



Application for Licence Amendment

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L6498/1991/11
Licence Holder	Northern Star Resources Ltd
ACN	092 832 892
File Number	DWERVT16194
Premises	Jundee Mining Operations Legal description Mining tenements G53/20, M53/191, M52/412, M53/413 and M53/414 As defined by the Premises maps attached to the issued works approval
Date of Report	25 November 2024
Decision	Revised licence granted

**MANAGER, RESOURCE INDUSTRIES
REGULATORY SERVICES**

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

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1. Decision summary

Licence L6498/1995/11 is held by Northern Star Resources Ltd (Licence Holder) for the Jundee Operations (the Premises), located within the Shire of Wiluna.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the Premises. As a result of this assessment, Revised Licence L6498/1995/11 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

2.2 Amendment application summary

On 5 June 2024, the Licence Holder submitted an application to the department to amend Licence L6498/1995/11 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments were sought:

- Installation and operation of a temporary 4 megawatt (MW) power station and 140,000 liters of fuel storage (removed from scope of amendment)
- Construction and operation of two new landfill locations within Invicta and gateway waste rock dumps (WRD); and
- A request to include existing Elliot and Moon Turkey nest dams on the licence.

On 2 August 2024, the Licence Holder submitted a second application to the department to amend Licence L6498/1995/11 under section 59 and 59B of the EP Act. The following amendments were sought:

- Decommissioning of tailing storage facility (TSF) monitoring bores and their removal from the licence.

These two licence amendment applications will be processed together as one amendment and decision report. More detail on each amendment request is outlined in the below sections.

2.2.1 Category 52: Electric power generation and Category 73: Bulk storage of chemicals

The Licence Holder is proposing to install the Barton temporary Power Station which was to include a 4MW power station and 140,000 L of fuel storage (2 x 70,000 L portable Kommander – LTKO 68 self-bunded double wall diesel storage tanks). The temporary power station would include: 8 x 500kVA portable self-bunded Himoinsa HRSW-505 T5 diesel generators. The temporary power station would be required for approximately 6-12 months until a third party renewable energy project is complete.

Subsequent correspondence with the Licence Holder advised Barton Power Station will no longer be required as the project will fast track the construction of high voltage powerlines associated with the renewables energy project. This has therefore been removed from the scope of this amendment.

2.2.2 Category 64: Class II or III Putrescible Landfill

The Licence Holder proposes to construct two additional landfills (Invicta & Gateway Waste Rock Dump landfills) to increase the waste storage capacity for the premises to a maximum of 5,000 tonnes per annum (tpa) (from 820 tpa). Two unlined Class II Landfill site are proposed to be constructed. The landfills will be construction with a series of trenches up to approximately 3 metres (m) depth by 5m width and 10-30m in length. Excavated inert waste rock from the existing WRDs will be used to construct windrows and for landfill cover as well as final capping.

Landfills will be used to dispose of the following types of waste;

- clean and Uncontaminated Fill;
- Inert Waste Type 1 and Type 2;
- Putrescible Wastes; and
- Contaminated solid waste meeting waste acceptance criteria specified for Class II landfills.

The Licence Holder proposes the following operational and management measures for the landfills in line with the *Environmental Protection (Rural Landfill) Regulations 2002* (EP Landfill Regs);

- The active tipping area will be maintained to less than 30m in length and covered at a frequency and method consistent with the EP Landfill Regs.
- Landfills, where putrescible (Jundee village kitchen) waste is placed, will be fenced to prevent land-based animal ingress.
- Surface water run-off will be managed with windrows to divert water away from trenches. Adjacent waste rock landforms shield them from potential stormwater, WRD surfaces will be contoured where required to redirect surface stormwater flows away from landfill trench.
- Landfill windrows will be installed as part of each trench development to prevent any surface water from flowing into the landfill. Incidental rainfall will be retained in the trench or in the worst case within the WRL crest bund and retained on site.

Note existing licence controls require construction of new landfills to be further than 100m from surface water and shall excavate no deeper than 3m above the highest level of the water table.

Groundwater

Bore hydrographs in the area south-east of the Invicta WRD (Fischer in-pit Tailings Storage Facility) illustrate a trend of gradually falling water levels in the area monitoring bores since tailings deposition ceased in June 2017. Sampling data from 2023 taken from the Annual Audit Compliance Report (AACR 2023) indicate water levels have remained static at approximately 30 metres below ground level (mbgl).

Pre-mining groundwater levels in the vicinity of the Gateway WRD are estimated to be around 20 to 25 mbgl. Following tailings deposition into the historic Nimary TSF, significant groundwater mounding occurred, with water levels rising up to 2 mbgl in some bores within the first four years of tailings deposition. Nimary TSF was decommissioned in 2007 and became fully rehabilitated in 2009. The groundwater mound previously associated with seepage has now completely dissipated with levels now ranging from 14 mbgl to 34 mbgl from Nimary TSF bores in 2020. Bore hydrographs illustrate a long-term trend of declining water levels at Nimary TSF.

2.2.3 Category 6: Mine dewatering – discharge containment

Existing Turkey's nest dams 'Elliot' and 'Moon' are also proposed to be added to the Licence as approved containment infrastructure, these dams have been identified as being used for storage and containment of mine dewatering discharge in a Compliance and Enforcement

Annual Environmental Report, Annual Audit Compliance Report review undertaken in late 2023.

Elliot and Moon Turkey's Nests

As mentioned above, Elliot and Moon Turkey's Nests (TN) are currently being used to store dewatering discharge from the premises. The dams are HDPE lined above ground paddock style containment dams built from compacted clay sourced from the surrounding area. Depth to groundwater in the Elliot TN area is approximately 27.93mbgl and 34.61mbgl for the Moon TN.

The following summarises the operational and infrastructure specifications for the dams -

- The dams have been constructed with the following dimensions –
 - (i) Elliot TN: 45m (L) x 45m (W) x 2m (H)
 - (ii) Moon TN: 50m (L) x 50m (W) x 2.4m (H)
- Maintain an operational freeboard of 300 millimetres (mm)
- Operate with automatic float level sensor cut offs and twice daily freeboard inspections (every 12 hours).
- Water used for dust suppression of haul road between Jundee processing stockpiles and Ramone and Vause/Gourdis ore stockpiles.

Elliot TN receives surface water runoff from Area 7 pit and 2 groundwater bores adjacent to Charlton 1 and Charlton 2 pits (decommissioned). Moon TN dewatering discharge is sourced from Moon pit and consists of ground water seepage from within the pit and surface water runoff. Pipeline routes for the TNs can be seen in Figures 2 and 3 below.

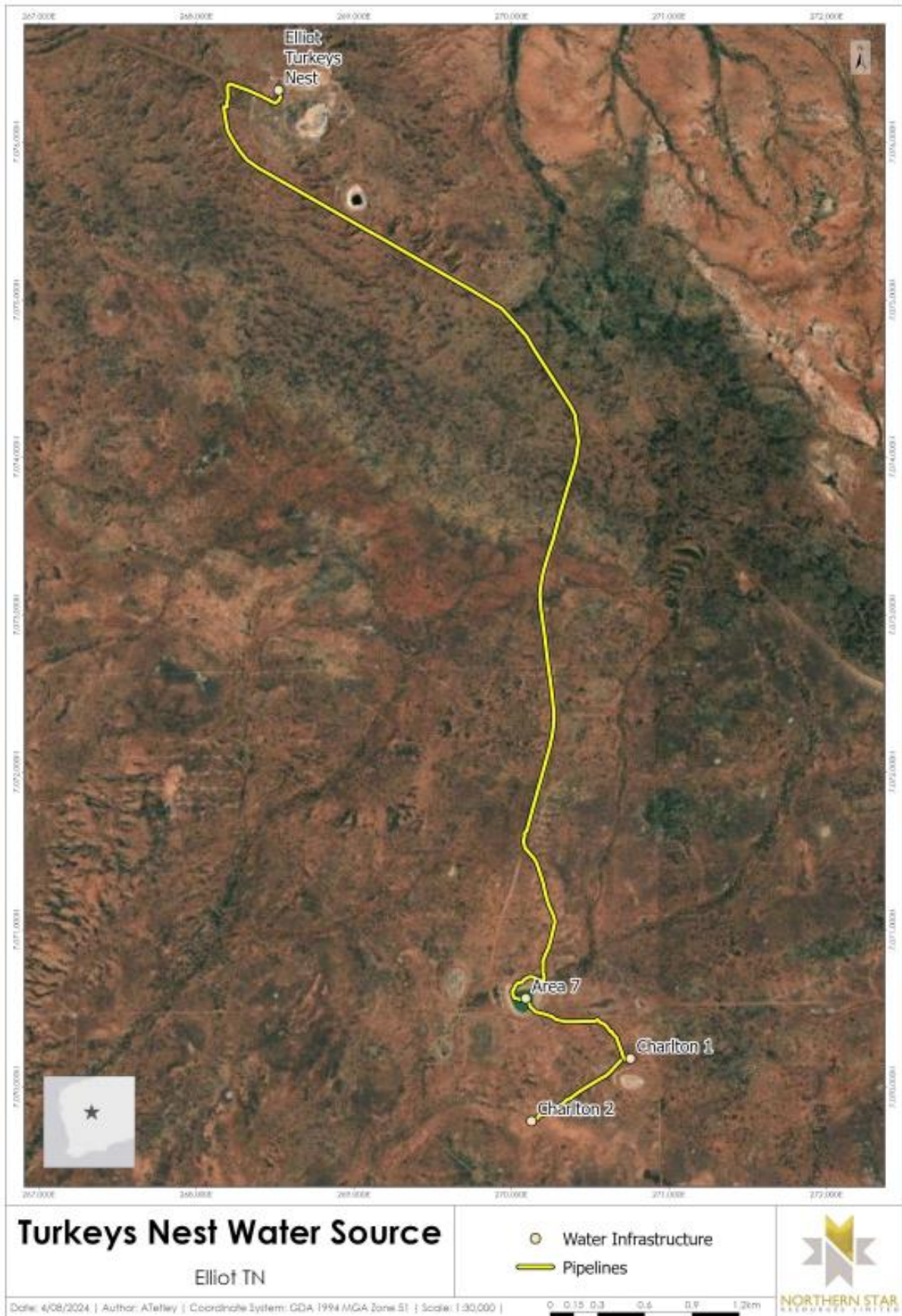


Figure 2: Elliot TN dewatering pipeline route

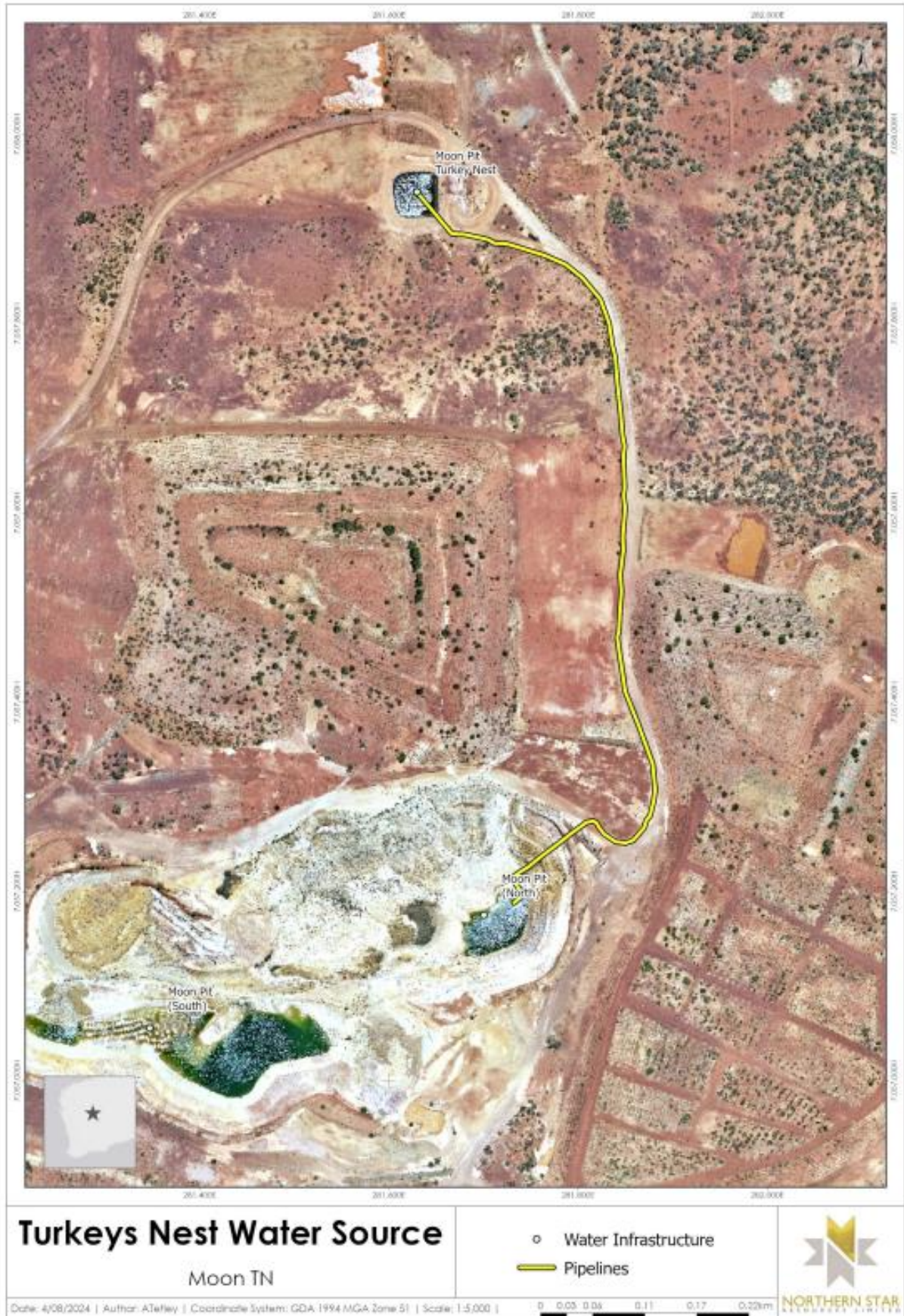


Figure 3: Moon TN dewatering pipeline route.

2.2.4 Monitoring bores - decommissioning

A second amendment was submitted to the department on 2 August 2024. The Licence Holder plans to recommence construction of TSF3 under works approval W6522/2021/1. The construction of TSF3 Cell 2 base layer will overlap with groundwater bores that are currently used for monitoring around the Nimary TSF and conditioned under L6498/1995/11.

Tailings disposal into Nimary TSF ceased in June 2007 with the closing of the Nimary process plant. The Nimary TSF has since been rehabilitated and only annual monitoring of surface water levels has taken place since 2020.

The following Nimary TSF groundwater bores are located in TSF3 Cell 2 footprint and are requested to be removed from the licence –

- Nimary TSF Seepage indication Bores: NMB01-D and NMB02-D
- Nimary TSF Compliance Bores: NMB08-D, NMB09-D, NMB10-D, NMB10-S

As mentioned above, the groundwater mound previously associated with seepage from the Nimary TSF has stabilised with the most recent monitoring data from the AACR 2023 now showing groundwater levels ranging from 16 mbgl to 24 mbgl.

Dewatering associated with mining activities has significantly modified the groundwater system in the area by creating a steep hydraulic gradient eastwards towards the underground pits to the north east of TSF3. This has caused the local groundwater flow to be redirected towards the mining area. Water quality has been collected from monitoring bores within the TSF 3 footprint since 2017 with average results ranging from 330 – 11,000 mg/L total dissolved solids (TDS) (fresh to hypersaline).

A network of 8 new monitoring bores was proposed for TSF3 for groundwater monitoring and approved for installation under W6522/2021/1 namely monitoring bores NMB16 – NMB23. Once established, water levels and samples will be taken at least every three months, or as prescribed by licence conditions.

2.3 Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020).

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.

2.4 Source-pathways and receptors

2.4.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in Table 1 below. Table 1 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 1: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Category 6 amendment			
Rupture of pipeline causing discharge of mine dewatering effluent to land	Pipelines and dewatering infrastructure (breach).	Direct discharge to land and vegetation.	<ul style="list-style-type: none"> Condition 1.2.1 requires all pipelines containing saline water to have secondary containment and or automatic cut-outs or telemetry systems installed. Condition 1.2.5 requires visual integrity inspections every 72 hours when in operation.
Seepage of saline water	Mine dewatering discharge from the dewatering bores pumped to Elliot and Moon Turkey's Nest dams,	Seepage of saline water to ground or vertically through unlined pits.	Elliot and Moon TNs are HDPE lined to prevent seepage.
Saline water	Mine dewatering discharge from the dewatering bores pumped to Elliot and Moon Turkey's Nest dams.	Overtopping / overflowing direct discharge causing direct discharge and potential overland runoff from Turkey's Nests	<ul style="list-style-type: none"> Licence condition for visual integrity inspections every 72 hours when in operation. Minimum of 300 mm operational freeboard. Operate with automatic float level sensor cut offs and twice daily freeboard inspections (every 12 hours).
Category 89 amendment			
Dust	Construction of landfill trenches. Vehicle movements/earthworks	Wind / Airborne	No controls proposed.
Odour	Disposal of waste into landfill	Air/windborne	No nearby sensitive receptors. Screened out due to lack of receptors.
Solid/liquid waste and leachate	Disposal of waste into landfill	Seepage to land.	Disposal of waste will only take place within defined trenches within earthen bunds.

Emission	Sources	Potential pathways	Proposed controls
			<p>Routine covering of waste in accordance with condition 1.2.7</p> <p>Landfills will be located within WRDs many meters above the ground surface creating a buffer between groundwater and the base of the landfill.</p>
Windblown waste	Disposal of waste into landfill	Air/windborne	<ul style="list-style-type: none"> • Routine covering of waste in accordance condition 1.2.7 • Condition 1.2.8 requires all windblown waste to be collected at least on a monthly basis and returned to the active tipping area
Contaminated stormwater	General operations of the landfill facility	Overland flow/runoff	<ul style="list-style-type: none"> • Installation of landfill windrows for every trench to reduce the incidence of surface water. • Surface water run-off will be managed with windrows to divert water away from trenches. • Adjacent waste rock landforms shield them from potential stormwater, WRD surfaces will be contoured where required to redirect surface stormwater flows away from landfill trench

2.4.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation. Table 2 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020)).

Table 2: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Jundee Homestead	2.6km from processing plant/main active mining area.
Environmental receptors	Distance from activity / prescribed premises
Aboriginal Sites	<p>There are approximately 20 sites of archaeological and ethnographic significance in the Jundee Operations area. These tend to be artefact “scatters”, with each site containing between 100 and 30,000 artefacts.</p> <p>The nearest Aboriginal Site is an artefact/scatter “Jundee 07” approximately 2km north-east from Elliot Turkey’s nest.</p> <p>“Plover Bore” is located within a materials stockpiling area 1km east of the Invicta WRD.</p> <p>Screened out due to distance.</p>
Groundwater	<p>Water quality across the premises ranges from fresh to hypersaline. Monitoring bores within the TSF 3 footprint since 2017 with results ranging from 330 – 11,000 mg/L TDS.</p> <p>See also Sections 2.2.3 and 2.2.4</p>
Surface Water	<p>Minor non-perennial surface water bodies are located within and surrounding Moon TN and Elliot TN.</p> <p>A minor non-perennial water course is located 2.5km north of the Invicta WRD.</p>

2.5 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 2.4. Where linkages are incomplete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 2.4), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 3.

The Revised Licence L6498/1998/11 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. category 6 and 89 activities.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 3. Risk assessment of potential emissions and discharges from the Premises during construction and operation

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
Construction								
Landfill – trench excavation	Dust	Pathway – Air/windborne pathway. Impact – Poor vegetation health due to dust accumulating on adjacent remnant native vegetation.	Remnant native vegetation	Refer to section 2.4	C = Minor L = Rare Low Risk	Y	N/A	Trench excavation will be of short duration only and unlikely to result in impacts to nearby receptors.
Operation								
Transportation of dewatering water by pipeline	Rupture of pipeline causing discharge of mine dewatering effluent to land	Pathway – Direct discharge to land and vegetation. Impact – Topsoil contamination and plant smothering/ stress or death.	Remnant native vegetation Land/soil	Refer to section 2.4	C = Moderate L = Unlikely Medium Risk	Y	Existing condition 1.2.1 (pipeline requirements)	Existing conditions are sufficient to manage this risk.
Mine dewatering discharge from the dewatering bores pumped to Elliot and Moon Turkey's Nest dams	Seepage of saline water	Pathway – Seepage of saline water to ground.	Remnant native vegetation Land/soil	Refer to section 2.4	C = Minor L = Rare Low Risk	Y	Existing condition 1.2.2 (dams to be lined with HDPE)	Existing conditions are sufficient to manage this risk.

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
		Impact - Seepage into the root zone of vegetation, causing stress or death	Groundwater					
Mine dewatering discharge from the dewatering bores pumped to Elliot and Moon Turkey's Nest dams	Saline water	Pathway - Overtopping / overflowing causing direct discharge and potential overland runoff from Turkey's Nests. Impact – Destruction of vegetation, erosion of surface land / soils, and impacts to local drainage channels/surface water bodies	Remnant native vegetation Soil / land Surface water and nearby drainage lines	Refer to section 2.4	C = Moderate L = Unlikely Medium Risk	Y	Existing condition 1.2.4 - Minimum vertical freeboard Existing condition 1.2.5 – visual inspections of embankment freeboard	Existing licence controls for maintaining minimum freeboard and visual inspections of embankment freeboard are sufficient to manage this risk.
Landfill – Disposal of waste into landfill trenches	Solid/liquid waste and leachate	Pathway – Solid and liquid waste leaching from unlined trench to land Impact – Contamination of	Soil / land Groundwater	Refer to section 2.4	C = Moderate L = Unlikely Medium Risk	Y	Updated condition 1.2.6: management of waste Existing condition 1.2.7: Covering of waste Updated condition 1.2.10 – landfill construction	Existing licence conditions apply, which requires the licence holder to ensure landfill trenches are located further than 100m from surface water and excavated no deeper than 3m above the highest water table and that waste is covered on a regular basis with inert material. This will reduce the generation of leachate. No additional regulatory

Risk Event					Risk rating ¹ C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions ² of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
		groundwater or surface water					requirements	controls are required
	Windblown waste	Pathway – Air/windborne Impact - Solid waste blown into surrounding environment, destruction of native vegetation and ecosystem health	Native vegetation, particularly priority flora (TECs)	Refer to Section 2.4	C = Slight L = Unlikely Low Risk	Y	Existing conditions Condition 1.2.7: cover requirements Condition 1.2.8 management of windblown waste	Existing licence controls (for cover requirements and control and collection of windblown waste) are considered sufficient regulatory controls. No additional controls are required.
	Sediment laden stormwater / contaminated stormwater	Pathway - Overland runoff and/or waste contaminated stormwater. Impacts - contamination of soil.	Soil/land	Refer to Section 2.4.1	C = Slight L = Unlikely Low Risk	Y	Existing conditions Condition 1.2.6: management of waste Condition 1.2.8 management of windblown waste Condition 1.2.10: landfill construction requirements	Existing licence controls require landfills to be built withing defined trenches in earthen bunds. Updated condition 1.2.10 requires landfill trenches to include a surrounding bund to divert stormwater away from waste.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020).

Note 2: Proposed Licence Holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

3. Consultation

Table 4 provides a summary of the consultation undertaken by the department.

Table 4: Consultation

Consultation method	Comments received	Department response
Licence Holder was provided with draft amendment on 5 November 2024	See Appendix 1	See Appendix 1

4. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

4.1 Summary of amendments

Table 5 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 5: Summary of licence amendments

Condition no.	Proposed amendments
Condition 1.2.2 Table 1.2.1	Table 1.2.1 updated to add a reference to figure 9 and figure 10 in relation to the location of the turkey's nest dams
Condition 1.2.3 Table 1.2.4	Table 1.2.4 updated to increase total waste volume to 5000 tonnes per year and to add the names of the new landfill locations
Condition 1.2.10 Table 1.2.5	Table 1.2.5 updated to include construction requirements for the new landfill locations.
Condition 3.3.1 (Table 3.3.1) Nimary TSF Compliance Bores	Remove NMB01-D and NMB02-D from the table. Remove NMB08-D, NMB09-D, NMB10_D and NMB10S from the table.
Figure 4 Ramone Emission Points	Update with new emission points and containment infrastructure
Figure 8 Nimary TSD nf TSF Cell3 Groundwater monitoring bores	Update to remove reference to bores removed from Condition 3.3.1.
Figure 9 and	New figures added to show location of Elliot and Moon pit TNs

Figure 10	
Figure 11	New figure added to show location of landfills

References

1. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
2. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
3. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
4. Northern Star Resources, 2024, Application Supporting Documentation and response to request for further information (DWER references: DWERDT985583, DWERDT952919, A2309755, A2312043).

Appendix 1: Summary of Licence Holder's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder's comment	Department's response
Table 1.2.1	Maps for Figure 9 correspond to Figure 2: Elliott TN dewatering pipeline route and Figure 3: Moon Pit TN dewatering pipeline route found in L6498/1998/11 Amendment Report Draft:	Figure 3 from amendment report has been added to licence as new Figure 10 Figure 10 reference updated to Figure 11
Maps	New map showing location of landfills provided	New map inserted as Figure 11
	New map showing location of Fisher in-pit TSF monitoring bores provided	New map inserted as Figure 7
	Figure 9 is missing Moon Pit Turkey's Nest figure. L6498/1998/11 Amendment Report Draft: Figure 3: Moon Pit TN dewatering pipeline route, can be used.	Figure 3 from amendment report has been added to licence as new Figure 10
Condition 1.2.11 (d)	With regards to Gateway and Invicta Landfills, could the requirements set under 1.2.11 be applicable for the first trench only.	Yes, this is the intent of the condition. No changes to wording has been made.
Amendment report	Page 2, bullet point 6 - Please revise to: "Landfills, where putrescible (Jundee village kitchen) waste is placed, will be fence to prevent land-based animal ingress."	Changes made
	Page 8 Table row 3 - "Fencing around the landfill to contain the waste" Please remove this bullet point as it relates to animal ingress not windblown rubbish. Existing controls to manage windblown rubbish was also considered sufficient on page 13 in Table 3. Risk assessment of potential emissions and discharges from the Premises during construction and operation. Though this is a hazard, it does not fit into the "potential emission" categories	Change made. No change to risk profile for windblown waste.