Decision Report

Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6238/2019/1
Applicant	Pilbara Iron Pty Ltd
ACN	107 210 248
File Number	DER2019/000218
Premises	Koodaideri Railway Project Miscellaneous Licence for Railway 7 (L7SA) Shire of Ashburton TOM PRICE WA 6751 As defined by the coordinates in Schedule 1 of the Works Approval
Date of Report	5 August 2019
Status of Report	Final

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1. Definitions of terms and acronyms

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

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
ANZECC	Australian and New Zealand Environment and Conservation Council
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Commissioning	means the process by which an equipment, facility, or plant (which is installed, or is complete or near completion) is tested to verify if it functions according to its design objectives or specifications
Decision Report	refers to this document.
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.
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)
MS	Ministerial Statement
mtpa	million tonnes per annum
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Prescribed Premises	has the same meaning given to that term under the EP Act
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Risk Event	As described in *Guidance Statement: Risk Assessment*
WACA	Wittenoom Asbestos Control Area
WAMA	Wittenoom Asbestos Management Area

WQPN	Water Quality Protection Note
Works Approval Holder	Pilbara Iron Pty Ltd
µS/cm	microsiemens per centimetre

2. Purpose and scope of assessment

An application was received on 26 March 2019 by DWER from Pilbara Iron Pty Ltd (the Applicant) for a Works Approval to:

- construct/install a modular wastewater treatment plant (WWTP) and treated effluent disposal sprayfield to support the Crossing Camp (see Figure 9); and
- install and operate two mobile crushing and screening plants (Crushing Plants) within various borrow pits (see Figure's 1- 5)

on Miscellaneous Licence L7SA to support the Koodaideri Railway (the Project).

The Applicant proposes to commission the proposed WWTP and treated effluent disposal sprayfield for a period of 6 months during which time an application for an operating licence will be lodged with DWER. Commissioning of the WWTP and treated effluent disposal sprayfield has therefore been approved under the Issued Works Approval.

The Applicant also proposes to operate the proposed Crushing Plants for a period of 6 months under the Works Approval during which time the Applicant will apply for an operating licence. Operation for a period of not greater than 6 months has therefore been approved under the Issued Works Approval.

This Decision Report and associated Works Approval assess the emissions and discharges from the construction, commissioning and operation of the WWTP and treated effluent disposal sprayfield and from the installation, relocation and operation of the Crushing Plants.

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Availability	Date received
Application form	DWER records (DWERDT146951)	26/03/2019
Works Approval Supporting Documentation Koodaideri Railway Project Miscellaneous Licence for Railway 7 – L7SA	DWER records (DWERDT146951)	26/03/2019
Additional Works Approval application information – received via email	DWER records (A1784735)	8/05/2019

3. Background

Pilbara Iron Pty Ltd (a subsidiary of Rio Tinto) provides the operation, maintenance and management of construction works associated with the port, rail and power assets of Hamersley Iron Pty Ltd. Pilbara Iron Pty Ltd is therefore the occupier for any licences or permits required under Part V of the *Environmental Protection Act 1986*.

Table 3 lists the prescribed premises categories that have been applied for.

Table 3: Prescribed Premises Categories within application

Classification of Premises	Description	*Approved Premises production or design capacity or throughput*
Category 54	Sewage Facility: premises- (a) On which sewage is treated (excluding septic tanks): or (b) From which treated sewage is discharged onto land or into waters	Not more than 148m^3 per day
Category 12	Screening, etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled sized or separated	Not more than 10 million tonnes processed per year

4. Overview of Premises

The WWTP and Crushing Plants are required to support the 170 km Project within the L7SA tenure boundary (Premises) that will connect the Koodaideri mine development to the existing Rio Tinto mainline.

The proposed rail alignment for the Project intersects the WAMA and WACA (see Figure 6). An approved Asbestos Environmental Management Plan (as per condition 12 – 1 of Ministerial Statement 999) was required, to ensure that the design and construction of the rail does not increase the spread of asbestos in the WAMA and WACA. Crushing and screening will therefore not be allowed in the WAMA or WACA.

The WWTP and Crushing Plants are expected to be on site for approximately two years to support the construction of the rail. The Applicant has committed to all structures associated with the Project to be removed and the site to be rehabilitated upon completion.

4.1 Construction and Operational aspects

4.1.1 Construction (from Application)

Proposed WWTP and associated Sprayfield

The WWTP is a pre-fabricated skid mounted modular system and will be assembled and installed within a lined earthen bund of approximately 0.08 ha.

The 4.1 ha sprayfield will be a gated, signposted, fenced and mildly graded evaporation /infiltration area, containing irrigation pipes and low drift fan-spray nozzle sprinklers spaced for even distribution. An earthen bund will be constructed around the perimeter of the sprayfield to prevent any runoff to the environment.

Crushing Plants

Construction is not required as these plants are preconfigured for use and can be simply brought to site and moved around as required. The testing of dust suppression sprays, adjusting the crusher jam aperture and installing the screens to produce material of the desired size is all that is required before use.

4.2 Operational aspects (from Application)

WWTP and disposal spray field

Balance Tanks

Macerated raw sewage will be delivered to one of three interconnected balance tanks which will have a total volume of 67.5 kL. The balance tanks will provide sufficient storage capacity for peak flows and provide the treatment plant with a continuous feed throughout the day. It will be aerated to minimise anaerobic activity. The tanks will be fitted with level sensors to control the flow of wastewater to the treatment plant and to minimise the risk of over flow.

Bio-selector Tank

Recycled mixed liquor from the MBR system will be mixed with fresh feed from the balance tank and directed to the bio-selector tank. This will be the first step in the biological process where denitrifying bacteria will remove nitrogen from the sewage. The bio-selector tank will over flow directly into the anoxic tank via two gravity overflow pipes.

Anaerobic Tank

The anaerobic zone is a continuity of the anaerobic process started in the bio-selector tank and it is dominated by anaerobic bacteria that consume nutrient and reduce chemical oxygen demand / biological oxygen demand (BOD) and phosphorus levels.

Anoxic Tank

The anaerobic bacteria in anoxic process will reduce the Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), biological phosphorous and biological nitrogen. The anoxic tank will be equipped with a circulation system to continuous mix the content of the tank. The content of the anoxic tank will then be gravity fed to the aeration tank.

Aeration Tanks

The aeration tanks will be equipped with air blowers to provide the biological process with the required oxygen and to keep the content in suspension. Coarse bubble diffusers will be installed at the base of each of the aeration tanks to provide a stable and homogenous oxygen transfer into the mixed liquor while constantly mixing. Bacteria and single-cell organisms will degrade the dissolved organic and ammonium substances in the sewage and convert them into carbon dioxide and nitrates.

Membrane Bioreactor (MBR) System

The MBR system will be a submerged ultra-filtration module made of robust polyethylene flat plates covered on both sides with ultra-filtration membranes and will have a pore sizes of approximately 0.04 µm. The membrane housing will be fitted with a series of tube diffusers that continuously supply air bubbles to the membrane surface to self-clean the membrane surface The concentrated bio-solid (mixed liquor) rejected by the filters will be returned to the Bio-Selector tank via the mixed liquor pumps. Excess bio-solids from the membrane system will be wasted to the sludge tank and the permeate will be transferred to the final holding tanks for irrigation. Membrane cleaning is required for operational consistency and maintenance of performance. Hydrogen peroxide, citric acid and sodium hypochlorite will be used for MBR membrane cleaning. The MBR will have a two membrane systems which will allow for continuous operation of the treatment plant during this cleaning process.

Sludge Tank

Waste activated sludge in the 22,500L sludge holding tank will be manually pumped out by a licensed waste carrier and taken offsite for disposal at an appropriately licensed facility in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004*.

Final Effluent Storage

Chemical dosing for disinfection and pH control will occur in the final effluent holding tank. Additional tanks will be provided to increase the storage capacity for 3 days of operation in wet weather condition. The final holding tank will be fitted with a circulation pump to continuously mix the tank contents. Chemical dosing and control measurement devices will be installed on the circulation line for efficient dosing and mixing of chemicals. The chlorine disinfection system will consist of a sodium hypochlorite dosing pump, chemical storage tank and on-line chlorine measuring and control system. Chlorine level will be maintained between 0.2–0.5 mg/L. The final holding tank will be equipped with a pH measuring system that will maintain the pH range between 6.5 and 8.5. In the event of wet weather, the final treated effluent will be held in wet weather storage tanks.

Spray field

Treated effluent from the Treated Effluent Storage Tanks will be delivered manually to the sprayfield via effluent distribution pumps. In the event of prolonged wet weather, the final treated effluent will be held in wet weather storage tanks before being irrigated.

Table 4 provides the anticipated quality of the treated wastewater that will be discharged from the WWTP to the sprayfield.

Table 4: Anticipated treated effluent quality (from Application)

Parameter	Concentration
5 Day Biological Oxygen Demand (BOD_5)	<20 milligrams /litre (mg/L)
Total suspended solids (TSS)	<5mg/L
Total nitrogen (TN)	<13mg/L
Total phosphorous (TP)	<1.5mg/L
Thermo-tolerant Faecal Coliforms	<500 colony forming units (cfu) /100mL
Residual Free Chlorine	0.2 mg/L – 0.5 mg/L
pH	6.5 – 8.5

Crushing Plant

The Crushing Plants will have a combined design capacity of 10 mtpa and will move location throughout the premises boundary (see Figure's 1- 5) in accordance with construction schedules and borrow material types. The general layout of the crushing and screening facilities will have a footprint area of approximately 0.5 ha within previously disturbed borrow pits.

The Crushing Plants will be fitted with water sprays for dust suppression and are standalone units powered by self-contained diesel engines. Diesel fuel will be supplied by a service truck as needed. Water for dust suppression will be sourced from licensed ground water bores located throughout the rail construction corridor.

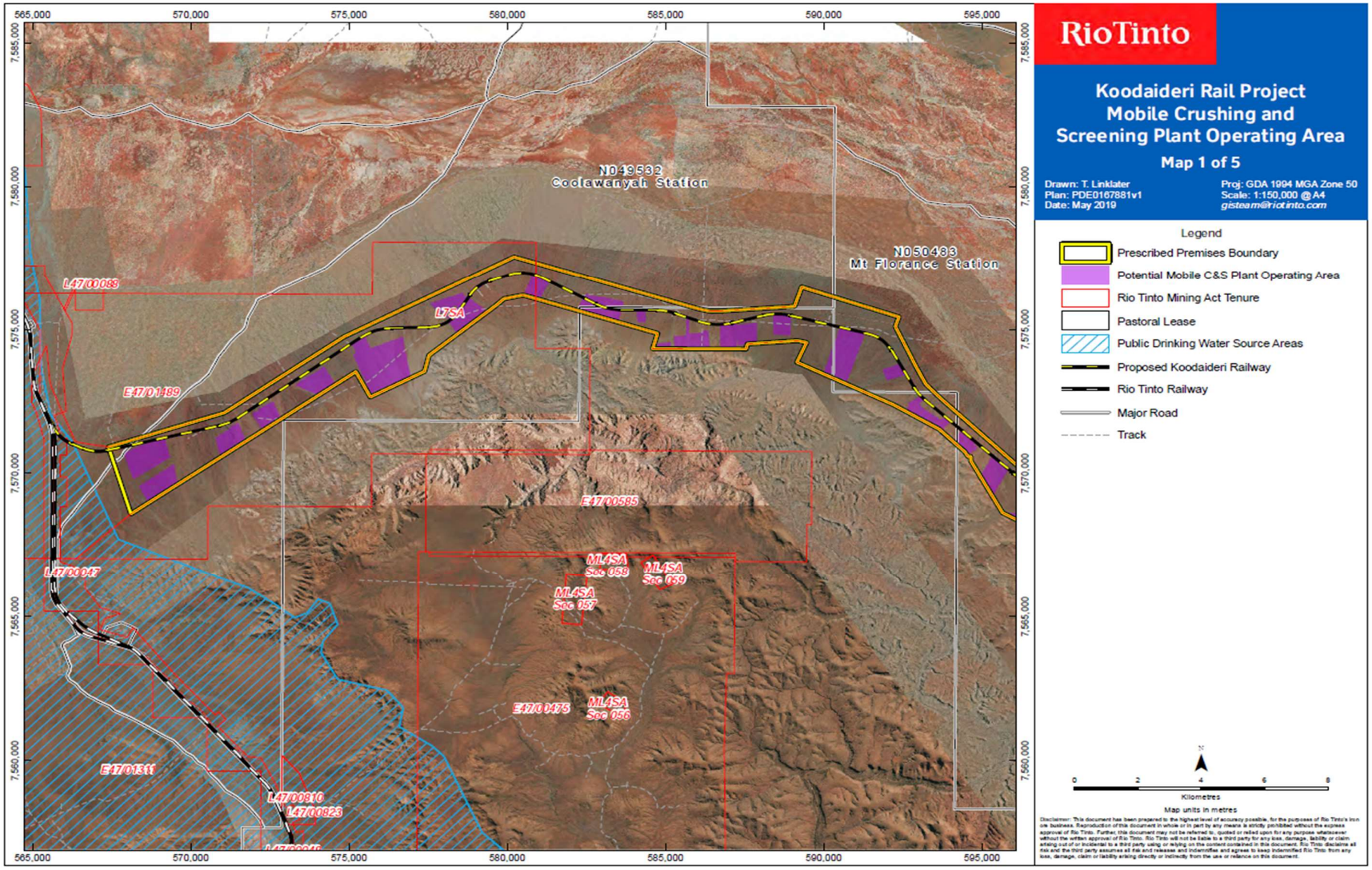

Figure 1: Mobile Crushing Plant operating areas (sourced from Applicant's supporting information)

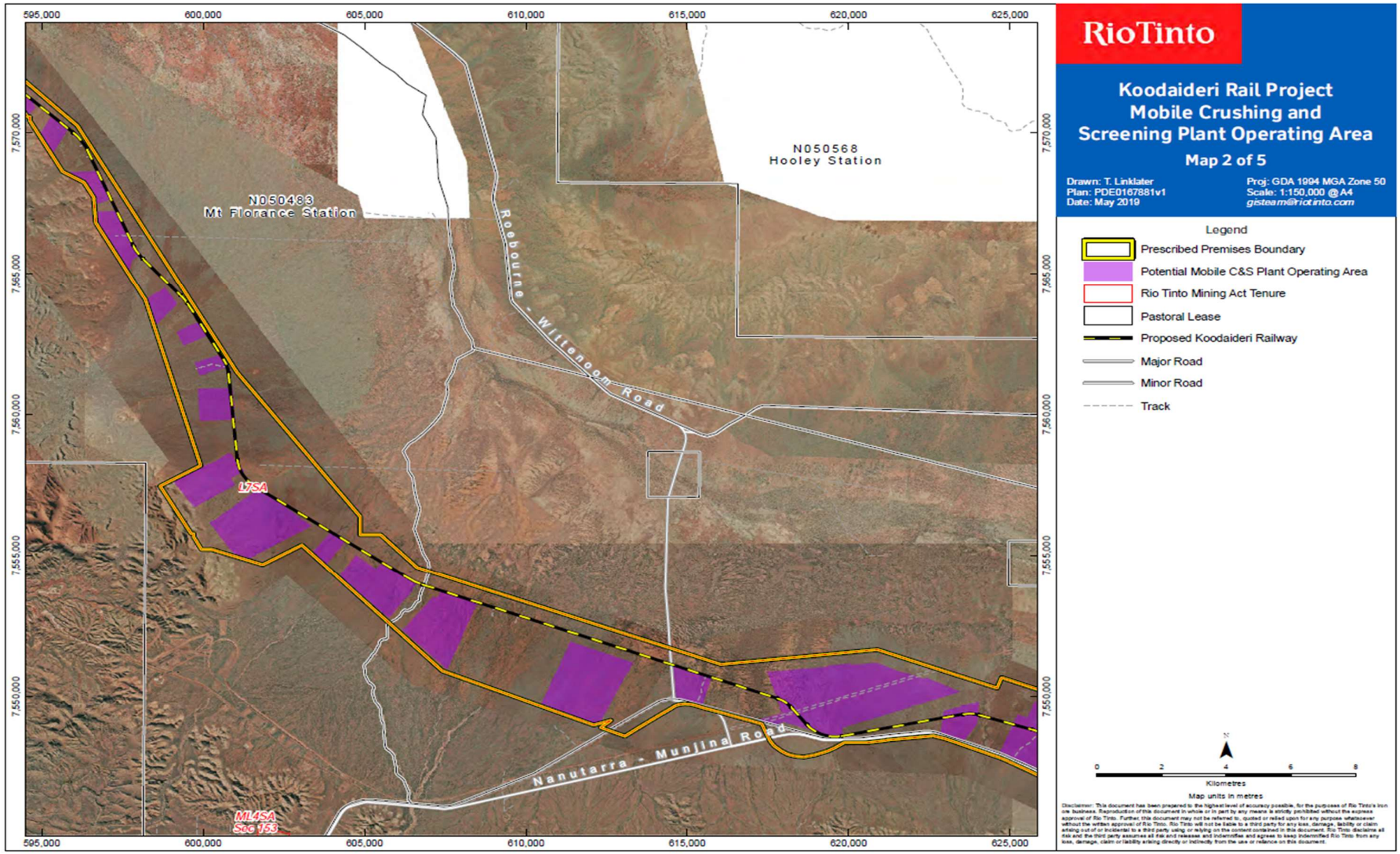

Figure 2: Mobile Crushing Plants operating areas (sourced from Applicant's supporting information)

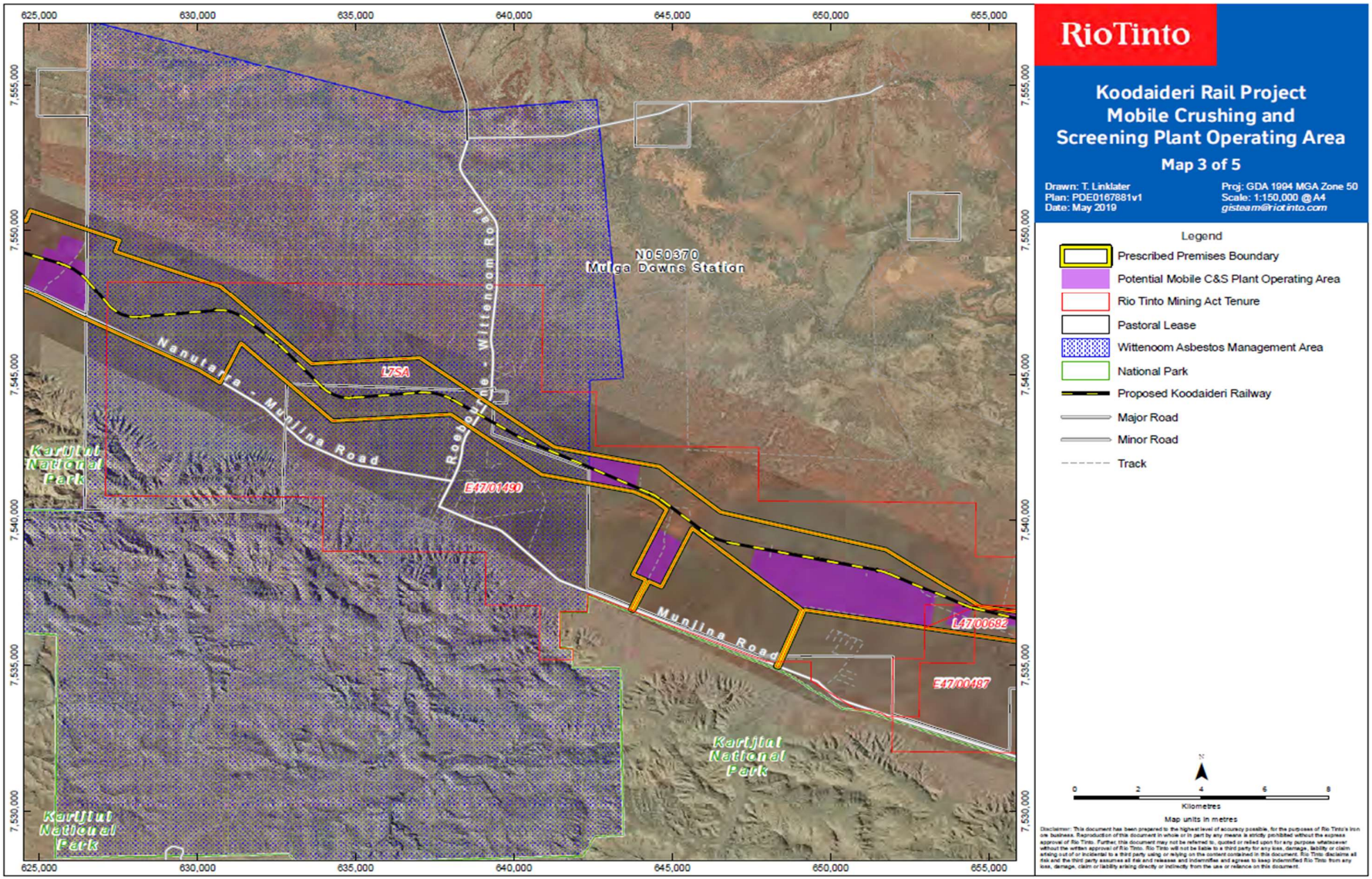

Figure 3: Mobile Crushing Plants operating areas (sourced from Applicant's supporting information)

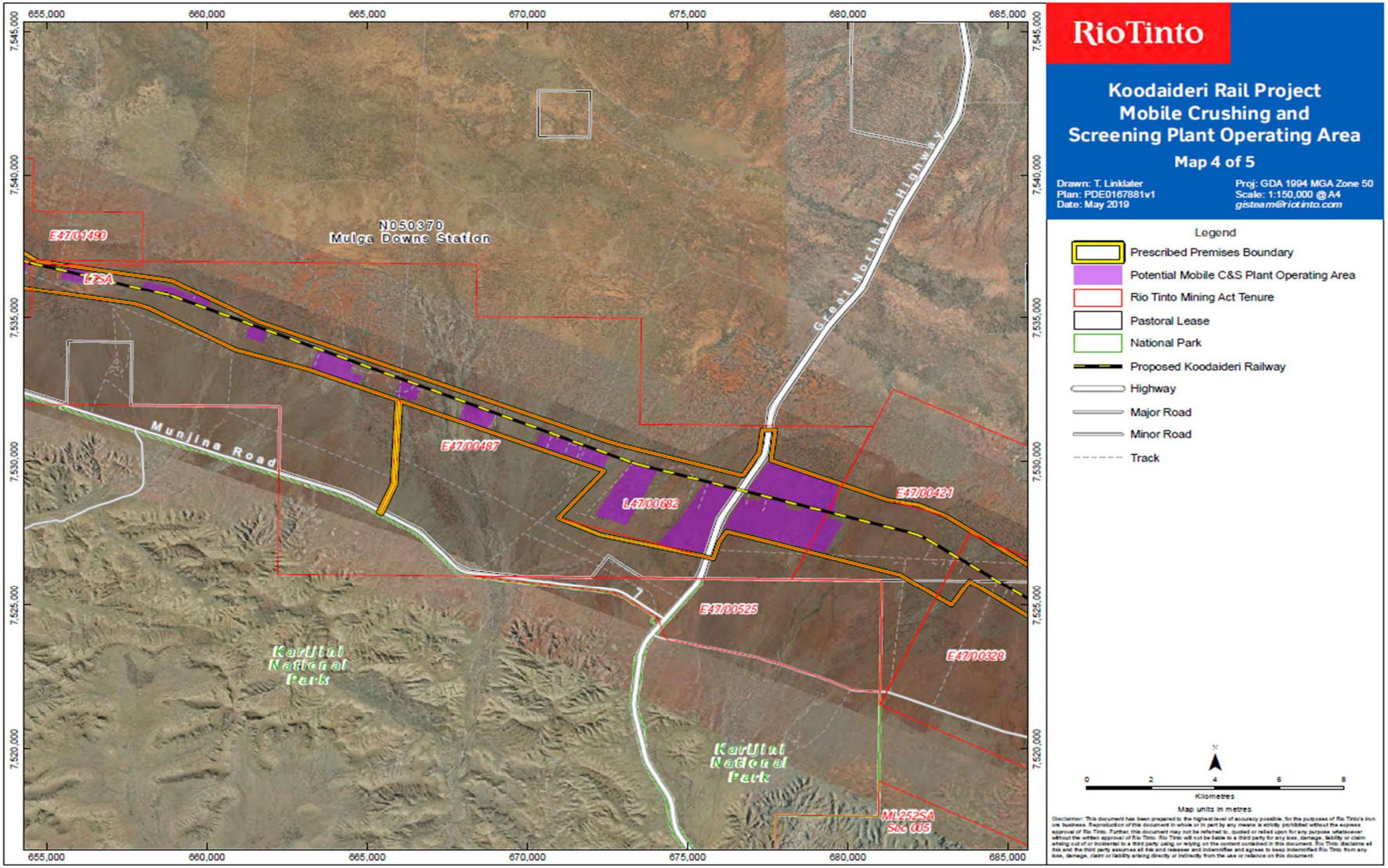

Figure 4: Mobile Crushing Plants operating areas (sourced from Applicant's supporting information)

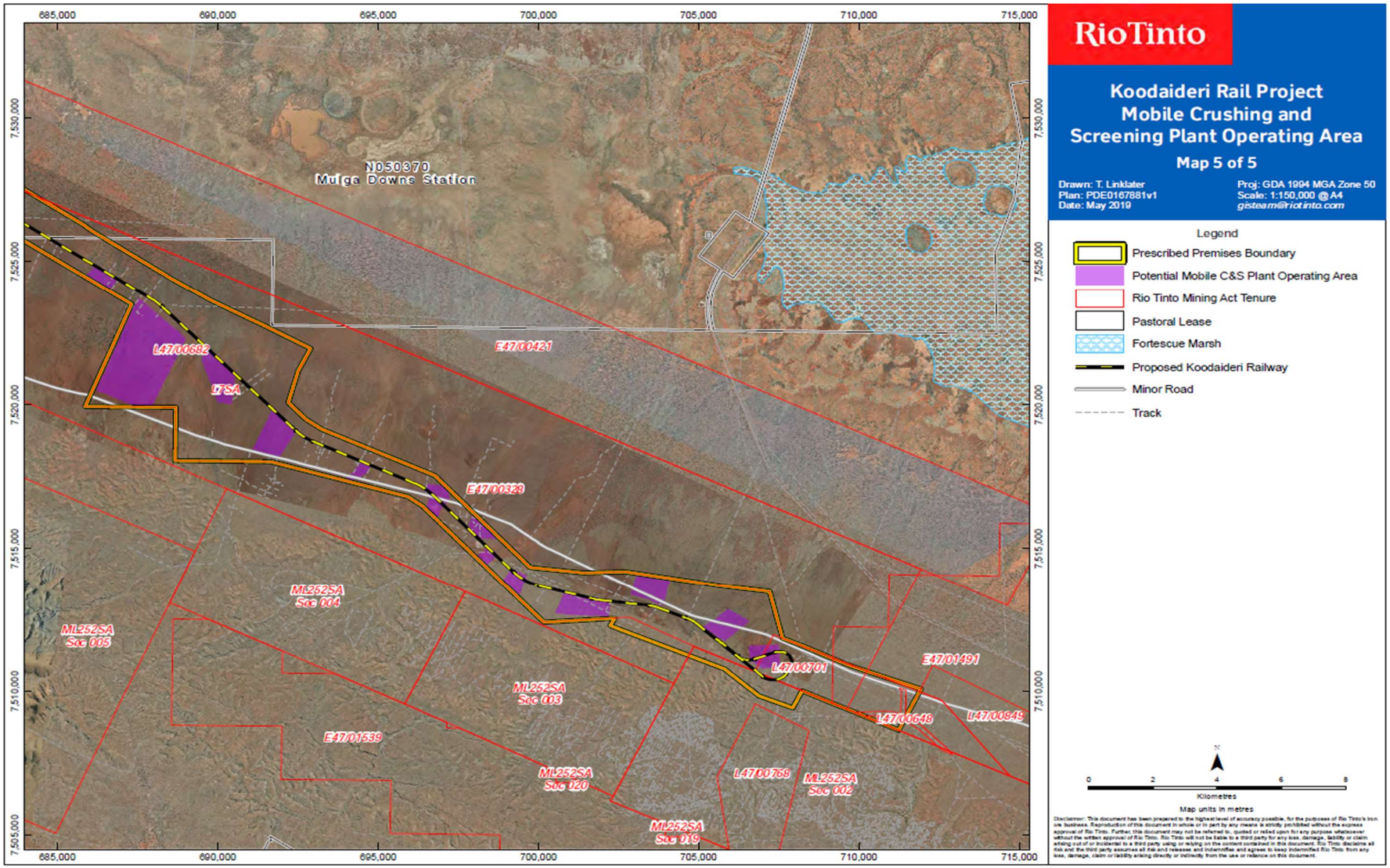

Figure 5: Mobile Crushing Plants operating areas (sourced from Applicant's supporting information)

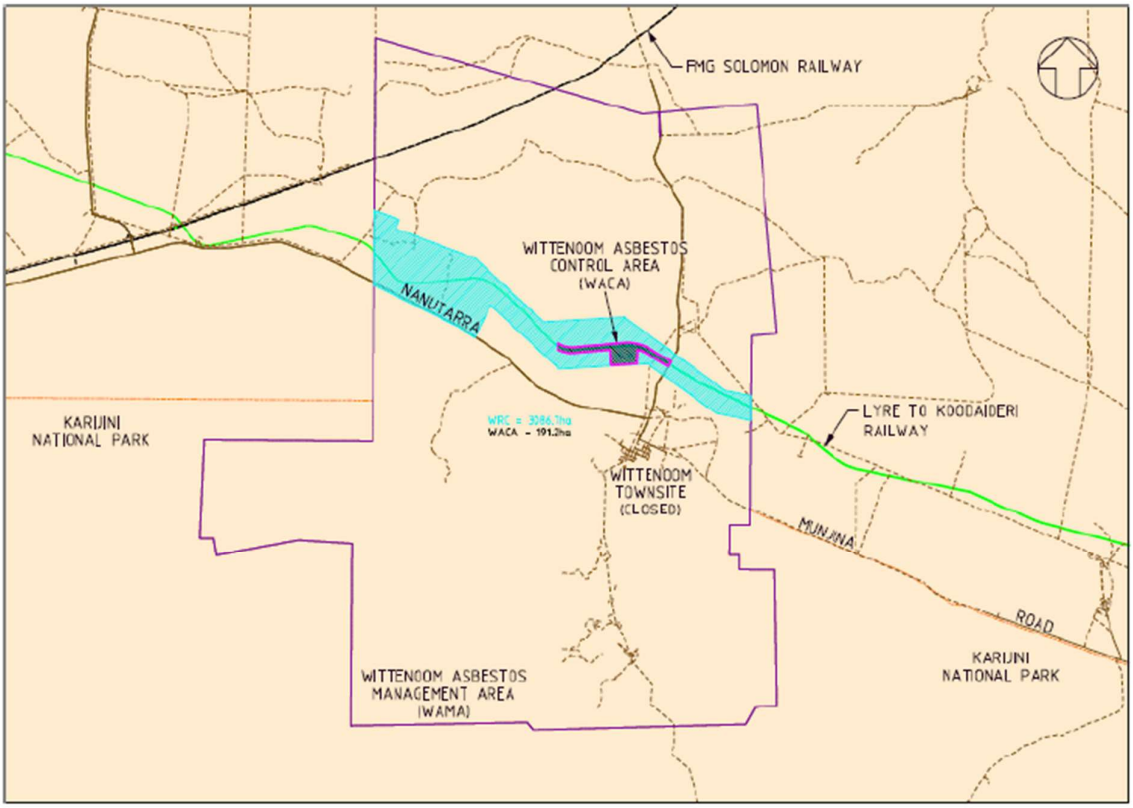

Figure 6: WAMA and WACA (sourced from Applicant's supporting information)

4.3 Infrastructure

The Project facility infrastructure, as it relates to Category 54 and 12 activities, is detailed in Table 5 and with reference to the Site Plans.

Table 5 lists infrastructure associated with each prescribed premises category.

Table 5: Koodaideri Railway Project facility Category 54 and 12 infrastructure (from Application)

	Infrastructure	**Site Plan Ref.**
	Prescribed Activity Category 54	**(see Figure 7 WWTP plant layout)**
The Applicant will construct and operate a Modular WWTP with a maximum design capacity of 148m^3 /day) consisting of the following infrastructure		
1	A compacted earthen bund constructed to contain all wastewater treatment, storage and transfer infrastructure.	N/A
2	WWTP comprising of: inlet screen balance tank x 3 sludge tank irrigation tank anoxic tank anaerobic tank bio-selector tank membrane bioreactor system aeration tanks x 2 liquid chlorine tank	inlet screen balance tank sludge tank irrigation tank

<table>
<tr><th></th><th>Infrastructure</th><th>Site Plan Ref.</th></tr>
<tr><td></td><td>chemical storage tank.
carbon filter.
transfer pumps and pipes.
20 x 22.5 kL treated effluent storage UV resistant polyethylene tanks
inlet and outlet (final effluent) flow meters.
audio and visual high tank volume level alarm system.

WWTP capable of treating effluent to the following standard:
<table>
<tr><th>Parameter</th><th>Concentration</th></tr>
<tr><td>5 Day Biological Oxygen Demand (BOD_5)</td><td><20mg/L</td></tr>
<tr><td>Total suspended solids (TSS)</td><td><5mg/L</td></tr>
<tr><td>Total nitrogen (TN)</td><td><13mg/L</td></tr>
<tr><td>Total phosphorous (TP)</td><td><1.5mg/L</td></tr>
<tr><td>Thermo-tolerant Faecal Coliforms</td><td><500cfu/100mL</td></tr>
<tr><td>Residual Free Chlorine</td><td>0.2 mg/L – 0.5 mg/L</td></tr>
<tr><td>pH</td><td>6.5 – 8.5</td></tr>
</table></td><td>treated effluent storage skid 112.5kL</td></tr>
<tr><td>3</td><td>Self bunded sea container for chemical storage</td><td>N/A</td></tr>
<tr><td>4</td><td>Treated effluent sprayfield consisting of:
4.1 ha irrigation area.
signposted perimeter wire fence with access gate.
irrigation delivery pipes and approximately 30 fixed sprinklers with low drift fan-spray nozzles distributed evenly over the irrigation area</td><td>N/A</td></tr>
<tr><td></td><td>Prescribed Activity Category 12</td><td>Site Plan Ref. (see Figure’s 1- 5)</td></tr>
<tr><td colspan="3">The Applicant proposed Crushing Plants each with a design capacity of 500 tonnes per hour</td></tr>
<tr><td>1</td><td>2 Terex J-1840 Jaw Crushers (or equivalent) incorporating:
main conveyor
hopper and feeder
jaw chamber
self-contained diesel engine
fitted water sprays</td><td rowspan="3">N/A</td></tr>
<tr><td>2</td><td>2 Terex Finlay 883 Mobile Screening Plants (or equivalent) incorporating:
aggressive screen box
hydraulic adjustable modular configuration screen box
hydraulic adjustable conveyors
self-contained diesel engine
fitted water sprays</td></tr>
<tr><td>3</td><td>Processed material stockpile areas located within borrow pits</td></tr>
</table>

4.4 Exclusions to this Assessment

The Applicant will also be constructing the following infrastructure at the Premises which is not within the scope of this assessment:

- borrow pits;
- crossing camp accommodation village;
- access roads and parking areas; and
- construction and operation of an open cut iron ore mine with associated infrastructure including the railway.

This Decision Report is only assessing the emissions and discharges of construction and operation of the proposed new WWTP and sprayfield with associated infrastructure and the installation and operation of the Crushing Plant.

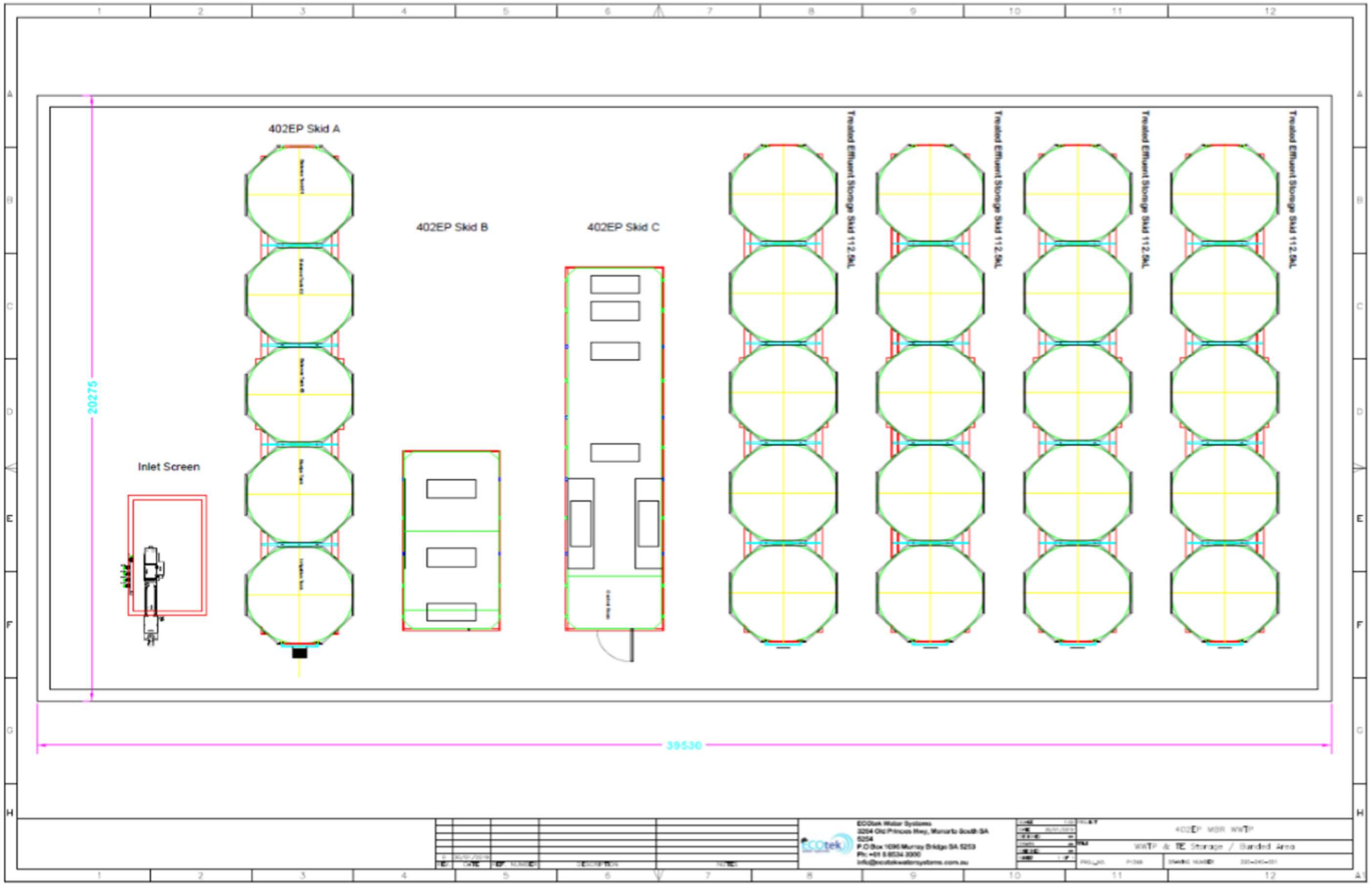

Figure 7: Layout plan for the WWTP (sourced from application)

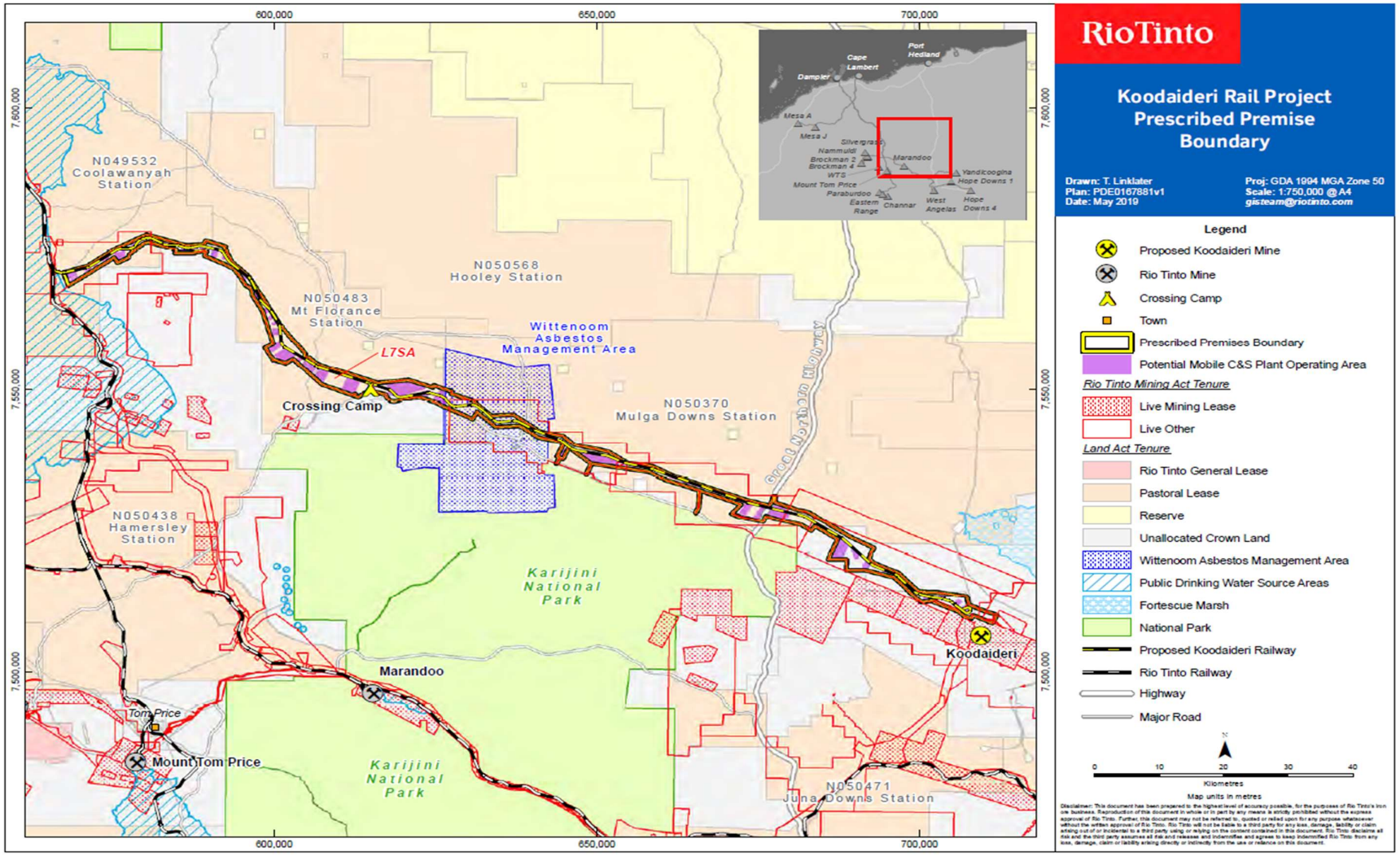

Figure 8: WWTP located at Crossing Camp (sourced from application)

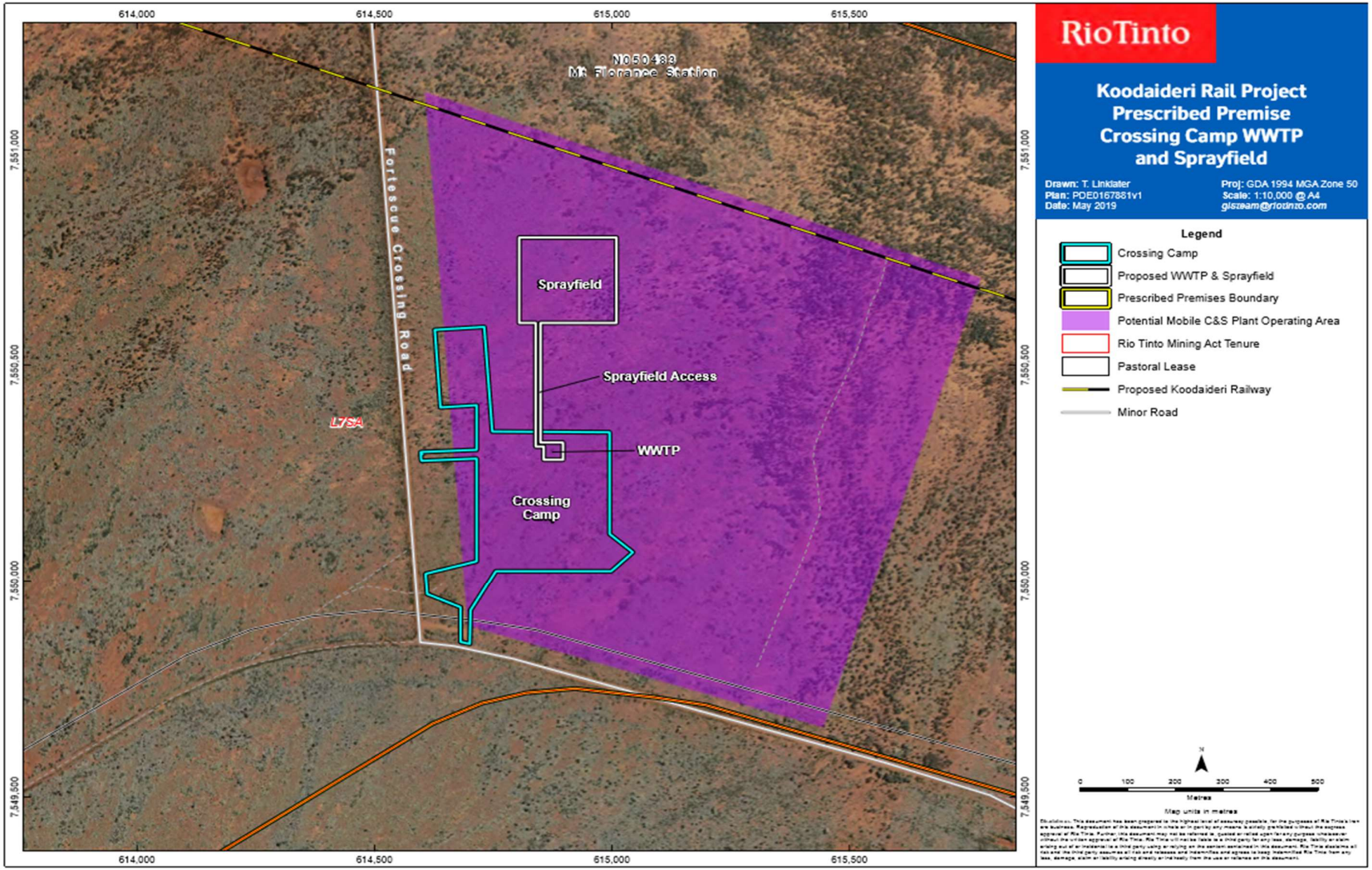

Figure 9: Location of WWTP and Sprayfield (sourced from Applicant's supporting information)

5. Legislative context

Table 6 summarises approvals relevant to the assessment.

Table 6: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
Iron ore (Hammersley) Agreement Act 1963	Miscellaneous Licence 7SA	Pilbara Iron Pty Ltd	A miscellaneous licence for the construction operation and maintenance of a Railway
Rights in Water and Irrigation Act 1914	GWL202549 and GWL202550	Pilbara Iron Pty Ltd	Approved by DWER for groundwater abstraction
Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974	Approval number 50.19	Pilbara Iron Pty Ltd	DoH approval for surface spray irrigation over 4.1ha

5.1 Part IV of the EP Act

5.1.1 Background

Rio Tinto referred a proposal to the Environmental Protection Authority (EPA) on 28 May 2012 to develop and operate an open pit iron ore mine, rail corridor and associated infrastructure at the Premises.

5.1.2 Ministerial Statement 999

Ministerial Statement 999 was approved on 10 March 2015 for the construction and operation of an open cut iron ore mine with associated infrastructure including the railway. Approval was subject to the implementation of conditions and procedures within the approved 'Koodaideri Iron Ore Mine and Infrastructure Project Asbestos Environmental Management Plan - RTIO-HSE-0283017' (Asbestos Environmental Management Plan) dated January 2017 relevant to the construction of the rail corridor through the WAMA.

Key Finding: No crushing and screening activities within the WAMA and WACA are assessed or approved under this Works Approval and Decision Report.

5.2 Part V of the EP Act

5.2.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations. The guidance statements which inform this assessment are listed in Appendix 1.

5.3 Contaminated sites

Parcels of land associated with the WAMA are classified as "Contaminated – Remediation Required" under the *Contaminated Sites Act 2003.*

5.4 Other relevant approvals

5.4.1 Clearing

Ministerial Statement 999 allows clearing of no more than 4,014ha within the 34,697ha rail corridor. The Issued Works Approval does not assess or authorise clearing of native vegetation

6. Consultation

Letters were sent to the Shire of Ashburton, Department of Jobs, Tourism, Science and Innovation, Department of Mines, Industry Regulation and Safety and Department of Biodiversity, Conservation and Attractions on 21 May 2019 inviting comment/s on the proposal.

The Department of Jobs, Tourism, Science and Innovation advised DWER in an email on 30/05/2019 that they had no comment on the application. No other comments were received.

7. Location and siting

7.1 Siting context

The Premises is located on Miscellaneous Licence for Railway 7 (L7SA) within the Shire of Ashburton. The Premises runs adjacent to the Karijini National Park and also intersects the WAMA and WACA (see Figure 2).

7.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 7.

Table 7: Receptors and distance from activity boundary

Sensitive Land Uses	**Distance from Prescribed Activity (WWTP)**
Tom Price	Approximately 70km south west
Mt Florence Station Pastoral homestead	Approximately 46 km east
Mulga Downs Homestead	Approximately 37 km east
Sensitive Land Uses	**Distance from Prescribed Activity (Mobile crushing and screening plants)**
Coolanwanyah Station Homestead	Approximately 11 km from the eastern edge of the prescribed premises boundary
Youngaleena Community and law grounds	Heritage site boundaries within the premise boundary. The Law Ground is approximately 300 m from southern edge of premise boundary and the Youngaleena Community approximately 2 km from the southern edge of premise boundary.

Key finding: In accordance with the *Guidance Statement: Risk Assessments*, the Delegated Officer has determined that this assessment will not consider the risk of potential impacts to people in accommodation camps occupied by the Applicant. Potential impacts to people at these locations are subject to requirements under occupational health and safety regulations and obligations, therefore, the Delegated Officer considers that people at the accommodation camp are excluded as potential receptors.

7.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 8. Table 8 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting.*

Table 8: Environmental values

Specified ecosystems	Distance from the Premises
Ramsar Site – Fortescue Marsh	Approximately 6 km north of the eastern end of the premises
Karijini National Park	At is closest point the Premises is 500 m north of the Karijini National Park boundary
Priority Ecological Communities (PEC)	PEC: Freshwater Claypans downstream of Fortescue Marsh 5.7 km

7.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 9.

Table 9: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental value
The Fortescue River	3.5 km north of the premises boundary at its closest point	River pools, riparian vegetation and stygofauna are dependent on the Fortescue River
Groundwater	Groundwater depth varies from 13 m to 65 m with an average of 40m below ground level (mbgl).	Water in the majority of bores are fresh with electrical conductivity (EC) ranging between 261 and 1172 uS/cm.(sourced from supporting information)

7.5 Soil type

The Premises is exclusively located on Cainozoic and Quaternary colluvial and alluvial plain deposits on the southern side of the Fortescue Valley. There are no saline soils, highly expansive clays or potentially acid sulphate soils identified along the railway construction corridor (supplied in application).

7.6 Meteorology

7.6.1 Wind direction and strength

Based on wind speed and direction data sourced from the Bureau of Meteorology for Paraburdoo station (station ID 007185), morning winds are predominantly easterly and afternoon winds are predominantly from the west and east.

The 9am and 3pm wind roses generated from the Paraburdoo Aero station are presented in Figure 10 and Figure 11 below. (Source: Bureau of Meteorology)

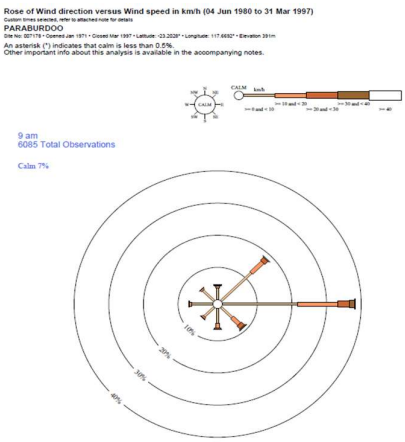

Figure 10: 9am wind rose

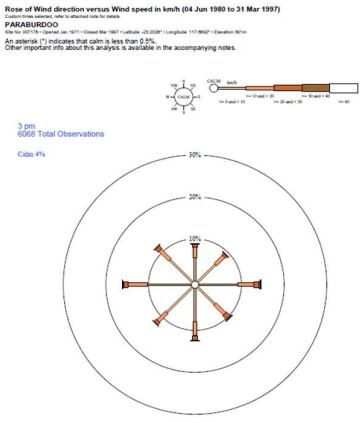

Figure 11: 3pm wind rose

7.6.2 Rainfall and temperature

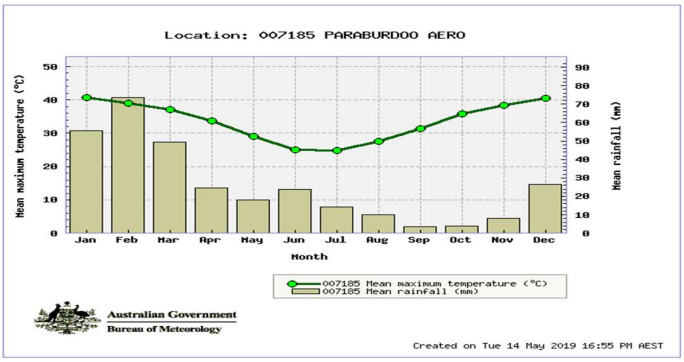

Figure 12: Paraburdoo monthly average rainfall (Source: Bureau of Meteorology)

8. Risk assessment

8.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 11.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 10 and 11 below.

Table 10. Identification of emissions, pathway and receptors during construction and mobilisation of the WWTP and Crushing Plant

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Construction, mobilisation and positioning of infrastructure	Vehicle movements on unsealed access roads	Noise and Dust	No residences or other sensitive receptors in proximity	Air / wind dispersion	Amenity	No	The Delegated Officer considers the risk of noise and dust during construction to be insignificant as there are no receptors present Dust and noise can be adequately regulated by section 49 of the EP Act and the Noise Regulations The Applicant has a Dust Management Plan which will be employ the use of water sprays and water trucks during construction.
	Construction and mobilisation of the crushing and screening plants and WWTP onto Premises						
	Construction of earthen bund for WWTP containment						

Table 11: Identification of emissions, pathway and receptors during commissioning and operation of WWTP and Crushing and Screening plants

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Waste Water Treatment Plant	Raw and treated sewage, activated sludge and screenings	Odour	No residences or other sensitive receptors in proximity	Air / wind dispersion	Health and Amenity	No	The Delegated Office considers there to be sufficient separation from sensitive receptors to mitigate the risk of odour
	Sewage pipes, holding tanks	Rupture of pipes and/or overtopping of holding tanks	Depth to groundwater averages about 40m below ground level.	Direct discharge to land Infiltration to underlying groundwater	Contamination of soil and impacts to groundwater or surface water quality		The entire WWTP is within earthen bund to capture overflow and stormwater (including freeboard) to prevent discharge to the environment. Audio and visual high level alarm system The Delegated Office considers there to be sufficient separation from sensitive receptors to mitigate the risk of pollution
	Irrigation of treated effluent to sprayfield	Nutrient rich Treated effluent discharged to the sprayfield				yes	See section 8.4
	Bulk storage of chemicals	Breach of containment causing chemical discharge to land				No	Liquid sodium hypochlorite, small volumes of citric acid and hydrogen peroxide (for membrane cleaning and disinfection) will be stored in a dedicated self bunded sea container The Delegated Office considers there to be sufficient separation from sensitive receptors to mitigate the risk of impacts

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Crushing and Screening plants	Crushing of materials during the operation of the Terex J-1840 Jaw Crusher (or equivalent)	Noise and Dust	Youngaleena Community approximately 2km away	Air / wind dispersion	Amenity	No	The Applicant has a Dust Management Plan which will employ the following: • Fitted water sprays to be operate during crushing and screening activity • Use of angle-adjustable stockpiling conveyors to minimise drop heights • Crushing plants to be located at least 50 meters from any significant ephemeral creek crossing. The Delegated Office considers there to be sufficient separation from sensitive receptors to mitigate the risk of any amenity impacts
	Screening of raw material during the operation of the Terex Finlay 883 Mobile Screening plant(or equivalent)						
	Screened material to product stockpiles via stacker	Dust from stacker conveyor					The Applicant proposes to apply dust suppression products on stockpiles when required and spray the feed stockpile with water, if necessary, prior to it being fed into the Crushing Plants
	Product stockpiles during non-screening operations	Dust lift-off from stockpiles					
	Stormwater during high rainfall events	Stormwater contaminated with suspended particulates during high rainfall events	Creeks and drainage lines	Direct discharge to land	Impacts to surface water quality	No	Stormwater will be collected and held within the borrow pit footprint during crushing and screening operations Crushing Plant will only be operated in borrow pits, that have at least 50 meters separation from any creek or drainage line.

8.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 12 below.

Table 12: Risk rating 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

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 13 below.

Table 13: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*

"onsite" means within the Prescribed Premises boundary.

8.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 14 below:

Table 14: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

8.4 Risk Assessment – Nutrient rich wastewater irrigated to land – nutrient loading impact analysis

8.4.1 Description of Risk Event

Irrigation of treated wastewater with high levels of nutrients to land causing soil degradation, surface water and groundwater contamination affecting ecosystem health.

8.4.2 Identification and general characterisation of emission

The WWTP is designed to treat up to 148kL/day of waste water to the expected quality as outlined in previous Table 4.

8.4.3 Description of potential adverse impact from the emission

The discharge of treated wastewater to land via irrigation has the potential to contaminate surrounding land and adversely impact upon surface water, soil and groundwater. Depth to groundwater averages about 40mbgl and the Fortescue River is approximately 10 km away.

8.4.4 Criteria for assessment

The nutrient application criteria to control eutrophication risk set out in WQPN 22 are considered appropriate assessment criteria to determine loading limits for nitrogen and phosphorus when irrigating effluent to land (refer to Table 16 below). ANZECC are considered appropriate to assess potential impacts on groundwater or surface water quality.

The WWTP lies within the Hamersley Range which is principally comprised of rocks of the Brockman Iron Formation. In accordance with WQPN 22 (Table 1 – Eutrophication risk based on soil type and location), the acceptable range of nutrient application is for risk Category B soils.

The expected annual nutrient loading based on the expected water quality (refer Table 4) volume of 148kL/day and irrigated to a sprayfield area of 4.1 ha will be:

$$\text{Expected Nitrogen loading} = \frac{13\text{mg/l} \times 148\text{kl} \times 365}{1000 \times 4.1\text{ ha}} = 171.28\text{kg/ha/yr}$$

Expected Phosphorous Loading = $\frac{1.5mg/l \text{ X } 148kl \text{ x } 365}{1000 \text{ x } 4.1 \text{ ha}}$ = 19.7kg/ha/yr

Table15 below shows WQPN22 recommended maximum nutrient application criteria for risk Category B compared to the expected nutrient loading.

Table 15: Expected nutrient loading vs WQPN 22 risk category B

Risk Category	WQPN 22 requirement		Expected nutrient loading	
	Max Nitrogen addition (kg/ha/yr)	Max Phosphorous addition (kg/ha/yr)	Nitrogen (kg/ha/yr)	Phosphorous (kg/ha/yr)
B	180	20	171	19.7

The Delegated Officer has determined that irrigation to the 4.1 ha sprayfield with the forecasted treated sewage nutrient levels will be marginally below those recommended by WQPN22.

8.4.5 Applicant controls

This assessment has reviewed the controls set out in Table 16 below:

Table 16: Applicants proposed controls for irrigation (from Application)

Control	Description
Siting	Positioned away from any creeks or drainage lines.
Engineering / infrastructure	Irrigation will occur via low drift fan-spray nozzle sprinklers to provide a course droplet and spaced for even distribution.
	The sprayfield will be surrounded by a wire fence with access gate to prevent unauthorised entry.
	An earthen bund will be constructed around the perimeter of the sprayfield to prevent runoff to the environment.
	The sprayfield will be mildly graded to increase infiltration and prevent ponding.
	Audio and visual high tank volume level alarm system
	Irrigation area (4.1 ha) sized to meet minimum nutrient application criteria.
Procedure	Irrigation only to occur within the designated sprayfield area. In the event of wet weather or process failure, the final treated effluent will be held in final effluent storage tanks for up to 3 days before being irrigated or transported offsite for disposal.
Water quality, monitoring and reporting	Monitoring of effluent quality during commissioning phase to determine criteria of discharge. WWTP system will be designed and commissioned to meet discharge performance criteria as per Table 4 before irrigation. Monitoring and reporting will be undertaken in accordance with the requirements of the EP Act Part V licence when issued. Document daily inspections of storage and transfer areas.

8.4.6 Key findings

The Delegated Officer has reviewed the information regarding irrigation of treated wastewater and has found:
Preliminary assessment of nutrient loading rates at the premises shows that the sprayfield area will be large enough to manage the nutrient application rates for TN and TP according to WQPN- 22.

8.4.7 Consequence

Based on the treated wastewater quality and volume to be directed to the sprayfield, depth to groundwater, distance to surface water receptors and Applicant controls proposed, the Delegated Officer has determined that the discharge under normal operations is unlikely to cause negative impacts. Therefore the Delegated Officer considers the consequence to be **Slight**.

8.4.8 Likelihood of consequence

Based upon the irrigation area available, proximity to receptors, soil type, current water quality and volume from the WWTP, the Delegated Officer has determined that the likelihood of off-site impacts on a local scale will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood to be **Unlikely.**

8.4.9 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 12) and determined that the overall rating for the risk of treated effluent irrigation on sensitive receptors during operation is **Low.**

8.5 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 17 below.

Table 17: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	Discharge of treated sewage (irrigation)	On-site disposal of treated wastewater	Direct discharge to land or surface water Contamination of soil and infiltration to groundwater	Siting Infrastructure and management controls (off-site disposal of sludge)	Slight Consequence Unlikely **Low risk**	Acceptable subject to Applicant controls conditioned and some regulatory controls

9. Works Approval controls

9.1.1 Wastewater management, infrastructure and equipment

The following infrastructure and equipment (Table 18) should be constructed onsite for wastewater management. The requirements in Table 18 are derived from Applicant controls as described in section 4.1

Table 18: Wastewater infrastructure requirements

Infrastructure / equipment	Requirements (design and construction)
WWTP	Designed to treat up to 148 kL sewage per day. Have operational visual and audible high level alarms on the pump pit. All wastewater treatment, storage and transfer infrastructure to be enclosed within an earthen bund. Designed and commissioned to meet discharge performance criteria as per Table 4.
Sprayfield	Sized to at least 4.1 ha Fenced, gated and signposted to prevent unauthorised entry. Irrigation area to be fitted with approximately 30 low drift fan-spray nozzle sprinklers to provide a course droplet and spaced for even distribution. Irrigation area to be surrounded by an earthen bund to prevent any runoff to the environment.

Grounds: The approved infrastructure and equipment will suitably minimise the risk of nutrient rich wastewater causing land, soil and groundwater contamination or affecting ecosystem health.

9.1.2 Commissioning of the WWTP

Standard conditions have been added to the Works Approval detailing requirements and duration of commissioning.

Grounds: The risk assessment in section 8.4 outlined that the potential emissions and discharges during commissioning and/or operation present an acceptable risk to the environment and public amenity. The Applicant is permitted to commission the WWTP for a period of up to 6 months. This commissioning period will allow the Applicant to commission whilst a Licence application is undertaken. For this to occur, the Applicant should apply for a Licence as soon as certification that works have been constructed in accordance with Condition 3 of the Issued Works Approval is submitted to DWER.

9.1.3 Operation of the Crushing Plants

Grounds: The risk assessment in Table11 outlines the potential emissions and discharges during operation of the Crushing Plants as an acceptable risk to the environment and public amenity. The Applicant is therefore, permitted to operate for a period of 6 months. This limited operating period will allow the Applicant to operate whilst a Licence application is undertaken. For this to occur, the Applicant should apply for a Licence as soon as operation commences in accordance with the condition 8 of the works approval.

10. Determination of Works Approval conditions

The conditions in the Issued Works Approval have been determined in accordance with the *Guidance Statement: Setting Conditions*.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approval under the EP Act.

11. Determination of Licence conditions

Following the Applicant completing the works and submitting specified certifications for the WWTP and providing written advice specifying the date on which operation commenced for the Crushing Plants they will need to submit an application for an operating licence. The Applicant should ensure that the application is lodged as soon as certification is submitted to DWER and all necessary information is provided to allow timely processing, assessment and determination of the licence application.

Licence conditions will be determined in accordance with the *Guidance Statement: Setting Conditions* following compliance with this Works Approval.

12. Applicant's comments

The Applicant was provided with the draft Works Approval and Decision Report on 4 July 2019. The Applicant provided comments which are summarised, along with DWER's response, in Appendix 2.

13. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that the Issued Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Caron Goodbourn
Manager, Process Industries

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

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Water Quality Protection Note - 22	WQPN 22	N/A
2.	ANZECC -Australian and New Zealand Environment and Conservation Council	ANZECC	
3.	Ministerial Statement 999	MS 999	accessed at www.epa.wa.gov.au
4.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	-	accessed at www.dwer.wa.gov.au
5.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	-	
6.	DER, February 2017. *Guidance Statement: Risk Assessments*. Department of Environment Regulation,	-	
7.	DER, February 2017. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	-	
8.	DWER, Guideline, Industry Regulation Guide to Licensing, June 2019	-	

Appendix 2: Summary of Works Approval Holder's comments on risk assessment and draft conditions

Condition	Summary of Works Approval Holder comments	DWER response
Page 8 of Decision Report (irrigation to sprayfield)	Treated effluent to be manually delivered to sprayfield.	The Delegated Officer updated the Decision Report accordingly.
Infrastructure Table 5 of Decision Report.	The earthen bund will be constructed with compacted earth and not lined.	
	The treated effluent storage tanks is constructed out of UV resistant polyethylene.	
	Works Approval Holder confirmed inlet and outlet flowmeters.	
	Works Approval Holder confirmed irrigation area to be fitted with approximately 30 low drift sprinklers.	
Table 6 of Decision Report	Works Approval Holder submitted the DoH approval for the WWTP and sprayfield.	
Condition 9 Table 5 of Works Approval	Did not list the Table number for discharge point.	The Delegated Officer amended Condition 9 by including the Table reference number.
	The licensee submits that contaminant loading limits are at an annual rate which the WWTP and sprayfield was designed to meet (Category B – 180kg/ha/year for TN and 20kg.ha/year for TP), and that if a limit (preferably a target) is required then this annual rate should be used, noting it would be reported based on 6 months of use during commissioning. *However the licensee requests that contaminant loadings (condition 9) be removed in its entirety from the works approval given the risk posed by the facility. As per the decision document, the risk is classified as slight consequence with unlikely probability, hence a low risk. Loading limits are more appropriate to be applied in the operating licence post commissioning, as all other facilities managed by the licensee in the Pilbara (including those with a higher risk profile than this facility).*	In determining the loading limits for Condition 9 of the Works Approval, the Delegated Officer applied the principles of the Department of Water's WQPN 22 over the six months commissioning period. Based on the expected treated water quality supplied by the Works Approval Holder and irrigation to a 4.1ha sprayfield, the Delegated has determined that the expected nutrient loading was only marginally below those recommended by WQPN 22. Increasing the sprayfield area would lower the expected nutrient loading limits for the Premises. The overall 'low' risk rating determined by Delegated Officer in section 8.4 of the Decision Report is based on the Works Approval Holder achieving the expected discharge loading limits.

Condition	Summary of Works Approval Holder comments	DWER response
		The Delegate Officer therefore does not remove or amend the loading limits required in Condition 9. The Works Approval Holder can always expand the irrigation area through a Works Approval amendment application) in the event that there is concern that the loading limits may not be achieved. It must be noted that an amendment application requires at least a lead time of at least 40 working days to enable DWER to process a minor amendment application.
Condition 10 (b) of Works Approval	The Works Approval Holder requested to operate the Crushing Plants for 12 months or the duration of the works approval to reduce the number of administrative licence amendments that will be needed when a licence is issued for the Premises.	Under the Department's *Industry Regulation Guide to Licensing – June 2019* - "the period of operations under the works approval will be set between 90 and 180 calendar days to allow for the assessment of the licence application. Operation under licence conditions can begin when the licence is granted". The Delegated Officer notes that an operating licence for both the WWTP and the Crushing Plants can be submitted as a single application. Where infrastructure and operation of the premises meet the design and operational specifications, the Department will apply the findings of the works approval assessment in its licence decision and the time limited operations conditions of the works approval may be transferred, into the operating licence and simplify (and shorten) the assessment process. The Delegated Officer, therefore, does not agree to increase the operating period of the Crushing Plants.
Condition 14 of Works Approval.	Did not list the Table numbers.	The Delegated Officer amended Condition 14 by including the Table reference numbers