Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Licence Number	L7967/2003/6
Licence Holder	Savannah Nickel Mines Pty Ltd
ACN	103 729 282
File Number:	DER2013/001406-1
Premises	Savannah Project M80/179, M80/180 and M80/181 WARMUN WA 6740
Date of Report	24 June 2020
Decision	24 June 2020

1. Definitions and interpretation

1. Definitions

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

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
Amendment Report	refers to this document
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
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
Licence Holder	Savannah Nickel Mines Pty Ltd
m^3	cubic metres
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Report applies, as specified at the front of this Amendment Report.
Revised Licence	the amended Licence issued under Part V, Division 3 of the EP

	Act, with changes that correspond to the assessment outlined in this Amendment Report.
Risk Event	as described in *Guidance Statement: Risk Assessment*

2. Amendment

Savannah Nickel Mines Pty Ltd (licence holder) submitted a licence amendment application on 13 November 2019 in relation to Category 54 sewage facility and Category 64 Class II putrescible landfill site. The application is to replace the existing wastewater treatment plant and extend the existing landfill site, including authorisation to construct additional landfill cells. The licence holder is not proposing to increase the production or design capacity or throughput of the wastewater treatment plant (WWTP) or landfill on the existing licence.

This amendment report sets out an amendment to licence L7967/2003/6. The licence document has been updated accordingly to reflect this amendment. This amendment is limited to the installation of a new wastewater treatment plant and additional landfill cells.

This amendment has been informed by the Department of Water and Environmental Regulation's (DWER) Regulatory Framework which is available at https://www.der.wa.gov.au/our-work/regulatory-framework.

3. Decision

The Delegated Officer (DO) considers that the upgrade of WWTP and additional landfill cells, including construction of the associated infrastructure should be granted.

3.1 Wastewater treatment plant

The licence holder had previously applied to amend the licence to increase the design capacity of the WWTP from not more than 200m^3/day to 1,880m^3/day. This was refused given that the loading rates were not acceptable at this capacity. It was also identified during this amendment issued on 21 December 2018 that the loading rates at the reduced capacity for the current WWTP were elevated and therefore an improvement condition was included to improve the WWTP treatment or increase the irrigation area.

The licence holder is proposing to replace the existing WWTP with an activated sludge bioreactor (ASBR-075-C-X-A-X-X-P-X) WWTP with a capacity of 75 m^3/day, with a disposal to the irrigation area. The irrigation area is also being increased from the existing 1.33ha to 2.4ha irrigation area. There are no proposed changes to the emission points or nature of waste. Design capacity of the WWTP has been reduced from 200 m^3/day to 100 m^3/day to reflect the capacity of the new plant and additional water from the reverse osmosis treatment plant.

The monthly average of treated wastewater to the irrigation field ranges from 1500-1800kL and irrigation occurs all year round.

Table 2: Proposed nutrient application rate

Analyte	Units	Current value (from Improvement Plan)	Proposed value (from Application)
Capacity of WWTP	m^3/day	200	75
Peak person per day	person	150	177
Wastewater flow per person	L	270	270
Discharge irrigation area	ha	1.33	2.4

Analyte	Units	Current value (from Improvement Plan)	Proposed value (from Application)
Biochemical Oxygen Demand	mg/L	22	<20
Total Suspended Solids	mg/L	37	<30
Total Nitrogen	mg/L	21	24
Total Phosphorus	mg/L	4	5
Free chlorine	mg/L	-	0.2-2
pH	pH units	-	6.5-8.5
E.Coli	Cfu/100ml	521,513	<1,000
Total N (loading rates)	kg/ha/yr	864	288
Total P (loading rates)	kg/ha/yr	145	60

The proposed WWTP is expected to reduce the current total nitrogen and total phosphorus loading rates, this will be confirmed through the commissioning period.

3.2 Landfill

Approval is sought to extend the existing landfill site located within the existing North Waste Rock Dump (NWRD) and allow construction of additional landfill cells (eight cells). The proposed area of disturbance is 0.25ha for the landfill site, 0.03ha for the landfill road and 0.02ha for the bund wall. The landfill proposed is a Class II unlined landfill designed to accept putrescible and inert waste only, which is the same as the current approved landfill. The waste will be transported to the upper surface of the NWRD via surface mobile equipment, tipper trucks and light vehicles. The waste will be placed within defined cells enclosed by earthen bunds and temporary fencing. Each cell will be restricted to a maximum linear length of 30m, 4m in width and 5m in depth (i.e. volume of 600m³). Up to 30 tonnes will be disposed of into the proposed landfill per annum. Each landfill cells has a lifespan of two years.

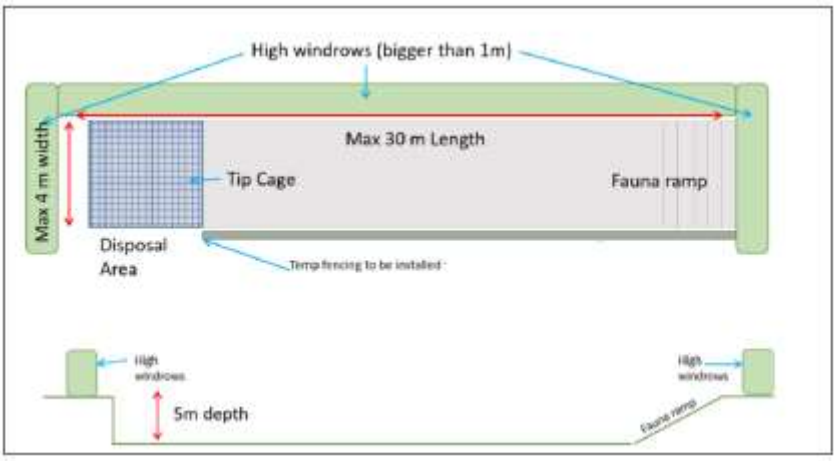

Figure 1: Proposed landfill cell design

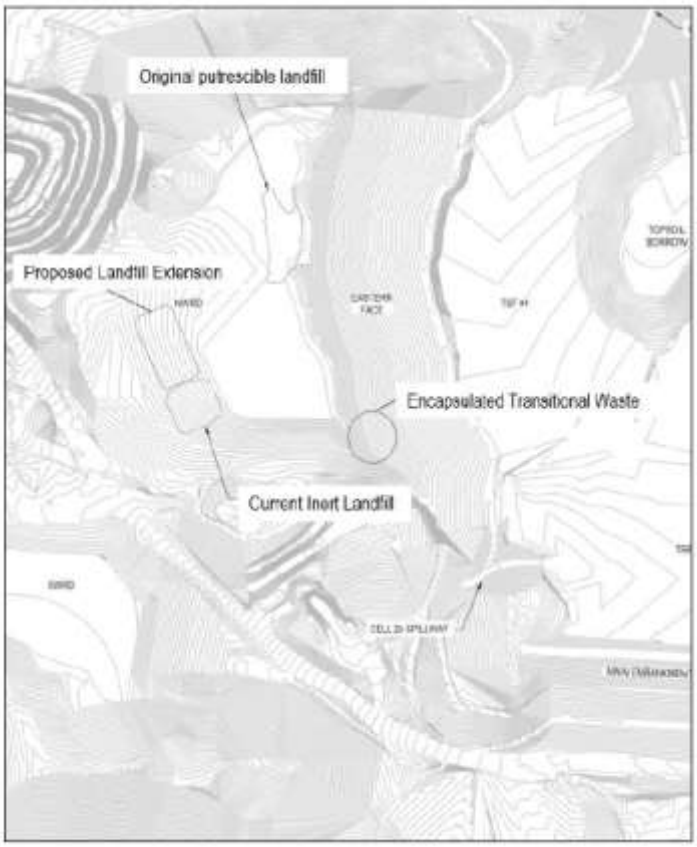

Figure 2: Location of existing and proposed landfill site within north waste rock dump

4. Amendment History

Table 3 provides the licence amendment history for L7967/2003/6.

Table 3: Licence amendments

Instrument	Issued	Amendment
L7967/2003/6	31/07/2014	Instrument issued
Amendment Notice 1	24/04/2018	Amendment Notice 1: administrative amendment to change the annual period.
Amendment Notice 2	21/12/2018	Amendment Notice 2: reinstate the previously approved premises production design capacities onto the licence and incorporate TSF management conditions as part of the TSF lift approved via Works Approval W5208/2012/1.
Amended Licence: L7967/2003/6	24 June 2020	This application to replace the WWTP and additional landfill cells.

5. Consolidation of Licence

As part of this amendment package the Department has consolidated the licence by incorporating changes made under the following Amendment Notices:

- *Amendment Notice 1, granted 24 April 2018 – administrative change to annual period; and*
- *Amendment Notice 2, granted 21 December 2018 – Changes to throughput, removal of Category 6, improvement conditions, and administrative changes.*

The obligations of the licence holder have not changed in consolidating the licence. The Department has not undertaken any additional risk assessment of the Premises related to previous Amendment Notices.

In consolidating the licence, the CEO has:

- *updated the format and appearance of the Licence;*
- *deleted the redundant AACR form set out in schedule 2 of the previous licence and advise the licence holder to obtain the form from the Department's website;*
- *revised licence condition's numbers, and removed any redundant conditions and realigned condition numbers for numerical consistency; and*
- *corrected clerical mistakes and unintentional errors.*

Previously issued Amendment Notices will remain on the Department's website for future reference and will act a record of the Department's decision making.

6. Other approvals

The licence holder has provided the following information relating to other approvals as outlined in Table 4.

Table 4: Other relevant approvals

Instrument	Number	Approval
Mining Act 1978	Mining Lease M80/179, M80/180, M80/181	Approval for development and operation of mining, expiry 15/6/2029
Rights in Water and Irrigation Act 1914	GWL 153527(6)	Groundwater Licence, licence allocation 1446000kL Dewatering for mining purposes, dust suppression for mining purposes, mineral ore processing and other mining purposes, and mining camp purposes. Licence duration 30 January 2014 to 31 October 2022

7. Location and receptors

7.1 Residential and Sensitive premises

Table 5 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Frog Hollow Aboriginal Community	10km north of the premises. The Delegated Officer considers it unlikely a risk event for noise or dust emissions will occur, given the minimum distance of 10km between the premises boundary and the closest residential receptor. Therefore, the Delegated Officer does not consider the risk to be significant enough to warrant further assessment.
Warmun Aboriginal Community	40km north of the premises. The Delegated Officer considers it unlikely a risk event for noise or dust emissions will occur, given the minimum distance of 40km between the premises boundary and this receptor. Therefore, the Delegated Officer does not consider the risk to be significant enough to warrant further assessment.

7.2 Specified Ecosystems and Environmental Receptors

Table 6 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 6: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
The Savannah mine lies within the Ord River basin. The mine is surrounded by a number of drainage lines including Stoney Creek, Fletcher Creek and Mine Creek. Fletcher Creek flows southwards while Stoney Creek and Mine Creek are tributaries that flow south-eastwards into Fletcher Creek.	Rademy creek (minor drainage line) is 100m north of the WWTP irrigation area (down gradient) which flows into Fletcher creek, 400m east. Fletcher creek is 2km east of the landfill area (down gradient).
Nearby water uses include Mabel Downs pastoral bores. Groundwater quality: • pH levels are neutral, ranging from 6.7 to 7.1: • Total Dissolved Solids (TDS) between 950 mg/L and 2260 mg/L; • Sulphate concentrations from 460 mg/L to 2200 mg/L; • Copper levels ranged from less than 0.001 mg/L to 0.001 mg/L; • Nickel levels ranged from less than	25 km from premises to Mabel Downs pastoral bore Groundwater flow is topographically-driven in that it is recharged across the catchment but drains to local creek lines. Depth to groundwater in the vicinity of the landfill is approximately 30mbgl. The WWTP and irrigation area are 200m and 500m from the village bore. Depth to groundwater is closely related to topographic elevation and seasons recharge. Seasonal variations of 3-15m occur as a result of direct infiltration and recharge.

Environmental receptors	Distance from Prescribed Premises
0.001 mg/L to 0.022 mg/L; • Cobalt levels ranged from less than 0.001 mg/L to 0.004 mg/L; • Manganese levels ranged from 0.02 mg/L to 0.67 mg/L; and • Selenium levels ranged from less than 0.001 mg/L to 0.008 mg/L.	
Flora: • Gum trees (Corymbia dichromophloia and Eucalyptus brevifolia). • Acacia smeringa with scattered Cajanus pubescens and Grevillea pyramidalis (Caustic Bush). • Spinifex (Triodia basedowii).	Within the WWTP irrigation area
Soil type: dominant soil type consists of red/brown non-cracking clays with minor soils or red loamy earths. Site observations undertaken by Outback Ecology (2009) identified loamy sands and gravels to be the dominant substrate found in the base of both the creek lines near the production bore. The vegetation type is *"grassland with scattered bloodwoods (Corymbia sp.) and Snappy gum (Eucalyptus brevifolia) with spinifex and annual grasses (Graham 2001).*	Within the premises.

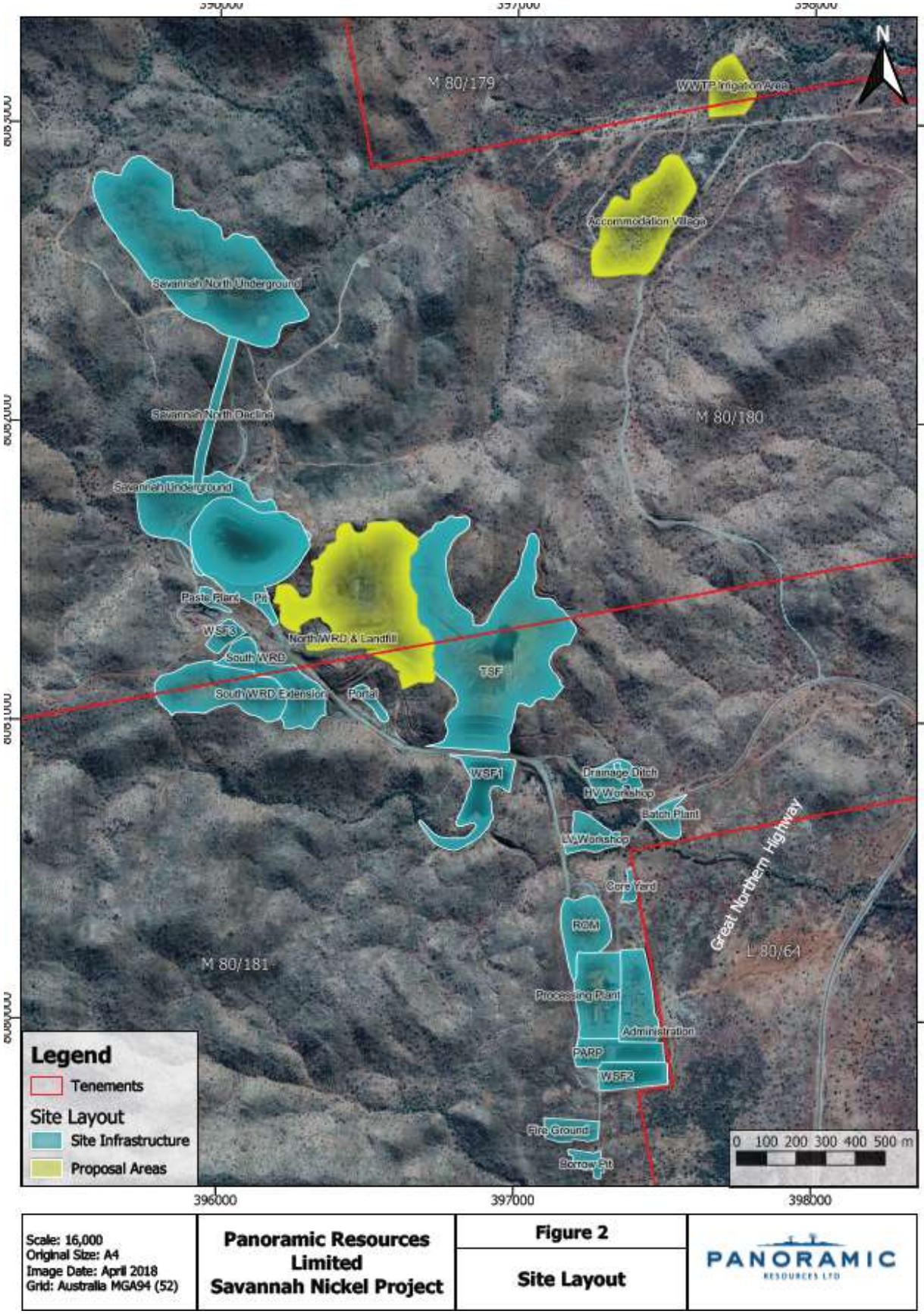

Figure 3: Site layout

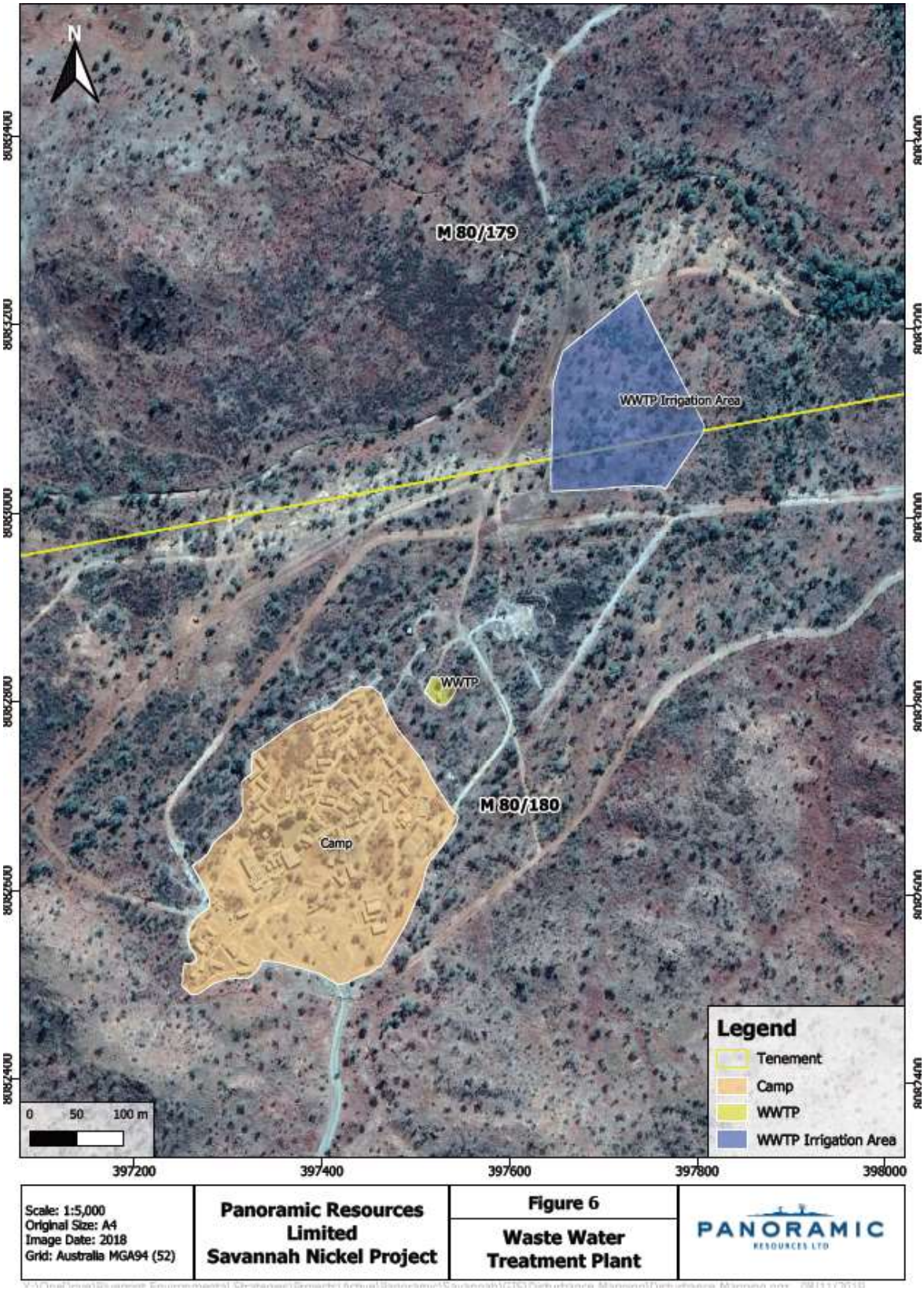

Figure 4: WWTP location and irrigation area

8. Risk assessment

8.1. Determination of emissions, pathways and receptors

Table 7 and Table 8 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 7: Risk assessment for proposed amendments during construction

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions, pathway and receptor**	**Applicant controls**	**Potential adverse impacts**				
Cat 54 *Wastewater treatment plant* ***Cat 64*** *Landfill*	Construction of new landfill cells Installation of WWTP	Dust emissions via air / wind Dispersion impacting on native vegetation within the project area	Fugitive dust emissions are to be managed using on site water truck.	Smothering of vegetation from dust emissions.	Slight	Rare	Low	The DO considers that it is unlikely that there will be deposition of dust on the nearby vegetation, given the short term and the intermittent nature of the works related to installation of a wastewater treatment plant and construction of landfill cells. Therefore, adverse impacts are not anticipated.

Table 8: Risk assessment for proposed amendments during operation

Risk Event					Consequence Rating	Likelihood Rating	Risk	Reasoning
Source/Activities		**Potential emissions, pathway and receptors**	**Applicant controls**	**Potential adverse impacts**				
Cat 54 *Sewage facility*	Irrigation of treated wastewater to irrigation area.	Wastewater via direct discharge to native vegetation within the irrigation area	The licence holder has proposed the following control measures: • Irrigation area has been increased from 1.3 to 2.4ha. Design and slope of irrigation area to ensure: • Treated wastewater is evenly distributed over the irrigation area • No soil erosion occurs • Irrigation does not occur on land that is water logged • Vegetation cover is maintained over the irrigation area • Irrigation field consists of seven irrigation lines each with several 1 metre high sprinklers for effective evaporation; and • The lines are utilised on a rotational basis to ensure the surrounding soil does not become water logged.	Adverse impacts to the health and survival of vegetation in the irrigation area.	Minor	Unlikely	Medium	Licence conditions and controls relating to management of irrigation are on the existing licence. The DO considers that there will be a medium of wastewater discharge to vegetation. Therefore there will be an additional condition to monitor the nutrient loading rates for total nitrogen and total phosphorus to ensure that they meet the WQPN 22, and as committed by the licence holder in the Improvement Plan submitted as part of Condition 4.3.1 of Licence Amendment Notice 2.
Cat 54 *Sewage facility*	Treatment of sewage and irrigation of treated wastewater to irrigation area.	Sewage spills associated with loss of containment or break of irrigation area pipelines and equipment direct discharge to land and nearby surface water.	The Licence Holder has proposed the following controls: • All plant equipment will be managed from a control centre and will be regularly maintained to ensure efficient operation • Effluent discharge from the WWTP will be managed to allow effluent to infiltrate or evaporate and prevent surface ponding or runoff from the irrigation area. • Regular inspections of the replacement WWTP and irrigation area pipelines and equipment will be conducted to ensure they are being managed appropriately.	Contamination of soils and nearby surface water.	Slight	Unlikely	Low	The DO considers that there will be a Low risk based on the Licence Holder's proposed controls. Therefore, the conditions on the existing licence are sufficient in managing the risk.
Cat 64 *Landfill*	Leachate to groundwater	Leachate seepage via infiltration to groundwater	The licence holder has implemented the following control measures: • Separation distance of 3m or more will be maintained between the base of the landfill and the highest groundwater level (SWL is monitoring through existing bores). • Dominant soil type at the premises (consisting of red/brown non-cracking clays with minor soils or red loamy earths) will provide an added barrier given the low permeability. • Only putrescible and inert waste disposal which pose a lower risk to the environment than other contaminants found in Class III or higher landfills. • Landfill waste will not be deposited within 2m of the final tipping surface • Landfill will be overlain with a 4m thick encapsulating cover of waste rock material, assisting to reduce infiltration from rainfall into the landfill cell.	Contamination of groundwater	Slight	Unlikely	Low	The DO considers the depth to groundwater, proposed controls and current licence conditions sufficient to manage the risks of groundwater contamination.

8.2. Consequence and Likelihood of risk event

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 9 below.

Table 9: 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 10 below.

Table 10: 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

Likelihood	
The following criteria has been used to determine the likelihood of the Risk Event occurring.	
Almost Certain	The risk event is expected to occur in most circumstances
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

Consequence		
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)**
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
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
Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*
* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*
"onsite**"** means within the Prescribed Premises boundary.

8.3. Consequence and Likelihood of risk event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 11 below:

Table 11: 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. Consultation

Table 12: Summary of Consultation

Method	Comments received	DWER response
Licence holder referred draft documents	The Licence Holder advised: Section 3.2: Up to 30 tonnes of waste disposed to landfill cells not 3 tonnes. Category 54 capacity to be amended to 100m^3/day not 75m^3/day due to reject water from reverse osmosis treatment plant (this will not increase the emissions).	The Amended licence has been updated to include these changes.

10. Summary of amendments

A summary of the proposed amendments as below. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 13: Summary of amendments

Amendment	Description
Prescribed premises category description	Category 54: amended to 100m^3/day
Definitions	Update of the department's new address Addition of definitions for Environmental Commissioning Report.
Table 1.2.1	Amendment of wastewater treatment plant capacity from 200m^3/day to 100m^3/day and table updated to reflect new activated sludge bioreactor.
Attachment 2 of the Current licence has removed	The template for Annual Audit Compliance Report is now available on DWER's website.
Insertion of new licence conditions 1.2.9 & 1.2.10	New set of conditions related to design, construction, and operation of the wastewater treatment plant and landfill cells.
Table 2.3.1	Amended from 1.3 ha to 2.4 ha spray irrigation field.
Insertion of new licence condition 2.3.3 (and corresponding Table 2.3.3)	Irrigation emission limits included
Table 3.3.1	Amended to include additional monitoring requirements

Table 4.3.1	Improvement Condition relating to WWTP removed; and addition of requirement to report any breach of licence limit for new condition 2.3.3
Schedule 1	Amended to include the location of WWTP and proposed landfill cells.

11. Conclusion

Based on the assessment in this amendment report, the Delegated Officer has determined that the amendment to the works approval will be granted, subject to the changes outlined in Table 13: Summary of amendments above.

These conditions reflect the controls determined to be and necessary for emissions management.

Lauren Fox

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Lauren Fox
A/MANAGER - RESOURCE INDUSTRIES
INDUSTRY REGULATION

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

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L7967/2003/6	L7967/2003/6	accessed at www.dwer.wa.gov.au
2	Amendment Notice 1 – 24 April 2018	Amendment Notice 1	accessed at www.dwer.wa.gov.au
3	Amendment Notice 2 – 21 December 2018	Amendment Notice 2	accessed at www.dwer.wa.gov.au
4	Licence Amendment Application L7967/2003/6 Amendment of Prescribed Premises Categories 64 and 54	Application	DWER records (DWERDT223506)
5	Further information provided for Licence Amendment Application	Further information	DWER records (A1857714)
6	Further information provided for Licence Amendment Application	Further information	DWER records (A1874252)
7	2019_Savannah Nickel Mine WWTP Improvement Plan	Improvement Plan	DWER records (A1801300)
8	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
9	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	
10	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2016b	
11	DER, November 2016. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2016c	