Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works Approval Number	W6043/2017/1
Works Approval Holder	Atlas Iron Limited
ACN	110 396 168
Registered business address	Level 18, 300 Murray Street PERTH WA 6000
File Number	DER2017/000441
Duration	**06/09/2017 to 05/09/2020**
Date of issue	06/09/2017
Prescribed Premises	Category 5 – Processing or beneficiation of metallic or non-metallic ore Category 85 – Sewage facility Category 89 – Putrescible landfill site
Premises	Corunna Downs Project G45/339, L45/408, L45/407, L45/410 and M45/1257 NULLAGINE WA 6758

This Works Approval is granted to the Works Approval Holder, subject to the following conditions, on 6 September 2017, by:

Date signed: 6 September 2017

Alana Kidd

Manager Industry Regulation – Resource Industries

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Explanatory notes

These explanatory notes do not form part of this Works Approval.

Defined terms

Definition of terms used in this Works Approval can be found at the start of this Works Approval. Terms which are defined have the first letter of each word capitalised throughout this Works Approval.

Department of Water and Environmental Regulation

The Department of Water and Environmental Regulation (DWER) is 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 *Environmental Protection Act 1986* (WA) (EP Act). The Department also monitors and audits compliance with licences and works approvals, takes enforcement action and develops and implements licensing and industry regulation policy.

Works Approval

Section 52 of the EP Act provides that an occupier of any premises commits an offence if any work is undertaken on, or in relation to, the premises which causes the premises to become, or to become capable of being, Prescribed Premises, except in accordance with a works approval.

Section 56 of the EP Act provides that an occupier of Prescribed Premises commits an offence if Emissions are caused or increased or permitted to be caused or increased, or Waste, noise, odour or electromagnetic radiation is altered or permitted to be altered from Prescribed Premises, except in accordance with a works approval or licence.

Categories of Prescribed Premises are defined in Schedule 1 of the *Environment Protection Regulations 1987* (WA) (EP Regulations).

This Works Approval does not authorise any activity which may be a breach of the requirements of another statutory authority including, but not limited to, the following:

- conditions imposed by the Minister for Environment under Part IV of the EP Act;
- conditions imposed by DWER for the clearing of native vegetation under Part V, Division 2 of the EP Act;
- any requirements under the *Waste Avoidance and Resource Recovery Act 2007;*
- any requirements under the *Environmental Protection (Controlled Waste) Regulations 2004*; and
- any other requirements specified through State legislation.

It is the responsibility of the Works Approval Holder to ensure that any action or activity referred to in this Works Approval is permitted by, and is carried out in compliance with, statutory requirements.

The Works Approval Holder must comply with the Works Approval. Contravening a Works Approval Condition is an offence under s.55 of the EP Act.

Responsibilities of Works Approval Holder

Separate to the requirements of this Works Approval, general obligations of Works Approval Holders are set out in the EP Act and the regulations made under the EP Act. For example, the Works Approval Holder must comply with the following provisions of the EP Act:

- the duties of an occupier under s.61; and

- restrictions on making certain changes to Prescribed Premises unless the changes are in accordance with a Works Approval, Licence, closure notice or environmental protection notice (s.53).

Strict penalties apply for offences under the EP Act.

Reporting of incidents

The Works Approval Holder has a duty to report to the Department all Discharges of Waste that have caused or are likely to cause Pollution, Material Environmental Harm or Serious Environmental Harm, in accordance with s.72 of the EP Act.

Offences and defences

The EP Act and its regulations set out a number of offences including:

- Offence of emitting an Unreasonable Emission from any Premises under s.49.
- Offence of causing Pollution under s.49.
- Offence of dumping Waste under s.49A.
- Offence of discharging Waste in circumstances likely to cause Pollution under s.50.
- Offence of causing Serious Environmental Harm (s.50A) or Material Environmental Harm (s.50B).
- Offence of causing Emissions which do not comply with prescribed standards (s.51).
- Offences relating to Emissions or Discharges under regulations prescribed under the EP Act, including materials discharged under the *Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA).*
- Offences relating to noise under the *Environmental Protection (Noise) Regulations 1997 (WA).*

Section 53 of the EP Act provides that a Works Approval Holder commits an offence if Emissions are caused, or altered, from a Prescribed Premises unless done in accordance with a Works Approval, Licence or the requirements of a closure notice or an environmental protection notice.

Defences to certain offences may be available to a Works Approval Holder and these are set out in the EP Act. Section 74A(b)(iii) provides that it is a defence to an offence for causing Pollution, in respect of an Emission, or for causing Serious Environmental Harm or Material Environmental Harm, or for discharging or abandoning Waste in water to which the public has access, if the Works Approval Holder can prove that an Emission or Discharge occurred in accordance with a Works Approval.

This Works Approval specifies the Emissions and Discharges, and the limits and Conditions which must be satisfied in respect of specified Emissions and Discharges, in order for the defence to offence provision to be available.

Authorised Emissions and Discharges

The specified and general Emissions and Discharges from the Works authorised through this Works Approval are authorised to be conducted in accordance with the Conditions of this Works Approval.

Amendment of Works Approval

The Works Approval Holder can apply to amend the Conditions of this Works Approval under s.59 of the EP Act. An application form for this purpose is available from DWER.

The CEO may also amend the Conditions of this Works Approval at any time on the initiative

of the CEO without an application being made.

Duration of Works Approval

The Works Approval will remain in force for the duration set out on the first page of this Works Approval or until it is surrendered, suspended or revoked in accordance with s.59A of the EP Act.

Suspension or revocation

The CEO may suspend or revoke this Works Approval in accordance with s.59A of the EP Act.

Definitions and interpretation

Definitions

In this Works Approval, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
Books	has the same meaning given to that term under the EP Act.
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-der@dwer.wa.gov.au
Condition	means a condition to which this Works Approval is subject under s.62 of the EP Act.
Department	means the department established under s.35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
Department Request	means a request for Books or other sources of information to be produced, made by an Inspector or the CEO to the Works Approval Holder in writing and sent to the Works Approval's address for notifications, as described at the front of this Works Approval, in relation to: (a) compliance with the EP Act or this Works Approval; (b) the Books or other sources of information maintained in accordance with this Works Approval; or (c) the Books or other sources of information relating to Emissions from the Premises.
Discharge	has the same meaning given to that term under the EP Act.
DWER	Department of Water and Environmental Regulation
Emission	has the same meaning given to that term under the EP Act.
Environmental Harm	has the same meaning given to that term under the EP Act.
EP Act	means the *Environmental Protection Act 1986* (WA).
EP Regulations	means the *Environmental Protection Regulations 1987* (WA).
Implementation Agreement or	has the same meaning given to that term under the EP Act.

Decision	
Inspector	means an inspector appointed by the CEO in accordance with s.88 of the EP Act.
Material Environmental Harm	has the same meaning given to that term under the EP Act.
Pollution	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Works Approval applies, as specified at the front of this Works Approval and as shown on the map in Schedule 1 to this Works Approval.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Serious Environmental Harm	has the same meaning given to that term under the EP Act.
Unreasonable Emission	has the same meaning given to that term under the EP Act.
Waste	has the same meaning given to that term under the EP Act.
Works	refers to the Works described in Schedule 2, at the locations shown in Schedule 1 of this Works Approval to be carried out at the Premises, subject to the Conditions.
Works Approval	refers to this document, which evidences the grant of the works approval by the CEO under s.54 of the EP Act, subject to the Conditions.
Works Approval Holder	refers to the occupier of the Premises being the person to whom this Works Approval has been granted, as specified at the front of this Works Approval.

Interpretation

In this Works Approval:

(a) the words ‘including’, ‘includes’ and ‘include’ will be read as if followed by the words ‘without limitation’;

(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;

(c) where tables are used in a Condition, each row in a table constitutes a separate Condition;

(d) any reference to an Australian or other standard, guideline or code of practice in this Works Approval means the version of the standard, guideline or code of practice in force at the time of granting of this Works Approval and includes

any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the Works Approval; and

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act.

Conditions

Infrastructure and equipment

1. The Works Approval Holder must install and undertake the Works for the infrastructure and equipment:

(a) specified in Column 1;

(b) to the requirements specified in Column 2; and

(c) at the location specified in Column 3

of Table 2 below.

The Works Approval Holder must not depart from the requirements specified in Column 2 of

2. Table 2 except:

(a) where such departure does not increase risks to public health, public amenity or the environment; and

(b) all other Conditions in this Works Approval are still satisfied.

Within 60 days of the completion of the Works specified in Column 1 of Table 2, the Works Approval Holder must provide to the CEO a report from the Works Approval Holder with a photo and confirmation that the works specified in Column 1 of

3. Table 2 below have been constructed with no material defects and to the requirements specified in Column 2.

Table 2: Infrastructure and equipment requirements table

Column 1	Column 2	Column 3
Infrastructure /Equipment	**Requirements (design and construction)**	**Site plan reference**
Crushing and screening plant	1 x Feeder and Grizzly 1 x Jaw (primary) Crusher 2 x (secondary and tertiary) cone crusher 2 x twin deck sizing screens Pan feeders 2 x Radial Stackers 2 x Cross belt samplers Weightometers Metal detection units Hydrocarbons to be stored in accordance with AS1940:2004 The Storage and Handling of Flammable and Combustible Liquids. Stormwater sedimentation basins will be installed on the ROM pad to manage a 1 in 5 year rain event before mobilisation of the crushing and screening plant. The basins will incorporate a rock armoured spillway to encourage settling of sediment and prevent erosion. Mobile Water truck with cannon or spray bar. Water spray units to be installed on the feed bin, at strategic conveyor transfer points and on stacker head chutes.	located 2km from the Coongan River as shown in figures 1 and 2 in schedule 1

Column 1	Column 2	Column 3
Infrastructure /Equipment	**Requirements (design and construction)**	**Site plan reference**
Landfill facility	Constructed in accordance with the *Environmental Protection (Unauthorised Discharges) Regulations 2004*, including • Located more than 100m from a waterbody • Located more than 500m any residential development (camp) • The base of the landfill to be separated from the highest level of the water table by at least 3m • Stormwater diversion structures to be constructed to divert runoff around and away from the facility • A fence around the boundary of the facility that is of sufficient height and strength to prevent access of cattle, horses and other fauna; prevents waste from being washed or blown outside the facility; and is secured by a lockable gate to prevent unauthorised access • The tipping area (landfill face) not exceeding 30m in length or 2m above ground level in height • A 3m wide fire break to be cleared around the boundary fence of the landfill • Fire control equipment (i.e. fire extinguishers to be located within the facility) • Inert Type waste (i.e. tyres) to be disposed of within the active waste rock dumps (i.e Runway, Shark Gully and Spilt Rock waste rock dumps)	As shown in figure 1 schedule 1

Column 1	Column 2	Column 3
Infrastructure /Equipment	**Requirements (design and construction)**	**Site plan reference**
Wastewater treatment facility	The wastewater treatment facility consists of two main components: 1. A wastewater treatment plant comprising • Pump well • Primary tank • Balance tank • 2 x sequential batch reactor including air injection pump • Final effluent tank, including chlorine pump • Treated wastewater irrigation storage system (i.e. tanks) 2. An irrigation spray field (treated wastewater discharge area) consisting of 2 Ha fenced area, sprinklers and signage Management measures will include: • Installation of flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart) against expected parameters for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorous (TP) and Escherichia coli. • Daily inspections and checks for discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps. • High level alarms (audible and visible). • Contingency tanks to allow for additional storage. • Earthen bunding around the plant to contain run-off. • Evacuation sump with pump. • Above ground pipework. • Barricading or bollards. • Restricting access to authorised persons. • Fencing installed around the spray field perimeter to prevent unauthorised access. • Weed removal as required at the spray field. • Monthly visual monitoring of the sprayfield to ensure: • even distribution of treated effluent to minimise the risk of waterlogging and associated impact on vegetation ; and • no irrigation generated run-off or discharge and associated impact on vegetation occurs outside the sprayfield. •	As shown in Figures 1, 2 and 3 in Schedule 1

Emissions

4. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for specified Emissions and general Emissions described in Column 1 of Table 3, subject to the exclusions, limitations or requirements specified in Column 2, of Table 3.

Table 3: Authorised Emissions table

Column 1	**Column 2**
Emission type	**Exclusions/Limitations/Requirements**
General Emissions	
Emissions which arise from undertaking the Works set out in Schedule 2.	Emissions excluded from General Emissions are: • Unreasonable Emissions; or • Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or • Discharges of Waste in circumstances likely to cause Pollution; or • Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access; or • Emissions or Discharges which do not comply with an Approved Policy; or • Emissions or Discharges which do not comply with prescribed standard; or • Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or • Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the Environmental P*rotection (Unauthorised Discharges) Regulations 2004*.

Record-keeping

5. The Works Approval Holder must maintain accurate Books including information, reports and data in relation to the Works and the Books must:

(a) be legible;

(b) if amended, be amended in such a ways that the original and subsequent amendments remain legible or are capable of retrieval;

(c) be retained for at least 3 years from the date the Books were made; and

(d) be available to be produced to an Inspector or the CEO.

6. The Works Approval Holder must comply with a Department Request within 14 days from the date of the Department Request or such other period as agreed to by the Inspector or the CEO.

Schedule 1: Maps

Premises

The Premises are shown in the map below.

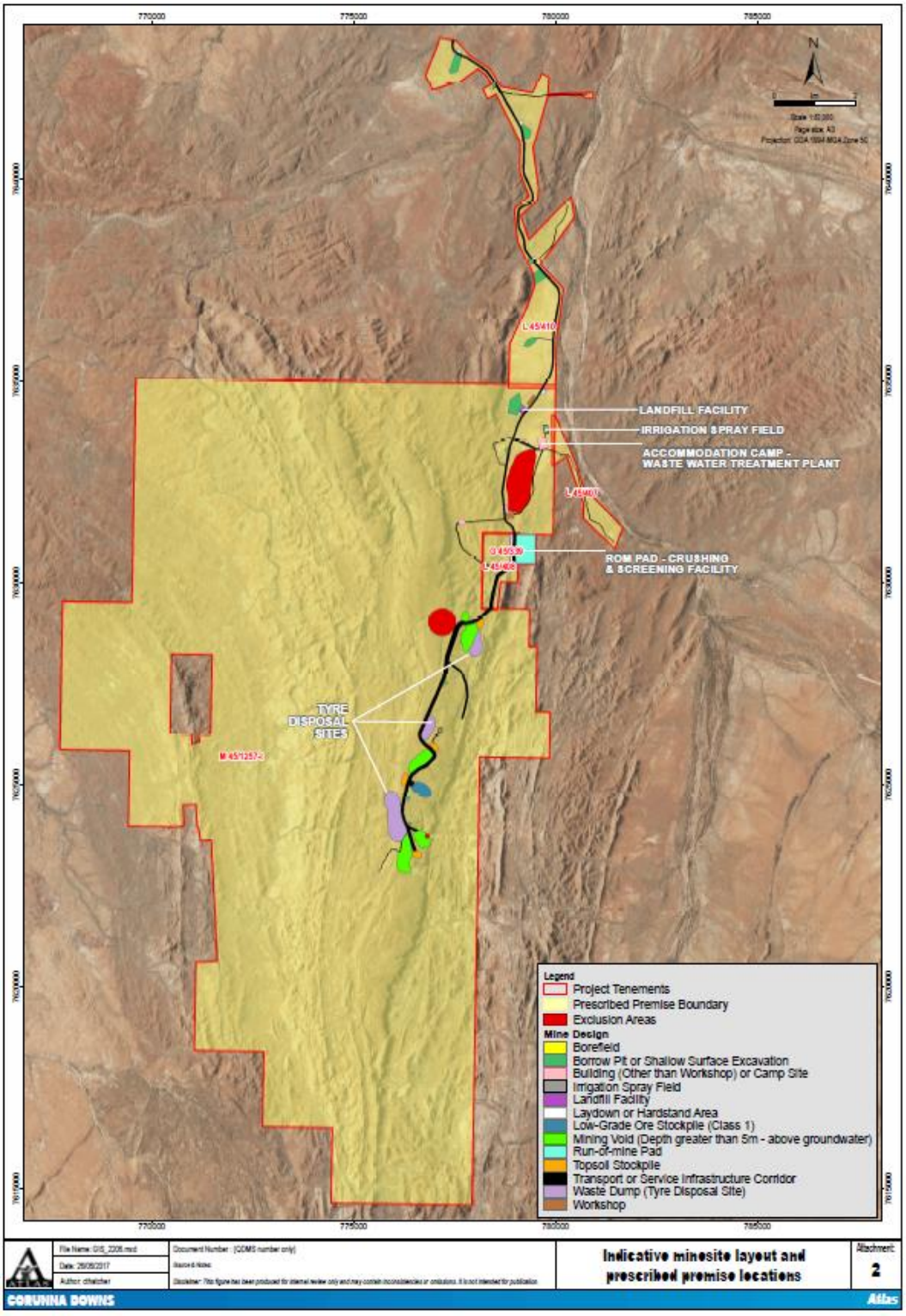

Figure 1: Premises layout

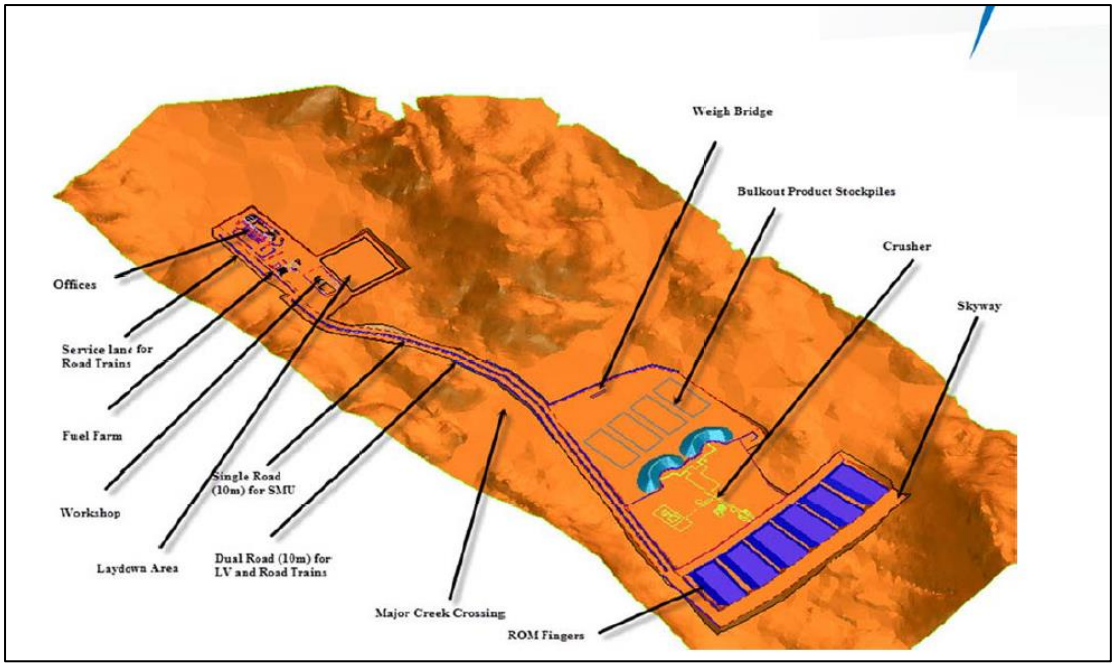

Figure 2: ROM pad layout

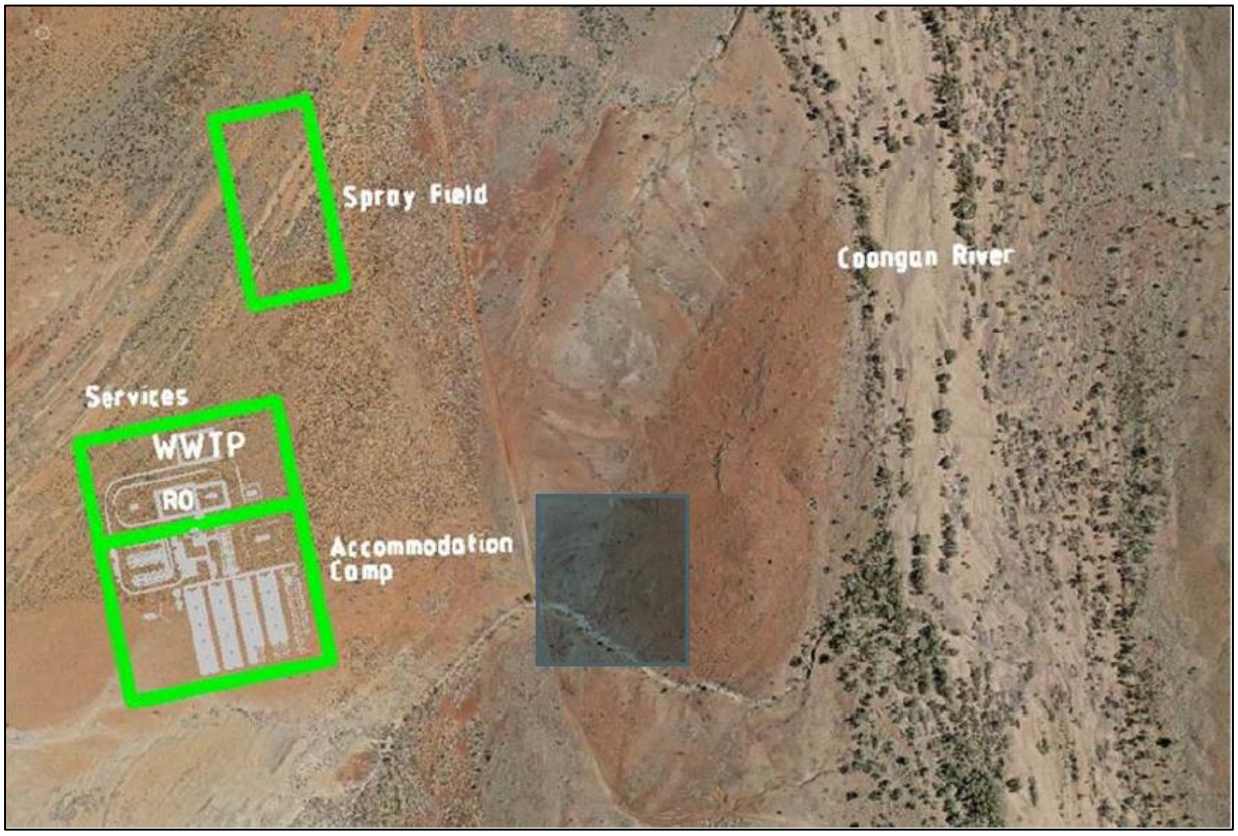

Figure 3: Waste water treatment plant layout

Schedule 2: Works

At the time of assessment, Emissions and Discharges from the Works listed in Table 4 were considered in the determination of the risk and related Conditions for the Works Approval.

Table 4: Authorised Works

Works	Specifications/Drawings
Crushing and screening plant	Target water moisture content of 5% for fines and 3.5% for lump will be achieved by the application of water sprays. Water sprays to be installed on the feed bin, strategic conveyor transfer points, and stacker head chutes. A mobile truck with a water cannon and/or spray bar will be used to manage dust emissions on the ROM pad.
Sequential Batch Reactor (SBR) system	The SBR is comprised of: • A primary tank (including screen) that receives the raw effluent from the pump station settles the heavy solids and collects fats, oils and proteins. • A balance tank that helps with peak flow periods. IT delivers primary treated effluent to the SBR via duty and stand-by pumps. • An SBR that aerates, mixes, settles and decants waste water. It treats effluent with a combination of air and mixing schedules controlled by an air induction pump that adds oxygen and mixes the chamber for nitrogen conversion. • A final effluent tank that collects treated effluent. Upon the decant phase of the SBR, treated effluent is gravity fed and disinfected with sodium hypochlorite via a dose pump and sorted within the chlorine contact tank. • Storage and irrigation of treated effluent generated by the wastewater treatment plant. This will be stored in tanks (with a minimum capacity of two days) prior to discharge by impact sprinklers on the designated spray field. The SBR will be designed and operated in accordance with Atlas Wastewater Treatment Plant Management Plan, Attachment 3AA (Wastewater Treatment Plant (WWTP) Management Plan: Compliance 950-HSE-PLN-0002 Revision 0) of the Corunna Downs Project Works Approval Application – Supplementary Documentation No. 179-LAH-EN-REP-0005 Revision 0. Management measures will include: • Installation of flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart) against expected parameters for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorus (TP) and *Escherichia coli*.

	• Daily inspections and checks for discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps.
	• High level alarms (audible and visible).
	• Contingency tanks to allow for additional storage.
	• Earthen bunding around the plant to contain run-off.
	• Evacuation sump with pump.
	• Above ground pipework.
	• Barricading or bollards.
	• Restricting access to authorised persons.
	• Fencing installed around the spray field perimeter to prevent unauthorised access.
	• Weed removal as required at the spray field.
	• Monthly visual monitoring of the sprayfield to ensure:
	  ○ even distribution of treated effluent to minimise the risk of waterlogging and associated impact on vegetation; and
	  ○ no irrigation generated run-off or discharge and associated impact on vegetation occurs outside the sprayfield.

Landfill	Constructed in accordance with the *Environmental Protection (Rural Landfill) Regulations 2002,* including: • Located more than 100m from a waterbody. • Located more than 500m any residential development (camp). • The base of the landfill to be separated from the highest level of the water table by at least 3m. • Stormwater diversion structures to be constructed to divert runoff around and away from the facility. • A fence around the boundary of the facility that is of sufficient height and strength to prevent access of cattle, horses and other fauna; prevents waste from being washed or blown outside the facility; and is secured by a lockable gate to prevent unauthorised access. • The tipping area (landfill face) not exceeding 30m in length or 2m above ground level in height. • A 3m wide fire break to be cleared around the boundary fence of the landfill. • Fire control equipment (i.e. fire extinguishers to be located within the facility). Inert Type waste (i.e. tyres) to be disposed of within the active waste rock dumps (i.e. Runway, Shark Gully and Spilt Rock waste rock dumps). Once operational, the landfill will be managed in accordance with Atlas Landfill management Procedure Attachment 3AB (Landfill management Procedure 950-HSE-PLN-0020 Revision 1) of the

	Corunna Downs Project Works Approval Application – Supplementary Documentation No. 179-LAH-EN-REP-0005 Revision 0.

Decision Report

Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6043/2017/1
Applicant	Atlas Iron Limited
ACN	110 396 168
File Number	DER2017/000441
Premises	Corunna Downs Project G45/339, M45/1257, L45/410, L45/407 and L45/408 NULLAGINE WA 6758
Date of Report	6 September 2017
Status of Report	Final

Table of Contents

1. Definitions of terms and acronyms 1
2. Purpose and scope of assessment 3
   2.1 Application details 3
3. Background 3
4. Overview of Premises 5
   4.1 Operational aspects 5
      4.1.1 Crushing and screening plant (Category 5) 5
      4.1.2 Sewage facility (Category 85) 6
      4.1.3 Landfill (Category 89) 10
   4.2 Infrastructure 2
5. Legislative context 5
   5.1 Part IV of the EP Act 5
   5.2 Contaminated sites 5
   5.3 Part V of the EP Act 5
      5.3.1 Applicable regulations, standards and guidelines 5
      5.3.2 Clearing 6
6. Consultation 6
7. Location and siting 6
   7.1 Siting context 6
   7.2 Residential and sensitive Premises 7
   7.3 Specified ecosystems 8
   7.4 Groundwater and water sources 9
   7.5 Soil type 11
   7.6 Meteorology 11
8. Risk assessment 12
   8.1 Determination of emission, pathway and receptor 12
   8.2 Consequence and likelihood of risk events 24
   8.3 Acceptability and treatment of Risk Event 25
9. Regulatory controls 25
   9.1 Works Approval controls 25
      9.1.1 Plant infrastructure and equipment 25
   9.2 Licence controls 27
      9.2.1 Infrastructure and equipment 27
10. Determination of Works Approval conditions 28
11. Applicant's comments 28

12. Conclusion 28
Appendix 1: Key documents
Appendix 2: Summary of applicant's comments on risk assessment and draft conditions
Attachment 1: Works Approval W6043/2017/1

Figure 1: Indicative crushing and screening plant layout 5
Figure 2: Wastewater treatment process overview 7
Figure 3: Wastewater treatment plant layout 9
Figure 4: Groundwater sampling locations 1
Figure 5: Premises layout 4
Figure 6: Regional location 7

Table 1: Definitions 1
Table 2: Documents and information submitted during the assessment process 3
Table 3: Prescribed Premises Categories 4
Table 4: Expected combined WWTP and RO unit effluent parameters for spray field disposal 9
Table 5: Groundwater monitoring data 1
Table 6: Premises infrastructure 2
Table 7: Premises infrastructure 2
Table 8: Relevant approvals and tenure 5
Table 9: Receptors and distance from activity boundary 8
Table 10: Environmental values 8
Table 11: Groundwater and *water sources 9
Table 12: Soil and sub-soil characteristics 11
Table 13: Identification of emissions, pathway and receptors during construction 12
Table 14: Identification of emissions, pathway and receptors during operation 16
Table 15: Risk rating matrix 24
Table 16: Risk criteria table 24
Table 17: Risk treatment table 25
Table 18: Plant infrastructure and equipment 25
Table 19: Summary of infrastructure controls to be applied 27
Table 20: Summary of conditions to be applied in the works approval 28

1. Definitions of terms and acronyms

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

Table 1: Definitions

Term	Definition
Applicant	Atlas Iron Limited
BOD	Biochemical oxygen demand
BoM	Bureau of Meteorology
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Decision Report	refers to this document
Delegated Officer	an officer under section 20 of the EP Act
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation
EC	Electrical conductivity
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP (CW) Regulations	*Environmental Protection (Controlled Waste) Regulations 2004*
EP Regulations	*Environmental Protection Regulations 1987* (WA)
EP (Rural Landfill) Regulations	*Environmental Protection (Rural Landfill) Regulations 2002*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
m^3	cubic metres
mbgl	Metres below ground level

PDWSA	Public Drinking Water Source Area proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* and the *Country Areas Water Supply Act 1947*
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*
RiWI Act	*Rights in Water and Irrigation Act 1914*
RO	Reverse Osmosis
ROM	Run of Mine
SBR	Sequential Batch Reactor (waste water treatment plant)
TDS	Total dissolved solids
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
WC Act	*Wildlife Conservation Act 1950*
WWTP	Wastewater Treatment Plant

2. Purpose and scope of assessment

Atlas Iron Limited (the Applicant) submitted an Application on 23 March 2017 for a concurrent Works Approval and Licence under the *Environmental Protection Act 1986* (EP Act). The applicant wishes to develop five open pits (Split Rock, Razor Back, Shark Gully, Runway North and Runway South) to mine iron ore at the Corunna Downs Project (Premises), located approximately 23 kilometres (km) south of Marble Bar in the Pilbara region of Western Australia. It is anticipated that 23.3 million tonnes (Mt) or iron ore will be mined using conventional drill and blast, load and haul methods over a 6 year period.

This Decision Report assesses emissions and discharges associated with the construction and operation of the following:

- Crushing and screening facility (Category 5 Prescribed Premises);
- Sewage facility (Category 85 Prescribed Premises); and
- Landfill facility (Category 89 Prescribed Premises).

This assessment has resulted in the Department of Water and Environmental Regulation (DWER) issuing Works Approval W6043/2017/1 (Works Approval), which is contained in Attachment 1.

2.1 Application details

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Application form for a concurrent works approval and licence	22 March 2017
Corunna Downs Project Works Approval Application – Supplementary Documentation (179-LAH-EN-REP-0005, Revision 0)	23 March 2017
Email containing construction cost details	28 March 2017
Email containing: • Hydrocarbon Management Procedure 950-HSE-EN-PRO-0005, Revision 2 • Hydrocarbon (AND Chemical) Spill Management Procedure, 950-HSE-EN-PRO-0007, Revision 2 • Responses to clarification questions	13 June 2017
Email containing responses to clarification questions	26 June 2017
Email containing responses to clarification question on power generation	29 June 2017
Email containing responses to clarification questions	9 August 2017

3. Background

The Premises is located on mining tenements G45/339, M45/1257, L45/410, L45/407 and L45/408, which are leased and managed by the Applicant.

The Application relates to the following Primary Activities at the Premises for the prescribed premises Categories as defined in Schedule 1 of the *Environmental Protection Regulations 1987 (*EP Regulations*)* and listed in Table 3.

Table 3: Prescribed Premises Categories

Classification of Premises	Description	Approved Premises production or design capacity or throughput
Category 5	Processing or beneficiation of metallic or non-metallic ore: premises on which — (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	5,000,000 tonnes per Annual Period
Category 85	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.	56 cubic metres (m^3) per day treatment capacity and 75m^3 discharge capacity
Category 89	Putrescible landfill site: premises on which waste (as determined by reference to the waste type set out in the document entitled "Landfill Waste Classification and Waste Definitions 1996" published by the Chief Executive Officer, as amended from time to time) is accepted for burial	450 tonnes per Annual Period

Additional activities that will be undertaken by the applicant that are not within the scope of this assessment include:

- Clearing of native vegetation. While this activity is regulated under the EP Act, it has been considered separately to this application by the Department of Mines, Industry Regulation and Safety (DMIRS).
- Mining of ore from open pits.
- Abstraction of groundwater from the borefield. This activity is regulated under the *Rights in Water and Irrigation Act 1914* (RiWI Act) and GWL 176960 has been issued. Therefore it does not form part of this assessment.
- A Reverse Osmosis (RO) plant for the camp with a capacity of 0.029 gigalitres (GL) per year. This is below the threshold level of 0.5GL per year for which a premises must register as a category 85B prescribed premises. However as the brine discharge is to be mixed with the sewage facility discharge prior to irrigation, the discharge forms part of this assessment.
- Construction of additional infrastructure and supporting facilities (including offices, workshops and roads).
- Storage and use of chemicals, explosives and hydrocarbons including 120 tonnes of ammonium nitrate, five 110 kilolitre (kL) tanks of diesel fuel (at the workshop, mine operations centre and crusher) and 28kL of diesel fuel (camp), and less than 5kL of chlorine. This is less than the 1,000m^3 threshold level at which a premises must be registered for bulk storage of chemicals under category 73 and therefore does not form part of this assessment.
- Electricity generation will be produced by diesel generators, with a maximum capacity of 4.48 megawatt (MW). This is below the threshold level of 10MW, which triggers a category 52 prescribed premises and therefore does not form part of this assessment.

4. Overview of Premises

4.1 Operational aspects

The operational aspects as defined within the Application are detailed below.

4.1.1 Crushing and screening plant (Category 5)

Ore mined from the open pits will be hauled via haul trucks to the Run of Mine (ROM) pad, where it will be stockpiled prior to processing. Front end loaders will feed the stockpiled ore into the crushing and screening plant. The ore will then undergo three crushing stages and two screening stages to produce lump (40 – 6.3 mm) and fine (<6.3 mm) products before being fed out onto the product stockyard via two radial stackers (one for lump and one for fines).

Oversize ore will be separated into an oversize ore stockpile which will be periodically processed using a rock breaker before being re-fed into the crushing and screening plant. The product will then be transported by road trains to Utah Point in Port Hedland for export overseas.

An indicative schematic of the crushing and screening plant layout is provided in Figure 1.

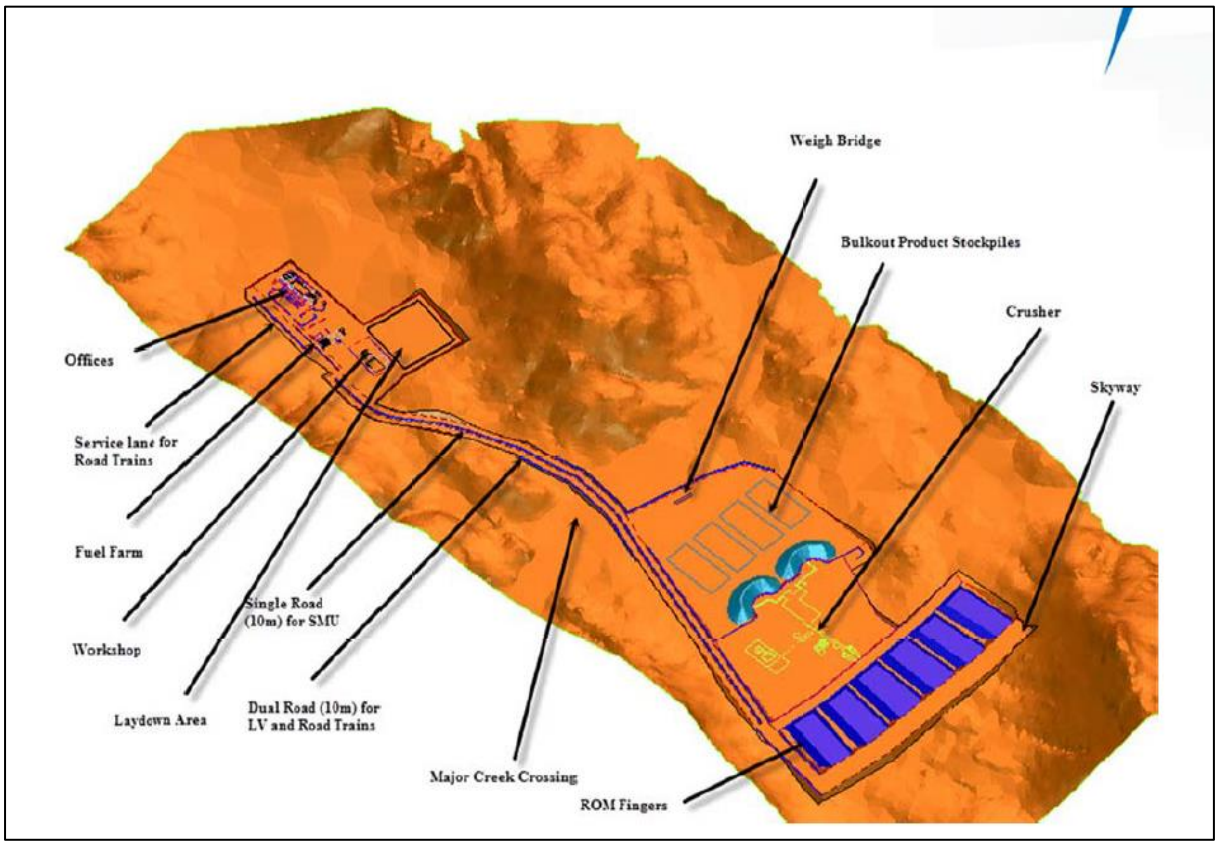

Figure 1: Indicative crushing and screening plant layout

4.1.2 Sewage facility (Category 85)

The Wastewater Treatment Plant (WWTP) will be a tank based Sequential Batch Reactor (SBR) system with a maximum operational capacity of 56 m^3/day to treat accommodation camp sewage and wastewater. This will be more than sufficient to accommodate the expected throughput of 45 m^3/day to the WWTP based on a maximum camp capacity of 180 people producing 250L of waste per person per day. The effluent from the WWTP will be disposed of by spray irrigation to a spray field.

Wastewater from the RO plant will be plumbed into the treated wastewater irrigation system, where it will mix with the treated wastewater before discharge by irrigation to the spray field. The irrigation system has been designed to accommodate a maximum of 75 m^3/day (based on throughput of 45 m^3/day from the WWTP and 30 m^3/day from the RO plant).

The wastewater treatment process includes biological degradation (aerobic/anaerobic treatment), nutrient removal (anoxic treatment), clarification and effluent sterilisation (chlorination). The key steps of the SBR treatment process are shown in Figure 2 and summarised below:

1. Primary Tank (including screen) receives raw effluent from pump station. Settles heavy solids and collects fats, oils and proteins;
2. Balance Tank – helps with high peak flow periods. Delivers primary treated effluent to the SBR via duty and standby pumps;
3. SBR – aeration, mixing, settling, decant. Treats effluent with a combination of air and mixing schedules controlled by an air induction pump that adds the oxygen and mixes the chamber for nitrogen conversion;
4. Final Effluent Tank – treated effluent collection. Upon the decant phase of the SBR treated effluent is gravity fed and disinfected with sodium hypochlorite via a dose pump and stored within the chlorine contact tank before discharge to the irrigation storage system; and
5. Storage and Irrigation - treated effluent generated by the WWTP will be stored in storage tanks (with a minimum storage capacity of up to two days – 150 m^3) prior to it being discharged by impact sprinklers to the designated spray field.

The irrigation spray field for the treated effluent will be approximately 2 hectares (ha) in size and located more than 100 metres (m) downwind of the accommodation camp buildings and 500 m from the Coongan River. It will be surrounded by a 1.2 m high, two strand perimeter fence and will include access gates to prevent unauthorised access and signage to alert personnel of effluent irrigation. The fence will be located a minimum of 5 m from the outer edge of the sprinkler spray area to reduce the likelihood of spray drift being discharged beyond the fenced area. Sprinkler heads will be selected to maximise droplet size, reducing the risk of spray drift.

Commissioning will involve the introduction of influent sewage from an external controlled waste facility in accordance with the Department of Health's Guidelines for the Non-Potable Uses of Recycled Water in Western Australia over a minimum of six weeks. Treated wastewater will not be discharged to the irrigation field during commissioning but stored and transported off site for disposal by a licensed controlled waste carrier in accordance with the *Environmental Protection (Controlled Waste) Regulations 2004* (the EP CW Regulations). Operational monitoring will be carried out following commissioning in accordance with the Department of Health's Guidelines for the Non-Potable Uses of Recycled Water in Western Australia.

Sludge from the WWTP will be periodically removed via vacuum truck by a licensed controlled waste carrier for offsite disposal at a suitably licensed facility in accordance with the EP (CW) Regulations.

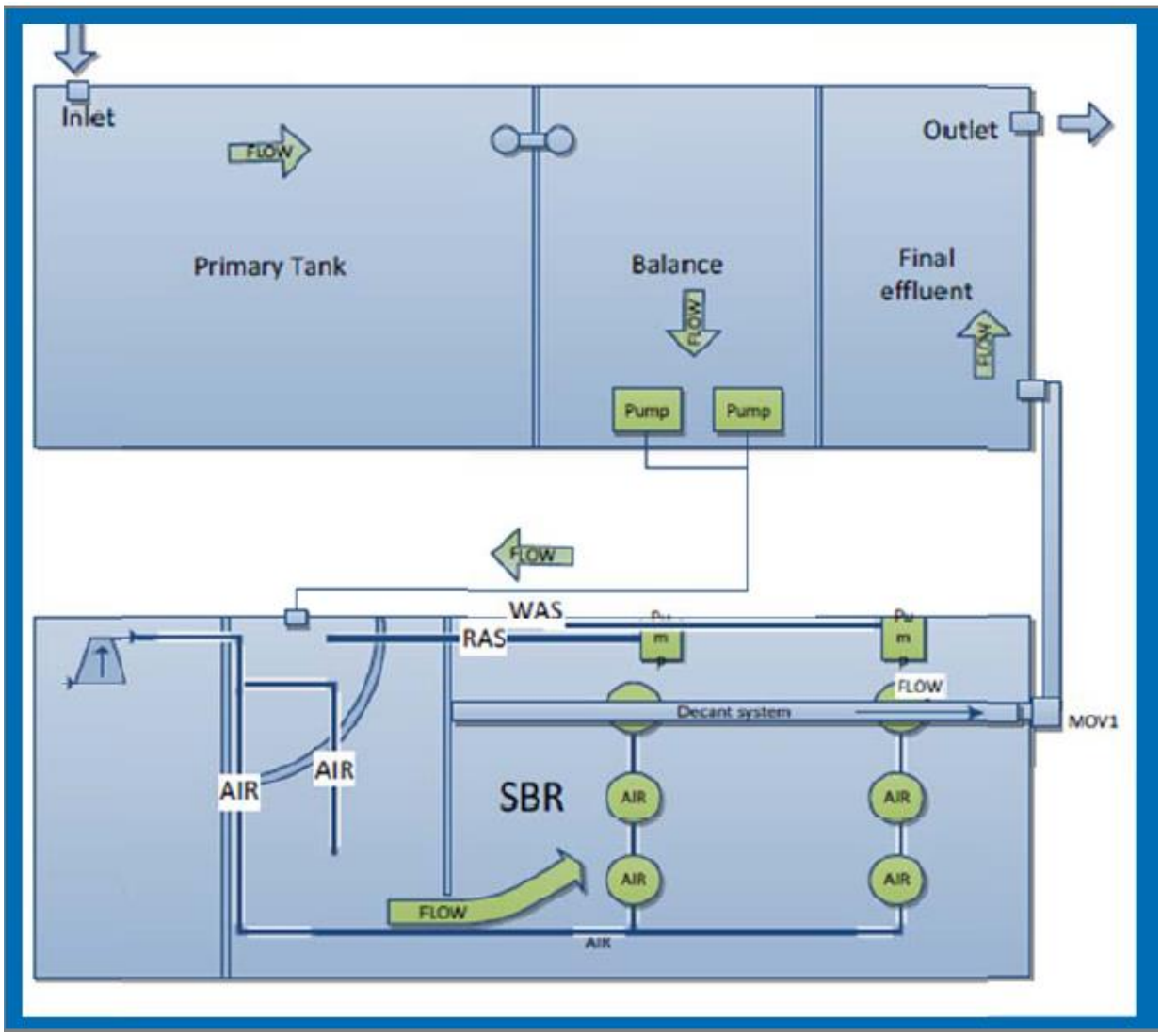

Figure 2: Wastewater treatment process overview

The Applicant has advised that while it is not yet certain whether an open or closed system will be used, that it does not expect overflow issues, even in the event of extreme rainfall events of 200mm of rain or more per month, owing to the presence of storage tanks with two day storage capacity and its experience with similar plants. Where an open unit is used, overflow alarms will be installed.

Management controls proposed for the WWTP include:

- Flow meters to allow monitoring of influent and irrigation volumes.
- Inline testing and sample ports.
- Quarterly sampling (at least 45 days apart for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorus (TP) and *Escherichia coli*).
- Daily inspections and checks for discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps.
- High level alarms (audible and visible).
- Contingency tanks to allow for additional storage.
- Earthen bunding around the plant to contain run-off.

- Evacuation sump with pump.
- Above ground pipework.
- Barricading or bollards.

Expected parameters for the combined effluent from the WWTP and RO unit that will be disposed of to the spray fields are detailed in Table 4 and the layout is shown in Figure 3. Expected wastewater effluent parameters are below or within threshold ranges required for ecosystem protection in the National Water Quality Management Strategy: Australian Guidelines for Sewerage Systems: Effluent Management. They are also consistent with a low level of human exposure risk, as defined in the Department of Health's Guidelines for the Non-Potable Uses of Recycled Water in Western Australia.

The irrigation spray field is vegetated with native species. The area subject to the spray field has been included within the boundary of clearing permit application CPS 7456/1, and consequently no monitoring of vegetation condition is proposed. Weeds will be removed as identified, with the site to be rehabilitated post completion of mining. The spray field size of 2 ha will result in annual application rates of 243 kg/ha/year nitrogen and 81 kg/ha/year of phosphorus. This is based on the Guidelines for the Non-Potable Uses of Recycled Water in Western Australia which applies the following methodology.

- Total P or N in effluent kg/year = (Number of people x hydraulic load of wastewater produced per person per day x Total P or N in effluent per day x 360) / 1,000,000

The annual emissions to the spray field are then obtained from the expected combined effluent concentrations of the WWTP and RO brine discharge as shown in Table 4 below, the Applicant's maximum camp size of 180 people and the expected volume of wastewater per person per day of 250L. The expected average effluent production per person is higher than the 180L indicated in the Guidelines for the Non-Potable Uses of Recycled Water in Western Australia. The emissions are:

- For Phosphorus: 180 * 250 * 10* 360 / 1,000,000 = 162 kg/year.
- For Nitrogen: 180 * 250 * 30 * 360 / 1,000,000 = 486 kg/year.

Based on the irrigation spray field size of 2 ha, the annual application rate is therefore 81 kg/ha/year for Phosphorus and 243 kg/ha/year for Nitrogen. This is consistent with the lowest level of protection for management of eutrophication risk (level D for fine grained soils, 480kg/ha/year for N and 120kg/ha/year for P) as identified in DWER's Water Quality Protection Note 22: Irrigation with Nutrient Rich Wastewater. This level applies to fine grained soils of loam, clay or peat with surface water within 500m of the irrigation site. This is applicable as the irrigation site is comprised of clayey or sandy loam soils and 500m from the Coongan River.

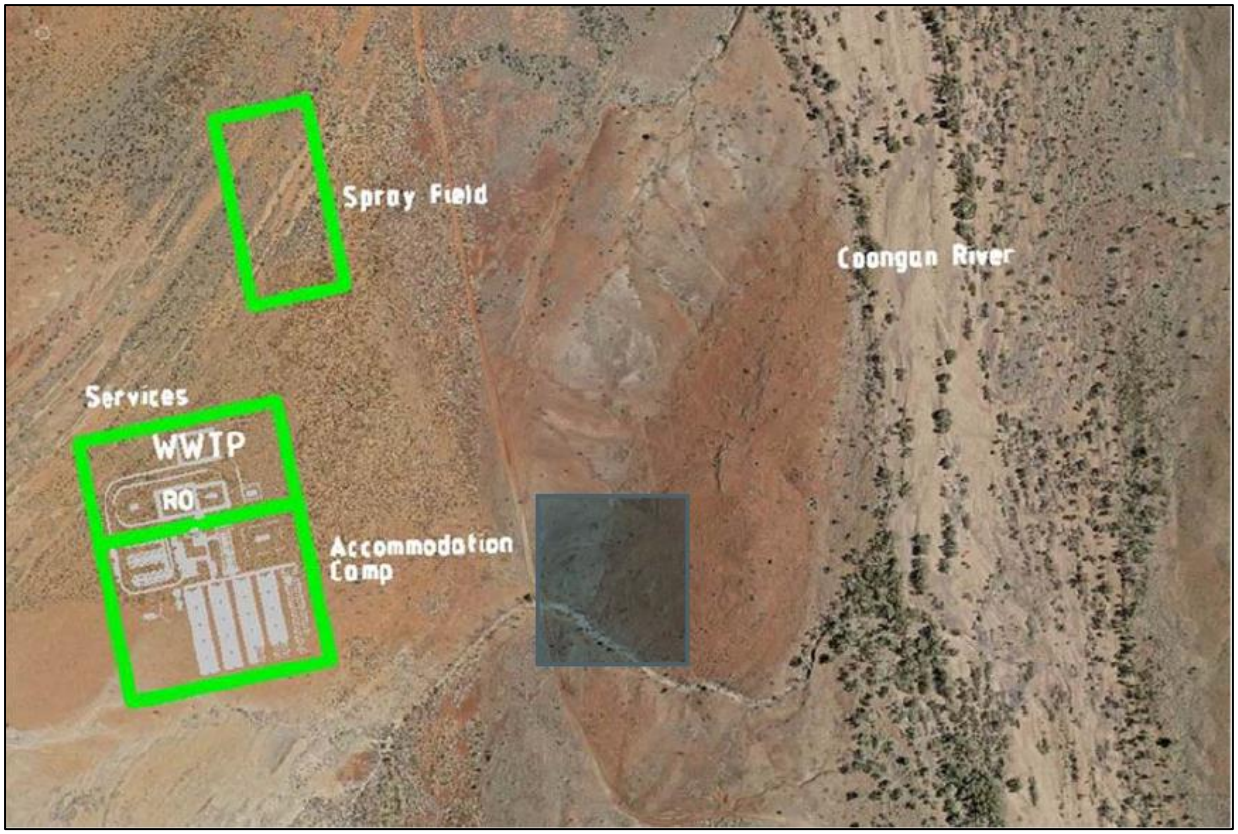

Figure 3: Wastewater treatment plant layout

Table 4: Expected combined WWTP and RO unit effluent parameters for spray field disposal

Parameter	Expected Effluent Concentration*	NWQMS 1997*
Biochemical Oxygen Demand (BOD)	<20 mg/L	20 – 30 mg/L
Total Suspended Solids (TSS)	<20 mg/L	25 – 40 mg/L
Total Nitrogen	<30 mg/L	20 – 50 mg/L
Total Phosphorus	<10 mg/L	6 – 12 mg/L
E. coli	<100 cfu/100mL	100,000 – 1,000,000 cfu/100mL
pH	6.5-8.0 pH units	-
Residual chlorine	<2.5 mg/L	-
Total Dissolved solids (TDS)	<2,500 mg/L	-
Electrical Conductivity (EC)	<2,000 µS/cm	-

*National Water Quality Management Strategy, Australian Guidelines for Sewerage Systems – Effluent Management, 1997

4.1.3 Landfill (Category 89)

The Applicant proposes to construct a landfill facility with a capacity of 400 tonnes per annum to accept Type 1 Inert Waste and Putrescible Waste generated at the accommodation camp and administration area. The landfill will be constructed and operated in accordance with the *Environmental Protection (Rural Landfill) Regulations 2002.*

The disposal process will involve a maximum open tipping face of 30m length and 2m height that is covered with an inert, incombustible material at least once per month. Disposal areas will be levelled and compacted as soon as possible after waste disposal to ensure stability and cells will be rehabilitated within 6 months after disposal to that cell has been completed. These practices are consistent with the requirements of the EP (Rural Landfill) Regulations.

In addition to this, 50 tonnes of Type 2 Inert Waste (tyres) is also expected to be generated on an annual basis once the Premises is operational and will be disposed of within one of the three active waste rock dumps. The tyres will be disposed of in batches no greater than 40m^3 that have been reduced to pieces and separated from other batches by at least 100mm of soil or in batches separated from each other by at least 100m of soil and each consisting of not more than 1,000 whole tyres. A 500mm cover of soil will be applied as soon as practicable completion of waste disposal in each area. These practices are consistent with the requirements of the EP Regulations.

Groundwater

The Applicant conducted groundwater monitoring between 2015 and 2017 at ten sites up, down and across hydraulic gradient of the landfill and spray field as shown in Figure 4 and Table 5. The data revealed the groundwater to be fresh to slightly brackish (400-800mg/L TDS; DWER Understanding Salinity, Salinity Status Classifications by Total Salt Concentration) and neutral to slightly alkaline (pH 7.0-8.2). The Applicant states that groundwater is greater than 13 m below ground level at the landfill.

Table 5: Groundwater monitoring data

Sample Point	Date	pH (pH Units)	EC @ 25 C (uS/cm)	TDS (mg/L)	Cl (mg/L)	HCO3 (mg/L)	SO4 (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Na (mg/L)	NO3 (mg/L)	TSS (mg/L)
CRD0026	13/12/2016	7.7	670	400	35	310	15	70	20	0.25	62	1.3	200
	13/04/2017	7.7	690	410	37	300	19	56	17	0.25	52	1.1	2.5
CRD0027	30/11/2015	8.2	950	550	-	420	-	58	33	15	93	-	-
CRD0028	1/12/2015	8.2	740	-	-	-	-	59	28	1.5	51	-	-
	8/08/2016	7.9	720	430	45	320	38	65	33	1.1	63	0.25	250
CRD0034	29/11/2016	7.8	1200	650	150	390	62	57	53	2.3	130	1.2	130
CRD0048	9/12/2016	8.0	1600	800	200	480	77	63	97	5.4	140	0.26	180
CRD0050	12/12/2016	8.1	820	490	73	310	40	66	36	1.9	70	0.026	2.5
	13/04/2017	8.0	850	510	72	310	44	56	31	1.8	63	0.0025	2.5
CRD0071	8/08/2016	8.0	560	330	47	320	39	69	33	1.3	63	0.19	2.5
	2/09/2016	7.0	690	420	45	320	40	62	26	1.2	52	0.023	2.5
	5/09/2016	7.0	760	460	46	350	32	70	25	0.7	55	0.76	2.5
CRD0073	11/12/2016	8.0	1400	750	170	470	61	64	93	5.3	110	0.74	19
CRD0082	11/07/2017	7.1	840	510	71	330	42	61	31	1.6	66	0.007	2.5
	11/07/2017	7.0	950	570	95	340	49	66	32	1.3	72	0.086	2.5
CRD0083	11/07/2017	7.0	790	480	40	360	22	79	19	0.25	56	0.98	2.5
	18/07/2017	7.0	770	460	42	350	22	88	22	0.25	61	0.83	2.5

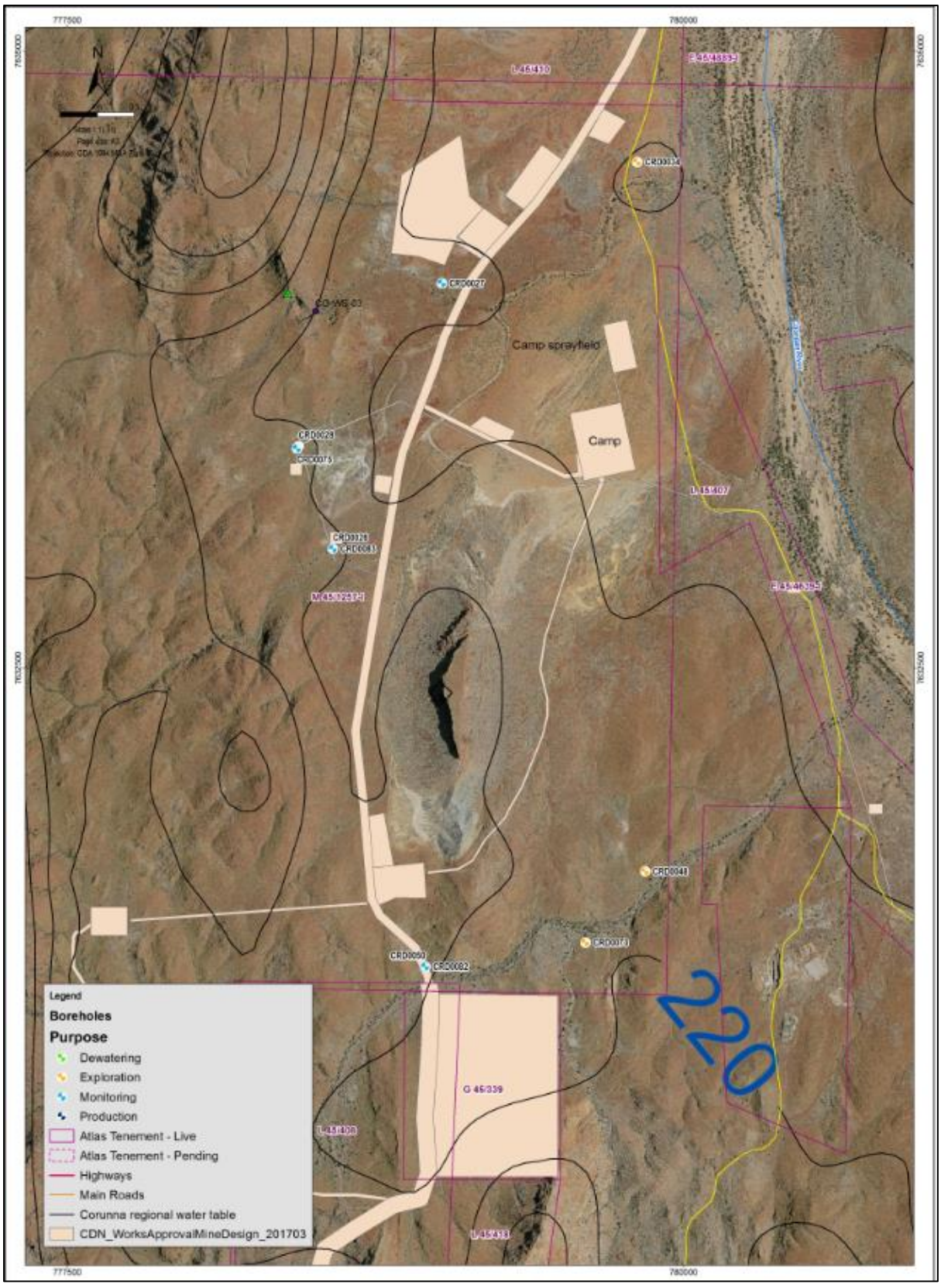

Figure 4: Groundwater sampling locations

Construction and Commissioning

Timeframes for mobilisation, construction, commissioning and operation are shown in Table 6.

Table 6: Premises infrastructure

Facility	Mobilisation/Construction	Commissioning	Operation
Crushing and Screening Plant	October 2017	January/February 2018	February/March 2018
WWTP	Mid 2017	Late 2017	September 2017
Landfill	Mid 2017	Mid 2017	Mid 2017

4.2 Infrastructure

Table 7 lists infrastructure associated with each prescribed premises category and with reference to the Site Plan (Figure 5). Information has been summarised for the Application.

Table 7: Premises infrastructure

	Infrastructure
	Prescribed Activity Category 5
A crushing and screening plant will process 23.3 Mt of iron ore over the life of the project at an expected production rate of 5 Mt per year via conventional drill, blast, load and haul methods. The crushing and screening plant will be located on the ROM pad and will provide primary, secondary and tertiary crushing and screening to produce Lump (40 – 6.3 mm) and Fines (<6.3 mm) products. Contaminated stormwater and sediment from the ROM pad will be captured in sediment basins.	
1	1 x Feeder and Grizzly
2	1 x Jaw (primary) Crusher
3	2 x (secondary and tertiary) cone crusher
4	2 x twin deck sizing screens
5	Pan feeders
6	2 x Radial Stackers
7	2 x Cross belt samplers
8	Weightometers
9	Metal detection units
	Prescribed Activity Category 85
The WWTP will be used to treat accommodation camp and sewage and wastewater and will be comprised of a treatment plant and irrigation spray field where the treated effluent will be disposed. The treatment plant is a tank based SBR with maximum capacity of 56m^3 / day. This will be used to treat the expected 45m^3 / day of sewage (based on maximum camp capacity of 180 people producing 250L of waste each per day). The treatment system has been designed to produce effluent that is suitable for disposal by spray irrigation. The irrigation spray field will take the effluent from the WWTP (45m^3) and the RO plant (30m^3), with a combined capacity of 75m^3.	
1	Sequential Batch Reactor (SBR) system consisting of:

	Infrastructure
	•Pump well •Primary tank •Balance tank •2 x SBR including air injection pump •Final effluent tank including chlorine pump Treated wastewater irrigation storage system (i.e. tanks)
2	Irrigation spray field consisting of 2 hectare fenced area with sprinklers and signage
	Prescribed Activity Category 89
The applicant expects to produce 450 tonnes of putrescible and inert waste per year, comprised of 400 tonnes of inert Type 1 and putrescible waste generated at the accommodation camp and administration and 50 tonnes type 2 waste once the premises is operational. Waste will be disposed of in one of three active waste rock dumps.	
1	Trenches
2	Three active waste rock dumps

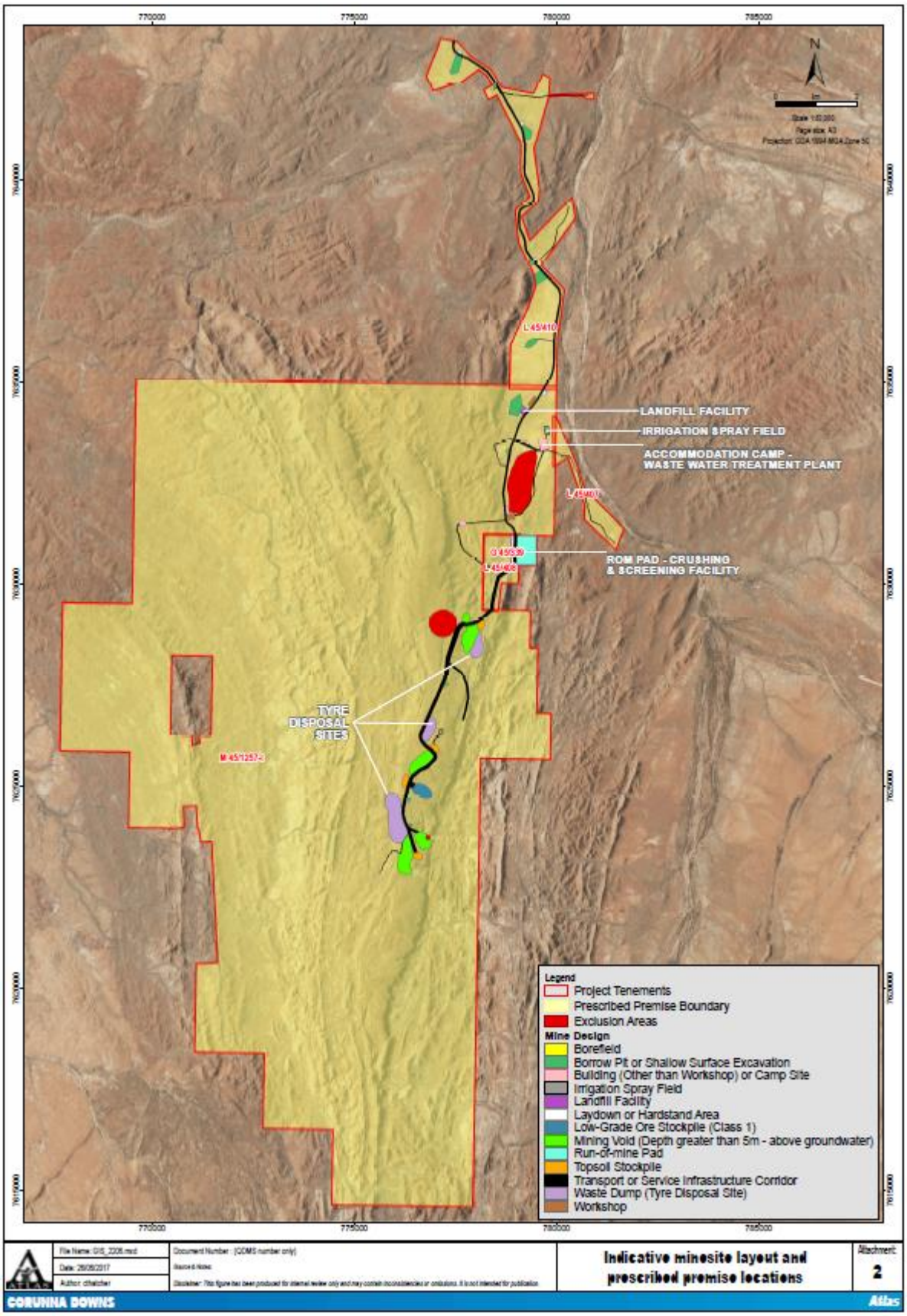

Figure 5: Premises layout

5. Legislative context

Table 8 summarises approvals relevant to the assessment.

Table 8: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
Mining Act 1978	Reg. Id 64209	Atlas Iron Limited	Corunna Downs Mining Proposal with Mine Closure Plan –assessed by DMIRS.
RiWI Act	GWL 176960	Atlas Iron Limited	Groundwater Licence for Corunna Downs – 50,000 kL/year from the Pilbara – fractured rock for potable and camp supply, earthworks and dust suppression and exploratory drilling
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)	EPBC 2017/7861	Atlas Iron Limited	Fauna of conservation significance: Presence of Northern Quoll (*Dasyurus hallucatus*), Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*, Pilbara form), Ghost Bat (*Macroderma gigas*) and Pilbara Olive Python (*Liasis olivaceus barroni*)
Environmental Protection Act 1986	CPS7456/1	Atlas Iron Limited	CPS7456/1 relates to the prescribed premises and is under review by DMIRS

5.1 Part IV of the EP Act

The applicant has advised that the project has not been referred for assessment under Part IV of the EP Act for the following reasons:

- The criteria for referral/assessment under Part IV of the EP Act, as detailed within the Memorandum of Understanding (MoU) established between DMIRS and the former Environmental Protection Authority (EPA) are not triggered by the Premises.
- Consultation with DWER identified that the Premises impacts could be adequately assessed through other approval mechanisms (e.g. DMIRS assessment of the Mining Proposal under the Mining Act 1978 and Native Vegetation Clearing Permit Application under Part V of the EP Act) and so did not require referral or assessment under Part IV of the EP Act.

The Delegated Officer has determined that no Part IV referral is necessary on the basis of the low environmental risk.

5.2 Contaminated sites

The Premises is not recorded in DWER's Contaminated Sites database.

5.3 Part V of the EP Act

5.3.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

DWER guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015);*
- *Guidance Statement: Setting Conditions (October 2015);*

- *Guidance Statement: Land Use Planning (February 2017);*
- *Guidance Statement: Decision Making (February 2017);*
- *Guidance Statement: Risk Assessments (February 2017);* and
- *Guidance Statement: Environmental Siting (November 2016).*

5.3.2 Clearing

The Applicant has applied for a clearing permit (CPS 7456/1), which is currently being assessed by DMIRS. The clearing of native vegetation is not assessed or approved under this Works Approval application.

6. Consultation

The Application was advertised in the West Australian on 24 April 2017 for a comment period ending on 15 May 2017.

A letter inviting comment was sent to the Shire of East Pilbara on 26 April 2017. No comments were received from the Shire of East Pilbara.

A letter of referral was sent to the DoW on 24 April 2017. No comments were received from DoW in relation to this Application.

DWER referred the draft works approval and Decision Report on 25 August 2017 to the Applicant.

7. Location and siting

7.1 Siting context

The Premises is located approximately 240km south-east of Port Hedland, 23km south-west of Marble Bar and 70km north-west of Nullagine in the Pilbara region of Western Australia as shown in Figure 6. The Corunna Downs Homestead is approximately 17 km south-east of the Premises.

The workforce for the Premises will be located at the Corunna Camp which is located approximately 100 m from the spray field, 730 m from the landfill and 2km from the crushing and screening facility. As the Camp is operated by the Applicant, it will not be considered a sensitive land use or receptor.

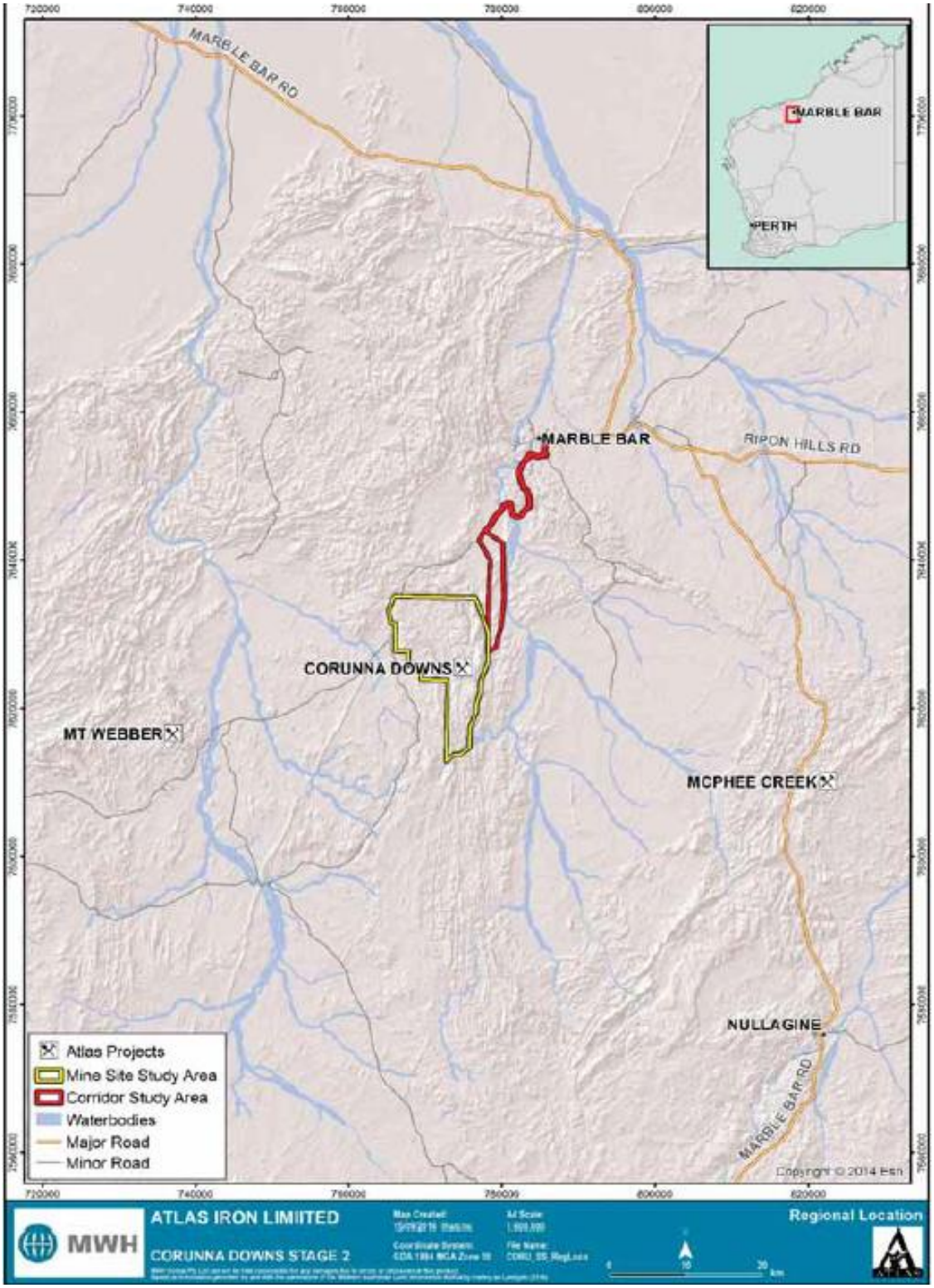

Figure 6: Regional location

7.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 9. The closest residential area to the Premises is Marble Bar, which had a population of approximately 512 people in 2011 (2011 Census QuickStats).

Table 9: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Closest residential zoned premises (zoned residential Shire of East Pilbara Planning Scheme No. 4)	The residential area of Marble Bar is approximately 23 km north-east of the crushing and screening facility
Corunna Downs Homestead	Approximately 17 km south-east of the Premises

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 10. Table 10 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

Table 10: Environmental values

Specified ecosystems	Distance from the Premises
Ramsar Sites in Western Australia	The Fortescue Marsh is located approximately 100 km south-west of the crushing and screening facility
Parks and Wildlife Managed Lands and Waters	Unallocated Crown Land (former leasehold proposed for conservation – ex Meentheena) is located approximately 54 km to the east of the Premises
Declared Rare Flora	There are no Declared Rare Flora within or in a 30 km radius of the Premises
Threatened Ecological Communities and Priority Ecological Communities	There are no Threatened Ecological Communities or Priority Ecological Communities within or in a 30 km radius of the Premises
Biological component	**Distance from the Premises**
Threatened/Priority Flora	The Mining Proposal states that "No Threatened Flora taxa listed under the *Wildlife Conservation Act 1950* (WC Act), or Threatened Species listed under the EPBC Act were recorded within the Study Area. 11 Parks and Wildlife classified Priority Flora taxa were recorded within the Study Area." The current disturbance footprint has relatively low local significance of impact on the significant flora locations and habitat within the Study Area, with a moderate impact proposed to *Heliotropium murium* (Priority 3) and *Swainsona thompsoniana* (Priority 3); and high local impact to *Acrostichum speciosum* as only three individuals were recorded during the survey and all are located within the current Disturbance Footprint. *A. speciosum* is widely distributed throughout the Kimberley, Northern Terrrtory, Queensland and Northern New South Wales. The Application states *"The nearest threatened flora (78 km)"* and *"The nearest priority flora (47 m from the irrigation spray field)".*
Threatened/Priority Fauna	The desktop study and field survey determined that the Study Area potentially contained 324 species of vertebrate fauna, with 174 (53%) of these located during field surveys. Eight of these species are of conservation significance (i.e. listed as Threatened under the EPBC Act and/or the WC Act, or are listed as Priority fauna by the Department of

	Parks and Wildlife as recorded below: • Northern Quoll (*Dasyurus hallucatus*) – Endangered (EPBC Act) and Schedule 2 (WC Act); • Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*, Pilbara form) – Vulnerable (EPBC Act) and Schedule 3 (WC Act); • Ghost Bat (*Macroderma gigas*) – Vulnerable (EPBC Act) and Schedule 3 (WC Act); • Pilbara Olive Python (*Liasis olivaceus barroni*) – Vulnerable (EPBC Act) and Schedule 3 (WC Act); • Peregrine Falcon (*Falco peregrinus*) – Schedule 7 (WC Act); • Spectacled Hare-wallaby (*Lagorchestes conspicillatus leichardti*) – Priority 3 (Parks and Wildlife, 2017) • Western Pebble-mound Mouse (*Pseudomys chapmani*) – Priority 4 (Parks and Wildlife, 2017); • Rainbow Bee-eater (*Merops ornatus*) – Migratory (EPBC Act) and Schedule 5 (WC Act). Nine significant micro-habitats are located in the proposed development area of the prescribed premises comprised of: • A non-permanent breeding roost of the Pilbara leaf-nosed bat • Four nocturnal refuges • Two semi-permanent water source • Two permanent water sources The applicant reports that studies have shown the Pilbara leaf nosed bat may be susceptible to mining and particularly blasting disturbances. For one project (Koodaideri iron ore) a distance of greater than 160m was shown to be needed, while other roosts exhibited disturbance at greater than 500m. Diurnal drilling and blasting trials at Mt Dove showed that these activities had little to no effect on visitation by the bat to nocturnal refuges. Atlas has committed to an exclusion zone around the entrance of the Pilbara Leaf nosed bat permanent diurnal roost (Cave CO-CA-01) and a 50m buffer surrounding the entrance of the Pilbara leaf nosed bat non-permanent breeding roost (Cave CO-CA-03). Based on regional records and habitats, an additional three species were considered likely to occur, nine were considered possible to occur and 12 were considered unlikely to occur.

7.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 11.

Table 11: Groundwater and *water sources

Groundwater and water sources	Distance from Premises	Environmental value
Public Drinking Water Source Areas (PDWSA)	The Priority 1 Marble Bar Water Reserve and Priority 3 Nullagine Water Reserve are located approximately 18 km to the north-east and 52 km to the south-east of the premises	The Priority 1 Marble Bar Water Reserve supplies water to the town of Marble Bar. *"Marble Bar receives it water supply from Water Corporation bores located approximately 2-3 km west of the town, close to the banks of the Coongan River"* (DWER, 2010).

Groundwater and water sources	Distance from Premises	Environmental value
Major watercourses / waterbodies	The Premises lies within the middle reaches of the Coongan River catchment, which sits within the De Grey River Basin. The Coongan River system has a total catchment area of around 7,090 km^2 and lies between the Chichester Ranges in the south and minor ranges on the west and east. The Coongan River borders the prescribed premises and is approximately 500 m east of the spray field and 2km from the ROM pad and the Shaw River is approximately 30 km to the west of the spray field. No perennial streams occur in the immediate vicinity of the mine site.	There was no identified significance, consistent with the DWER's environmental siting guideline. Rivers in the Pilbara region are typically ephemeral in nature; however surface water does exist throughout the year in pools along the main rivers and creeks. Major pools on the main branch of the Coongan River are the Nandingarra, Bookargemoona and Doolena pools. These pools are located upstream of the Premises and will not be impacted by the mining operation (Mining Proposal, 2017).
Groundwater and groundwater salinity	The application states that groundwater is greater than 13 m below ground level at the landfill. The local water table within the ore bodies lies at approximately 58 m below ground level (Mining Proposal, 2017). The standing water level recorded from the holes that intercepted groundwater along the main ridge ranged from 21.8 – 84.6 m below ground level (mbgl).	Groundwater salinity (Total Dissolved Solids (TDS)) is 500 – 1,000 mg/L, which is considered marginal (DWER, Understanding Salinity) During periods of river flow, following significant rainfall events, the groundwater systems are recharged by the presence of surface water in the river beds. Groundwater flow at the Premises is strongly controlled by local and regional-scale stratigraphy and topography, and may be enhanced or impeded along faults and discontinuities (Mining Proposal, 2017). The spray field for the treated wastewater has a vertical separation distance of more than 13m from the groundwater. This is in excess of the 2m recommended by DWER in its Water Quality Protection Note 22: Irrigation with Nutrient Rich Wastewater.
Aquifer	Mining Proposal, 2017 states "*The expected aquifer is an unconfined fractured system with the primary aquifer hosted in mineralised BIF. The aquifer type within the Project is not definitively known but unconfined to semi-confined systems are typical in mountainous fractured BIF aquifers of the Pilbara such as at McPhee Creek*".	N/A
RiWI Act	The Premises is located within the Proclaimed Pilbara Surface Water Area and Proclaimed Pilbara Groundwater Area	N/A

*DWER's GIS database

7.5 Soil type

DWER's GIS dataset identified two soil types as being present at the Premises which are shown in Table 12.

Table 12: Soil and sub-soil characteristics

Soil Unit*	Characteristics*	Environmental Value
Gf1	Steep ranges on basic lavas along with dolomites, tuff, banded iron formations, and dolerite dykes, with some narrow valley plains and high-level gently undulating areas of limited extent. The soils are generally shallow and stony and there are large areas without soil cover: chief soils are brown loams (Um6.23) along with significant areas of earthy loam (Um5.51) soils. (Dr2.33) soils occur on lower slopes with (Uf6.71) and (Ug5.37) soils on valley floors.	A soil survey was conducted (Soil Resource Assessment, 2016) , which identified that the soils have neutral pH, clayey or sandy loans that are prone to hardsetting with low to moderate water holding capacity and a moderate to moderately rapid drainage capacity.
Oa11	Dissected stony pediments and hills occurring at foot of unit Gfl; some residuals of more resistant rocks occur as mesas. On deeply dissected areas lime is released from weathering of more basic rocks: chief soils are hard alkaline red soils (Dr2.13) and other (Dr) soils. There are also shallow (Um5.51) and (Uc) soils associated with rock outcrop; some cracking clays (Ug5.37) on pediments associated with basic rocks; and some shallow calcareous loam soils (Um1.2).	

*Northcote, 1960-1968

7.6 Meteorology

The Pilbara bioregion experiences a semi-arid climate, characterised by hot, humid summers and relatively warm, dry winter. Tropical cyclones typically occur between January and April bringing sporadic drenching rainfall events. The nearest Bureau of Meteorology station at Marble Bar records 73% (277.8mm) of the annual rainfall (381.7mm) being received in this period.

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 Tables 13 and 14. The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 13 and 14 below.

Table 13: Identification of emissions, pathway and receptors during construction

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	Dust	The nearest residence is 17km south east of the premises	Air / wind dispersion	Human health, amenity and environment	No	Dust during construction will be controlled by the use of a mobile water truck with cannon and / or spray bar. The Delegated Officer considers that the separation distance to the nearest receptor is a sufficient buffer to prevent dust impacts.
		Noise	The nearest residence is 17km south east of the premises Pilbara leaf-nosed bat	Air / wind dispersion	Human health, amenity and environment Disturbance to bats	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential noise impacts. While noise from mining activity may disturb the Pilbara leaf nosed bat disturbance from mining itself (including blasting and drilling) is outside of the scope of category 5, 85 and 89 prescribed premises and therefore not managed by a works approval. Furthermore, the application is subject to assessment by DMIRS (ID No. 64209) while clearing based impacts are assessed separately. The provisions of the *Environmental Protection (Noise)*

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
							Regulations 1997 are also applicable.
	Earthworks, construction of new buildings, plant and infrastructure Construction of ROM pad Preparation of WWTP site and pipeline corridors Construction of landfill	Dust	The nearest residence is 17km south east of the premises No threatened species of native vegetation. Some priority 3 flora species within Premises	Air / wind dispersion	Human health, amenity and environment	No	Dust on the ROM pad and during construction of new infrastructure will be controlled by the use of a mobile water truck with cannon and / or spray bar. The Delegated Officer considers that the separation distance to the nearest receptor is a sufficient buffer to prevent dust impacts.
		Noise	The nearest residence is 17km south east of the premises Conservation significant fauna species (e.g. Pilbara leaf nosed bat)	Air / wind dispersion	Amenity	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential noise impacts. While noise from mining activity may disturb the Pilbara leaf nosed bat disturbance from mining itself (including blasting and drilling) is outside of the scope of category 5, 85 and 89 prescribed premises and therefore not managed by a works approval. Furthermore, the application is subject to assessment by DMIRS (ID No. 64209) while clearing based impacts are assessed separately. The provisions of the *Environmental Protection (Noise) Regulations 1997* are also applicable.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Contaminated stormwater runoff	Ground water, vegetation Watercourse (Coongan River)	Direct discharge and infiltration	Erosion and scouring of ground. Overland sedimentation inhibiting vegetation growth Turbidity and sedimentation affecting water quality of the Coongan River	No	Stormwater diversion structures will be constructed before mobilisation of the crushing and screening plant and wastewater treatment plant. They will be constructed to divert uncontaminated stormwater around the ROM pad. Water collected on the ROM pad will be directed to a sedimentation basin to allow for sediment removal before discharge. Sedimentation basins will be designed to a 1 in 5 year annual recurrence interval rainfall event and incorporate a rock armoured spillway to encourage settling of sediment and prevent erosion. The delegated officer considers that the separation distance to the Coongan River (2km) is sufficient to prevent impacts. The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* are sufficient to regulate contaminated stormwater emissions during construction.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Use and storage of hydrocarbons and chemicals	Spills and breach of containment	Ground – soil, groundwater, vegetation Watercourse (Coongan River)	Direct discharge and infiltration	Contamination of soil and groundwater	No	Groundwater at the premises ranges from a depth of 13m below ground level (mgbl) near the spray field to 58m in the ore bodies to 86.4mgbl on the ridge line. The Coongan River lies 500m from the spray field and 2km distant from the crushing and screening plant. The Delegated Officer considers that the depth to groundwater is sufficient to prevent groundwater quality impacts. Atlas will apply its Hydrocarbon Management Procedure (950-HSE-EN-PRO-005) and its Hydrocarbon (and Chemical) Spill Management Procedure (950-HSE-EN-PRO-0007). This will include the following management measures: • Hydrocarbons will be stored in impermeable bunds consistent with AS1940:2004. • Storage facilities will not be located near waterways or drainage lines. • Refuelling will be conducted on impermeable pads. • Where mobile refuelling is undertaken, it will not take place within 30m of a watercourse, dry break hoses will be used and spill kits shall be carried with vehicles. • Vehicles will be washed down on washpads with oil/water separators and impervious pads. • Washdowns that take place outside of washdown areas shall be in designated areas with contaminated soil removed regularly for disposal. • Personnel will be trained in spill response. The delegated officer considers that the separation distance to the Coongan River (2km) is sufficient to prevent impacts. The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* are sufficient to regulate hydrocarbon and chemical emissions during construction.

Table 14: Identification of emissions, pathway and receptors during operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Category 5 – Processing or beneficiation of metallic or non-metallic ore	Operation of crushing and screening plant, movement of ore on conveyors, stackers and stockpiles	Dust associated with ore processing, crushing and screening, stackers and stockpiles	The nearest residence is 17km south east of the premises Vegetation	Air / wind dispersion	Human health, amenity and environment	No	Dust during operation of the crushing and screening plant will be controlled by the use of a mobile water truck with cannon and / or spray bar. Water sprays will be installed on the feed bin, at strategic conveyor transfer points and on stacker head chutes. The Delegated Officer considers that the separation distance to the nearest receptor is a sufficient buffer to prevent dust impacts.
		Noise associated with the crushing and screening plant activities	The nearest residence is 17km south east of the premises Conservation significant fauna species (e.g Pilbara leaf-nosed bat)	Air / wind dispersion	Human health, amenity and environment	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential noise impacts. While noise from mining activity may disturb the Pilbara leaf nosed bat disturbance from mining itself (including blasting and drilling) is outside of the scope of category 5, 85 and 89 prescribed premises and therefore not managed by a Licence. Furthermore, the application is subject to assessment by DMIRS (ID No. 64209) and clearing based impacts are assessed separately. The provisions of the *Environmental Protection (Noise) Regulations 1997* are also applicable.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Contaminated stormwater – dry processing	Soil, groundwater Vegetation Watercourse (Coongan River)	Direct discharge and infiltration	Erosion and scouring of ground. Overland sedimentation inhibiting vegetation growth Turbidity and sedimentation of the Coongan River	No	Stormwater diversion structures will be constructed before mobilisation of the crushing and screening plant and wastewater treatment plant. They will be constructed to divert uncontaminated stormwater around the ROM pad. Water collected on the ROM pad will be directed to a sedimentation basin to allow for sediment removal before discharge. Sedimentation basins will be designed to a 1 in 5 year annual recurrence interval rainfall event and incorporate a rock armoured spillway to encourage settling of sediment and prevent erosion. The delegated officer considers that the separation distance to the Coongan River (2km) is sufficient to prevent impacts. The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* are sufficient to regulate contaminated stormwater emissions during operation.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Leaks and spills of hydrocarbons and chemicals from crushing and screening activities and ore handling areas	Ground –soil and groundwater, vegetation, Watercourse (Coongan River)	Direct discharge and infiltration	Contamination of soil and Coongan River	No	Atlas will apply its Hydrocarbon Management Procedure (950-HSE-EN-PRO-005) and its Hydrocarbon (and Chemical) Spill Management Procedure (950-HSE-EN-PRO-0007). This will include the following management measures: • Hydrocarbons will be stored in impermeable bunds consistent with AS1940:2004. • Storage facilities will not be located near waterways or drainage lines. • Refuelling will be conducted on impermeable pads. • Where mobile refuelling is undertaken, it will not take place within 30m of a watercourse, dry break hoses will be used and spill kits shall be carried with vehicles. • Vehicles will be washed down on washpads with oil/water separators and impervious pads. • Washdowns that take place outside of washdown areas shall be in designated areas with contaminated soil removed regularly for disposal. • Personnel will be trained in spill response. The delegated officer considers that the separation distance to the Coongan River (2km) is sufficient to prevent impacts to this watercourse. The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* are sufficient to regulate hydrocarbon and chemical emissions during operation.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Category 85 – WWTP	Sewage acceptance, storage and treatment including de-sludging	Odour from the degradation of biological matter and removal of sludge	The nearest residence is 17km south east of the premises	Air / wind dispersion	Amenity	No	Atlas has committed to implementing its WWTP Management Plan Document No. 950-HSE_EN-PLN-0002, revision 0) and other management measures. These are: • Flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorous (TP) and Escherichia coli). • Daily checks on system performance including manufacturer recommended parameters and discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps. • High level alarms (audible and visible). • Contingency tanks to allow for additional storage. • Earthen bunding around the plant to contain run-off. • Evacuation sump with pump. • Above ground pipework. • Barricading or bollards. • Restricting access to authorised persons. • Fencing installed around the spray field perimeter to prevent unauthorised access. Where an open WWTP is used this will be fitted with audible and visible overflow alarms. Commissioning of the WWTP will involve introduction of influent sewage. Waste generated during the commissioning period (six weeks) will be removed offsite for disposal by a licensed controlled waste carrier. The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential odour impacts.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Accidental spillage or discharge of untreated sewage outside containment infrastructure, Pipe ruptures or leakage, Tank overtopping	The nearest residence is 17km south east of the premises Coongan River Ground, soil, Vegetation	Direct discharge	Human health, amenity and environment	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential health impacts. Atlas has committed to implementing its WWTP Management Plan Document No. 950-HSE_EN-PLN-0002, revision 0) and other management measures. These are: • Flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorous (TP) and Escherichia coli). • Daily checks on system performance including manufacturer recommended parameters and discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps. • High level alarms (audible and visible). • Contingency tanks to allow for additional storage. • Earthen bunding around the plant to contain run-off. • Evacuation sump with pump. • Above ground pipework. • Barricading or bollards. • Restricting access to authorised persons. Where an open WWTP is used this will be fitted with audible and visible overflow alarms.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Irrigation of treated effluent	Treated effluent and brine mix discharged to spray field for irrigation Effluent with higher concentration of brine being discharged	The nearest residence is 17km south east of the premises Vegetation Coongan River Ground	Direct discharge	Human health, amenity and environment Vegetation death or change in vegetation (i.e. weeds) Vegetation death due to higher salinity of water Soil saturation Nutrient loading in soil	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential health impacts. The delegated officer considers that the separation distances to the Coongan River (500m), the nearest PDWSA (18km) management controls and conformance to environmental quality criteria are sufficient to prevent impacts. Management measures will include: • Installation of flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart) for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorus (TP) and *Escherichia coli*. • Daily inspections and checks for discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps. • High level alarms (audible and visible). • Contingency tanks to allow for additional storage. • Earthen bunding around the WWTP to contain run-off. • Evacuation sump with pump. • Above ground pipework. • Barricading or bollards. • Restricting access to authorised persons • Fencing installed around the spray field perimeter to prevent unauthorised access The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharges) Regulations 2004* are sufficient to regulate sewage discharge emissions during operation.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**		
Category 89 – Landfill	Acceptance of putrescible and inert waste for burial	Dust from vehicle movement and levelling, compacting and covering of waste	The nearest residence is 17km south east of the premises Ecosystems adjacent to the landfill Local fauna- foraging	Direct discharge	Soil contamination inhibiting vegetation growth and survival and health impacts to fauna	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential health impacts. The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharge) Regulations 2004* are sufficient to regulate dust emissions during operation.
		Odour and gaseous emissions from the degradation of putrescible waste	The nearest residence is 17km south east of the premises	Air / wind dispersion	Amenity	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential odour impacts.
		Windblown waste	Ecosystems adjacent to the landfill	Air / wind dispersion	Amenity	No	The applicant has committed to complying with landfill management requirements in the *Environmental Protection (Rural Landfill) Regulations 2002* and the *Environmental Protection Regulations 1987*. Waste will be covered at least monthly following disposal. The landfill will be fully fenced and secured with lockable gates to prevent unauthorised access, and checked monthly.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Leachate	Groundwater	Groundwater flow	Contamination of groundwater	No	The delegated officer considers that the separation distances to the Coongan River (2km), the nearest PDWSA (18km) and conformance to environmental quality criteria are sufficient to prevent impacts. The landfill will be located on flat or gently sloping land that is not subject to flooding, at least 100m from any surface water body, 500m from the camp, and at least 3m from the highest level of the water Table, which is approximately 13m below ground level. The Delegated Officer considers that Section 49 of the *Environmental Protection Act 1986* and the *Environmental Protection (Unauthorised Discharge) Regulations 2004* are sufficient to regulate sewage discharges emissions during operation.
		Smoke and fumes from possible fires	The nearest residence is 17km south east of the premises Native vegetation	Air / wind dispersion Direct contact	Human health, amenity and environment	No	The Delegated Officer considers that the separation distance to the nearest residential receptor is a sufficient buffer to prevent residential fire impacts. The landfill will have a firebreak of at least 3m around its perimeter and fire control equipment at the landfill. No sensitive native vegetation has been identified.

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 15 below.

Table 15: 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 16 below.

Table 16: 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, DER 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 17 below:

Table 17: 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.

9. Regulatory controls

9.1 Works Approval controls

In accordance with DWERs Guidance Statement; Risk Assessment (February 2017), DWER has regard for the applicant's proposed controls, and where they lower the assessed likelihood of or consequence of a risk event, these controls will be conditioned in the instrument. These controls, which are based on the applicant's commitments in the works approval application, will be included in the works approval.

9.1.1 Plant infrastructure and equipment

The following infrastructure and equipment as shown in Table 18 should be installed as proposed by the applicant.

Table 18: Plant infrastructure and equipment

Infrastructure	Requirements
Crushing and screening facility located 2km from the Coongan River	1 x Feeder and grizzly 1 x Jaw (primary) Crusher 2 x (secondary and tertiary) cone crusher 2 x twin deck sizing screens Pan feeders 2 x Radial Stackers 2 x Cross belt samplers Weightometers Metal detection units Stormwater sedimentation basins will be installed on the ROM

	pad to manage a 1 in 5 year rain event before mobilisation of the crushing and screening plant. The basins will incorporate a rock armoured spillway to encourage settling of sediment and prevent erosion. Mobile Water truck with cannon or spray bar. Water spray units to be installed on the feed bin, at strategic conveyor transfer points and on stacker head chutes.
Landfill facility	Constructed in accordance with the *Environmental Protection (Rural Landfill) Regulations 2002*, including • Located more than 100m from a waterbody. • Located more than 500m any residential development (camp). • The base of the landfill to be separated from the highest level of the water table by at least 3m. • Stormwater diversion structures to be constructed to divert runoff around and away from the facility. • A fence around the boundary of the facility that is of sufficient height and strength to prevent access of cattle, horses and other fauna; prevents waste from being washed or blown outside the facility; and is secured by a lockable gate to prevent unauthorised access. • The tipping area (landfill face) not exceeding 30m in length or 2m above ground level in height. • A 3m wide fire break to be cleared around the boundary fence of the landfill. • Fire control equipment (i.e. fire extinguishers to be located within the facility). Inert Type waste (i.e. tyres) to be disposed of within the active waste rock dumps (i.e. Runway, Shark Gully and Spilt Rock waste rock dumps).
Wastewater treatment facility	The waste water treatment facility consists of two main components: 1. A waste water treatment plant comprising: • Pump well • Primary tank • Balance tank • 2 x sequential batch reactor including air injection pump • Final effluent tank, including chlorine pump • Storage tanks to hold the treated wastewater prior to irrigation 2. An irrigation spray field (treated wastewater discharge area) consisting of no less than a 2 Ha fenced area, sprinklers and signage Management measures will include: • Installation of flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved

	Solids (TDS), Total Nitrogen (TN), Total Phosphorous (TP) and Escherichia coli). • Daily inspections and checks for discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps. • High level alarms (audible and visible). • Contingency tanks to allow for additional storage. • Earthen bunding around the plant to contain run-off. • Evacuation sump with pump. • Above ground pipework. • Barricading or bollards. • Restricting access to authorised persons. • Fencing installed around the spray field perimeter to prevent unauthorised access. • Weed removal as required at the spray field.

9.2 Licence controls

9.2.1 Infrastructure and equipment

The following environmental controls will be imposed as conditions on the licence to manage the risk of emissions during operation of the premises as shown in Table 19.

Table 19: Summary of infrastructure controls to be applied

Site infrastructure and equipment	Operational requirements
Crushing and screening plant	Water sprays installed on the feed bin, strategic conveyor transfer points and stacker head chutes. A mobile truck with water cannon is to be used to manage dust emissions on the ROM pad
WWTP system	Operated in accordance with Atlas Wastewater Treatment Plant Management Plan, Attachment 3AA (Wastewater Treatment Plant (WWTP) Management Plan: Compliance 950-HSE-PLN-0002 Revision 0) of the Corunna Downs Project Works Approval Application – Supplementary Documentation No. 179-LAH-EN-REP-0005 Revision 0, and other commitments. Commitments are: • Flow meters to allow monitoring of influent and irrigation volumes. • Inline testing and sample ports. • Quarterly sampling (at least 45 days apart for pH, biochemical oxygen demand (BOD), Total Suspended Solids (TSS), Electrical Conductivity (EC), Total Dissolved Solids (TDS), Total Nitrogen (TN), Total Phosphorus (TP) and *Escherichia coli*). • Daily inspections and checks for discharge volume, pH, chlorine, irrigation tank levels, sprayfield outlets and irrigation pumps. • High level alarms (audible and visible).

Site infrastructure and equipment	Operational requirements
	• Contingency tanks to allow for additional storage. • Earthen bunding around the plant to contain run-off. • Evacuation sump with pump. • Above ground pipework. • Barricading or bollards. • Restricting access to authorised persons.
Landfill	Managed in accordance with Atlas Landfill management Procedure Attachment 3AB (Landfill management Procedure 950-HSE-PLN-0020 Revision 1) of the Corunna Downs Project Works Approval Application – Supplementary Documentation No. 179-LAH-EN-REP-0005 Revision 0

10. Determination of Works Approval conditions

The conditions in the issued Works Approval in Attachment 1 have been determined in accordance with DWER's *Guidance Statement: Setting Conditions*.

Table 20 provides a summary of the conditions to be applied to this works approval.

Table 20: Summary of conditions to be applied in the works approval

Condition Ref	Grounds
Infrastructure and Equipment 1, 2 and 3	These conditions are valid, risk-based and contain appropriate controls.
Emissions 4	This condition is valid, risk-based and consistent with the EP Act.
Record keeping 5 and 6	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

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 approvals under the EP Act.

11. Applicant's comments

The Applicant was provided with the draft Decision Report and draft Works Approval on 25 August 2017. The Applicant provided comments which are summarised, along with DWER's response, in Appendix 2.

12. 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.

Alana Kidd
Manager Industry Regulation – Resource Industries
Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	Availability
1	Application form for a concurrent works approval and licence	DWER internal records (A1398604))
2	Australian Bureau of Statistics, 2011 Census QuickStats for Marble Bar. Accessed 2 June 2017	Accessed at http://www.censusdata.abs.gov.au
3	Bureau of Meteorology, Climate data online. Accessed 2 June 2017	Accessed at http://www.bom.gov.au
4	Corunna Downs Project Mining Proposal (179-LAH-EN-REP-0001, Revision 1), Atlas Iron Limited, 14 February 2017	DWER internal records (A1401049)
5	Corunna Downs Project: Soil Resource Assessment and Waste Characterisation, prepared by MWH Australia Pty Ltd for Atlas Iron Limited, December 2016	DWER internal records (1401049)
6	Corunna Downs Project: Terrestrial Vertebrate Fauna Survey, prepared by MWH Australia Pty Ltd for Atlas Iron Limited, November 2016	DWER internal records (A1401049)
7	Corunna Downs Project Works Approval Application – Supplementary Documentation (179-LAH-EN-REP-0005, Revision 0)	DWER internal records A1404049
8	Corunna Downs Project: Vertebrate Fauna Impact Assessment, prepared by MWH Australia Pty Ltd for Atlas Iron Limited, November 2016	DWER internal records (A1401049)
9	Corunna Downs Subterranean Fauna Assessment, prepared by MWH Australia Pty Ltd for Atlas Iron Limited, November 2016	DWER internal records (A1401049)
10	Corunna Downs Project Works Approval Application – Supplementary Documentation (179-LAH-EN-REP-005, Revision 0), Atlas Iron Limited, 22 March 2017	DWER internal records (A1401049)
11	Email containing construction cost details	DWER internal records (A1402284)
12	Email containing: • Hydrocarbon Management Procedure 950-HSE-EN-PRO-0005, Revision 2 • Hydrocarbon (AND Chemical) Spill Management Procedure, 950-HSE-EN-PRO-0007, Revision 2 • Responses to clarification questions	DWER internal records (A1449526)
13	Email containing responses to clarification questions	DWER internal records (A1460829)
14	Email containing responses to question on power generation	DWER internal records (A1463619)
15	Email containing responses to clarification questions	DWER internal records (A1503828)
16	Environmental Noise Impact Assessment, Prepared by Talis for Atlas	DWER internal records (A1401049)

	Iron, December 2016	
17	Final Report: Atlas Corunna Downs Air Quality Assessment	DWER internal records (A1401049)
18	Applicant comments on the draft Decision Report and Works Approval	DWER internal records (A1516354)
19	*Guidance Statement: Decision Making.* Department of Water and Environmental Regulation, Pert, DWER, February 2017.	accessed at www.der.wa.gov.au
20	*Guidance Statement: Environmental Siting*. Department of Environment Regulation, Perth, DWER, November 2016.	
21	*Guidance Statement: Land Use Planning*. Department of Water and Environmental Regulation, Perth, DWER, February 2017.	
22	*Guidance Statement: Regulatory principles.* Department of Water and Environmental Regulation, Perth, DWER, July 2015.	
23	*Guidance Statement: Risk Assessments*. Department of Water and Environmental Regulation, Perth, DWER, February 2017	
24	*Guidance Statement: Setting conditions.* Department of Water and Environmental Regulation, Perth, DWER, October 2015.	
25	Guidelines for the Non-Potable Uses of Recycled Water in Western Australia, Department of Health, 2011	Accessed at http://ww2.health.wa.gov.au/~/media/Files/Corporate/general%20documents/water/Recycling/Guidelines%20for%20the%20Non-potable%20Uses%20of%20Recycled%20Water%20in%20WA_140620.ashx
26	Landfill Management Procedure (950-HSE-EN-PRO-0020, Revision 1), Atlas Iron Limited, 8 December 2015	DWER internal records (A1401049)
27	Marble Bar Water Reserve, Drinking water source protection plan, Marble Bar town water supply (Report WRP 115) , Department of Water and Environmental Regulation, June 2010	Accessed at https://www.water.wa.gov.au/__data/assets/pdf_file/0017/4445/93607.pdf
28	National Water Quality Management Strategy: Australian Guidelines for Sewerage Systems: Effluent Management, Agriculture and Resource Management Council of Australia and New Zealand and Australian and New Zealand Environment and Conservation Council, 1997	Accessed at https://environment.gov.au/system/files/resources/e52e452b-a821-4abe-9987-23988790e353/files/sewerage-systems-effluent-man-paper11.pdf
29	Northcote,K.H. with Beckmann,G.G., Bettenay,E., Churchward,H.M., Van Dijk,D.C., Dimmock,G.M., Hubble,G.D., Isbell,R.F., McArthur,W.M., Murtha,G.G., Nicolls K.D., Paton,T.R., Thompson,C.H., Webb,A.A. and Wright,M.J. (1960-1968). Atlas of Australian Soils, Sheets 1 to 10. With explanatory data (CSIRO Aust. and Melbourne University Press: Melbourne)	Accessed at http://www.asris.csiro.au
30	Threatened and Priority Fauna List, Department of Parks and Wildlife, 3 February 2017	Accessed at https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals

31	Understanding-salinity – Salinity status classifications, by total salt concentration Table, Department of Water and Environmental Regulation	Accessed at http://www.water.wa.gov.au/water-topics/water-quality/managing-water-quality/understanding-salinity
32	Wastewater Treatment Plant (WWTP) Management Plan, Compliance (950-HSE-EN-PLN-0002, Revision 0), Atlas Iron Limited, 1 December 2015	DWER internal records (A1401049)
33	Water Quality Protection Note 22: Irrigation with Nutrient Rich Wastewater, Department of Water and Environmental Regulation, 2008	Accessed at http://www.water.wa.gov.au/__data/assets/pdf_file/0013/4045/82324.pdf

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of Applicant's comment	DWER response
Table 2	There is a typo in Table 2 of the Works Approval. Reference is made to a "lockable get" instead of "lockable gate".	Noted. Text amended.
Table 2	The loss of all vegetation associated with effluent irrigation within the sprayfield area has been accounted for under a worst case scenario by the clearing permit, which allows clearing of the sprayfield area. Consequently, specific vegetation monitoring had been proposed of this area. However, the following actions will be implemented to ensure impacts to vegetation are minimised: • Quarterly monitoring of effluent water against expected effluent concentrations • Monthly visual monitoring of the sprayfield to ensure: o even distribution of treated effluent across sprayfield to minimise the risk of waterlogging and associated impact on vegetation within the sprayfield. o no irrigation generated run-off or discharge, and associated impact on vegetation, outside the irrigation sprayfield.	Noted. Additional commitments included in the revised Licence.
3	The proposed timeframe of 60 days after completion of works is sufficient to enable submission to DWER of a report confirming construction has been completed to	Noted. 60 day period included in the final licence.

Condition	Summary of Applicant's comment	DWER response
	specified requirements.	
3	As the various components of the project will be completed at different times, please confirm that a compliance report may be issued for each of the project stages as they are completed.	The Works Approval requires only that a compliance report is submitted within 60 days after completion of the specified works. It does not prohibit compliance reports for each stage of the Premises being submitted. However, each Prescribed Premises category will need to be completed satisfactorily prior to use.

Attachment 1: Works Approval W6043/2017/1