesel to flow into the concrete bund at ground level;
- Each of the 12 train offloading arms have 'catch pans' under each rail car coupling and concrete bunding under the three train offloading pumps;
- All catch pans and concrete bunding are designed to have permeability of less than 10^{-9} m/s;
- The catch pans and bunded areas are gravity fed through piping to the OWS to treat any stormwater runoff captured within the bunded area to achieve a discharge quality of less than 5 parts per million (ppm) of total petroleum hydrocarbons; and
- Appropriate types and quantities of spill response equipment are maintained onsite proportionate to the volume of chemicals and hydrocarbons stored.

Risk Assessment

Consequence: The impact from spills/leaks of hydrocarbons from the bulk and satellite fuel facilities will result in minimal onsite impacts. Therefore, the consequence is slight.

Likelihood: Based on the Licensee controls, the frequent use and size of the fuel facilities, an environmental impact from spills and leaks of hydrocarbons/chemicals could occur at some time. Therefore, the likelihood of the consequence is possible.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for leaks and spills of hydrocarbons/chemicals to the environment to be **low**.

Regulatory Controls

The Delegated Officer notes that the Licensee has developed and implements the *Chemical and Hydrocarbon Management Plan*, in accordance with Part IV of the EP Act.

Fuel facilities are managed under the Solomon Project Dangerous Goods Site Licence and *Dangerous Goods Safety Act 2004*, administered by DMIRS.

The Delegated Officer is not imposing any specified conditions for the management of hydrocarbons, as sufficient regulatory control is currently imposed through approvals pursuant to Part IV of the EP Act and DMIRS.

Fuel storage areas at the Premises will be subject to DWER inspections, during which the management measures in place to minimise potential environmental impacts associated with chemical and hydrocarbon transport, storage, handling and disposal will be considered.

The general provisions of the EP Act with respect to the causing of pollution and environmental harm apply and discharges of hydrocarbons may be subject to the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

TSF
During the May 2017 amendment, the Licence was amended to approve the TSF embankment lift.

TSF Embankment Raise – Construction and Operation
Based on the current production forecasts, the existing TSF at the Premises is anticipated to reach capacity in late 2017. The Licensee proposes to increase the height of the TSF embankment to increase the total capacity of the TSF from 13.7 cubic megametres (Mm^3) to 46.4 Mm^3. The maximum tailings tonnage that could be discharged per year will remain at approximately 23.5 (wet) million tonnes, with the nominated operational tonnage being 6 Mtpa.

The TSF raise involves the construction of an engineered embankment rising above the existing crest elevation of 572 m Reduced Level (RL) to a maximum crest elevation of 605 mRL. The embankment raise will result in a maximum embankment height of approximately 67 m and allow for tailings storage for a further 8 years. At full height the crest length will be approximately 1,100 m.

The embankment raise may be undertaken in a number of stages, and will be founded on waste rock fill constructed immediately upstream of the current embankment. The embankment will be constructed using compacted waste rock material similar to that used in the construction of the existing TSF embankment to a similar design specification.

The embankment will consist of a single zone with the existing internal filter drainage system for TSF remaining operational. An intermediate bench will be designed between the TSF raise and the existing TSF embankment to manage stormwater runoff on the downstream face by directing discharge away from the upper embankment to minimise erosion.

The TSF raise will be designed as a non-release facility (no spillway). The tailings will be delivered to the TSF via a tailings delivery pipeline from the Kings OPF. Tailings will be deposited from spigots or open ended pipes located along the upstream crest of the raised embankment.

Surface water will be decanted from the TSF using the existing gravity decant system and/or additional skid-mounted pumps. Decant water will be discharged to the existing return water storage pond and will be pumped to the OPF for re-use via the return water pipeline. FMG, 2016 states that the existing decant system may be expanded through the installation of two additional decant towers and/or use of skid mounted pumps with floating intakes.

The primary objective of the TSF decant system is to ensure that the water level in the TSF is maintained within the design limits so that:

- The area of the pond is minimised to minimise losses through seepage and evaporation;
- Re-use of water for processing is maximised;
- Water does not pond up against the embankment during normal operations; and
- The pond level is below the level required to manage future storms.

The facility incorporates an emergency decant line to Kangeenarina Creek, which will operate as a contingency only (refer to Appendix D).

The TSF is located directly upstream of offices and workshops and mine access roads used by light vehicles, buses and trucks. In future mining plans, the open pit will also extend into the potential downstream breach-flow zone of the tailings dam. Therefore, in accordance with the *Code of Practice for Tailings Storage Facilities in Western Australia*, the raised TSF will be classified as a High Hazard Category 1 facility.

The Licensee has advised that the current groundwater monitoring bores will be utilised to monitor groundwater for seepage impacts. These bores will be effective until approximately 2020, after which

time the level of the tailings will encroach on several of the monitoring bores. The Licensee has advised that a licence amendment application will be submitted for approval to replace the effected bores.

The Licensee proposes to commence the raise of the TSF embankment in early 2017, with commissioning anticipated to commence in mid-2017.

The Licensee has advised that approximately 45,000 L of treated wastewater from an Ultraspin OWS is discharged to the OPF thickener, which ultimately discharges to the TSF.

Normal operation

Emission Description

Emission: Seepage from the TSF migrating to groundwater. Tailings are a waste product from the gravity separation process conducted at the OPFs. The tailings will have been dosed with a flocculent at the OPFs to aid in the sedimentation of solids and upon arrival at the TSF the tailings are approximately 50% solids. The flocculent, Magnafloc 336, is non-toxic and will be added at the recommended dose of 50-200 grams per tonne, or 0.05-0.2 ppm.

Approximately 45,000 L per month of treated oily water is discharged to the TSF via the OPF thickener.

Impact: Potential impacts to groundwater quality and groundwater levels (mounding). Changes to groundwater quality could impact on ecosystems receiving groundwater in the area. Mounding may impact on local vegetation, if it results in the growth medium becoming water logged. Groundwater is approximately 10 m below ground level (mbgl) at the location of the TSF.

Controls: The various rock formations underlying the TSF have permeability in the range of 1 $x10^{-5}$ to $1x10^{-9}$ m/s. The base of the TSF is now covered by low permeability tailings which will minimise seepage.

Supernatant water is decanted to minimise ponding and losses through seepage.

The Licensee has prepared the *Tailings Seepage Report*, which compares the quality of groundwater in monitoring bores downgradient of the pre-existing TSF in order to determine whether there is any appreciable impact to the receiving environment. The report concludes that the likelihood of acid or metalliferous drainage is low for tailings, based on geochemical static and short-term kinetic testing of three samples and characterisation of 33 tailings samples for acid potential.

This conclusion is based on the assumption that environmentally harmful mine drainage will only occur in the presence of sulphide minerals or the reaction products of sulfide oxidation, and that acid-base accounting and short-term leaching tests will adequately characterise the risks of metals and metalloids being leached from tailings materials.

The Delegated Officer notes that this assumption is not always valid as environmentally harmful concentrations of some metals and metalloids have the potential to be leached from mine wastes under circum-neutral pH conditions, even in the absence of sulfide minerals (MEND, 2004). Metals and metalloids that are at particular risk of being leached in such circumstances are antimony, arsenic, cadmium, chromium, cobalt, copper, iron, manganese, mercury, molybdenum, nickel, selenium, uranium and zinc (MEND, 2004). Many of these elements are present at elevated concentrations in the tailing material, and additionally, boron and strontium are present at elevated levels in tailings supernatant. This issue could be better characterised by conducting long-term and/or sequential leaching tests on the tailings material. The Delegated Officer notes that at this time, the

risks associated with tailings leachate can be appropriately addressed by the TSF design and management measures.

A drainage system has been installed on the existing TSF and will continue to operate for the TSF raise. This system involves a filter/drain and collection network, and discharges to the return water dam at the base of the TSF. No seepage from the embankment has occurred, and is not anticipated under normal operating conditions due to the distance from the decant pond, which is located around 1 km from the embankment.

Modelling indicates that seepage rates downstream of the embankment will be unlikely to be sufficient to require installation of seepage recovery bores. During operation of the mine, drawdown of groundwater for mine pit dewatering mitigates any potential mounding due to seepage. If seepage exceeds the design prediction to the extent that an unacceptable water level rise occurs on the downstream side of the TSF, or water flows into the downstream mining area are excessive, seepage recovery bores will be installed.

With respect to the discharge of treated oily water, the Delegated Officer notes that the Ultraspin OWS is designed to reduce TRH in wastewater to less than 15 mg/L and that within the thickener treated wastewater will be diluted at a ratio of approximately 1:148.

The TSF is located approximately 5 km from the Millstream PDWSA. Kangeenarina Creek is located 1.5 km downstream of the TSF.

The Delegated Officer notes that the TSF and embankment lift have been assessed by the former Department of Mines and Petroleum pursuant to the *Mining Act 1978*.

Risk Assessment

Consequence: Based on the geochemical characterisation of the tailings and the tailings seepage report, the impact of TSF seepage to sensitive receptors could result in low level off-site impacts at a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls (drainage system, distance to the Millstream PDWSA), the impact to sensitive receptors from TSF seepage will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for TSF seepage to be **medium**, subject to regulatory control.

Regulatory Controls

Construction

Conditions 1.2.8 and 1.2.9 include construction requirements for the TSF embankment lift and the operation of the TSF in accordance with the conditions of the Licence following submission of compliance documentation, required under condition 4.3.1.

Operation

Condition 1.2.7 requires an annual water balance for the TSF to be undertaken. Condition 3.4.1 has process monitoring requirements for the TSF which will apply to the TSF following the embankment lift. These provisions relate to monitoring the volume and mass deposited into the TSF, volumes of water recovered from the TSF measured from the TSF return line and gravity decant return line.

Ambient groundwater monitoring is conducted at four locations around the TSF to determine if groundwater quality is being impacted by the operation of the TSF – refer to the section 4 under "ambient monitoring".

The annual water balance, process monitoring and the ambient groundwater monitoring results are reported to DWER in the Annual Environmental Report (AER) for the Premises.

Abnormal Operation/Emergency Situation

Emission Description

Emission: Release of tailings due to overtopping of the TSF or embankment breach.

The tailings will have been dosed with a flocculent at the OPFs to aid in the sedimentation of solids and upon arrival at the TSF the tailings are approximately 50% solids. The flocculent, Magnafloc 336, is non-toxic and will be added at the recommended dose of 50-200 grams per tonne, or 0.05-0.2 ppm.

Impact: Contamination of surrounding soil, impacts to surface water quality and groundwater. Vegetation stress/degradation if volume released is significant or exposure prolonged. Site facilities, including workshops, are located downstream of the TSF.

Controls: The TSF has been designed as a non-release facility, with sufficient capacity to accommodate at least a 1 in 100 year, 72 hour event and maintain a 500 mm total freeboard, as required by the DMIRS Guidelines. The TSF and TSF embankment lift have been assessed by DMIRS via the Mining Proposal.

If the maximum operating water level is reached, the OPF production and all production water inputs into the TSF will be halted to prevent overtopping. No emergency spillway is proposed from the raised TSF, however the existing emergency decant line to Kangeenarina Creek will remain in place for contingency discharge, if required (refer to Appendix D).

Risk Assessment

Consequence: Following consideration of the geochemical characterisation of the tailings and location of Kangeenarina Creek 1.5 km downstream, the impact to sensitive receptors from tailings discharge due to containment/embankment breach or overtopping could result in midlevel onsite impacts and low level off-site impacts at a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls (designed to contain a 1 in 100 year, 72 hour event and maintain a 500 mm freeboard), an impact to sensitive receptors from tailings discharge as a result of a containment/embankment breach or overtopping will probably not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for tailings discharge from loss of containment to be **medium**, subject to regulatory control.

Regulatory Controls

Condition 1.2.2 specifies requirements relating to containment infrastructure at the Premises, including the TSF. These requirements also apply to the TSF following construction of the embankment lift, and include:

- Maintaining of a 500 mm freeboard;
- Provision of additional sufficient freeboard to minimise the likelihood of erosion of the embankments by wave action; and
- Installation and maintenance of a seepage collection and recovery system.

Condition 1.2.6 also requires daily visual inspections of the TSF to be undertaken to ensure freeboard capacity is maintained.

The Delegated Officer considers these measures as appropriate to prevent overtopping from the TSF and erosion which could compromise the integrity of the embankment.

The Licensee is also required to comply with the following obligations outlined in the Mining Proposal, issued under the *Mining Act 1978*:

- Implement the TSF1 Operation, Monitoring and Surveillance Manual;
- Daily operator inspection and routine higher level inspections and audits;
- Monitoring of water balance, including site rainfall and evaporation, tailings return water recovery volumes, seepage recovery volumes and volumes of tailings deposited; and
- An annual operational audit by an independent geotechnical or engineering specialist.

Abnormal Operation/Emergency Situation

Emission Description

Emission: Release of tailings due to pipeline rupture.

The tailings will have been dosed with a flocculent at the OPFs to aid in the sedimentation of solids and upon arrival at the TSF the tailings are approximately 50% solids. The flocculent, Magnafloc 336, is non-toxic and will be added at the recommended dose of 50-200 grams per tonne, or 0.05-0.2 ppm.

Impact: Contamination of surrounding soil, impacts to surface water quality and groundwater. Vegetation stress/degradation if volume released is significant or exposure prolonged.

Controls: The existing tailings delivery pipeline will be used from the King OPF. The tailings pipeline runs along the overland conveyor route and consists of a 750 mm diameter carbon steel polyethylene pipeline. Leak detection is provided in the form of flow meters at the pumps and prior to discharge into the TSF. Pressure indication is also provided with the flow meters, with the pressure and flow differentials used to indicate a potential leak.

Risk Assessment

Consequence: Following consideration of the geochemical characterisation of the tailings and location of Kangeenarina Creek 1.5 km downstream of the TSF, the impact to sensitive receptors due to tailings discharge as a result of a pipeline rupture could result in midlevel onsite impacts and low level off-site impacts at a local scale. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls (flow meters, pressure monitoring, pipe material) an impact to sensitive receptors from a tailing discharge as a result of a pipeline rupture will probably not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for tailings discharge from a pipeline rupture to be **medium**, subject to regulatory control.

Regulatory Controls

Condition 1.2.1 requires the tailings pipelines to be equipped with either telemetry, automatic cut-outs or secondary containment.

Condition 1.2.6 requires daily visual inspections of the tailings pipelines and tailings return water lines.

The Delegated Officer considers these measures as appropriate to minimise the impact of tailings discharge from pipeline ruptures.

WWTPs
The Premises has two WWTPs (Castle/Dally Camp WWTP and Kangi Camp WWTP) to treat wastewater produced from the site's accommodation villages. Treated wastewater from the WWTPs is disposed of via irrigation to two separate irrigation areas, or used for dust suppression throughout the Premises. Refer also to Appendix B – emissions to land including monitoring.

Emission Description
Emission: Overflow of untreated and/or treated wastewater from the WWTP storage, treatment and sludge tanks.

Impact: Contamination of surrounding land and surface water drainage, potential for eutrophication of surface water due to elevated nutrients and ecosystem disruption.

Controls:
- Wastewater is treated to a High Exposure Risk Level (ERL) under Department of Health (DoH) guidelines at the Castle/Dally Camp and both Low ERL and High ERL at the Kangi Camp;
- High level audible and visual alarms are installed on the SBR and balance tanks;
- The WWTP tanks have the capacity to maintain one day freeboard; and
- The WWTP is located outside the 1 in 100 year floodplain.

Risk Assessment
Consequence: The impact of overflows of wastewater from the WWTP could result in minimal onsite impacts. Therefore, the consequence is slight.

Likelihood: Based on the location of the closest drainage line (170 m from the WWTP), distance to groundwater (40-50 mbgl) and location of the WWTP outside of the 1 in 100 year floodplain, an environmental impact from the overflow of wastewater will occur in exceptional circumstances. Therefore, the likelihood of the consequence is rare.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for wastewater overflows to the environment to be **low**.

Regulatory Controls
Discharges of sewage may be subject to the provisions of the *Environmental Protection (Unauthorised Discharges) Regulations 2004.*

Used tyre storage
Regulatory Controls
Condition 1.2.3 has management requirements for the storage of used tyres including:
- Not more than 2,500 used tyres to be stored at the Premises at any one time; and
- Used tyres shall not be stored closer than 6 m from any other tyre stack.

The *Environmental Protection (Controlled Waste) Regulations 2004* sets out additional requirements for the acceptance of controlled waste (tyres).

Putrescible/Inert Landfills

Emission Description

Emissions: Potential leachate generation from inert and putrescible landfills.

Impact: Contamination of soil and groundwater, impacts to ecosystems receiving groundwater discharge from addition of hydrocarbons, nutrients and heavy metals. Potential impacts to the Millstream Water Reserve.

Controls: The Licensee has advised that the maximum depth to groundwater within the vicinity of the site's putrescible landfill is approximately 50 mbgl; and the landfill is approximately 10 km from the groundwater bores used for potable water supply.

The Licensee restricts the type of waste that is accepted for burial at the in-pit and waste rock dump landfill locations. Only tyres, conveyor belts, concrete and untreated wood are allowed.
All wood loads are visually checked to confirm that the wood is untreated prior to disposal. A branding on the wood indicates whether the packaging has been heat–treated or fumigated with methyl bromide, and hence this will be checked prior to disposal.

Only inert and putrescible waste is accepted at the putrescible landfill. Weekly covering of waste and appropriate stormwater management onsite further reduces the risk of leachate from the landfill impacting on groundwater. A perimeter drainage channel around the putrescible landfill and a drainage sump captures any potentially contaminated stormwater.

The Licensee has installed monitoring bores upstream and downstream of the landfill and monitors them to determine if there are any impacts to groundwater quality as a result of waste disposal. The sample results are analysed and if there is a difference (>5%) between the results from each bore and the baseline samples, corrective actions are undertaken. The potential sources of the elevated concentrations are determined. If the landfill is confirmed as the source and no faults are identified, an investigation into the expected success of potential actions is undertaken with actions implemented based on the findings.

Risk Assessment

Consequence: Leachate from the landfill facilities could result in low level onsite impacts and minimal off-site impacts at a local scale. Therefore, the consequence is minor.

Likelihood: Based on the Licensee controls (weekly covering of waste, stormwater diversion and management), depth to groundwater (50 mbgl), ephemeral nature of the creek systems in the area, landfill capacity and operational life, leachate from the landfills resulting in an environmental impact will probably not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for landfill leachate to be **medium**, subject to regulatory control.

Regulatory Controls

Condition 1.2.3 specifies requirements for the management of waste at the inert and putrescible landfills. The volume and types of waste is restricted to ensure that only that waste which has been assessed and approved for disposal is accepted at the landfills. Condition 1.2.5 specifies the landfill cover requirements, consistent with the controls proposed by the Licensee.

On completion of use, the landfill will be closed and rehabilitated in accordance with the Premises Mine Closure Plan, required by condition 15 of MS 1062. Closure will include fully covering all waste with inert material and creating a safe, stable, non-polluting landform. Topsoil will then be spread over the area to encourage revegetation.

HVWF
The Licensee has infrastructure onsite to contain potentially contaminated wash down water and stormwater runoff for treatment, or for holding prior to disposal.

Emission Description
Emission: Overflow of wastewater potentially contaminated with hydrocarbons and surfactants from the HVWF treatment ponds. Overflow of sumps or ponds used to store potentially contaminated stormwater.

Impact: Soil contamination, impacts to surface water ecosystems, groundwater dependant ecosystems and terrestrial ecosystems from addition of hydrocarbons and surfactants. Potential impacts to the Millstream Water Reserve.

Controls: The Licensee has stated the following (FMG, 2018):

- Drainage infrastructure at the Premises is designed and managed in accordance with the *Surface Water Management Plan*;
- The HVWF was constructed for a 5-year Average Recurrence Interval (ARI), with a 300 mm freeboard;
- The HVWF is located on a concrete slab with drainage directed to two pre-treatment ponds (one a sediment pond and the other a dirty water pond) prior to entering an oil water separator;
- The wastewater sumps associated with the HVWF are constructed of concrete with a permeability less than 1×10^{-9} m/s;
- The treated wastewater is stored in enclosed tanks and used for dust suppression or OPF water supply;
- The HVWF is located at least 1 km from the closest surface watercourse; and
- The HVWF is located within the Central Facilities Workshop Yard. This catchment is surrounded with a diversion bund to divert clean stormwater away from the workshop area, whilst a collection swale/trench directs potentially contaminated stormwater to a sediment basin.

Risk Assessment
Consequence: The impact from the discharge of potentially contaminated wastewater from the HVWF ponds could result in minimal on-site impacts. Therefore, the consequence is slight.

Likelihood: Based on the Licensee controls (concrete with permeability of less than 1×10^{-9} m/s, 300 mm freeboard), an environmental impact from the discharge of potentially contaminated wastewater from the HVWF ponds will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for untreated wastewater emissions from the HVWF to be **low**.

Regulatory Controls
The Delegated Officer is not imposing any specified conditions for the HVWF ponds. The general provisions of the EP Act with respect to the causing of pollution and environmental harm apply and discharges of hydrocarbons may be subject to the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

Bioremediation Facility
The Licensee operates a bioremediation facility to treat hydrocarbon contaminated soils from within the Premises. As the bioremediation facility does not accept liquid waste from outside the Premises it does not trigger a category under Schedule 1 of the EP Regulations.

Emission Description
Emission: Leachate/runoff from the bioremediation facility containing elevated concentrations of hydrocarbons and heavy metals.

Impact: Contamination of surrounding land with hydrocarbons. Potential for migration to surface water drainage systems in times of high rainfall. Potential impacts to the Millstream Water Reserve.

Controls: The bioremediation treatment cells are lined with HDPE, with a secondary clay liner and a log book is maintained to record date of deposition, material and approximate volume in cubic metres.

Risk Assessment
Consequence: The impact of leachate/runoff from the bioremediation facility will result in minimal onsite impacts. Therefore, the consequence is slight.

Likelihood: Based on the depth to groundwater (50 mbgl) and ephemeral nature of the creek systems in the area and Licensee controls (HDPE liner with secondary clay liner), leachate/runoff impacts from the bioremediation facility will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for leachate/runoff from the bioremediation facility to be **low**.

Regulatory Controls
The Delegated Officer is not applying any regulatory controls on the Licence with respect to the management of the bioremediation facility. The discharge of hydrocarbons to the environment is an unauthorised discharge under the *Environmental Protection (Unauthorised Discharges) Regulations 2004*. The general provisions of the EP Act with respect to the causing of pollution and environmental harm also apply.

Process limits
The recording and the establishment of limits for process throughputs is included in the Licence through condition 1.2.10. This ensures the Licensee does not exceed the approved throughputs for categories 5, 61, 62 and 73.

Appendix B

Emissions to land including monitoring

WWTPs
The Castle/Dally Camp WWTP and Kangi Camp WWTP irrigation areas are 12.5 ha and 16.3 ha in size, respectively. The irrigation areas are fenced with a 1.2 m high fence around the perimeter, to restrict access. Signs are fitted to all sides of the compounds.

Emission Description
Emission: Treated wastewater from the Castle/Dally Camp WWTP and Kangi WWTP discharged to the designated irrigation area, potentially with elevated concentrations of total nitrogen, total phosphorus, biochemical oxygen demand, total suspended solids and *E.Coli.*

Impact: Contamination of surrounding land and surface water drainage, potential for eutrophication of surface water due to elevated nutrients, ecosystem disruption and impacts to groundwater.

Controls: Wastewater is treated to a High ERL at the Castle/Dally Camp and both Low ERL and High ERL at the Kangi Camp. Refer also to Appendix A – WWTPs.

Wastewater is treated to the low exposure risk level, as outlined in the *Guideline for the Non-potable Uses of Recycled Water in Western Australia.*

There are no sensitive wetlands or drainage features in close proximity to the WWTPs irrigation areas. There are minor drainage lines throughout the area, with the closest approximately 170 m from the WWTP. However, these are ephemeral and only flow during significant storm events. The WWTP is located outside the 1 in 100 year floodplain. Groundwater is approximately 40-50 mbgl at the WWTPs.

Risk Assessment
Consequence: The impact from the irrigation of treated wastewater could result in low level onsite impacts and minimal off-site impacts at a local scale. Therefore, the consequence is minor.

Likelihood: Based on the location of the closest drainage line, distance to groundwater and location of the WWTP outside of the 1 in 100 year floodplain, an environmental impact from the irrigation of treated wastewater will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for the irrigation of treated wastewater to be **medium**, subject to regulatory control.

Regulatory Controls
Condition 1.2.3 specifies a limit of 1,178 m^3/day for sewage treatment to ensure that the WWTPs operate within the design specifications.

Condition 1.2.4 specifies requirements that need to be met with respect to the irrigation of treated wastewater. These management measures include no irrigation generated runoff, spray drift or discharge beyond the designated irrigation areas, wastewater is evenly distributed over the irrigation area, no soil erosion occurs, irrigation does not occur on land that is waterlogged and a healthy vegetation cover is maintained.

Condition 2.2.1 includes the two irrigation areas as specified emission points to land. Condition 3.2.1 requires quarterly sampling of the treated wastewater to ensure discharge quality is acceptable. Condition 4.2.1 requires the Licensee to report the monitoring results in the AER and interpret results against the plant design specifications.

BFSF OWS

Emission Description

Emission: Discharge of potentially contaminated treated wastewater from the BFSF OWS.

Impact: Elevated concentrations of TRH in discharge could contaminate soil, impact surface water and groundwater quality; leading to ecosystem disruption.

Controls: There are two OWS located at the BFSF. Treated wastewater from these OWS is discharged, as part of the site stormwater system, into a nearby drainage line.

The OWS have been designed to treat wastewater to achieve a TRH concentration of less than 5 mg/L. Monthly inspections of the systems are carried out to check for the presence of visible hydrocarbon sheen and to ensure that the systems are operating as per manufacturer's specifications.

The BFSF is located nearly 110 m from the nearest ephemeral surface water drainage line which eventually flows into Fortescue River.

Risk Assessment

Consequence: The impact from the discharge of treated wastewater from the BFSF OWS could result in low level onsite impacts and minimal off-site impacts at a local scale due to the size of the facility and volumes of water that require treatment. Therefore, the consequence is minor.

Likelihood: Based on the location of the closest drainage line, distance to groundwater and that the OWS has been designed to treat wastewater to achieve a TRH concentration less than 5 mg/L, the environmental impact of discharges of treated wastewater from the BFSF OWS will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for treated wastewater discharged from the BFSF OWS to be **medium**, subject to regulatory control.

Regulatory Controls

Condition 2.2.1 specifies the BFSF OWS treated wastewater discharge as an emission point to land. Condition 2.2.2 has been imposed to specify a limit for TRH in discharge water and monitoring requirements under condition 3.2.1.

Satellite Fuel Facilities OWS

Emission Description

Emission: Discharge of treated wastewater from the satellite fuel facility and MVWF OWS with elevated concentrations of hydrocarbons.

Impact: Potential contamination of surrounding land, surface water drainage systems and groundwater, possible ecosystem disruption.

Controls: The OWS emission points are located within areas already disturbed for mining and supporting infrastructure. The discharged treated wastewater is contained within the Premises footprint; following release it evaporates or infiltrates.

Discharge points are located at least 50 m from the closest surface water drainage lines and conservation significant vegetation. Surface water drainage lines in the area are episodic, flowing following significant rainfall events.

Groundwater within the Premises area is greater than 10 mbgl.

Potentially contaminated water undergoes treatment prior to discharge to achieve a TRH concentration of less than 15 mg/L.

Further to this, OWS are maintained and regularly inspected by the Licensee to ensure they are functioning in accordance with manufacturer's specifications. The Licensee also undertakes regular monitoring of the water discharged to validate that the OWS are effectively treating wastewater. Monitoring results from the 2015 reporting period indicate that TRH concentration in treated water is of sufficient quality.

Risk Assessment

Consequence: The impact from the discharge of treated wastewater from the satellite fuel facilities OWS could result in minimal onsite impacts due to the location of the satellite fuel facilities in already disturbed mining areas. Therefore, the consequence is slight.

Likelihood: Based on the location of the closest drainage line, distance to groundwater and previous treated wastewater monitoring results, impacts to the environment from the discharge of treated wastewater from the satellite fuel facilities OWS will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating for risk of treated wastewater discharged from the satellite fuel OWS to be **low**.

Regulatory Controls

The Delegated Officer is not imposing any additional conditions on the Licence as the offence provisions relating to the causing of pollution and environmental harm outlined in Division 1, Part V of the EP Act apply, as does relevant subsidiary legislation including the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

The Premises is also subject to routine compliance inspections by DWER officers during which pollution control equipment, including OWS and the associated emission points will be inspected. The Delegated Officer notes that no issues were identified by DWER officers during the 2016 compliance inspection.

Appendix C

Fugitive dust emissions

Emission Description
Emission: Dust emissions generated from mining related activities such as transport, processing, movement and storage of iron ore.

Impact: Deterioration of local air shed, including potential health impacts to residents. Dust emissions can be harmful to human health and the environment. Elevated total suspended particulates (TSP) can impact ambient environmental quality resulting in amenity impacts and can smother vegetation. Particulate matter that is less than 10 (PM_{10}) or 2.5 ($PM_{2.5}$) micrometres in diameter can be drawn deep into the lungs causing human health impacts. The chemical and physical properties of the particles, the size of the particles and the duration of exposure are all factors which may affect human health.

Controls: The following measures are implemented at the Premises to minimise dust emissions:

- Sprays or water trucks are used on ROM stockpiles to control fugitive dust;
- Dust suppression sprays have been fitted to crushers and conveyors;
- Water fogging sprays on the Sizing Hubs;
- Dry baghouse dust collection and ducting connected at all ore transfer points at the Firetail OPF;
- Water sprays are used at transfer points;
- Dust suppression sprays have been fitted to the screen to control fugitive dust emissions from product screening;
- Crushed material stockpiles (fines <12 mm) are sprayed (sprinklers and water trucks);
- In extreme conditions (high wind) the processing at the crushing facilities will cease until conditions improve;
- Water is added to the ore during processing and the final product will contain a moisture content of 6 – 8% moisture;
- A dust suppressant (e.g. Soiltac) is applied to the stockpiles to prevent windblown dust;
- Dust emissions from the MCF crushed product stockpiles and feed stockpiles is minimised using water sprinklers and a water truck;
- Dust suppression sprinklers are fitted to the MCF to control dust from the grizzly, primary crusher screen, primary crusher, cone crusher and conveyors.

The Licensee has set the following objectives with respect to dust emissions during operation of the Premises:

- That implementation of the Premises does not lead to community complaints regarding dust emissions or their impacts; and
- The operations do not cause National Environmental Protection Management (NEPM) standards to be exceeded at the Premises boundary.

The Licensee has implemented a dust monitoring program for the greater Solomon Project which includes the installation of at least 5 dust monitoring stations (and 1 background station) at varying locations around the Premises to quantify the significance of dust emissions during operation and effectively monitor ambient dust concentrations. PM_{10} concentrations are monitored continuously from monitors located around the Premises whilst visible dust from the crushing facilities is monitored daily and as the opportunity arises.

The Licensee has prepared an overarching dust management plan which applies across it's mine and rail sites and continues to implement this plan.

Each of the Licensee's tenements issued under the *Mining Act 1978* for the Premises also include conditions related to dust management. Further to this, conditions of the tenements require that the construction and operation of the project, and measures to protect the environment, are carried out generally in accordance with the submitted Mining Proposals. Each of the submitted Mining Proposals for the Premises has required dust management in accordance with the approved management plan.

Risk Assessment

Consequence: The closest sensitive receptors are Hamersley Gorge and Hamersley Station located 13 km and 33 km from the Premises respectively. The impact of fugitive dust emissions from the Premises would result in minimal impacts to amenity and health at these receptors, based on distance. Therefore, the consequence is slight.

Likelihood: Amenity and health impacts from fugitive dust emissions at these receptors will occur in exceptional circumstances. Therefore, the likelihood of the consequence is rare.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for fugitive dust emissions to be **low**.

Regulatory Controls

No specified conditions relating to fugitive dust emissions are imposed on the Licence. The Delegated Officer notes that the Licensee has implemented a range of dust suppression measures across the Premises to manage fugitive dust emissions to minimise environmental and human health impacts. In addition, a comprehensive dust monitoring network has been established by the Licensee to monitor ambient dust concentrations and visible dust from the crushing facilities is monitored daily.

The Delegated Officer also notes the regulation of dust from the Premises is also addressed under mining tenement conditions.

The Premises will be subject to future DWER inspections during which fugitive dust emissions and the effectiveness of existing dust mitigation measures will be assessed. If unreasonable dust emissions are identified, DWER will consider the inclusion of appropriate conditions to regulate dust. The general provisions of the EP Act also apply.

Appendix D

Process Monitoring

Solomon Power Station – Liquid Waste
The Licensee accepts liquid waste from the Solomon Power Station, occupied by TEC Pipe Pty Ltd. This liquid waste comprises of treated wastewater from a reverse osmosis plant, oil water separator and cooling tower blowdown. The treated wastewater is utilised for dust suppression on roads and stockpiles across the Premises.

The Licenses also utilises treated wastewater from the site's OWS for use in dust suppression. The risk assessment for the BFSF OWS and satellite fuel facilities OWS is detailed in Appendix B.

Normal operation
Emission Description
Emission: Discharge of potentially contaminated treated wastewater to land.

Impact: Potential contamination of surrounding land, surface water drainage systems and groundwater.

Controls: The Licensee monitors the quality of the treated wastewater to ensure the concentration of TDS and TRH are within acceptable levels. In the event that the quality requirements have not been met, the treated wastewater from the Solomon Power Station is diverted to the stockyard drainage pond, where it is diluted until it meets the water quality requirements suitable for discharge.

Risk Assessment
Consequence: The impact from the discharge of treated wastewater from the Solomon Power Station for dust suppression will result in low level onsite impacts and minimal off-site impacts at a local scale. Therefore, the consequence is minor.

Likelihood: Based on the Licensee controls (monitoring of water quality), environmental impacts from the discharge of treated wastewater reused for dust suppression will not occur in most circumstances. Therefore, likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for treated wastewater reused for dust suppression to be **medium**, subject to regulatory control.

Regulatory Controls
Condition 3.4.1 includes monitoring requirements for the treated wastewater from the OWS (BFSF and satellite fuel facilities) used for dust suppression onsite.

Condition 3.4.1 also includes monitoring requirements for the treated wastewater accepted from the Solomon Power Station. Limits for concentrations of TDS and TRH in treated wastewater discharged apply and the Licensee is required to record the volume of treated wastewater discharged at the Premises.

Abnormal/Emergency situation
Emission Description
Emission: Potential uncontrolled discharge of treated wastewater from the stockyard storage tanks.

Impact: Potential contamination of surrounding land and groundwater.

Controls: The Licensee stores the treated wastewater in an impermeable storage tank and maintains an operating vertical freeboard of 300 mm.

Risk Assessment
Consequence: The impact to the environment from the overflow of treated wastewater from the storage tanks will result in minimal onsite impacts, as any overflow would be isolated to the immediate area of the tanks and the water is treated. Therefore, the consequence is slight.

Likelihood: Based on the Licensee controls (freeboard), an environmental impact from the overflow of treated wastewater from the storage tanks will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk to the environment from treated wastewater overflows to be **rare**.

Regulatory Controls
The Delegated Officer is not imposing any additional conditions on the Licence as the offence provisions relating to the causing of pollution and environmental harm outlined in Division 1, Part V of the EP Act apply, as does relevant subsidiary legislation including the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

TSF Decant Line – Stormwater discharge to Kangeenarina Creek
The Licensee has an emergency decant line in place at the TSF to allow for discharge of decant water to Kangeenarina Creek, as a contingency measure during high rainfall events. DWER has assessed the contingency discharge of TSF decant water to Kangeenarina Creek, detailed below.

Emission Description
Emission: Contingency discharge of TSF decant water/stormwater to Kangeenarina Creek during high rainfall events.

Impact: Deterioration of surface water quality and increased turbidity/downstream sedimentation leading to ecosystem disruption. Kangeenarina Creek contains several groundwater fed pools which could be effected. Erosion of creek bed at discharge point.

Controls: The TSF provides sufficient capacity that storm events will generally not result in overtopping of the embankment. The decant line is a contingency measure to allow for discharge of decant water to Kangeenarina Creek, if required.

A contingency bypass pipeline extends past the decant/seepage water storage pond to allow for stormwater from an extreme storm event to be released to Kangeenarina Creek. Rock armouring has been constructed and a stilling basin installed to dissipate the energy of the flow.

Geochemical characterisation of mine waste samples has identified that tailings supernatant produced by the OPFs can be assumed to be geochemically inert and not considered a contaminant risk for surface waters.

The pools immediately downstream of the TSF contingency discharge point are located within the future Solomon mine pit area, and are therefore approved for disturbance under MS 1062. The Licensee has existing obligations under Part IV of the EP Act – MS 1062 condition 10-4 to "*continue to implement the Kangeenarina Pools Supplementation Plan – Northern Pools Addendum 600SO-00018-RP-HY-0003 until notified by the CEO that the plan meets the requirements of conditions 10-1(3), and 10-1(4)*".

Risk Assessment

Consequence: The impact from the discharge of TSF decant water and stormwater to Kangeenarina Creek could result in midlevel onsite impacts and low level off-site impacts at a local scale due to the geochemical characterisation of the tailings and supernatant water. It is also noted that discharge will only occur during and/or following significant rainfall events; effectively diluting the tailings liquor prior to discharge. Therefore, the consequence is moderate.

Likelihood: Based on the Licensee controls (sediment and erosion control) and infrequent use of the contingency option, impacts to Kangeenarina Creek from the discharge of TSF decant water and stormwater will not occur in most circumstances. Therefore, the likelihood of the consequence is unlikely.

Overall Risk Rating: Comparison of the consequence and likelihood ratings described above with the Emissions Risk Matrix (Table 2) determines the overall rating of risk for the contingency discharge of decant water and stormwater from the TSF during high rainfall events to Kangeenarina Creek to be **medium**, subject to regulatory control.

Regulatory Controls

Condition 3.4.1 specifies monitoring requirements that need to be implemented when contingency discharge of decant water from the TSF is undertaken during high rainfall events. The results of this monitoring will be reported to DWER via the AER, required under condition 4.2.1.

The Delegated Officer notes that the ambient water quality of the northern pools of Kangeenarina Creek are monitored under the *Kangeenarina Pools Supplementation Plan – Northern Pools Addendum 600SO-00018-RP-HY-0003* required under MS 1062. Noting this, conditions relating to the monitoring of the ambient surface water quality of Kangeenarina Creek have not been applied to the Licence.

The contingency discharge point will be inspected during DWER compliance inspections to determine if erosion at the discharge point is occurring.

References

	Document title	In text ref	Availability
1	AS 1940:2017 Australian Standard - The storage and handling of flammable and combustible liquids	AS 1940:2017	accessed at www.standards.org.au
2	AS/NZS 3678:2011 Australian/New Zealand Standard – Structural steel – Hot-rolled plates, floorplates and slabs	AS/NZS 3678:2011	accessed at www.standards.co.nz
3	Chemical and Hydrocarbon Management Plan (100-PL-EN-0011), Fortescue Metals Group Ltd, July 2014	Chemical and Hydrocarbon Management Plan	DWER records (A1570664)
4	Code of Practice for Tailings Storage Facilities in Western Australia, Department of Mines and Petroleum, 2013	Code of Practice for Tailings Storage Facilities in Western Australia	accessed at www.dmp.wa.gov.au
5	Department of Parks and Wildlife Threatened and Priority Flora List, 8 March 2017	DBCA, 2017b	accessed at https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities
6	*Guidance Statement: Decision Making*, Department of Environment Regulation, February 2017	*Guidance Statement: Decision Making*	accessed at www.dwer.wa.gov.au
7	*Guidance Statement: Environmental Siting*, Department of Environment Regulation, November 2016	*Guidance Statement: Environmental Siting*	
8	*Guidance Statement: Licence duration,* Department of Environment Regulation, August 2016	*Guidance Statement: Licence duration*	
9	*Guidance Statement: Setting Conditions,* Department of Environment Regulation, October 2015	*Guidance Statement: Setting Conditions*	
10	*Guidance Statement: Risk Assessments*, Department of Environment Regulation, February 2017	*Guidance Statement: Risk Assessments*	
11	*Guideline: Annual Audit Compliance Reports*, Department of Environment Regulation, August 2016	*Guideline: Annual Audit Compliance Reports*	
12	Guidelines for the Non-potable Uses of Recycled Water in Western Australia, Department of Health, August 2011	Guidelines for the Non-potable Uses of Recycled Water in Western Australia	accessed at http://ww2.health.wa.gov.au

	Document title	In text ref	Availability
13	Landfill Waste Classifications and Waste Definitions 1996 (As amended 2009, Department of Environment and Conservation	Landfill Waste Classifications and Waste Definitions 1996	accessed at www.dwer.wa.gov.au
14	Licence L8464/2012/2, amended 19 June 2017	L8464/2012/2	
15	Licence Amendment – L8464/2010/2 – Ambient Groundwater Monitoring (UID: 72942), Fortescue Metals Group, 29 September 2017	FMG, 2017	DWER records (A1535596)
16	List of Threatened Ecological Communities (TECs) endorsed by the Western Australia Minister for Environment, Species and Communities Branch (Correct as at 6 October 2016)	DBCA, 2016	accessed at www.dpaw.wa.gov.au
17	Ministerial Statement 862	MS 862	accessed at http://www.epa.wa.gov.au
18	Ministerial Statement 1062	MS 1062	
19	Priority Ecological Communities for Western Australia version 27, Species and Communities Branch, Department of Biodiversity, Conservation and Attractions, 30 June 2017	DBCA, 2017a	accessed at https://www.dpaw.wa.gov.au
20	Proposed Amendment to Licence L8464/2010/2 – Landfill Ambient Groundwater Monitoring Bore (UID-76867), Fortescue Metals Group, 10 January 2018	FMG, 2018	DWER records (A1593816)
21	Review of Water Quality Issues in Neutral pH Drainage: Examples and Emerging Priorities for the Mining Industry in Canada. MEND Report 10.1, report prepared by Stantec Consulting Ltd for The MEND Initiative, November 2004	MEND, 2004	accessed at http://mend-nedem.org/mend-report/review-of-water-quality-issues-in-neutral-ph-drainage-examples-and-emerging-priorities-for-the-mining-industry-in-canada/
22	Solomon Iron Ore Project, Fortescue Metals Group Limited. Report and recommendations of the Environmental Protection Authority, Report 1386, March 2011	Report 1386	accessed at http://www.epa.wa.gov.au
23	Solomon Iron Ore Project – Sustaining Production, Fortescue Metals Group Ltd. Report and recommendations of the Environmental Protection Authority, Report 1588, November 2016	Report 1588	
24	Solomon Iron Ore Project –	Tailings Seepage	DWER records (A1192983)

	Document title	In text ref	Availability
	Tailings Seepage Report SO-RP-EN-0111, Fortescue Metals Group Ltd, 21 August 2015	Report	
25	Solomon TSF Raise and Minor Works – Licence Amendment Application (SO-AP-EN-0070) – Solomon Project, Fortescue Metals Group Ltd, November 2016	FMG, 2016	DWER records (A1192983)
26	Surface Water Management Plan (100-PL-EN-1015), Fortescue Metals Group Ltd, December 2014	Surface Water Management Plan	DWER records (A1570758)
27	Water quality protection note no. 25, Land use compatibility tables for public drinking water source areas, Department of Water, April 2016	Water Quality Protection Note 25: *Land compatibility tables for public drinking water source areas*	accessed at https://www.water.wa.gov.au