Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Licence Number	L9221/2019/1
Licence Holder	Fortescue Metals Group
ACN	002 594 872
File Number:	DER2019/000542~1
Premises	Eliwana Iron Ore Mine Part of tenements M47/1524 and M47/1523 As defined by the coordinates in Schedule 1 of the licence
Date of Report	**21/05/2020**
Decision	**FINAL**

1. Definitions and interpretation

Definitions

In this Amendment Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Amendment Report	refers to this document
BOD	Biochemical Oxygen Demand
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
cfu/100ml	Colony forming unit per 100 millilitres
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DMIRS	Department of Mines Industry Regulation and Safety
DO	Dissolved Oxygen
DOH	Department of Health
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)

Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
EC	Electrical conductivity
ERL	Exposure risk level
kL	Kilolitres
Licence Holder	Fortescue Metals Group
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mg/L	Milligrams per litre
mS/cm	Microsiemens per centimetre
mtpa	million tonnes per annum
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Report applies, as specified at the front of this Amendment Report.
Revised Licence	the amended Licence issued under Part V, Division 3 of the EP Act, with changes that correspond to the assessment outlined in this Amendment Report.
TDS	Total dissolved solids
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
Risk Event	as described in *Guidance Statement: Risk Assessment*
RO	Reverse osmosis
SAR	Sodium adsorption ratio
WWTP	Waste Water Treatment Plant

2. Amendment Description

The following guidance statements have informed the assessment and decision outlined in this Amendment Report.

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guideline: Decision Making (June 2019)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

2.1. Background

Fortescue Metals Group (FMG) is developing the Eliwana Iron Ore Mine project located approximately 90km north-west of Tom Price in the Pilbara Region of Western Australia.

On 3 December 2019 DWER granted licence L9221/2019/1 related to the operation of a mobile crushing and screening facility (MCSF) required to produce construction material for the project.

On 23 August 2019 DWER granted works approval W6245/2019/1 related to the construction of the Eliwana Mine Waste Water Treatment Plant (WWTP). The works approval was amended on 20 February 2020. The Eliwana WWTP is required to service the Eliwana mine accommodation village.

2.2. Purpose and scope of assessment

On 15 January 2020 FMG submitted an application to amend Licence L9221/2019/1 for the proposed operation of the Eliwana WWTP and associated addition of Category 54 onto the licence.

FMG operates an additional WWTP (known as Eliwana Exploration Fly Camp WWTP) located within tenement M47/1509. DWER issued Registration ref R2451/2017/1 for this particular WWTP on 16 August 2017 for Prescribed Premises Category 85, under Schedule 1 Part 2 of the *Environmental Protection Regulations 1987*. FMG proposed this additional WWTP be added to Licence L9221/2019/1. However, DWER has determined that Registration R2451/2017/1 will not be amalgamated with the Licence as outlined in section 8 of this report.

2.3. Operational details

Overview

The Eliwana Mine WWTP is located approximately 3km south of the main channel of Duck Creek. Treated effluent is discharged to a new spray field located to the south of the WWTP. The location and footprint of the WWTP and sprayfield is shown in Figures 1 and 2.

The WWTP treats up to 350m^3 per day of raw sewage from the mine camp, administration and construction offices. The WWTP system includes the following:

- Influent screening;
- Balance tank mixing;
- Aerobic and anoxic treatment;
- Effluent chlorination;
- Effluent mixing with brine (from RO plant); and

- Spray field irrigation.

The quality of effluent discharged from the WWTP is monitored and reported.

Figure 1: Premises boundary map for prescribed premises Category 54 activity

Figure 2: As constructed layout of Eliwana WWTP

Process description

The wastewater treatment process flow is illustrated in Figure 3.

Influent screening and flow balancing

Sewage from the village pump station is pumped to a self-cleaning Rotary Screen which is installed on an elevated platform adjacent to the Balance Tank. Discharge from the Influent Screen flows via gravity to the Balance Tank. The Balance Tank includes a Mixer Pump which operates continuously and maintains the contents of the tank in suspension. The Balance Tank provides buffer storage capacity for 50% of the Average Dry Weather Flow.

A recycle flow of aerated liquor from the Aeration/Decant Tank is pumped to the Balance Tank where it is blended with the screened influent by the Mixer Pump. This recycled aerated liquor stream prevents the generation of odours and assists with the selector effect which favours floc forming bacteria and contributes to the elimination of filamentous bulking.

The recycled liquor stream is rich in Nitrate. Nitrogen and any dissolved oxygen present is scavenged in the Balance Tank due to the presence of BOD in the influent sewage. The Balance Tank level control system starts the Influent Feed Pump when required.

Anoxic Tank

Screened sewage blended with recycled mixed liquor is drawn from the Balance Tank and directed via the Influent Feed Pump to the Anoxic Tank to yield an environment devoid of oxygen and conducive to denitrification. Denitrification requires a substrate (food) source and anoxic conditions.

As any excess dissolved oxygen is scavenged in the upstream balance tank, the anoxic tank provides true anoxic conditions.

Dissolved oxygen is added to the Aeration/Decant tank through the aeration process with two aeration pumps. During periods of low load on the plant, Dissolved Oxygen (DO) in the Aeration/Decant Tank can increase and if unchecked can result in excessive oxygen being recycled to the Anoxic Tank. A Dissolved Oxygen (DO) Monitor/Controller is fitted to the Aeration/Decant Tank and controls the stopping and starting of Aeration Pump No 2.

The Anoxic Tank level is measured using a Hydrostatic Level Transducer. The analogue level signal is continuously monitored by the Programmable Logic Controller which starts the Forward Transfer Pump when required.

Aeration/Decant (A/D) Tank Sequences

The duty/standby Forward Transfer Pump delivers the blended liquor from the Anoxic Tanks to the Aeration/Decant Tank. Here it is aerated during the fill period, and the Recycle Pump returns a constant flow of nitrified mixed liquor back to the Balance Tank and subsequently to the Anoxic Tanks for denitrification. The recycle flowrate from this pump is controlled by selection of appropriately sized plumbing between the pump discharge outlet and the Balance Tank.

When the Aeration/Decant Tank reaches its top working level, the Programmable Logic Controller via a signal from the Level Sensor, inhibits the operation of the Forward Transfer Pump and Recycle Pump and initiates a 15minute precipitant chemical dosing phase. During precipitant dosing, the aerators remain in operation to ensure effective mixing of the precipitant with the liquor in the Aeration Tank. At the conclusion of the precipitant dosing, the aerators operate for a further 2 minutes to ensure complete mixing of the chemical. The contents of the Aeration Tank are then allowed to settle for 60 minutes. Influent to the plant during this time is

now accumulating in the Balance Tank.

During aeration, suspended solids can enter the Floating Decanter Device where they lodge. Therefore, near the end of the 1 hour settling period, the Recycle Pump is operated for 30 seconds and purges the piping circuits with clear supernatant and discharges it back to the balance tank thereby purging any suspended solid from the plumbing. At the end of the 60minute settling period a decant sequence is initiated and the top layer of clear supernatant liquid is drawn off by the Floating Decanter Device and directed by the Decant Pump, to the Effluent Tank. The treated effluent is chlorinated when in transit to the Effluent Tank.

When the LO Level or bottom working level point in the Aeration/Decant Tank is reached, the Decant Pump stops, and the Aerator, Forward Transfer and Recycle Pumps restart to commence a new aeration/fill cycle.

If, prior to an expected peak load period, the Aeration/Decant Tank mid-level point is activated on rising level, during a pre-set time window, an additional settle/decant sequence is initiated. This is timed to be finished by the beginning of the expected peak period. In this way, the system is emptied to its minimum level in preparation to receive the following peak load flows.

Effluent Disposal Sequences

After the chlorinated decant flow has entered the Effluent Tank, it is held for a 30-minute period to provide required chlorine contact time for disinfection. After this it is discharged via an air actuated valve to the Reverse Osmosis (RO) brine tank from where it is blended with small quantity of Reverse Osmosis concentrate before being discharged via sprinklers to the sprayfield from the duty/standby effluent pump.

RO Tank

The RO Brine Tank sits at the end of the WWTP process where brine is received from the RO Plant and effluent is received from the Effluent Tank. Both liquors are mixed prior to being irrigated into the sprayfield via a sprinkler system.

The brine source is from 2 x 350 kL/day RO plants that are used to supply potable water for the project. The Licence Holder has confirmed that each RO plant is capable of discharging 70kL of brine per day. However, only one RO plant is operational at any one time, as the additional RO plant is used as a back up during a maintenance or breakdown period. Therefore, up to 70kL/day of brine will be mixed with treated sewage prior to discharge to the sprayfield.

Sludge Disposal Sequence

A Huber inclined sludge dewatering press is installed on an elevated platform which facilities the discharge of filtrate via gravity to the balance tank and of dried sludge into a skip bin. Sludge is pumped from the sludge storage tank to the Huber press via a positive displacement sludge pump. Whilst in transit, the sludge is dosed with a dewatering polymer which facilitates the removal of water from the sludge when inside the press.

Dried sludge will be removed periodically from the skip bin by a licensed carrier and taken off-site for disposal at a licensed facility.

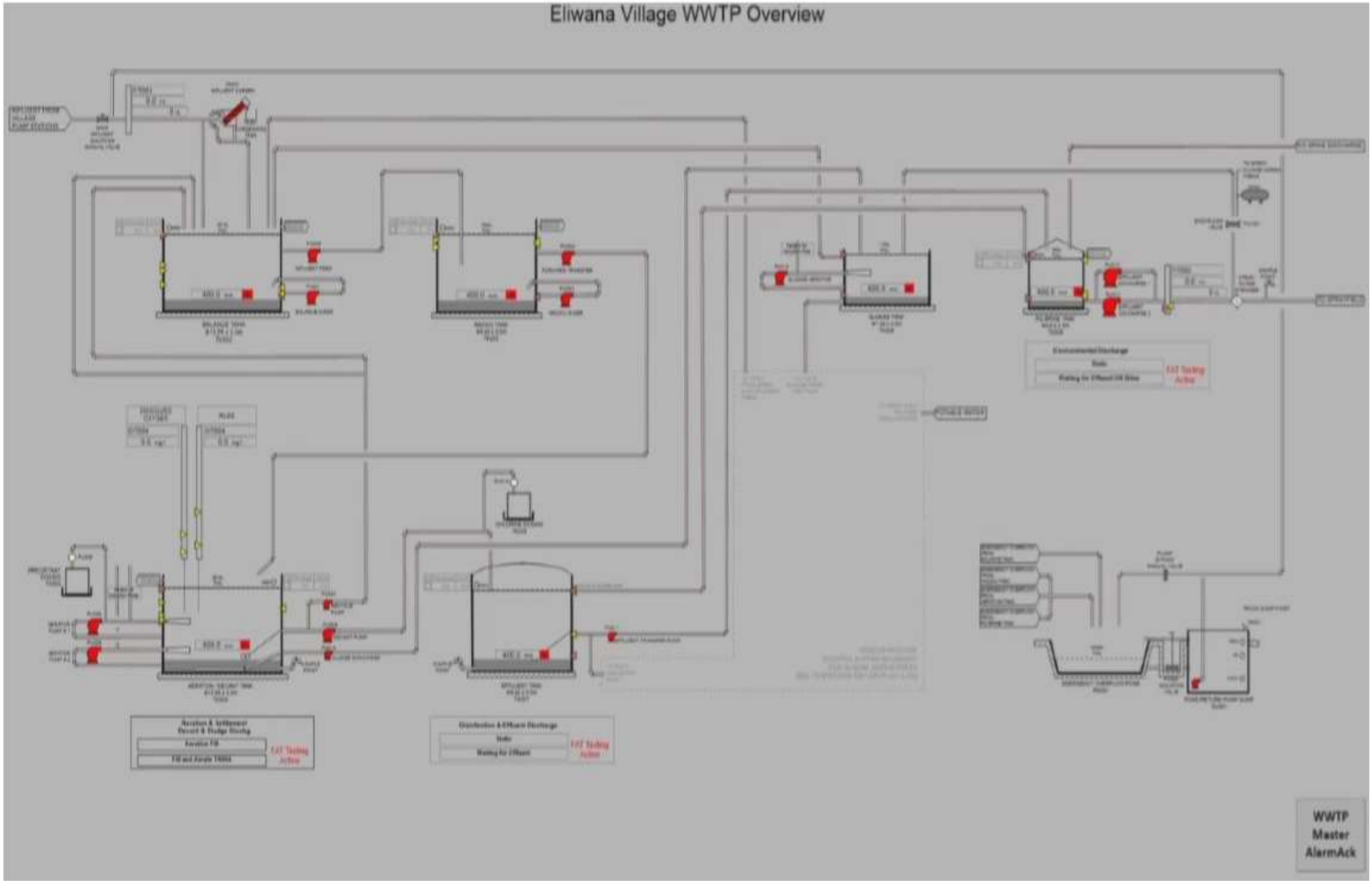

Figure 3 Eliwana WWTP process flow diagram

Treated wastewater disposal

Effluent disposal will be undertaken using a dedicated spray irrigation field. A flow meter is installed to measure the volume of the treated effluent that discharges to the sprayfield. The perimeter of the spray irrigation field is situated a minimum of 5 m from the sprinkler spray pattern to allow for spray drift. Sprinklers closest to the wire fence (perimeter fence) are designed to operate with a 180 degree spray arc facing inward from the fence. The WWTP was designed to meet the effluent specifications detailed in Table 2 below.

The WWTP was designed to meet the low exposure risk level (ERL) (level of human contact) detailed in *Guidelines for non-potable uses of recycled water in Western Australia* (Department of Health, 2011). Target values for E.coli, suspended solids, pH, and chlorine are in line with the low ERL compliance values.

The sprayfield design considered the nutrient application criteria detailed in *Water Quality Protection Note 22 (WQPN22): Irrigation with nutrient rich wastewater (Department of Water, 2008).* The Licence Holder has calculated nutrient application rates will be 480 kg/hectare/year (nitrogen) and 120 kg/hectare/year (phosphorus) and calculated a sprayfield area of 7.98 hectares would be required to control eutrophication risk (for surface waters within 500m of the irrigation site).

The Licence Holder has designed and constructed a sprayfield of 18.88 hectares and proposes that this sizing is adequate to prevent ponding and adverse impacts on soils and vegetation health.

Table 2: Expected treated effluent quality during operation

Parameter	Concentration
5-Day Biochemical Oxygen Demand (BOD_5)	<20 mg/L
Total Suspended Solids (TSS)	<30 mg/L
Total Nitrogen (TN)	<30 mg/L
Total Phosphorus (TP)	<7.5 mg/L
E.coli	<1000 cfu/100 mL
Residual Free Chlorine	>0.5 mg/L – <2.0 mg/L
pH	>6.5 – <8.5
Total dissolved solids (TDS)	<1000mg/L

WWTP treated effluent monitoring

The volume of treated effluent discharged via the spray irrigation field is recorded. Analysis of treated effluent includes the parameters detailed in Table 3 below.

Table 3: WWTP effluent parameters

Parameter	Unit
5-Day Biochemical Oxygen Demand (BOD_5)	mg/L
Total Suspended Solids (TSS)	mg/L
Total Nitrogen (TN)	mg/L
Total Phosphorus (TP)	mg/L
E.coli	cfu/100ml
Residual Free Chlorine	mg/L
pH	N/A
Total dissolved solids (TDS)	mg/L

2.4. Infrastructure

The WWTP and disposal sprayfield infrastructure, as it relates to a Category 54, is detailed in Table 4 and with reference to the Site Plan.

Table 4: WWTP facility infrastructure

	Infrastructure	**Site Plan Reference**
	Prescribed Activity Category 54 WWTP (design capacity of 350 kL/day) consisting of the following infrastructure	
1	WWTP comprising: ▪ Fully automated WWTP via electrical control board (can also be operated manually if necessary) ▪ Rotary screen ▪ Balance tank (bolted zincalume steel panel tank with heavy polyethylene liner) ▪ Aeration / decant tank with aeration pumps and floating decanter ▪ Anoxic tank ▪ Final effluent tank with floating decanter (irrigation tank) ▪ Truck dump and pond return pump station ▪ Sludge screw dewatering press ▪ Sludge storage tank ▪ Screenings tank ▪ Polymer holding tank ▪ Liquid chlorine holding tank ▪ 700 kl emergency overflow pond constructed with heavily compacted earth ▪ Dewatered sludge skip bin ▪ Treated water discharge pipeline to irrigation field	Schedule 1 of the licence – WWTP layout map

	▪ Flow meters (inlet to WWTP and outlet to the sprayfield) ▪ Transfer pumps and valves ▪ Filters ▪ Alarm system on SCADA or text alert to operate if: ➢ pump/s fails ➢ high WWTP tank levels ➢ tank/s overflows ➢ any wastewater spills into emergency overflow pond	
2	Cutoff drains and/or bunds to direct stormwater away from the WWTP work areas.	Schedule 1 of the licence – WWTP layout map
3	Impervious and fully enclosed RO brine storage tank designed to store up to 70kL /day of brine before blending with final effluent.	
4	18.88 ha wastewater sprayfield consisting of: • irrigation delivery pipes, pumps, switches, valves and above ground sprinklers • enclosed by a two strand wire fence with signage and access gate • 5m spray drift buffer from the edge of the sprinkler radius	
5	Self - bunded sea container for chemical storage	

3. Other approvals

The Licence Holder has obtained other approvals for the project summarised in Table 5 below.

Table 5: Other approvals

Legislation	Number	Approval
Part IV of the *Environmental Protection Act 1986 (WA)*	N/A	Notice of decision to consent minor or preliminary works – Eliwana Iron Ore Mine Project Assessment No.2125 – dated August 2018.
	Statement number: 1109 Eliwana Iron Ore Mine Project	Statement that a proposal may be implemented pursuant to section 45 of the *Environmental Protection Act 1986.*
Environmental Protection and *Biodiversity Conservation Act 1999 (Cth EPBC Act)*	EPBC 2017/8024	Approval of action under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* – Eliwana Iron Ore Mine Project Dated 25 September 2019
Rights in Water and Irrigation Act 1914	*GWL202596 (1)*	Licence to take water - 1,600,000 kL per annum from sources within tenement M47/1524 for earthworks/construction, dust suppression and camp purposes. Licence issued 22 March 2019 for a 2 year term.

4. Compliance with works approval

The Licence Holder submitted a report proposing that the WWTP infrastructure was constructed in accordance with the requirements detailed under Condition 1 of works approval W6245/2019/1. DWER has reviewed this report and acknowledges the Licence Holder's compliance with Condition 1 of the works approval.

It is noted that the Licence Holder has constructed a sprayfield which is larger than the sprayfield area noted in works approval W6245/2019/1. The works approval assessment noted an 8.75 hectare sprayfield, however an 18.8 hectare sprayfield has been constructed. DWER notes that the larger sprayfield area is nonetheless within the WWTP infrastructure footprint assessed in works approval W6245/2019/1. DWER has also considered the larger sprayfield area in the risk assessment and licence determination.

Under works approval W6245/2019/1 the Licence Holder was authorised to undertake commissioning of the WWTP for a period of up to 120 days. The commissioning report submitted by the Licence Holder is generally compliant with reporting condition 14 of works approval W6245/2019/1.

5. Sensitive premises and environmental receptors

5.1 Sensitive premises

There are no residential/sensitive premises in the vicinity of the WWTP that may be impacted as a result of emissions/discharges from the WWTP.

The nearest town is Pannawonica, located approximately 98km north-west of the WWTP.

The Licence Holder's Eliwana Iron Ore Mine Environmental Review report, section 4.9.4.3 (October 2018) provides a review of the location of homesteads in the vicinity of the mine development envelope. The nearest homesteads are Duck Creek and Mount Brockman homesteads located 10km and 12kms away from the mine development envelope. The homesteads are therefore at least 10kms away from the WWTP footprint.

DWER has determined that this assessment will not consider the risk of potential impacts to people in accommodation camps occupied by the Licence Holder. Potential impacts to people at these locations are subject to requirements under occupational health and safety regulations and obligations, therefore, DWER considers that people at the accommodation camp are excluded as potential receptors.

5.2 Environmental receptors

Table 6 lists the environmental receptors in the vicinity of the WWTP which may be impacted by the WWTP operation.

Table 6: Environmental receptors and distance from activity boundary

Environmental receptors	Approximate distance from WWTP
Specified ecosystems	
Priority flora: *Indigofera sp. Bungaroo creek* (S. van Leeuwen 4301) (Priority 3) *Eragrostis surreyana* (Priority 3)	Potentially in the vicinity of the WWTP footprint

Other environmental receptors	
Native vegetation	In the vicinity of the WWTP and sprayfield (but not within)
Groundwater	> 2m below ground level
Unnamed ephemeral creeks	The nearest downstream creeks are approximately 480m north-east and 300m north-west of the WWTP The sprayfield is located approximately 140m away from the nearest ephemeral creek.

Ministerial Statement 1109 authorises the clearing of up to 7,900 hectares of native vegetation within the 43,804 hectare mine development envelope. It is understood that clearing of native vegetation is authorised within the WWTP/sprayfield footprint as this falls within the indicative disturbance footprint shown in Figure 1 of Ministerial Statement 1109.

As native vegetation within the WWTP and sprayfield footprint is authorised to be cleared DWER has excluded such vegetation in the risk assessment.

6. Risk assessment

Table 7 below describes the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. The table identifies whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 7: Risk assessment for proposed amendments during operation

Risk Event				Consequence rating[1]	Likelihood rating[1]	Risk[1]	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	**Potential emissions**	**Potential receptors, pathway and impact**	**Applicant controls**					
Operation of WWTP	Untreated sewage and brine spilled from the WWTP facility Untreated sewage and brine spilled due to leak in sewage/brine pipelines	**Potential receptors:** Soils; Native vegetation (outside of WWTP and pipeline footprint); Ephemeral creeks (downstream) Groundwater **Pathways:** Overland flow; Infiltration to groundwater. **Impacts:** Soil contamination Adverse impact on vegetation health; Groundwater contamination (elevated levels of pathogens, salts and nutrients)	▪ The WWTP is a closed system designed to treat 350kL raw sewage per day. ▪ WWTP technology to stop pumps operating at set levels; ▪ Alarm system to alert operator/s to potential/actual spill events; ▪ 700 kL emergency overflow pond designed to capture spills and return waste water to the WWTP.	Minor	Unlikely	Medium	On site low level impacts are anticipated from a spill at the WWTP. However, a spill is not expected to occur in most circumstances given the design and contingency measures implemented by the Licence Holder. In the unlikely event of a sewage/brine pipeline leak, low level impacts are anticipated within or in the vicinity of the premises	The risk event is acceptable subject to regulatory controls summarised below <u>Operational requirements</u> ▪ Operate and maintain spill prevention technology ▪ Operation and maintenance of WWTP alarm system ▪ Maintain the WWTP infrastructure in good working order to prevent and manage spills <u>Reporting requirements</u> ▪ Reporting of incidents in the AER.
	Untreated sewage and brine spilled from the WWTP facility Untreated sewage and brine spilled due to leak in sewage/brine pipelines	**Potential receptors:** **Priority flora** in vicinity of WWTP (*Indigofera sp. Bungaroo creek & Eragrostis surreyana).* **Pathway:** Overland flow **Impact:** Adverse impact on vegetation health	N/A	N/A	N/A	N/A	Impacts to priority flora are considered to be assessed and regulated under Part IV of the EP Act – i.e. Ministerial Statement 1109 condition 7.	Impacts to priority flora are considered to be assessed and regulated under Part IV of the EP Act – i.e. Ministerial Statement 1109 condition 7.

Risk Event				Consequence rating[1]	Likelihood rating[1]	Risk[1]	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	**Potential emissions**	**Potential receptors, pathway and impact**	**Applicant controls**					
	Treated effluent **(treated wastewater blended with waste RO brine)** spilled due to leak in sprayfield pipeline	**Potential receptors:** Soils; Native vegetation; Ephemeral creek (downstream); Groundwater. **Pathway:** Overland flow; Infiltration to groundwater **Impact:** Soil contamination; Adverse impact on vegetation health; Groundwater contamination (elevated levels of pathogens, salts and nutrients)	None reported	Minor	Unlikely	Medium	In the unlikely event of a pipeline leak, low level impacts or minimal impacts are anticipated within or in the vicinity of the premises.	The risk event is acceptable. Due to the expected low/minimal impact (in the unlikely event of a pipeline leak) regulatory controls are not required in this case.
	Treated effluent (treated wastewater blended with waste RO brine) discharged at the irrigation sprayfield – *potential for elevated pathogens, suspended solids, salts, nitrogen and phosphorus*	**Potential receptors:** Soils (within sprayfield area) **Pathway:** Direct contact **Impact:** Elevated levels of salts and nutrients; Establishment of weed species.	▪ Blending of treated wastewater with waste RO brine prior to discharge;; ▪ Monitoring of the volume of effluent discharged to the sprayfield; ▪ Monitoring of effluent quality to verify the WWTP performance; ▪ Sprayfield area designed to mitigate contaminant application rates	Minor	Possible	Medium	Elevated levels of salts, nitrogen and phosphorus in soils could occur at some time and facilitate the establishment of weed species. On site (within sprayfield area) low level impacts are anticipated.	The risk events are acceptable subject to regulatory controls summarised below <u>Siting</u> ▪ Treated wastewater blended with waste RO brine to be discharged within the sprayfield area only Emission ▪ Authorised emission is treated wastewater blended with waste RO brine. <u>Monitoring requirements</u> ▪ <u>Monitoring of the</u> volume of brine received at the RO brine tank (located at the WWTP facility); ▪ Monitoring of the volume of effluent discharged to the sprayfield. ▪ Monitoring of effluent quality to verify WWTP performance <u>Reporting requirements</u> ▪ Reporting of monitoring outcomes in the AER.
		Potential receptors: Groundwater **Pathway:** Infiltration to groundwater **Impact:** Groundwater contamination (elevated levels of pathogens, salts and nutrients)		Minor	Unlikely	Medium	Elevated levels of pathogens, salts, nitrogen and phosphorus in groundwater will probably not occur in most circumstances due to the method of effluent application; high evaporation rates and depth to groundwater. Impacts are anticipated to be: ▪ On site low level impacts (at the sprayfield area). ▪ Off-site impacts (away from sprayfield area) are expected to be minimal or not detectable.	

Risk Event				Consequence rating[1]	Likelihood rating[1]	Risk[1]	Reasoning	Regulatory controls (refer to conditions of the granted instrument)
Source/Activities*	**Potential emissions**	**Potential receptors, pathway and impact**	**Applicant controls**					
		Potential receptors: Soils and native vegetation in the vicinity of the sprayfield **Pathway:** Spray drift. **Impact:** Elevated levels of salts and nutrients in soils; Adverse impact on vegetation health; Establishment of weed species.	▪ Discharge of treated wastewater only; ▪ Monitoring of effluent quality to verify the WWTP performance; ▪ Sprayfield perimeter sprinklers designed to operate with a 180 degree spray arc facing inward; ▪ Sprinkler spray pattern designed to be a minimum of 5m from the sprayfield perimeter to allow for spray drift.	N/A	N/A	N/A	The sprayfield is designed to minimise spray drift to adjacent areas. Spray drift is not expected to have an adverse impact on soils and vegetation in areas surrounding the sprayfield.	N/A
		Potential receptors: Soils and native vegetation in the vicinity of the sprayfield and ephemeral creeks **Pathway:** Runoff from sprayfield **Impact:** Elevated levels of salts and nutrients in soils; Adverse impact on vegetation health; Establishment of weed species.	▪ Discharge of treated wastewater only; ▪ Monitoring of effluent quality to verify the WWTP performance; ▪ Sprayfield sized to prevent ponding ▪ Sprayfield sited away from creek lines (ephemeral creeks).	Minor	Rare	Low	Off-site local scale minimal impacts. Run off from the sprayfield area is not expected to occur given the effluent application method, sprayfield sizing and evaporation at the site.	The risk event is acceptable subject to regulatory controls summarised below <u>Siting</u> ▪ Treated wastewater to be discharged within the sprayfield area only.
Bulk storage of chemicals	**Spill of chemicals used in the waste water treatment process – i.e. Chlorine**	**Potential receptors:** Soils; Native vegetation (outside of WWTP footprint). **Pathway:** Overland flow. **Impact:** Soil contamination; Deceased vegetation.	Self - bunded sea container for chemical storage	Slight	Rare	Low	On site minimal impacts. A spill may only occur in exceptional circumstances given the containment measures implemented by the Licence Holder.	The risk event is acceptable and not subject to regulatory controls.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the Department's Guidance Statement: Risk Assessments (February 2017)

7. Consultation

Table 9: Summary of consultation

Method	Summary of comments received	DWER response
Request for comment to DMIRS	DMIRS has no objections or comments to provide.	Submission noted.
Request for comment to Shire of Ashburton	No submission received	Noted.
Submission from Department of Health (DOH)	"The DOH provides the following comment: The DOH has approval No 87.19 for the 1000EP Eliwana Village WWTP granted for a total irrigation area of 12.3Ha (not 8.75 Ha as indicated in the Licence Amendment Report). It is noted that brine from the RO plants is mixed with the treated wastewater prior to discharge via the spray field. However, there is no information provided on: • the volumes of RO brine produced per day; • the capacity of the RO brine tank and; • the water balance calculations to determine the adequacy of the proposed expansion x18.8Ha irrigation area".	The Licence Holder has confirmed that each RO plant is capable of discharging 70kL of brine per day. However, only one RO plant is operational at any one time, as the additional RO plant is used as a back up during a maintenance or breakdown period. Therefore, up to 70kL/day of brine will be mixed with treated sewage prior to discharge to the sprayfield. The Licence Holder has reported a 70kL RO brine tank has been constructed at the WWTP facility. DWER has considered the above information and the larger sprayfield area in the risk assessment and licence determination.

8. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that the licence amendment relating to Prescribed Premises Category 54 will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

The Delegated Officer has determined that the proposed addition of the Eliwana Exploration Fly Camp WWTP (Registration R2451/2017/1) to the Licence will not be granted as this particular activity is well outside of the boundary of the Licence (L9221/2019/1) premises. The registered WWTP is located within tenement M47/1509 which is approximately 24kms south-east of the Eliwana WWTP. However, under Registration R2451/2017/1 the Eliwana Exploration Fly Camp WWTP continues to be an authorised Prescribed Premises.

8.1. Summary of amendments

Table 10 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the revised licence as part of the amendment process.

Table 10: Licence amendments

Condition No.	Proposed amendments
1	New condition regarding the disposal of biosolids from the WWTP
2	Amended condition to include operational requirements for the Eliwana WWTP
3	New condition regarding authorised discharge point for emissions
4	New condition regarding operational requirements for the WWTP sprayfield
5 & 6	New conditions regarding emissions and discharge monitoring for the WWTP
7	Amended to update condition numbering and include item (d)
10	Amended to require the submission of the AACR by 31 March each year
11	New condition regarding the required submission of an Annual Environmental Report.
Definitions	Definition of annual period amended
Schedule 1 Maps	Additional premises boundary map for prescribed premises Category 54 Addition of as constructed layout map for the Eliwana WWTP;

Alana Kidd
Manager - Resource Industries

An officer delegated by the CEO under section 20 of the EP Act

Appendix 1: Key documents

Document title	In text ref	Availability
Works Approval W6245/2019/1, issued on 23 August 2019. Including Decision Report dated 23 August 2019 and Amendment Report dated 20 February 2020.	Works Approval	https://www.der.wa.gov.au/our-work/licences-and-works-approvals
Licence amendment application including: - Cover letter - Application form, dated 15 January 2020 - Application supporting document, dated 15 January 2020	Application	DWERDT244684
Eliwana WWTP construction compliance report required under Condition 3 of works approval W6245/2019/1, dated 28 November 2019	Application	A1862056
Licence amendment application – supporting figures, submitted on 4 March 2020	Application	A1873135
Licence amendment application – as constructed layout map of WWTP, submitted on 3 April 2020 and 6 April 2020	Application	A1883439, A1883438
Submission from DMIRS dated 20 March 2020	N/A	A1877901
Submission from Department of Health, dated 6 April 2020	N/A	A1882744
Commissioning report - Eliwana mine WWTP W6245/2019/1, dated 14 April 2020	Application	DWERDT272460
Submission from Licence Holder received on 15 May 2020	Application	A1894561

Appendix 2: Summary of Licence Holder comments on risk assessment and draft conditions

The Licence Holder was provided with the draft Amendment Report on 23 April 2020 for review and comment. The Licence Holder responded on 15 May 2020. The following comments were received on the draft Amendment Report and draft Amended Licence.

Report section / Condition	Summary of Licence Holder comment	DWER response
Title page in amendment report and Licence	Please refer to the Premises as the Eliwana Iron Ore Mine	Premises name updated on page 1 of the Licence and the Amendment Report
Licence title page	The Table on the title page refers to the assessed capacity of the WWTP as 350 m3 per day. Whilst Category 54 refers to a threshold limit in m3 per day, Fortescue reports its daily output in kL per day	Noted.
Licence - Page 2	Table at top of the page, please refer to the Eliwana Mine WWTP.	Amended – Licence history table refers to the amendment to add Category 54 for the operation of the Eliwana Mine WWTP
Condition 2, Table 1	Daily Inspection of WWTP and emergency pond. This is not a requirement of any other WWTP currently licensed at Fortescue's other sites (e.g. Solomon License, which is approximately four times as large as Eliwana) and does not appear to be commensurate with the risk posed by the facility. Fortescue requests this requirement be removed.	Condition 2, Table 1 requiring daily inspection of the WWTP and emergency overflow pond has been omitted. Condition 2 has been amended to require 'Maintain the WWTP infrastructure in good working order to prevent and manage spills'.
Condition 4	Fortescue notes that there are no conditions in the license regarding the operation of the MCSF. Category 12 remains on the license (and should remain on the license).	The Licence includes Category 12 with an approved production/design capacity of 1,000,000 tonnes per annum – this relates to the Eliwana mobile crushing and screening facility and was approved on 3 December 2019. Schedule 1 illustrates the approved premises boundary for the mobile crushing and screening operations. Please refer to Condition 2 (determined on 3 December 2019) for operational requirements relating to mobile crushing and screening operations.
Condition 4 (e)	The requirement to cease irrigation when rainfall is imminent, during, or immediately after rainfall is not a requirement of any other	Condition 4 (e) omitted. The potential risk associated with runoff from the sprayfield during/following a rainfall event is

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	WWTP currently licensed at Fortescue's other sites. This condition is also not necessarily feasible during several months of the year in the Pilbara where the threat of localised thunderstorms is apparent for most of the day.	considered to be low and does not require the specified condition. Potential impacts in this circumstance are expected to be minimal and localised. Treated effluent will be discharged via a sprayfield. Rainfall in the region is expected to be sporadic. During a rainfall event, the potential discharge of salts/nutrients from the sprayfield area are not expected to be significant in the context of overall stormwater flow.
Condition 4 (i)	The requirement to make a weekly inspection of the sprayfield is not commensurate with the level of risk.	Condition 4 (i) omitted. The risks associated with discharge of treated wastewater at the sprayfield are managed through other conditions on the licence, commensurate with the level of risk.
Condition 5, Table 3	Fortescue requests that measurements for available chlorine be able to made with field-based equipment. Chlorine tends to degrade in samples sent to laboratories and more accurate measurements can be made with field-based equipment.	Condition 5, Table 3 amended to permit analysis of residual free chlorine with field-based equipment.
Condition 5, Table 3	Fortescue is not required to measure EC at any other WWTP currently licensed at Fortescue's other sites. Fortescue requests this requirement be removed. Fortescue has not committed to monitoring EC.	Analysis of electrical conductivity (EC) has been omitted. However, analysis of total dissolved solids (TDS) is required as detailed in Condition 5, Table 3.
Condition 10	Please amend the reporting time period to refer to a date, being the 31 March each year for the duration of the license, for the preceding calendar year. This will ensure reporting for this license will be consistent with Fortescue's other licenses.	The Licence Holder's reference to Condition 10, relates to Condition 11 on the Licence. Conditions 10 and 11 amended to require the submission of the Annual Audit Compliance Report and Annual Environmental Report by 31 March each year for the preceding annual period.
Condition 10, Table 4	The monitoring for nitrogen, phosphorus and BOD is required quarterly, not monthly.	The Licence Holder's reference to Condition 10, relates to Condition 11 on the Licence.

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		Condition 11, Table 4 amended to require reporting of quarterly and annual loadings of nitrogen, phosphorus and BOD applied at the WWTP sprayfield.
Condition 10, Table 4	A spelling error, "…basis for determining loading rates; and"	The Licence Holder's reference to Condition 10, relates to Condition 11 on the Licence. Condition 11, Table 4 amended to correct a spelling error.
Condition 10, Table 4	Fortescue notes there is no reporting requirement for the MCSF.	The Licence Holder's reference to Condition 10, relates to Condition 11 on the Licence. Records and reporting Conditions 7, 8, 9, 10 and 11 are relevant to the Eliwana mobile crushing and screening operations and WWTP.
Licence - Definitions	This should be Table 5.	Table number corrected on the Licence
Licence - Definitions	As per request above, Fortescue requests the annual period be January 1 to December 31st.	Annual period definition amended to – "a 12 month period commencing from 1 January until 31 December in the same year".
Definitions	BOD is "Biological Oxygen Demand"	The term Biochemical Oxygen Demand has been retained.
Licence - Definitions	Insert the term 'quarterly'. Defined as 'the four periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September and 1 October to 31 December.	Definition for quarterly accepted and noted on the Licence.
Licence – Schedule 1 Premises map	Figures addressing this request are attached. The premise coordinates are in the maps. Note, due to scale, and the number of coordinates for the MCSF boundary, it is not possible to put the PPB for both the WWTP and the MCSF in the same figure. The figure has been split into two figures.	The submission received by DWER included a premises map and an as constructed layout map for the Eliwana WWTP. However, did not include a premises map relevant to the mobile crushing and screening operations. Schedule 1 of the licence details the premises boundary in accordance with the approved premises boundary for category 12 (approved on 3 December 2019) and the

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		premises boundary map submitted for category 54.
As constructed layout map for Eliwana WWTP	This figure has been amended as requested and is attached. Note, the larger PPB has been replaced by the smaller PPB from the works approval as per a previous request. Fortescue has not committed to any surface or groundwater monitoring in this application and it is not a condition of the works approval for the WWTP to install a monitoring location. However, a monitoring site for Part IV purposes is located downstream of the WWTP and accommodation camp and is shown in the amended figure.	Noted. The Licence does not require surface water or groundwater monitoring. However, monitoring of treated wastewater discharged at the sprayfield is required in accordance with Condition 5 of the Licence. The monitoring location is specified in Condition 5 Table 3 of the Licence.
WWTP process description – RO brine volumes	Fortescue can confirm that there are two RO Plants at Eliwana, both capable of discharging 70 kL of brine per day. However, only one of the RO Plants is operational at any one time. The other is used as a contingency for when the other plant is not operational, either due to maintenance or breakdown. It is not anticipated that both RO Plants will be operational at the same time, therefore only 70 kL of brine will be discharged to the sprayfield per day. Fortescue apologies for any confusion.	Noted. The authorised emission from the WWTP is treated wastewater blended with waste RO brine as detailed in Condition 3. The Licence Holder is required to report the volume of brine received at the RO brine tank (located at the WWTP facility) and the volume of treated wastewater discharged at the sprayfield, as specified in Condition 11. Analysis and reporting of the discharge quality is required as detailed in Conditions 5 and 11.
WWTP process description – Figure 3 Eliwana WWTP process flow diagram	Unfortunately, Fortescue is not able to source a better image than the one provided in the Compliance Report. The image in question is a photograph taken of a computer screen, showing the various components being monitored by the alarm system in real time to demonstrate compliance with works approval conditions. It is not a pdf document. If DWER require a flow diagram, one was supplied with the license application.	DWER's records indicate the documents submitted with the Licence application did not include a process flow diagram for the WWTP. However, a diagram submitted with the Works Approval (W6245/2019/1) compliance report (Figure 3 in this Amendment Report) illustrates the WWTP process flow and has been utilised in this assessment.
Commissioning report - Eliwana mine WWTP (dated 14 April 2020) – Table 2 and Table 5	Table 2 of the commissioning report shows the volume of brine and total volume of both brine and treated effluent sent to the sprayfield on the date of sample. For example, on 16 February 8 kL of brine was received by the WWTP and a total of 101 kL of treated effluent and brine was sent to the sprayfield. One could deduce that 93 kL of treated effluent was sent to the sprayfield on 16 February.	Noted. Condition 11 requires the Licence Holder to report the volume of brine received at the RO brine tank and the volume of treated wastewater discharged at the sprayfield.

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	Table 5 shows the total volume of both brine and treated effluent sent to the sprayfield for the week up to the sample date. For example, in the week up to 25 February, a total of 9,195 kL of brine and treated effluent was sent to the sprayfield. There is no inconsistency between Table 2 and Table 5 of the Commissioning Report.	
Control measures to managed spills during operations	Other safety interlocks or processes in place to mitigate a spill: Level interlocks which will stop pumps at a set level Secondary back-up float system in case PLC failure PLC algorithms which is intuitive to stop pump if there are abnormal levels detected Overflow outlets directed into the spill pond so sewage does not hit the ground Note, the spill pond is sized to cater for 2 days of sewage.	Noted. Condition 2 has been amended to require 'Maintain the WWTP infrastructure in good working order to prevent and manage spills'