



## Application for Works Approval

### Division 3, Part V *Environmental Protection Act 1986*

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**Works Approval Number** W6244/2019/1

**Applicant** Paddington Gold Pty Ltd

**ACN** 008 585 886

**File Number** DER2019/000043

**Premises** Golden Cities

Mining tenements M24/564, M24/565, M24/616, M27/185 and L24/231

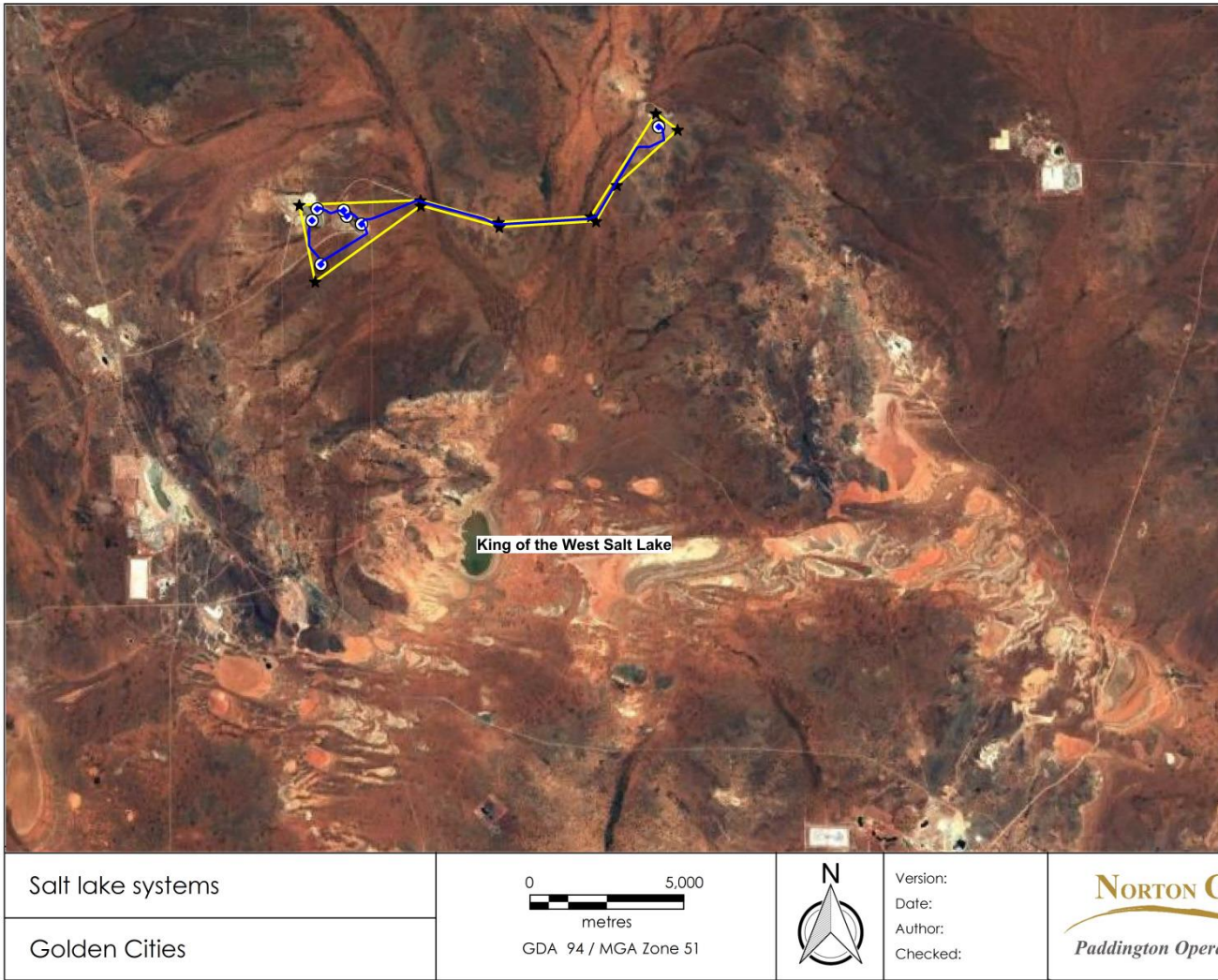
As depicted in Schedule 1 of the Works Approval

**Date of Report** 01 August 2019

**Status of Report** Final

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## 1. Definitions of terms and acronyms

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

**Table 1: Definitions**

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
AS 4156.6 – 2000	Australian Standard AS 4156.6 – 2000: Determination of Dust/moisture Relationship for Coal.
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
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 <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cth)</i>
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review

m <sup>3</sup>	cubic metres
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mtpa	million tonnes per annum
NEPM	National Environmental Protection Measure
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Occupier	has the same meaning given to that term under the EP Act.
PM	Particulate Matter
PM <sub>10</sub>	used to describe particulate matter that is smaller than 10 microns (µm) in diameter
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
Primary Activities	as defined in Schedule 2 of the Revised Licence
Review	this Licence review
Revised Licence	the amended Licence issued under Part V, Division 3 of the EP Act following the finalisation of this Review.
Risk Event	As described in <i>Guidance Statement: Risk Assessment</i>
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
µg/m <sup>3</sup>	micrograms per cubic metre
µg/L	micrograms per litre
Works Approval Holder	Paddington Gold Pty Ltd

## 2. Purpose and scope of assessment

The scope of the application is for the assessment of a mine dewatering project at the Golden Cities project.

### 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
Norton Gold Fields – Dewatering Works Approval Application – Golden Cities Project	2 January 2019
Reply to email titled <i>Golden Cities Works Approval queries</i> , Sheree Blechynden of Norton Gold Fields Limited	25 June 2019

## 3. Background

Paddington Gold Pty Ltd (Paddington) is a wholly owned subsidiary of Norton Gold Fields Limited. Current Prescribed Premises operated by Paddington include:

- Enterprise – L8692/2012/1 – category 6: mine dewatering;
- Bullant Underground – L8512/2010/2 – category 6: mine dewatering;
- Mount Pleasant – L8327/2008/2 – category 6: mine dewatering;
- Janet Ivy – L9028/2017/2 – category 6: mine dewatering.

All of the ore from the mines operated by Paddington is transported to and processed at the Paddington Mill. The Paddington Mill is located 33 km north-northwest of Kalgoorlie-Boulder and processes 3.7 million tonnes of ore per annum. An adjacent tailings storage facility exists for tailings disposal. This mill is operated under the Environmental Protection (Gold Extraction Operations) Exemption Order 1993.

Paddington plan to commence mining in the Golden Cities project area in 2019 which requires the dewatering of pits for mining to occur.

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

**Table 3: Prescribed Premises Categories**

Classification of Premises	Description	Approved Premises production or design capacity or throughput
Category 6	Mine dewatering: premises on which water is extracted and discharged to the environment to allow mining of ore.	4,000,000 kL per year

Whilst the design capacity of the dewatering infrastructure has been determined at 4,000,000 kL per year, the nominated throughput is expected to peak within the first twelve months (approximately 2,000,000kL from Havana pit) after which it will reduce to approximately 500,000 kL per year.

## 4. Overview of Premises

### 4.1 Operational aspects



The Golden Cities project is located approximately 40 km north of Kalgoorlie-Boulder and 10 km northeast of the Paddington Mill. Mining of several pits is anticipated to commence in mid-2019, pending approvals. It is expected operations will continue until 2022. As part of the operations of this site, mine dewatering of a number of pits is required.

Paddington has proposed a staged approach in order to allow for continual update of feasibility data and schedule of mining. The proposed stages are as below:

Stage 1:

- Dewatering from Federal South pit and Federal North pit into Havana pit;
- Option to discharge into Mulgarrie pit if required.

Stage 2:

- Dewatering from Jakarta pit to Havana pit.

Stage 3:

- Dewatering from Havana pit to Jakarta pit or Federal North/South pits;
- Option to discharge into Mulgarrie pit if required via bypass pipeline if unable to discharge into Federal North/South pits.

Stage 4:

- Dewatering from Mulgarrie pit to Federal South pit.

Both the Jakarta pit and Federal North pit are yet to be constructed.

The total volumetric capacity of the pits is outlined in Table 4.

**Table 4: Volumetric capacity of Golden City pits**

Existing pits	Total Capacity (to 6 m freeboard) – m <sup>3</sup>	Current volume – m <sup>3</sup>	Remaining volume to 6 m freeboard – m <sup>3</sup>	Current % of total capacity (to 6 m freeboard)
Havana	6,275,145	904,205	5,370,940	14
Federal South	2,442,242	885,277	1,556,965	36
Mulgarrie	6,201,393	491,696	5,709,697	8
Proposed pits	Estimated Total Capacity – m <sup>3</sup>	N/A	N/A	N/A
Jakarta	2,081,999	N/A	N/A	N/A
Federal North	1,008,000	N/A	N/A	N/A

The Works Approval Holder has stated that it is expected during the initial 12 months approximately 2 GL will be pumped, allowing for a 50 L/sec maximum inflow, should the aquifer be full after an extended period of recharge. It is considered that this is a peak flow and groundwater inflow should reduce as the aquifer depressurises.

Water from the Federal Pit may be used by Poseidon Nickel Limited (Poseidon) Black Swan

Operations for their processing plant under an operating licence held by Poseidon. Poseidon and Norton have a legal agreement in place which allows Poseidon access to the pit as a source of water for their operations. The agreement also includes modifying access should mining of the Federal pit be required. However, water has not been abstracted since 2009.

The pipeline from Federal pit to the Black Swan Operation is owned and operated by Poseidon. Norton is negotiating with Poseidon to use the 8 km pipeline between Federal South to the Mulgarrie turnoff road. A new pipeline (4 km) will then be connected to the existing pipeline at this point to the Mulgarrie pit.

New pipelines will be constructed between Federal (South and North), Havana and Jakarta pits.

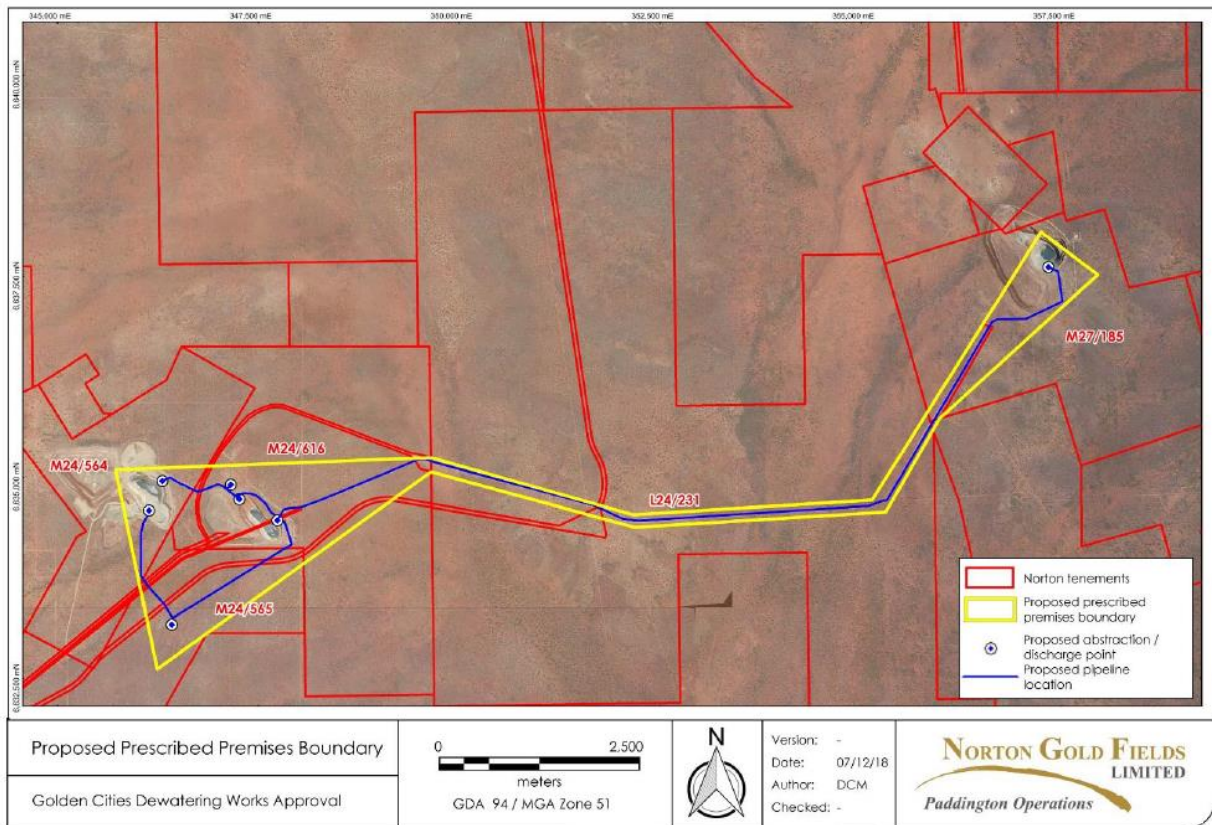
## 4.2 Infrastructure

The dewatering infrastructure, as it relates to Category 6 activities, is detailed in Table 4 and with reference to the Site Plan (attached in the Issued Works Approval).

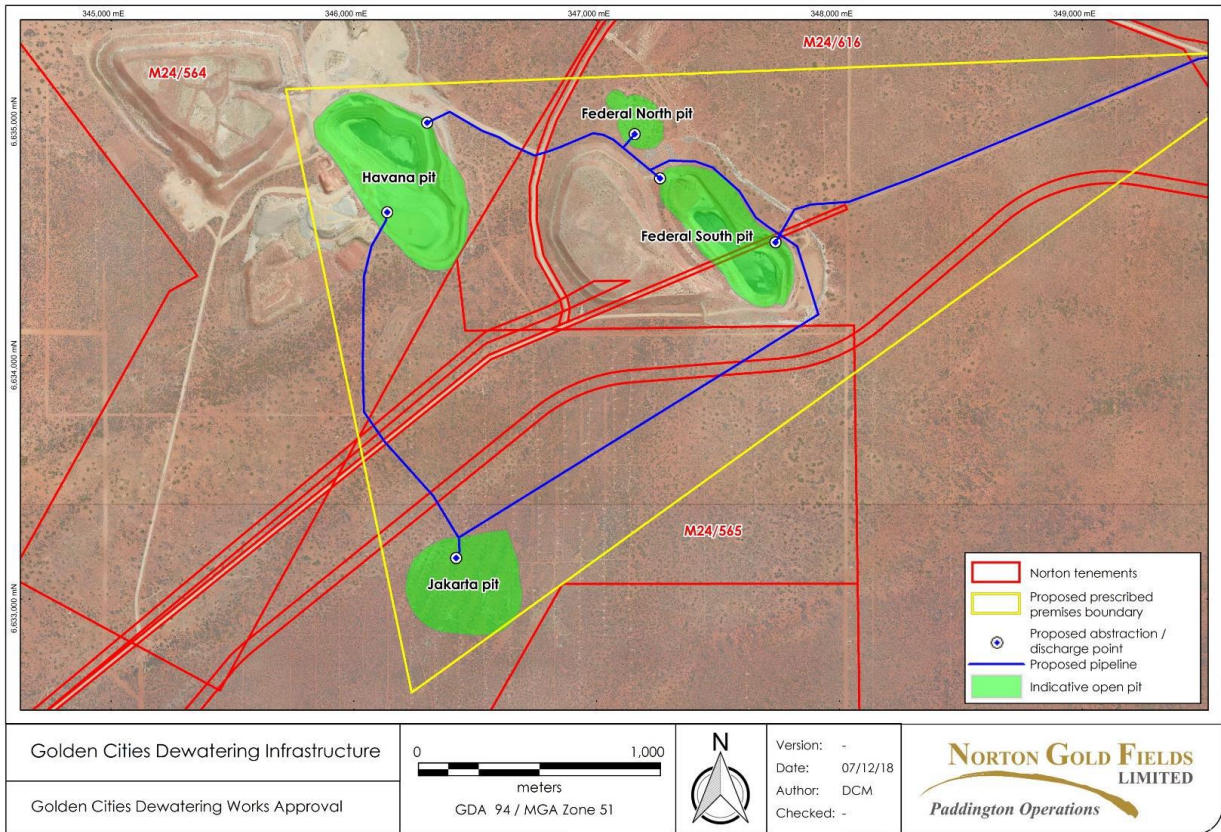
Table 5 lists infrastructure associated with each prescribed premises category.

**Table 5: Mine dewatering infrastructure**

	Infrastructure	Site Plan Reference
	<b>Prescribed Activity Category 6</b>	
Four stages of mine dewatering from and discharging to the various pits within the Golden Cities project to allow the mining of ore.		
1	Pipelines – potentially existing Poseidon pipeline from Federal South to Mulgarrie turnoff (8km) 4 km new pipeline from Mulgarrie turnoff to Mulgarrie pit New pipelines to be constructed between Federal (North and South), Havana and Jakarta.	Figures 2 and 3
2	V-drains	Not depicted
3	Scour pits	Not depicted
	<b>Directly related activities</b>	
Authorisation of abstraction of groundwater for mining is covered under the <i>Rights in Water and Irrigation Act 1914</i> (also administered by DWER but through a separate licence)		
1	Install and operate dewatering pumps	
Use of groundwater for dust suppression		
2	Standpipe located north of the Havana pit for water cart access	

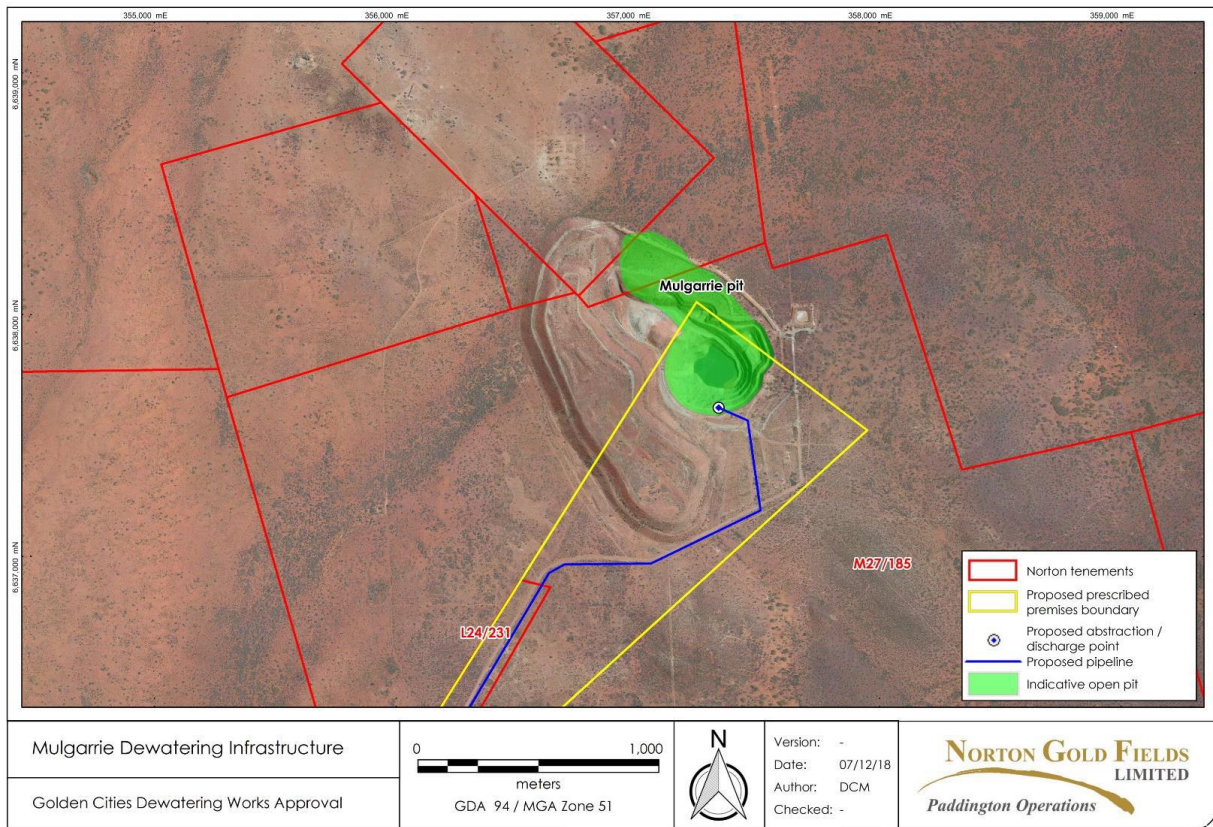


**Figure 1: Golden Cities Project Site Plan (Premises Boundary shown by yellow line)**



**Figure 2: Dewatering infrastructure between Jakarta, Havana, Federal North and Federal South pits**





**Figure 3: Dewatering infrastructure to Mulgarrie pit**

### 4.3 Exclusions to the Premises

Any mining activities or construction of ancillary infrastructure such as workshops, offices and ablutions are excluded from the activities licensed as Prescribed Premises.

The activity of groundwater abstraction is also excluded, as this is regulated under the *Rights in Water and Irrigation Act 1914*.

## 5. Legislative context

Table 6 summarises approvals relevant to the assessment.

**Table 6: Relevant approvals and tenure**

Legislation	Number	Subsidiary	Approval
Mining Act 1987	Mining Proposal Reg ID 79765	Paddington Gold Pty Ltd	<p>'Golden Cities Revised Version 2' approved on 4 July 2019. Mining Proposal to allow mining of the pits.</p> <p>Clearing Permit 8316/1 to cover required clearing for construction of dewatering pipeline within Premises Boundary, approved 2 March 2019.</p>

Legislation	Number	Subsidiary	Approval
Rights in Water and Irrigation Act 1914	GWL 151865(10)	Paddington Gold Pty Ltd	Licence to abstract water

## 5.1 Contaminated sites

The Premises is not classified under the *Contaminated Sites Act 2003*, and has not been reported as a known or suspected contaminated site.

## 5.2 Other relevant approvals

### 5.2.1 Department of Mines, Industry Regulation and Safety

A Mining Proposal was submitted to the Department of Mines, Industry Regulation and Safety at the end of 2018. This was approved on 4 July 2019, Reg ID 79765.

## 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.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guidance Statement: Publication of Annual Audit Compliance Reports (May 2016)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessments (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

### 5.3.2 Clearing

The Applicant has submitted a Clearing Permit application to DMIRS alongside the Mining Proposal. The Clearing Permit will cover any required clearing for the construction of dewatering pipeline. Where possible existing tracks and disturbed areas will be utilised.

The Applicant has stated that any clearing required on tenement L24/231 or M27/185, that is not covered under the above Clearing Permit will be managed in accordance with Schedule 1, Item 2, Subclause 2 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

## 6. Location and siting

### 6.1 Siting context

The Project is located within the Eastern Goldfields and lies within the Coolgardie bioregion, which lies on the Yilgarn Craton 'Eastern Goldfields Terrains'.

## 6.2 Residential and sensitive Premises

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

**Table 7: Receptors and distance from activity boundary**

Sensitive Land Uses	Distance from Prescribed Activity
Residential Premises	The nearest residential community is the Broad Arrow town site, located 12 km to the west of the project area

## 6.3 Specified ecosystems

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

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





**Table 8: Environmental values**

Specified ecosystems	Distance from the Premises
Ramsar Sites in Western Australia	There are no Ramsar Sites within 100 km of the Premises
Salt Lakes	There is an extensive salt lake system located to the south east of the Premises. The closest of these salt lakes is known as King of the West and is approximately 10 km south of the Premises. See Figure 4.
Important wetlands – Western Australia	Rowels Lagoon is the nearest wetland that is listed in the Australian Directory of Important Wetlands, located within the same Intermin Biogeographical Regionalisation for Australia (IBRA) bioregion, which is the Coolgardie bioregion. Rowels Lagoon is the only freshwater wetland within the Goldfields Regional reserved for nature conservation. Rowels Lagoon is greater than 50 km from the Premises.
Threatened Ecological Communities and Priority Ecological Communities	No Threatened or Priority Ecological Communities were recorded within the survey area which includes the Premises.
Biological component	Distance from the Premises
Threatened/Priority Flora	No Threatened or Priority species were located within the survey area which includes the Premises.
Threatened/Priority Fauna	Five threatened species of fauna and five migratory species of birds were identified as potentially occurring within the project area following a targeted Fauna and Malleefowl Survey

	<p>carried out in 2017.</p> <p>22 malleefowl mounds were located within the project area, two of which were found to be active. One is located 500m south west of the proposed Jakarta pit. The other, which is classed as 'recently active' is located approximately 100m south of the proposed Jakarta pit. Both are outside of the Premises Boundary. Malleefowl are listed as vulnerable under the <i>EPBC Act 1999</i>. The Works Approval Holder has stated that no mounds will be impacted by the dewatering or any mining activities.</p> <p>See Figure 5</p>
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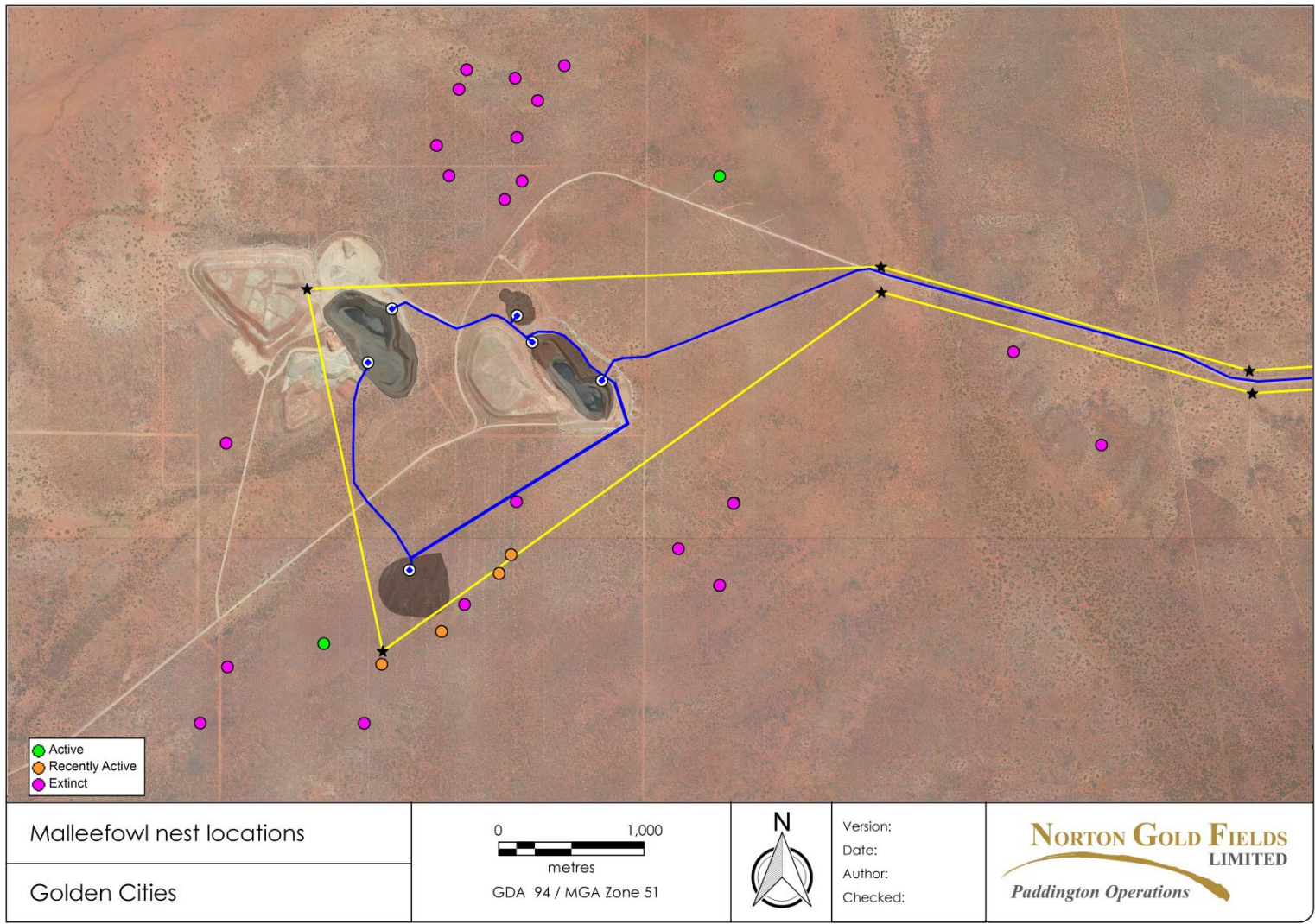




Salt lake systems	 0 5,000 metres		Version: Date: Author: Checked:	
Golden Cities	GDA 94 / MGA Zone 51			

**Figure 4: Location of salt lake system approximately 10km south-west of the Premises**





**Figure 5: Location of malleefowl nests in proximity to the Premise**

## 6.4 Groundwater and water sources

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

**Table 9: Groundwater and water sources**

Groundwater and water sources	Distance from Premises	Environmental value
Major watercourses/waterbodies	<p>Surface water generally flows in a south east direction towards an extensive salt lake systems.</p> <p>The nearest surface water body is King of the West salt lake, located approximately 10 km to the south of the Premises.</p>	<p>Salt lakes support a range of aquatic invertebrates and bird life. As they are mostly ephemeral, natural flood events play an important role with the hatching cycles of invertebrates which in turn provides a food source for flying fauna such as bats and birds.</p> <p>See Figure 4</p>
Groundwater	<p>Depth to groundwater ranges between 15 and 290 mbgl across the project area.</p>	<p>There is no environmental value and there are no groundwater dependent ecosystems.</p> <p>TDS ranges between 27,700 mg/L to 84,200 mg/L and pH ranges from 5.9 – 8.6.</p> <p>The high salinity of the groundwater means it is only utilised for industrial (mining) purposes.</p>

## 6.5 Meteorology

### 6.5.1 Regional climatic aspects

The project lies within the semi-arid region of Western Australia, characterized by hot summers and mild winters. The mean annual maximum temperature is 25.5°C and the mean annual minimum temperature is 11.6°C.

### 6.5.2 Rainfall and temperature

The closest Bureau of Meteorology (BOM) weather station is located at the Kalgoorlie-Boulder airport. Annual rainfall at Kalgoorlie-Boulder is 268.4 mm. The area is considered arid. Most of the rain falls between February and July.

Annual evaporation is approximately ten times higher than rainfall, with evaporation rates greatly exceeding average rainfall during each month of the year.

## 7. Risk assessment

### 7.1 Determination of emission, pathway and receptor

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

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

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

**Table 10. Identification of emissions, pathway and receptors during construction, commissioning and time limited operating period**

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities		Potential emissions	Potential receptors	Potential pathway			Potential adverse impacts
<b>Construction, mobilisation and positioning of infrastructure</b>	Construction and installation of dewatering pipelines	Noise	No residences or other sensitive receptors in proximity	Air / wind dispersion	Amenity impacts	No	No receptor present. The Delegated Officer considers that the provisions of the Environmental Protection (Noise) Regulations 1997 and section 49 of the EP Act are sufficient to regulate noise and dust emissions during construction.
		Dust					
<b>Commissioning and time limited operation of dewatering</b>	Discharge of hypersaline mine dewater to various mine pits	Hypersaline mine dewater	Native vegetation	Groundwater mounding/lateral seepage at base of the pit	Inundation of vegetation rootzones	Yes	Refer to section 7.4

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
		Overtopping of pit	Surrounding soils and native vegetation	Direct discharge	Decline/death of vegetation via inundation	No	Given the short time frame of commissioning and time limited operation, the risk of receiving pits overtopping during this period is unlikely.
	Operation of dewatering pipelines	Rupture of pipeline causing hypersaline water to discharge to land	Vegetation adjacent to the dewatering pipeline	Direct discharge	Surrounding soil contamination which could inhibit vegetation growth and survival	Yes	Refer to section 7.6

**Table 11: Identification of emissions, pathway and receptors during commissioning and operation**

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
<b>Dewatering</b>	Abstraction resulting in drawdown of groundwater levels	<i>None</i>	Groundwater dependent ecosystems	Abstraction of groundwater	Reduction in groundwater availability for dependent vegetation	No	Not within scope of Part V of the EP Act. Regulated under the RiWI Act and Part IV of the EP Act.
	Discharge to various Golden City pits	Hypersaline mine dewater	Native vegetation	Groundwater mounding/lateral seepage at base of the pit	Inundation of vegetation rootzones	Yes	Lateral seepage from the water discharged to the pits may impact on the rootzone of vegetation if water levels reach within 6 m of the surface level. Refer to section 7.4
		Overtopping of pit	Surrounding soils and native vegetation	Direct discharge	Decline/death of vegetation via inundation	Yes	Refer to section 7.5

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts			
	Commissioning and operation of dewatering pipelines	Rupture of pipeline causing hypersaline water to discharge to land	Vegetation adjacent to the dewatering pipeline	Direct discharge	Surrounding soil contamination which could inhibit vegetation growth and survival	Yes	Refer to section 7.6



## 7.2 Consequence and likelihood of risk events

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

**Table 12: Risk rating matrix**

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

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

**Table 13: Risk criteria table**

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> <li>onsite impacts: catastrophic</li> <li>offsite impacts local scale: high level or above</li> <li>offsite impacts wider scale: mid-level or above</li> <li>Mid to long-term or permanent impact to an area of high conservation value or special significance<sup>^</sup></li> <li>Specific Consequence Criteria (for environment) are significantly exceeded</li> </ul>	<ul style="list-style-type: none"> <li>Loss of life</li> <li>Adverse health effects: high level or ongoing medical treatment</li> <li>Specific Consequence Criteria (for public health) are significantly exceeded</li> <li>Local scale impacts: permanent loss of amenity</li> </ul>
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> <li>onsite impacts: high level</li> <li>offsite impacts local scale: mid-level</li> <li>offsite impacts wider scale: low level</li> <li>Short-term impact to an area of high conservation value or special significance<sup>^</sup></li> <li>Specific Consequence Criteria (for environment) are exceeded</li> </ul>	<ul style="list-style-type: none"> <li>Adverse health effects: mid-level or frequent medical treatment</li> <li>Specific Consequence Criteria (for public health) are exceeded</li> <li>Local scale impacts: high level impact to amenity</li> </ul>
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> <li>onsite impacts: mid-level</li> <li>offsite impacts local scale: low level</li> <li>offsite impacts wider scale: minimal</li> <li>Specific Consequence Criteria (for environment) are at risk of not being met</li> </ul>	<ul style="list-style-type: none"> <li>Adverse health effects: low level or occasional medical treatment</li> <li>Specific Consequence Criteria (for public health) are at risk of not being met</li> <li>Local scale impacts: mid-level impact to amenity</li> </ul>
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> <li>onsite impacts: low level</li> <li>offsite impacts local scale: minimal</li> <li>offsite impacts wider scale: not detectable</li> <li>Specific Consequence Criteria (for environment) likely to be met</li> </ul>	<ul style="list-style-type: none"> <li>Specific Consequence Criteria (for public health) are likely to be met</li> <li>Local scale impacts: low level impact to amenity</li> </ul>
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> <li>onsite impact: minimal</li> <li>Specific Consequence Criteria (for environment) met</li> </ul>	<ul style="list-style-type: none"> <li>Local scale: minimal to amenity</li> <li>Specific Consequence Criteria (for public health) met</li> </ul>

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

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

"onsite" means within the Prescribed Premises boundary.

## 7.3 Acceptability and treatment of Risk Event

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

**Table 14: Risk treatment table**

Rating of Risk Event	Acceptability	Treatment
<b>Extreme</b>	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
<b>High</b>	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.
<b>Medium</b>	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.
<b>Low</b>	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

## 7.4 Risk Assessment – Groundwater Mounding

### 7.4.1 Description of Groundwater Mounding

Increasing localised groundwater mounding following discharge to the receiving Golden Cities pits may result in vegetation rootzones being inundated, with resulting poor health or death to native vegetation species.

### 7.4.2 Identification and general characterisation of emission

The emission is hypersaline groundwater, removed from various mined pits. TDS ranges between 27,700 mg/L to 84,200 mg/L and pH ranges from 5.9 – 8.6.

### 7.4.3 Description of potential adverse impact from the emission

Vegetation roots that become saturated with hypersaline water can cause harm or death to the vegetation due to contamination with dissolved solids.

A vegetation survey of the project area was carried out in 2017 by Native Vegetation Solutions. The vegetation type is predominantly Eucalypt Woodland with a saltbush understory. The survey did not identify any threatened ecological communities, priority ecological communities, threatened or priority species within the survey area. Eucalypts are generally known to be shallow-rooted.

### 7.4.4 Applicant controls

The Applicant refers to a study that was carried out in 1999, which was an investigation into dewatering within the project area. It is stated that findings from the study showed there is



insignificant and sporadic groundwater, and that water levels in the pits are expected to be low.

To ensure the maximum pit lake volume is not exceeded, the Applicant has committed to monitor on a monthly basis the pipeline flow meters as well as water level surveys of all the pits.

#### 7.4.5 Consequence

If groundwater mounding occurs, then the Delegated Officer has determined that the impact of inundating rootzones will be a mid level on site impact. Therefore, the Delegated Officer considers the consequence of groundwater mounding to be **moderate**.

#### 7.4.6 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of groundwater mounding could occur at some time. Therefore, the Delegated Officer considers the likelihood of groundwater mounding to be **possible**.

#### 7.4.7 Overall rating of groundwater mounding

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 10) and determined that the overall rating for the risk of groundwater mounding during time-limited operation and normal operating conditions causing vegetation inundation is **medium**.

### 7.5 Risk Assessment – Overtopping of discharge pits

#### 7.5.1 Description of overtopping of discharge pits

Overtopping of the receiving pits may occur if dewatering is not managed in conjunction with major rainfall events.

#### 7.5.2 Identification and general characteristic of emission

The emission is hypersaline groundwater, removed from various mined pits. TDS ranges between 27,700 mg/L to 84,200 mg/L and pH ranges from 5.9 – 8.6.

#### 7.5.3 Description of potential adverse impact from the emission

Hypersaline water can contaminate surrounding soils with dissolved solids (salts) and can cause vegetation stress or death.

#### 7.5.4 Applicant controls

The Applicant has surveyed all of the pits which will be receiving points, which demonstrates available capacity to receive dewater. The Applicant will be staging the dewatering through four stages, as described in section 4.1. This is to allow for water to be shifted for mining requirements whilst ensuring pit capacity is sufficient.

The Applicant has also committed to not allowing water levels to rise above 6 m from the pit crest level. This will be monitored monthly and the pit capacity will be surveyed monthly.

#### 7.5.5 Consequence

If overtopping of the receiving pits were to occur, the Delegated Officer has determined that the impact of hypersaline water to native vegetation will cause mid-level on-site impacts. Therefore, the Delegated Officer considers the consequence of overtopping of pits to be **moderate**.

### 7.5.6 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of an overtopping event would probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of overtopping to be **unlikely**.

### 7.5.7 Overall rating of overtopping of discharge pits

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating of the risk of a pit overtopping event is **medium**.

## 7.6 Risk Assessment – Dewatering pipeline failure

### 7.6.1 Description of dewatering pipeline failure

Pipeline rupture or failure of the dewatering pipelines would result in the uncontrolled discharge of hypersaline water with the potential to impact on local soils and adjacent vegetation.

### 7.6.2 Identification and general characteristic of emission

The quality of the water in the vicinity of the project is considered hypersaline. The most recent samples of pH and TDS from within the pit lakes are shown in Table 15.

**Table 15: Water quality of dewatering pits**

Pit Name	pH	Total Dissolved Solids
Federal South	5.9 – 8.0	78,700 – 84,200
Havana	8.3 – 8.6	34,800 – 37,100
Mulgarrie	7.6 – 8.4	27,700 – 57,200

### 7.6.3 Description of potential adverse impact from the emission

Hypersaline water can contaminate surrounding soils with dissolved solids (salts) and can cause vegetation stress or death.

A vegetation survey of the project area was carried out in 2017 by Native Vegetation Solutions. The vegetation type is predominantly Eucalypt Woodland with a saltbush understory. The survey did not identify any threatened ecological communities, priority ecological communities, threatened or priority species within the survey area. Eucalypts are generally known to be shallow-rooted.

### 7.6.4 Applicant controls

The pipelines will be constructed in accordance with relevant Australian Standards and will be located within v-drains and earthen bunds. Inspections of the pipelines will also be carried out every 12 hours. Scour pits will be located at minimum 500m intervals with enough capacity to contain a spill in between routine inspections. Staff are trained to be aware and understand licence requirements and they have a Mine Dewatering Procedure which must be followed.

As an additional control, the Applicant will install telemetry on the section of pipeline between Federal pit and Mulgarrie pit.

The Applicant has also committed to undertake monitoring of water quality annually to include pH, EC, TDS and metals and metalloids. It is important to monitor pH and TDS as acidic or more highly saline water may cause more rapid deterioration of the pumps and pipework, increasing the risk of water leakage.

### 7.6.5 Consequence

If a pipeline rupture occurs, the Delegated Officer has determined that the impact of hypersaline water to native vegetation will cause mid-level on-site impacts. Therefore, the Delegated Officer considers the consequence of a pipeline rupture to be **moderate**.

### 7.6.6 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of a pipeline rupture event could occur at some time. Therefore, the Delegated Officer considers the likelihood of pipeline ruptures to be **possible**.

### 7.6.7 Overall rating of dewatering pipeline failure

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating of the risk of a pipeline rupture event during time-limited operation and normal operation is **medium**.

## 7.7 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 16 below. Controls are described further in section 11.

**Table 16: Risk assessment summary**

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
1.	Hypersaline mine dewater - mounding	Golden Cities pits requiring dewatering	Lateral movement of water through pit walls	Monitoring of pit volumes and levels. Maintaining pit water levels to 6 m or below crest level.	Moderate consequence Possible likelihood <b>Medium Risk</b>	Acceptable subject to regulatory controls
2.	Hypersaline mine dewater - overtopping	Golden Cities pits requiring dewatering	Direct discharge to designated pits.	Monitoring of pit volumes and levels. Maintaining pit water levels to 6 m or below crest level.	Moderate consequence Unlikely <b>Medium risk</b>	Acceptable subject to regulatory controls

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
3.	Hypersaline mine dewater – pipeline rupture	Golden Cities pits requiring dewatering	Direct discharge from pipeline rupture	Pipelines to be laid within earthen bunds. Scour pits to be constructed to contain possible spills.  12 hourly inspections  Training of all staff on dewatering protocol	Moderate consequence Possible likelihood <b>Medium Risk</b>	Acceptable subject to regulatory controls

## 8. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out in the following section. The risks are set out in the assessment in section 7 and the controls are detailed in this section. DWER will determine controls having regard to the adequacy of controls proposed by the Applicant. The conditions of the Works Approval will be set to give effect to the determined regulatory controls.

### 8.1 Works Approval

#### 8.1.1 Dewatering pipelines

The following environmental controls shall be completed, so as to mitigate potential risks identified in the Decision Report:

1. All pipelines are to be contained within v-drains, and have scour pits every 500 m, with capacity to contain a spill volume for the period between inspection times.

#### 8.1.2 Specified actions

The Applicant shall submit a compliance document demonstrating compliance with the Works Approval conditions. The compliance certificate will need to be signed by a suitably qualified engineer.

#### 8.1.3 Time limited operational requirements

1. Authorised discharge pits will be listed on the Works Approval as the only authorised discharge points for mine dewater.
2. 6 m vertical freeboard to be maintained in all receiving pits.
3. 12 hourly visual inspections are to be carried out of pipelines and scour pits for integrity.
4. Monitoring of volume of dewater, standing water level, pH and TDS are required throughout the time-limited operating period.
5. A written log of each inspection is required which must be signed by the responsible person.

## 9. Determination of Works Approval conditions

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

Table 17 provides a summary of the conditions to be applied to this works approval.

**Table 17: Summary of conditions to be applied**

Regulatory controls	Grounds
Infrastructure and Equipment Conditions 1 to 4	These conditions are valid, risk-based and contain appropriate controls
Commissioning phase Conditions 5 to 8	These conditions are valid, risk-based and enable flexibility in operations.
Time-limited operational phase Condition 9	These conditions are valid, risk-based and enable flexibility in operations.
Emissions Condition 10	These conditions are valid, risk-based and consistent with the EP Act.

Discharge of mine dewatering Condition 11	This condition is valid, risk-based and consistent with the EP Act.
Monitoring general Condition 12	This condition is valid, risk-based and consistent with the EP Act.
Process monitoring Condition 13	This condition is valid, risk-based and consistent with the EP Act.
Record-keeping Conditions 14 and 15	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

## 10. Determination of Licence conditions

The conditions to be included in the Licence have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 18 provides a summary of the conditions to be applied to this works approval.

**Table 18: Summary of conditions to be applied**

Regulatory controls	Grounds
Emissions Licence to specify: -Locations of receiving pits	These conditions are valid, risk-based (as per risk assessment) and consistent with the EP Act.
Infrastructure and Equipment Licence to specify: -secondary containment for pipelines; -12 hourly inspections; Operational freeboard of 6m below crest level	These conditions are valid, risk-based (as per risk assessment) and contain appropriate controls
Monitoring Licence to specify monitoring for the following parameters at each receiving pit: - volumetric flow rate; -standing water level; -pH; and -total dissolved solids	These conditions are valid, risk-based (as per risk assessment) and consistent with the EP Act.
Record-keeping	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

## 11. Applicant's comments

The Applicant was provided with the draft Decision Report and draft issued Works Approval on 16 July 2019. 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.

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.

**Tim Gentle**  
**Manager – Resource Industries**  
**REGULATORY SERVICES**

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

## Appendix 1: Key documents

	Document title	Availability
1.	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
2.	DER, October 2015. <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth.	
3.	DER, February 2017. <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth.	
4.	DER, February 2017. <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth.	
5.	Norton Gold Fields – Dewatering Works Approval Application (including Appendices)– Golden Cities Project, January 2019	DWER records (A1752828)



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

Condition	Summary of Licence Holder comment	DWER response
Section 4.2, Table 5 of Decision Report	The Licence Holder confirmed they are still negotiating the use of the 8 km existing Poseidon pipeline and have a draft agreement which is expected to be completed in August 2019.	Noted.
Section 5, Table 6 of Decision Report	The Licence Holder confirmed the Mining Proposal Reg ID 79765 was approved on 4 July 2019. The Licence Holder confirmed that Clearing Permit 8316/1 was approved on 2 March 2019	Noted and table updated.
Section 5.2 of Decision Report	Updated with Mining Proposal details, as above	Noted and updated.
Section 7.6.4 of Decision Report	The Licence Holder has confirmed that telemetry will be installed as an additional control on the section of pipeline between Federal pit and Mulgarrie pit. As indicated in the Stage description of 4.1 of the decision document, this pipeline is not required in the next twelve months but it is highly likely in the term of the Works Approval.  Telemetry will not be installed on the sections of pipeline between the Federal North/South, Havana and Jakarta pits due to high volume of mining traffic in the vicinity, in addition to 12 hourly inspections and relatively short lengths of pipeline.	Noted and updated into risk assessment.
General – Decision	Page number require amendment	Page numbering corrected.

Condition	Summary of Licence Holder comment	DWER response
Report		
Condition 12 of Licence	<p>The Licence Holder provided the following comment:</p> <p>This condition states the locatons specified must be monitored during the Time Limited Operation Phase, however Jakarta and Federal North pits do not yet exist and as stated above in Section 4.1 of the decision document this will occur in a staged way. Suggest to modify wording to clarify this. Perhaps a caveat or additional note like 'where the Location exists and has been connected to the works in Condition 1'.</p>	<p>Noted and note added to Table 5 to explain monitoring to occur to existing locations which have been connected to the approved works.</p>

## Attachment 1: Issued Works Approval W6244/2019/1

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