Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

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

Licence Number	L9373/2023/1
Licence Holder	Coburn Resources Pty Ltd
ACN	165 036 537
File Number	DER2022/000583
Premises	Coburn Mineral Sands Project Coburn Road, MEADOW WA Legal description – Mining tenements M09/102, M09/103, M09/104, M09/105, M09/106, M09/111 and M09/112 As defined by the Premises maps attached to the Revised Licence
Date of Report	21 May 2024
Decision	Revised licence granted

Christine Pustkuchen

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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 L9373/2023/1 is held by Coburn Resources Pty Ltd (Licence Holder) for the Coburn Mineral Sands Project (the Premises), located on mining tenements M09/102, M09/103, M09/104, M09/105, M09/106, M09/111 and M09/112.

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 L9373/2023/1 has been granted.

The revised Licence issued as a result of this amendment consolidates and supersedes the existing Licence previously granted in relation to the Premises.

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 Application summary

2.2.1 Works approval and licence history

Table 1 summarises the works approval and licence history for the premises.

Table 1: Works approval and licence history

Instrument	Issued/Amended	Nature and extent of works approval, licence or amendment
W6258/2019/1	02/09/2019 (issued)	Works approval for Category 85 and Category 89 to construct a wastewater treatment plant and putrescible landfill.
W6475/2021/1	21/06/2021 (issued)	Works approval for Category 8, Category 52 and Category 85B. Authorising the construction of the: • Wet Concentrator Plan (WCP), • Mineral Separation Plant (MSP), • Off path Tailings Storage Facility (TSF), • pipelines, • Reverse Osmosis (RO) desalination plant, • 10 x 2.0 MW gas generator units, • LNG storage tanks, and • groundwater bore monitoring network in tenement M09/102.
	30/05/2023 (amended)	To extend Time-Limited Operations (TLO) to 16 August 2023 on the following infrastructure: • Wet Concentrator Plan (WCP), • Mineral Separation Plant (MSP), • pipelines, • Reverse Osmosis (RO) desalination plant, • 10 x 2.0 MW gas generator units, and • LNG storage tanks Off-path TSF removed as an authorised discharge point as it had reached capacity.
L9373/2023/1	28/04/2023 (issued)	Licence for Category 85 and Category 89 to continue operating the wastewater treatment plant and putrescible landfill.

Instrument	Issued/Amended	Nature and extent of works approval, licence or amendment
W6819/2023/1	16/11/2023 (issued)	Works approval for Category 8 to authorize the construction of lifts for the off-path TSF and subsequent TLO to operate the facility.

2.2.2 Application details

Works approval W6475/2020/1

A works approval application for mineral sands mining and processing at the premises was submitted to the department in 2020 under section 54 of the *Environmental Protection Act 1986* (EP Act). During the assessment of that application, it was noted that groundwater mounding from tailings deposition was identified as a key environmental risk in 2005 during the Part IV of the EP Act assessment (see section 2.3). Preliminary groundwater mounding modelling was undertaken for the Part IV assessment process in 2005.

The works approval application submitted in 2020 included updated, detailed modelling for mining and tailings deposition in the southern-most tenements. The applicant indicated that mining was now scheduled to begin with the northern tenements and progress southwards, and revised groundwater mounding modelling had not yet been completed to reflect this. The application requested to deposit tailings to mined out voids, and to establish an off-path tailings storage facility (TSF). The Delegated Officer determined that updated modelling could be completed and submitted to the department prior to the commencement of time-limited operations under the works approval, to be used in the subsequent licence assessment for the operation (this assessment). Updated modelling was supplied to the department in August 2022 (AECOM 2022).

This application – June 2023 submission

This licence amendment application consists of two applications that have been amalgamated into one assessment.

On 13 June 2023, Coburn Resources Pty Ltd (the Licence Holder) submitted an application to the department to amend Licence L9373/2023/1 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The application was seeking to authorise the ongoing operation of infrastructure that had been installed at the premises under works approval W6475/2020/1. This includes:

- The Wet Concentrator Plant (WCP)
- The Mineral Separation Plant (MSP);
- The reverse osmosis (RO) desalination plant;
- Gas electricity generators, equating to a 20 MW power station;
- Liquified natural gas (LNG) storage tanks;
- Pipelines and process water ponds; and
- Expanding the prescribed premises boundary to be consistent with W6475/2020/1.

The ongoing use of the off-path TSF that was constructed under W6475/2020/1 was not included in the application as the Delegated Officer had determined that further approvals for that facility would require assessment under a works approval framework (W6819/2023/1). The Licence Holder informed the department that decant water from the off-path TSF was being discharged to mine voids in March 2023.

By the time the licence amendment application was submitted, the majority of the authorised infrastructure for the project had been operating under time-limited operations for around six months. After the submission of the application, the Licence Holder informed the department

that on-site observations demonstrated that the geology of the ore had been mischaracterised. A significantly higher fraction of clay had been encountered which resulted in the need for substantive operational changes to the project. The department was informed that a solar drying pond (SDP) had been constructed in June 2023 and was being used to manage excess decant water from the tailings. This was in addition to the on-going discharge of decant water to mine voids. The Licence Holder outlined that further SDP's would be required and other operational modifications for water management which had not previously been assessed by the department, were being actively considered.

The mining project had been designed based on the assumption that the ore and tailings contained mainly sand with only a minimal clay fraction, and would therefore be largely free-draining. The implementation of the project revealed that there was an unexpectedly high proportion of clay with a low hydraulic conductivity, which resulted in reduced seepage from the tailings material, an increased volume of decant water that could not be adequately managed within the existing site infrastructure, lower quality (high turbidity) decant water that couldn't easily be used in the processing plants, and an underestimation of the tailings volume which would require additional storage capacity that had not previously been factored in. It also meant that fundamental assumptions around potential groundwater impacts would need to be revised.

In September 2023, the Delegated Officer advised that an additional amendment application would be required to outline infrastructure that had been built without assessment; infrastructure that would be required in the future; operational changes that the Licence Holder intends to implement going forward; and updated information regarding the changes to the understanding of potential environmental impacts to the site, particularly in relation to water management and groundwater mounding.

Second application – December 2023 submission

On 8 December 2023, the Licence Holder submitted a second application to the department to amend licence L9373/2023/1 under section 59 and 59B of the EP Act. The application was seeking to:

- Add the construction and operation of solar drying ponds (SDP's) to the licence,
- Include authorization for Integrated Waste Landform Containment Facilities (IWLCF), which would encompass:
    - in-pit tailings deposition (previously assessed and approved),
    - the use of in-pit settlement ponds to manage decant/process water, and
    - the use of cyclone stackers for in-pit tailings deposition.
- Expand the permitted mining and tailings deposition area beyond M09/102 into the southern tenements,
- Expand the groundwater monitoring network to tenement M09/103, and
- Provide additional monitoring and revised modelling information to inform the department about changes to potential groundwater mounding impacts from the project.

No changes were requested to the existing categories on the licence relating to sewage and landfill facilities.

Table 2 below outlines the proposed category and throughput capacity changes to the existing licence for the amalgamated amendment.

Table 2: Proposed throughput capacity changes to the licence

Category description	Current throughput capacity	Proposed throughput capacity

Category 8: Mineral sands mining or processing: premises on which mineral sands ore is mined, screened, separated or otherwise processed.	N/A	23.4 million tonnes per year
Category 52: Electric power generation: premises (other than premises within category 53 or an emergency or standby power generating plant) on which electrical power is generated using a fuel.	N/A	15.9 MW
Category 85B: Water desalination plant: premises at which salt is extracted from water if waste water is discharged onto land or into waters (other than marine waters).	N/A	0.62 GL per year
Category 85: Sewage facility: premises – (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters	75 cubic metres per day	No change
Category 89: Putrescible landfill site	2,700 tonnes per year	No change

2.3 Part IV of the EP Act

The Coburn Mineral Sands Project was assessed under Part IV of the EP Act, and was granted approval in May 2006 under Ministerial Statement (MS) 723. It was also assessed and determined to be a "controlled action" under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) on the basis of potential effects on world heritage, listed migratory species and listed threatened species and communities (reference number – EPBC 2003/1221). The WA Environmental Protection Authority (EPA) examined these matters in accordance with the bilateral agreement between Western Australia and the Australian Government. The project was approved by the Commonwealth Minister for Environment and Heritage in July 2006.

The EPA published EPA Bulletin 1211 in December 2005 in relation to this proposal. It identifies the following environmental factors as relevant to the proposal, requiring detailed evaluation:

- Groundwater;
- Flora and vegetation;
- Fauna;
- Rehabilitation; and
- World heritage and conservation values.

Minor changes to MS 723 under section 45C of Part IV of the EP Act have been granted on six occasions, with the most recent amendment approved on 26 October 2023.

2.3.1 Groundwater

The key environmental factor identified in MS 723 that directly relates to discharges and emissions from the operation (and is therefore within the scope of this Part V assessment) is the deposition of tailings which may impact groundwater and vegetation. The project area is located within the dry, sandy dunes of the Peron Sandstone, which overlies an aquitard called the Toolonga Calcilutite. Studies undertaken by the Licence Holder indicate that there is a risk of water from tailings deposition to accumulate above the aquitard, in the sandy dune system.

Figure 1 (below) was prepared for the EPA as part of the "Groundwater Resources Impact Assessment" (URS 2005), identifying areas that are at elevated risk of vegetation being impacted by groundwater mounding. These areas generally correspond to areas where the sand dunes overlying the Toolonga Calcilutite aquitard is thin. It is noted that several of these areas extend into the Shark Bay World Heritage Property (SBWHP) from the prescribed premises.

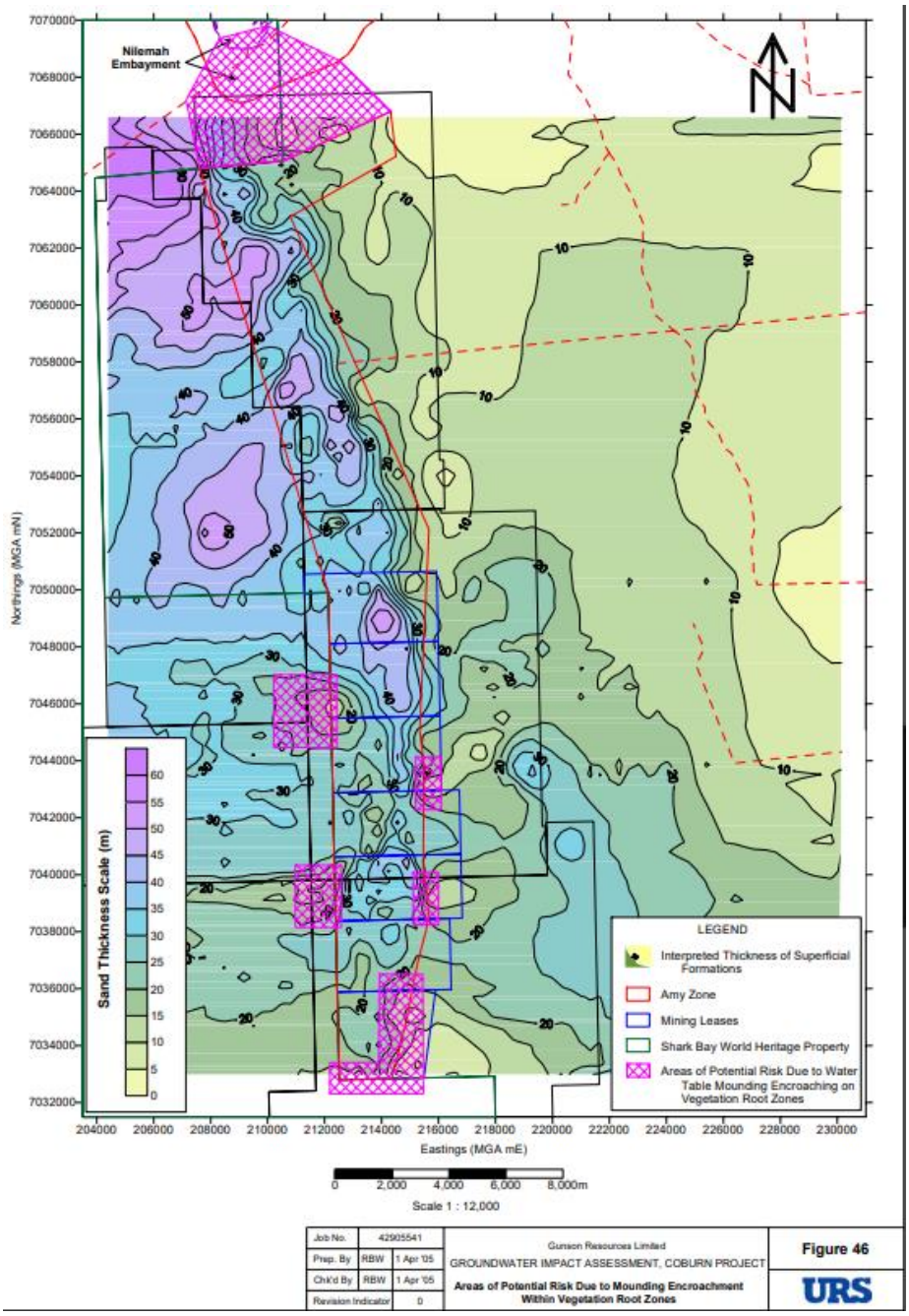

Figure 1: Areas of potential risk due to groundwater mounding (URS 2005)

The MS requires the Licence Holder to prepare a Groundwater Mounding Management Plan (GMMP) that includes "threshold" and "limits" for action in accordance with MS 723 conditions 7-1 to 7-11. The MS states that "*the objective of this plan is to monitor and manage groundwater mounding to prevent the loss of vegetation … outside the proposal area*," with particular focus on the SBWHP. The applicant submitted a GMMP in 2012 that was approved by the EPA.

A revised GMMP was submitted with the second licence amendment application in December 2023. It focuses on the two northern tenements (M09/102 and M09/103) and reflects the new understanding regarding water management at the project. It presents monitoring data collected during time-limited operations in M09/102, provides revised groundwater modelling and updates the groundwater monitoring network to extend into tenement M09/103. Revised "thresholds" and "limits" are included as part of this plan.

2.3.2 Dust

MS 723 also focuses on the importance of minimising dust from the operation, specifically requiring the prevention of visible dust in the SBWHP to protect the world heritage and conservation values of the area. The Licence Holder has provided the Dust Management Plan (DMP) that has been prepared in accordance with MS 723 which includes management actions, a dust monitoring network and vegetation monitoring to ensure that any impacts from dust are identified and can be managed appropriately.

2.3.3 Other relevant conditions

MS 723 includes a condition requiring a 100-metre protective buffer between the project area and the SBWHP, in which there may be no adverse disturbance or impact on vegetation. There is an exemption to allow the implementation of a Groundwater Mounding Management Plan (GMMP) which would permit the installation of bores in this zone. There is also a requirement not to disturb regionally significant vegetation communities S5 and S10 (which occur on tenements M09/106, M09/111 and M09/112) with a mandated 50-metre buffer.

As part of the rehabilitation conditions of MS 723 there is a limit of 40 hectares being used for the drying of clay or slimes at any one time. There is also a requirement to begin rehabilitation of at least 80% of the total area mined each year after the first six months of mining.

Conditions relating to fauna include requirements to fence open water dams and trenches, install egress matting and conduct regular inspections for trapped animals.

Key Finding: The Delegated Officer recognises that there is some overlap in regulation between Part IV and Part V in relation to groundwater impacts from this premises. Part IV has a narrow focus on this issue around managing impacts to vegetation outside the premises boundary and within the SBWHP. The Part V assessment will have a broader scope, considering all potential impacts from the discharge of tailings.

Other conditions listed in the Ministerial Statement will be taken into consideration during the assessment process and the setting of licence conditions. The Delegated Officer will take a risk-based approach regarding the need for complimentary conditions being placed on the licence. Conditions on the Ministerial Statement relating to Part V matters will not be duplicated on the licence.

3. Overview of Premises

3.1 Existing infrastructure and operations

The Coburn Mineral Sands Project involves open pit, dry mining of up to 23.4 million tonnes per annum (Mtpa) of mineral sands.

Support infrastructure includes a RO desalination plant, power generation facilities (LNG and solar power), a concrete batching plant, an on-site mining village with landfill and wastewater treatment facilities, fuel storage facilities (LNG and diesel), access roads, a laboratory, workshops and offices. A general site layout can be seen in figure 2 (below).

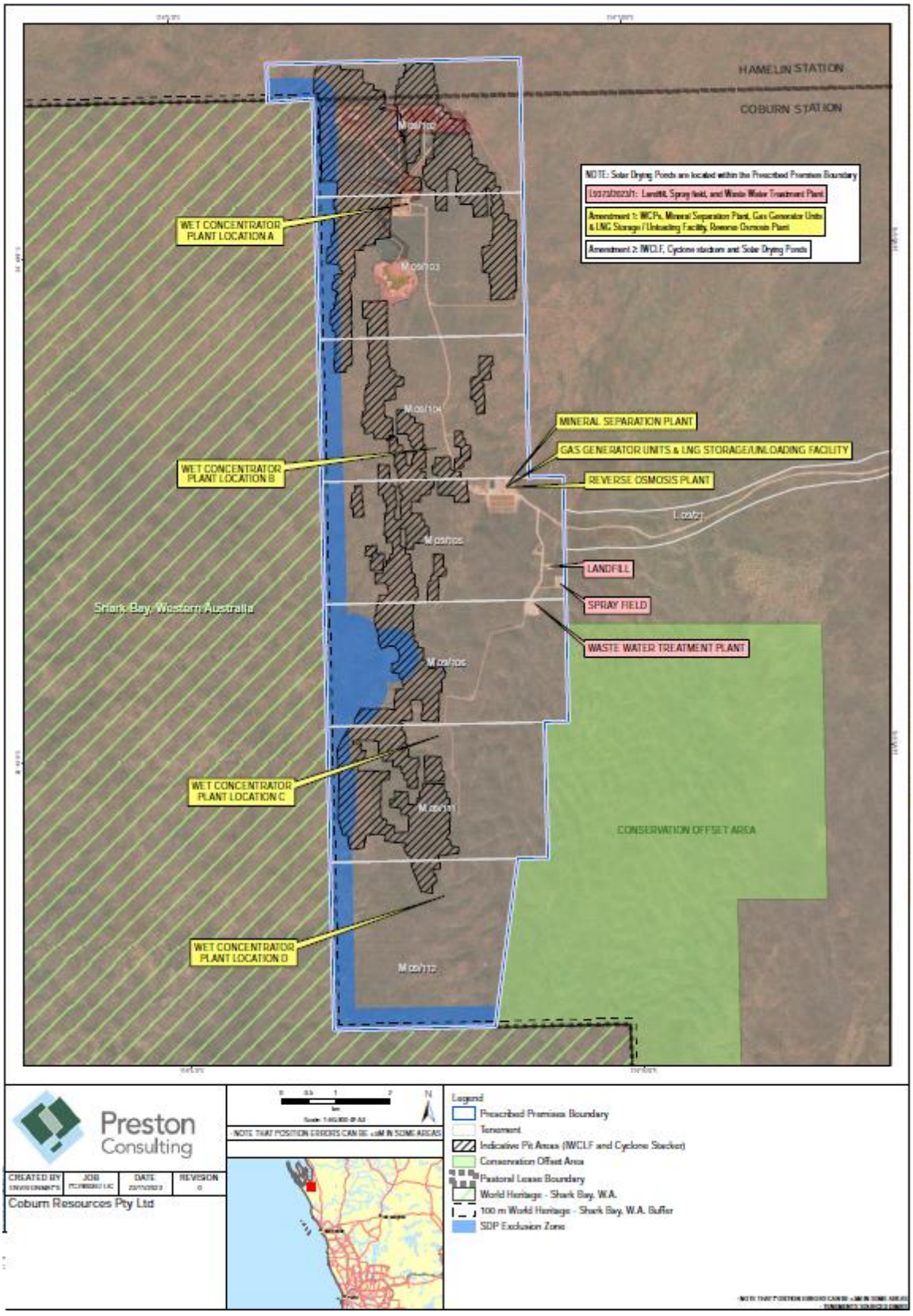

Figure 2: Prescribed premises boundary and general site layout

The village, wastewater treatment plant and landfill that are authorised on the existing licence are located to the east of tenements M09/105 and M09/106 and will not be reassessed in this amendment application (see figure 3).

The MSP, RO plant, gas power generation facilities (consisting of 9 x 2 MW gas generating units) and fuel storage facilities are fixed items of infrastructure located in the northeast of M09/105. Compliance documents submitted under W6475/2020/1 indicate that they have been installed in accordance with the works approval requirements.

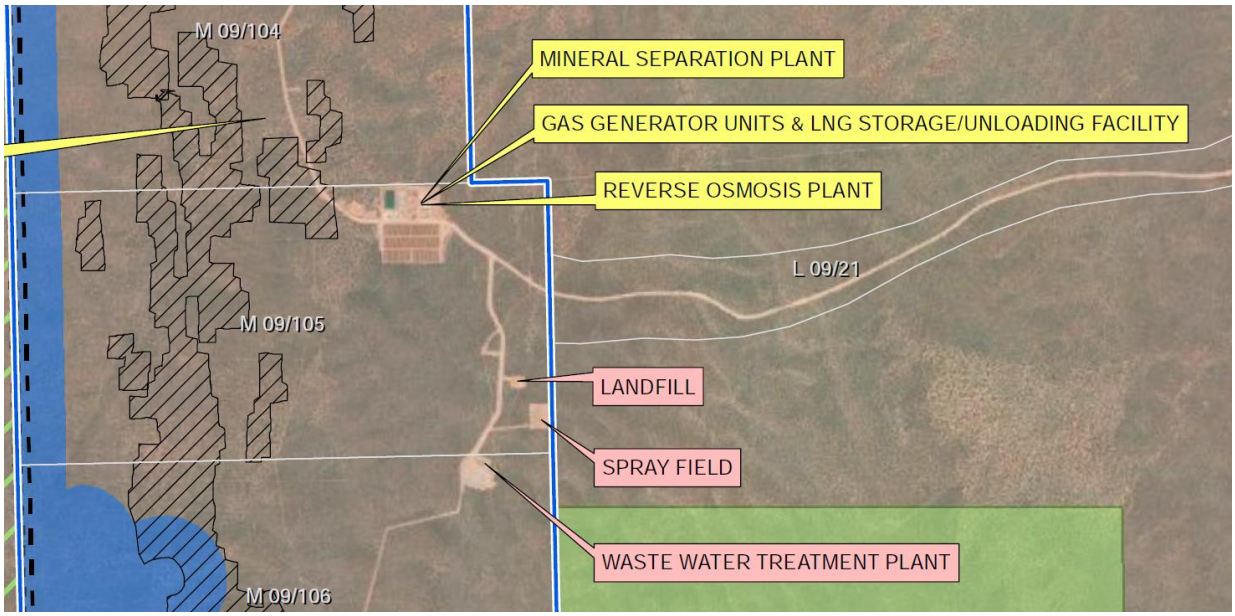

Figure 3: Fixed infrastructure on L9373/2023/1 (red) or installed under W6475/2020/1 (yellow)

Mining began in mid-2022 in the northern-most tenement, M09/102. Mining was initially scheduled to only occur within this tenement during the first five years of operations. Mining would then move incrementally south, with backfilling of mined out voids with tailings and overburden to occur progressively. Dewatering for mining is not required as the ore lies above the water table. Water for processing is sourced from an off-site borefield and is managed under Ground Water Licence (GWL) 159157(7). The salinity of the process water is brackish, at around 8,500 mg/L total dissolved solids (TDS). The salinity of the groundwater underlying the project area is saline, at 10,000 to 30,000 mg/L TDS.

Ore is slurried within the pit during mining and piped to the Wet Concentrator Plant (WCP) for physical separation using cyclones and washing with RO water. Non-hazardous flocculant and attritioning agents may be added during this stage. The ore is known to contain low levels of monazite, which has the potential to leach radium isotopes after processing. It is generally expected that the monazite should report to the heavy metal concentrate (HMC). The HMC produced at the WCP may be sent to the Minerals Separation Plant (MSP) for secondary processing, before being trucked off-site. Lined process water and settling ponds are adjacent to the WCP and MSP. The WCP was installed in M09/103 in accordance with the works approval conditions but will eventually be relocated further south as mining progresses.

Tailings from the processing of the ore was initially deposited to the off-path tailings storage facility (TSF) in November 2022, which reached capacity in April 2023. Tailings is currently authorised to be discharged to mining voids as they become available within tenement M09/102. Further use of the off-path TSF has been authorised under W6819/2023/1. Originally, after the TSF reached capacity, all tailings was intended to be deposited to mine voids and all of the decant water was to be returned to lined ponds adjacent to the WCP for reuse in the processing circuit.

3.2 Revised groundwater modelling

Updated groundwater mounding modelling reflecting the revised mining plan was submitted to the department in August 2022, prior to time-limited operations commencing. Its scope covered the northern two tenements where mining was initiated, and a few hundred metres of the surrounding area. It reinforced the understandings of the initial investigation in 2005 which indicated that areas with thin sand cover could have an increased risk of mounding reaching surface level and potentially impacting vegetation. Figure 4 (below) shows the updated modelled groundwater levels which indicates that there is potential for the mounding to reach ground level to the northeast of the prescribed premises on Hamelin Station, up to several hundred metres away from the premises boundary.

The modelling also suggests that areas within the prescribed premises boundary and immediately around the areas of tailings deposition generally have a low risk of impacting vegetation through groundwater mounding, as the modelled depth to groundwater typically 20 to 40 mbgl. This is likely a result of a thicker coverage of sand within the prescribed premises.

Overall, the modelling shows that mounding will occur beneath the premises due to tailings deposition, however, across the majority of the site it will remain below levels that are likely to impact vegetation root zones. The modelling suggests that there are small pockets of higher risk where the sand above the Toolonga Calcilutite is thin.

It should be noted that all of the modelling undertaken by the Licence Holder assumes that the tailings and the underlying superficial geology have a high hydraulic conductivity and will allow the water from the tailings to drain freely until it reaches the Toolonga Calcilutite aquitard.

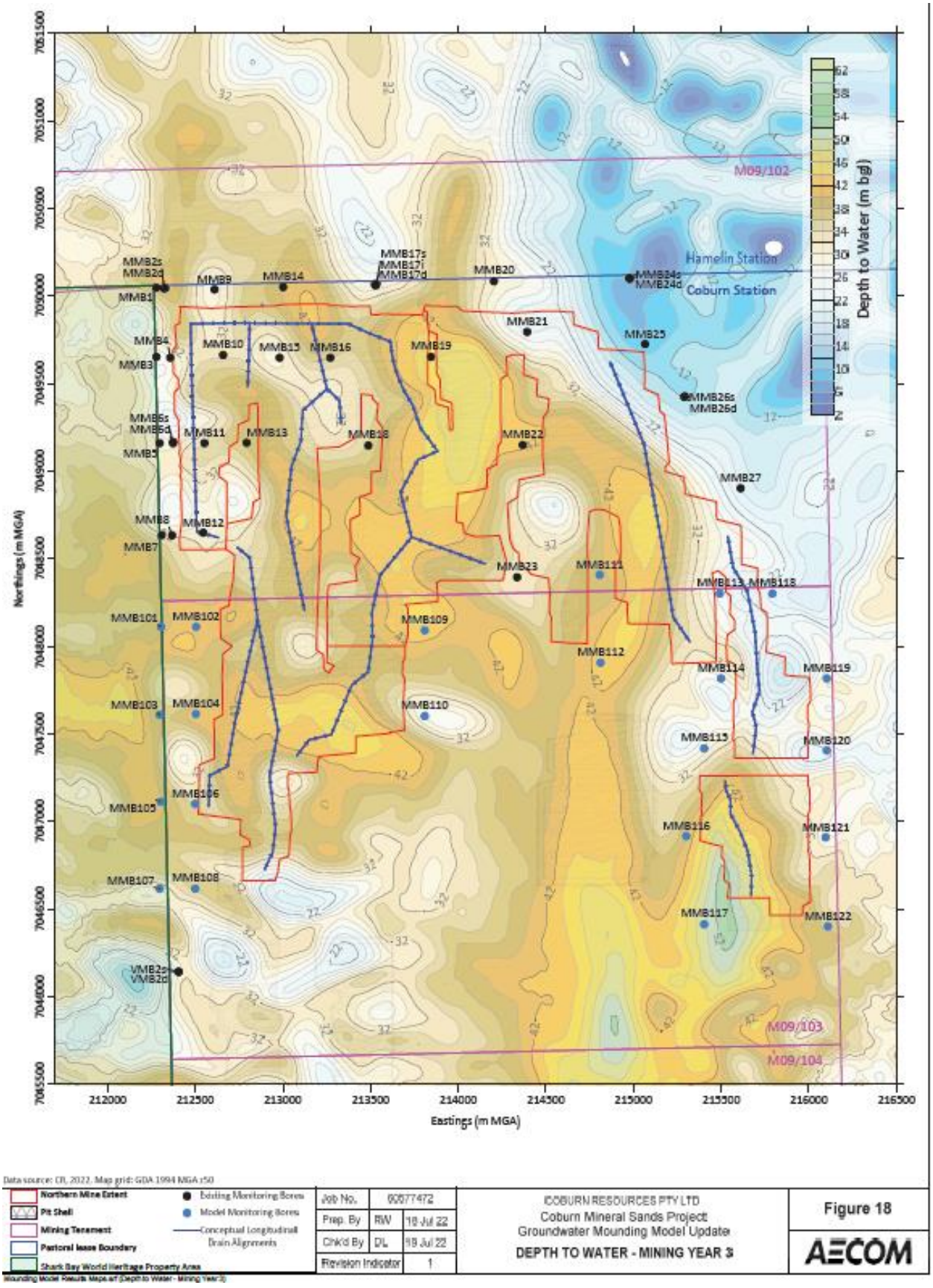

Figure 4: Updated groundwater modelling indicating potential depth to groundwater from tailings deposition (2022)

3.3 Time-limited operations

Under works approval W6475/2020/1, the Licence Holder conducted pre-mining baseline groundwater monitoring starting in October 2021. Groundwater monitoring continued during time-limited operations. The groundwater monitoring network has only been established in the northern tenement M09/102, where mining is currently occurring.

Between November 2022 and April 2023, tailings was sent to the off-path TSF to the south of the mining area in M09/103. Decant water recovery to the process water circuit commenced in January 2023. In March 2023 the Licence Holder informed the department that decant water from the off-path TSF was being discharged to mine voids, as it could not be returned to the processing circuit. The Licence Holder explained that there was an unexpected volume of decant water ponding on the surface of the TSF.

The Licence Holder found that large, unanticipated quantities of clay were being encountered in bands throughout the mining area. The clay was creating hydraulic barriers when it settled in the deposited tailings. This resulted in significantly reduced seepage to the soil, an increase in the volume of decant water being produced and an increase in swell of the tailings material.

During time-limited operations, the Licence Holder found that tailings and process water could not be adequately managed using the existing infrastructure on site. The plan to deposit tailings predominantly in the pit voids and return all process water to lined ponds was deemed not possible by the Licence Holder, given the observed properties and behaviour of the tailings material. There was a particular problem with water that contained elevated clay fines and could not be easily reused within the processing circuit.

The Licence Holder undertook a review of the ambient groundwater monitoring after the initial six months of operations, and after two months of discharge to the mine voids, to the end of April 2023 (*2023 Interim Groundwater Mounding Monitoring Review*, AECOM 2023). This review suggested that there had been no discernible change in groundwater levels within tenement M09/102 and no change in groundwater quality. It indicated that losses of water to seepage steeply reduced over time.

3.4 Additional plans to be assessed

The Licence Holder is proposing to build new infrastructure to manage tailings and process water on site. The Licence Holder now intends to use a combination of solar drying ponds (SDPs) and Integrated Waste Landform Containment Facilities (IWLCF), in addition to the existing infrastructure to manage tailings and process water at the operation.

3.4.1 Integrated Waste Landform Containment Facilities (IWLCF)

The IWLCFs will comprise of:

- in-pit tailings deposition (via wet slurry with 55-65% solids, piped to the pit),
- the use of cyclone stackers for in-pit tailings deposition (~75% solids, with effluent recovered at the WCP and blended into the tailings wet slurry for disposal), and
- the use of in-pit settlement ponds, constructed via upstream lifts on top of deposited tailings material, to manage process/decant water.

In-pit embankment walls to constrain the tailings to certain areas of the pits will be constructed. These walls are for safety and operational purposes, and not to prevent the escape of tailings to the environment, so their structural integrity is regulated through the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) and will not be assessed in this application.

The Licence Holder is requesting to construct IWLCFs within any available pit void on the premises. Previously, tailings discharge to the mining voids has been restricted to M09/102 in accordance with W6475/2020/1.

3.4.2 Solar Drying Ponds (SDP)

The Licence Holder has provided engineering designs for an initial bank of SDPs of 5 to 5.5m in height, south of the East Pit. They are classified as “Low” on the ANCOLD rating system. The SDPs are designed to contain process or decant water with elevated levels of clay fines that cannot be reused in the processing plant. The SDPs are intended to allow the clay to settle out, so that clarified water can be recovered for reuse, and they will also facilitate increased removal of excess process water through evaporation. It is expected that this will result in an increase in the salinity of the process water on site over time. The SDPs will be unlined, but on-site observations during TLO indicate that the settled clay fines from the deposited process water are likely to create a hydraulic barrier (ie a natural clay lining), significantly reducing seepage. The ponds are designed with a weir system that overflows to a lined decant pond for recovery to the process plant. When dry, settled clay fines will be excavated and disposed of in the mining voids.

The Licence Holder is seeking to construct SDPs in any area of the prescribed premises, with the exception of within 400m of the boundary shared with the SBWHP or the S5 and S10 vegetation (refer to section 3.1, figure 2, blue zone).

In June 2023, the department was informed that a solar drying pond (SDP) had been constructed prior to it being assessed. In-pit settlement cells had also been established in the West Pit. Refer to figure 5, below. It is understood that additional SDP cells are under construction.

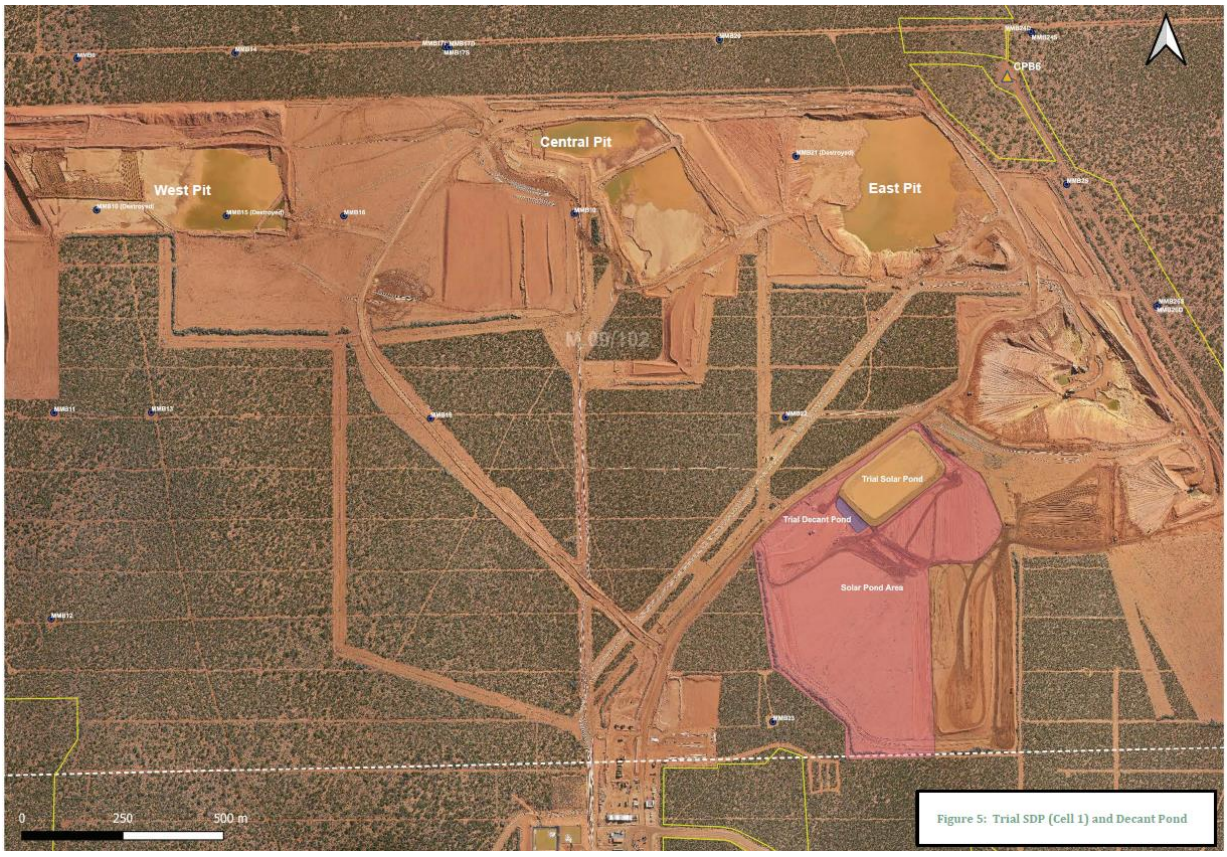

Figure 5: Location of proposed solar drying ponds (SDPs) with trial cell.

The Licence Holder conducted a *Solar Ponds and Settlement Cells Groundwater Assessment* (AECOM 2023) to better understand the potential impacts of this new infrastructure. It analysed monitoring data up to October 2023. Results of this assessment are discussed in section 4.3.

3.4.3 Expansion of the mining area

Mining and subsequent tailings discharge to the mining voids has previously been restricted to M09/102 in accordance with W6475/2020/1. As part of this assessment, the Licence Holder is seeking to remove restrictions to the areas permitted for mining within the prescribed premises boundary. By extension, this would also remove geographic restrictions on tailings deposition to the voids.

An updated groundwater assessment relating to the deposition of tailings into M09/103 has been prepared and an expanded groundwater monitoring network into this tenement has been proposed. Insufficient information has been provided in this application to assess mining operations and tailings disposal moving beyond M09/103. The Delegated Officer will assess operations moving into M09/103, however, any operations south of that tenement will require further licence amendments.

It is important to note that there are strict requirements in MS 723 to begin rehabilitation of at least 80% of the total area mined each year after the first six months of mining. This requirement is not negated by the approval in the licence to open up additional mining areas. These conditions apply in parallel.

Key Finding: The construction of in-pit embankments for IWLCFs will not be assessed as all discharges will be contained within the pit voids. Retrospective approval for the construction of the SDPs will also not be given. However, the operation of these facilities going forward will be assessed and conditioned on the licence.

The expansion of the active mining area into M09/103 will be assessed, but there is insufficient information to assess operations beyond that tenement.

4. 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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises construction and operation which have been considered in this Amendment Report are detailed in Table 3 below. Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 3: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Operation			
Noise	Mining activities Processing activities	Air	No residential receptors. Noise emissions will not be considered further in this assessment
Dust	Mining activities Stockpiling Dust emissions from processing in the WCP and MSP Dust from exposed tailings	Air/windborne pathway	DMP prepared and implemented under MS 723. Ore processing is wet. Dry processes are carried out in a fully enclosed building. Moisture content of tailings material is high. Water carts for dust suppression Monitoring of dust and vegetation health in accordance with DMP.
Contaminated stormwater	Mining areas, stockpiles and processing areas (sediment). Workshops, hydrocarbon storage areas, diesel gensets and mobile equipment use (chemicals).	Contamination of ground or surface water	Stormwater management infrastructure has been completed around the processing areas. Mine void structures prevent contaminated runoff. Minimisation of disturbed areas. Hydrocarbon Management Plan Self-bunded diesel storage tanks. Hydrocarbons and chemicals stored in bunding. Coolant and waste hydrocarbons contained and disposed of off-site. LNG storage and power station areas contoured to report to sediment traps. Oil-water separator system has been installed around generators and fuel bays. Spill kits available.
Gaseous emissions (CO, NO_x, PM_{10} and SO_2)	Gas generators LNG storage and use	Air/windborne pathway	Modelling has been completed that indicates emissions will be below the National Environment Pollution Measure (NEPM) for ambient air quality. Infrastructure has been installed to manufacturers specifications. LNG storage is a closed loop system with no emissions points.
Slurried ore or tailings	Pipeline failure Overtopping of mining voids	Direct discharge to soil and vegetation	Flow meters, sensors and telemetry on the pipelines have been installed to allow for the detection of leaks and failures. Pipelines are inspected daily while

Emission	Sources	Potential pathways	Proposed controls
			operating. Ore slurry contained within the open pits. Tailings deposited and contained within the mine voids.
Process water	Overtopping of process water pond or settling pond. Pipeline failure Overtopping of solar drying ponds	Direct discharge to soil and vegetation	Flow meters, sensors and telemetry on the pipelines have been installed to allow for the detection of leaks and failures. Pipelines are inspected daily while operating. Process water and settling ponds: • Area contoured so that spills are contained within processing area drainage structures. • Commitment to maintain sufficient freeboard to prevent overtopping. • Daily inspections Solar drying ponds (SDP's): • Embankments compacted to a minimum 95% maximum modified dry density (MMDD) • Downstream embankment slope 1V:3H with a 10m crest • Clarified water recovered through a weir box and decant system and pumped to the processing circuit. • Maintain minimum 400m distance from SBWHP and S5 and S10 vegetation communities. • Minimum operational freeboard of 500 mm maintained, plus capacity for the rainfall from a 100 year 72 hour ARI storm event. • Daily inspections while operating.
Seepage of process water	WCP process water and settling ponds. MSP process water pond. Solar drying ponds (SDP's) SDP decant pond	Seepage to soils and groundwater	All process water ponds are lined with a minimum 1.0 mm HDPE liner. SDP decant pond lined with 0.5 mm HDPE liner. SDP expected to exhibit low seepage rates due to high slimes concentrations in deposited water. Proposed minimum 400m distance from SBWHP and S5 and S10 vegetation communities Groundwater monitoring network in place

Emission	Sources	Potential pathways	Proposed controls
			and to be expanded to M09/103. Trigger levels and limits for action to reduce seepage have been developed in the updated GMMP.
Seepage from tailings	Tailings deposited to mine voids In-pit settlement cells	Seepage to soils and groundwater	Wet tailings expected to exhibit low seepage rates due to high slimes concentrations. Cyclone stackers used to deposit dry tailings will reduce deposited water fraction. Decant water to be recovered and reused in the processing circuit. Settlement cells to be created in-pit on top of deposited tailings expected to exhibit low seepage rates. Groundwater monitoring network in place and to be expanded to M09/103. Trigger levels and limits for action to reduce seepage have been developed in the updated GMMP.

4.1.2 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 4 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 4: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Hamelin Station Homestead	Hamelin Station (managed by Bush Heritage Australia) underlies the northern boundary of the prescribed premises. The homestead is located 30 km north of the premises boundary. Bore water used at the homestead is drawn from deeper, confined aquifers (unlikely to be impacted by groundwater mounding).
Environmental receptors	**Distance from prescribed activity**
Shark Bay World Heritage Property – covers a total area of 2.2 million hectares (ha), including the marine reserves and terrestrial areas.	Immediately adjacent to the western boundary of the premises. MS 723 requires a 100m buffer from mining areas

Hamelin Pool Marine Reserve – part of the Shark Bay World Heritage Property and Priority 1 Ecological Community Hamelin stromatolite	Approximately 30 km north of the premises
Priority 2 Flora - *Eremophila occidens*	Within the premises boundary
Threatened Flora - *Eucalyptus beardiana*	Approximately 4 km east of the premises
Threatened Fauna - *Ctenotus zastictus* (Hamelin Skink)	Habitat 10 km east of the premises
Threatened Fauna – *Leipoa ocellata* (Mallee Fowl)	May occur within the premises
Vegetation communities S5 and S10 (regionally significant)	Within the premises boundary. MS 723 requires a 50m buffer from mining areas.
Zuytdorp Nature Reserve	Immediately south of the premises boundary
Gascoyne Groundwater Area	Underlying the premises. Groundwater ranges from 10 to 50mbgl. Groundwater salinity is 11,000 to 35,000mg/L TDS.

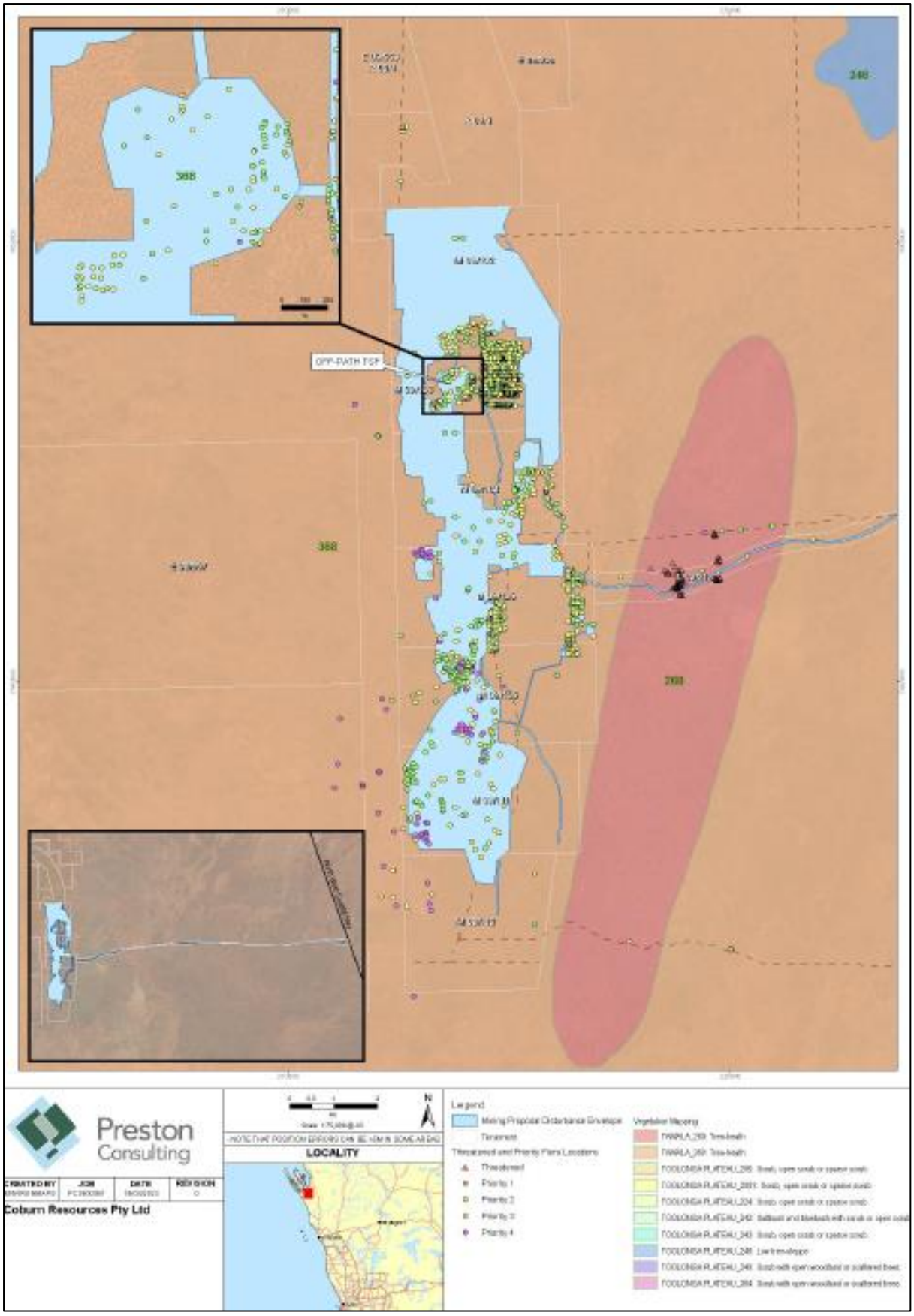

Figure 5: Distance to on-site sensitive receptors

4.2 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 4.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 4.1), 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 5.

The Revised Licence L9373/2023/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. mineral sands mining and processing activities.

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

Table 5. Risk assessment of potential emissions and discharges from the Premises during 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**				
Operation								
Mining and in-pit screening of ore	Dust	Air / windborne pathway	No residential receptors Shark Bay World Heritage Property Hamelin Pool	Refer to Section 3.1	C = Minor L = Rare **Low Risk**	Y	NA	Dust from mining will be adequately managed by the actions outlined in the DMP required by MS 723 Controls outlined in the plan will not be duplicated on the licence.
	Contaminated stormwater runoff	Surface water run off containing contaminants or sediment	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 9 (modified)	Existing condition 9 has been modified to relate to all activities on the premises. It outlines the requirement to prevent stormwater runoff becoming contaminated which reflects the Licence Holder commitments.
Operation of Wet Concentrate Plant (WCP) and Mineral Separation Plant (MSP) and associated stockpiles	Dust	Air / windborne pathway	No residential receptors Shark Bay World Heritage Property Hamelin Pool	Refer to Section 3.1	C = Minor L = Rare **Low Risk**	Y	NA	Dust from mining will be adequately managed by the actions outlined in the DMP required by MS 723. Controls outlined in the plan will not be duplicated on the licence.

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**				
	Contaminated stormwater runoff	Surface water run off containing contaminants or sediment	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 9 (modified)	Existing condition 9 has been modified to relate to all activities on the premises. It outlines the requirement to prevent stormwater runoff becoming contaminated which reflects the Licence Holder commitments.
Operation of ore, tailings and process water pipelines	Tailings, ore or process water	Direct discharge from pipeline rupture	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 1	Licence Holder's existing pipeline leak detection, coupled with inspections, are sufficient to manage risks. These controls have been conditioned within the licence.
Deposition of tailings material in the mine voids via wet slurry or cyclone stacker deposition method	Tailings	Direct discharge from overtopping	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 1	Tailings will be fully contained within the mine voids with sufficient freeboard to prevent overtopping. This has been conditioned within the licence.
	Process water	Direct discharge from overtopping	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 1	Tailings and decant water will be fully contained within the mine voids with sufficient freeboard to prevent overtopping. This has been conditioned within the licence.

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**				
	Seepage	Seepage through the base of the mine voids	Groundwater mounding impacting vegetation Deterioration of groundwater quality due to salinisation of process water	Refer to Section 3.1	C = Major L = Possible **High Risk**	N	**Condition 2** Condition 19, 20, 21	Refer to detailed risk assessment section 4.3
Use of in-pit settlement ponds	Seepage	Seepage through the base of the mine voids	Groundwater mounding impacting vegetation Deterioration of groundwater quality due to salinisation of process water	Refer to Section 3.1	C = Major L = Possible **High Risk**	N	Condition 1 **Condition 2** Condition 19, 20, 21	Refer to detailed risk assessment section 4.3
	Process water	Direct discharge from overtopping	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 1	In-pit settlement ponds will be fully contained within the mine voids with sufficient freeboard to prevent overtopping. This has been conditioned within the licence

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**				
			Native vegetation outside the prescribed premises boundary					
Use of solar drying ponds (SDPs)	Process water (including potential salinisation of process water through evaporation)	Direct discharge from overtopping or embankment failure	Shark Bay World Heritage Property Priority flora within the project area.	Refer to Section 3.1	C = Minor L = Possible **Medium Risk**	N	**Condition 1** **Condition 17** Condition 19, 20, 21	SDP location restricted to area south of East Pit. Refer to detailed risk assessment section 4.3. Additional process monitoring conditioned (condition 17) to monitor increase in salinisation of the process water due to evaporative losses of water through the operation of the SDPs.
	Seepage	Seepage through the base of the SDPs	Groundwater mounding impacting vegetation both inside and outside the premises boundary Deterioration of groundwater quality due to salinisation	Refer to Section 3.1	C = Major L = Possible **High Risk**	N	**Condition 1** Condition 19, 20, 21	Refer to detailed risk assessment section 4.3

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**				
			of process water					
Storage and use of diesel	Hydrocarbons	Direct discharge Spill	Soil Priority flora within the project area. Groundwater	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 8	General condition to remediate spills, in line with Licence Holder commitments.
Operation of gas generator units (18 MW)	NOx, CO, PM_{10}, SO_x	Air / windborne pathway	No residential receptors	Refer to Section 3.1	C = Slight L = Rare **Low Risk**	Y	NA	Low risk, additional conditions not required.
Operation of reverse osmosis plant	Saline effluent (brine)	Direct discharge Pipeline rupture	Soil Priority flora within the project area Groundwater	Refer to Section 3.1	C = Minor L = Unlikely **Medium Risk**	Y	Condition 15	Discharge to process water circuit conditioned.

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.

4.3 Detailed risk assessment for groundwater mounding

4.3.1 Groundwater mounding

The Licence Holder was initially intending to return all tailings to mined out voids, and return all process water to lined ponds for reuse in the processing circuit. Modelling undertaken by the Licence Holder indicated that this was likely to create groundwater mounding beneath and around the project that may impact vegetation in particular zones around the premises.

During time-limited operations, the Licence Holder found that the tailings was not behaving as expected. An excess volume of tailings and process water could not be adequately managed using the existing infrastructure on site.

The Licence Holder is now proposing to use a combination of SDPs and IWLCFs, as well as the existing infrastructure, to manage tailings and process water at the operation. Parts of this strategy was trialled during time-limited operations (TLO) and monitoring data was collected and analysed.

The water quality of the seepage from the proposed and existing infrastructure is likely to be in line with the water quality of the process water, given that the processing of the ore is a predominantly physical process with few chemical additions. It is noted, however, that monazite which is present in the ore is known to leach radium isotopes, nickel and cobalt. It is also noted that the use of evaporation ponds to remove water from the tailings and process water streams is likely to result in an increase in salinisation of process water over time.

Groundwater monitoring and monitoring bore network

Tailings was first deposited to an off-path TSF in November 2022. No groundwater level increases were measured or observed. It is noted that the groundwater monitoring network did not extend into the vicinity of the TSF. The department also notes that although the off-path TSF was not factored into the groundwater mounding modelling, it can be inferred that problematic seepage impacts from this location would be unlikely due to the depth of the sand at this location.

Process water and tailings were first deposited to the mining voids in tenement M09/102 in early March 2023. Deposition initially occurred in the West Pit, then subsequently occurred in the Central (April) and East Pits (June). A review of groundwater monitoring data to the end of April 2023 showed no groundwater mounding. Given that process water was being deposited to the West Pit for less than 2 months, and tailings had been deposited to Central Pit for a matter of weeks, this is not outside expectations. Measurable impacts from mounding likely required more time to develop.

The trial SDP and in-pit settling cells were built in June 2023. A second assessment reviewed the performance and observable groundwater impacts of the operation of these structures, analysing ambient groundwater data to the beginning of October 2023 (7 months after process water was first discharged to the area). This assessment showed that groundwater mounding became measurable below tailings and process water deposition points around May 2023 and steadily increased during the monitoring period.

Measured groundwater levels in monitoring bores around the deposition sites were used to infer groundwater contours (figure 5, below). It is noted that these contours largely rely on groundwater level observations in four bores – MMB15 (since destroyed), MMB16, MMB19 and MMB20. Three key bores (MMB10, MMB15 and MMB21) were destroyed during mining, and the data from MMB25 was deemed as anomalous and discounted from the analysis (these bores are highlighted in green in figure 5). The other bores in the network either show no or minimal groundwater level fluctuations, but they are typically over 500 m from the discharge areas.

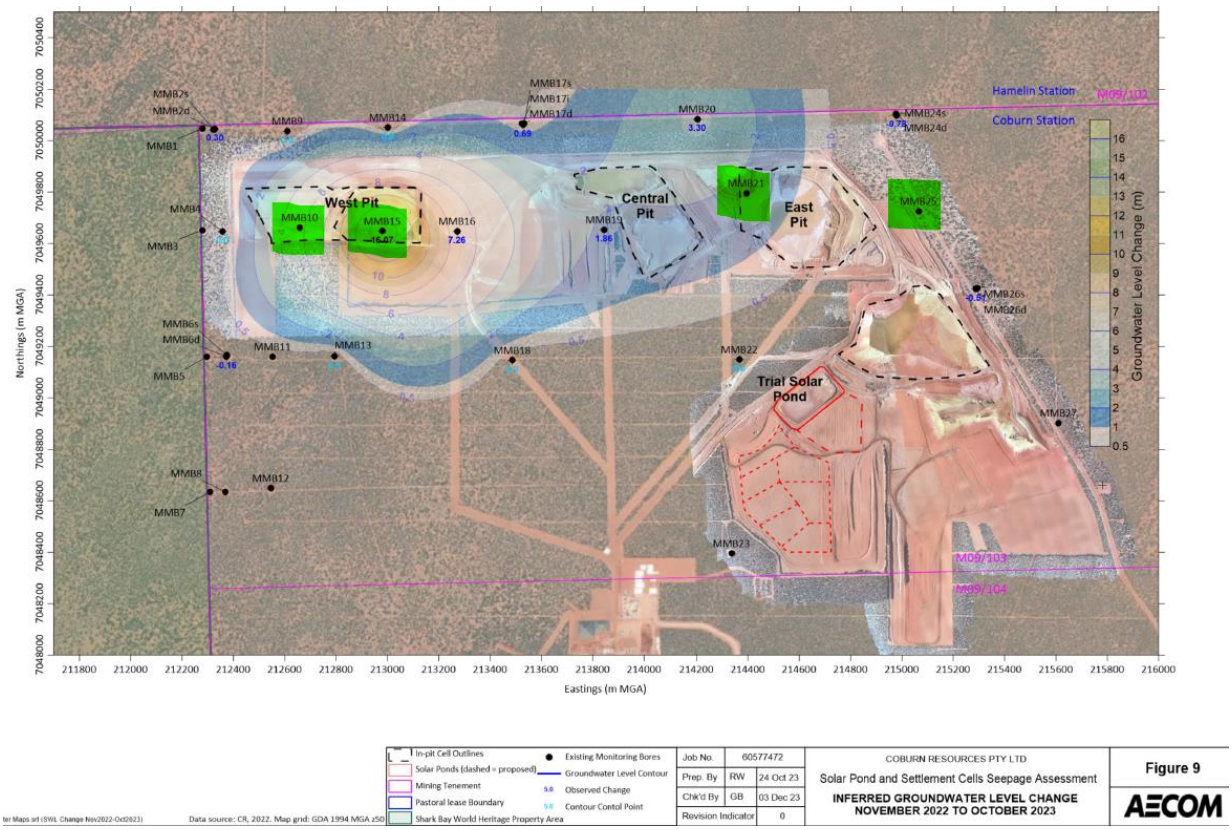

Figure 5: Inferred groundwater level increase contours at October 2023, with removed bores identified in green.

The department considers that the existing bore network is likely to give a reasonable understanding of groundwater mounding around the West Pit, but is unlikely to be sufficient to be able to properly distinguish mounding around the East and Central Pits. The distance of the bores from the deposition points, coupled with a lower number of bores around these pits introduces an increased level of ambiguity to the data.

The Licence Holder has proposed an expansion to the monitoring bore network that includes in-fill bores in tenement M09/102, in addition to a network of bores in tenement M09/103, as depicted below in figure 6. The Delegated Officer is satisfied with the proposed placement of bores in the supplementary groundwater monitoring bore network, and will condition their construction on the licence.

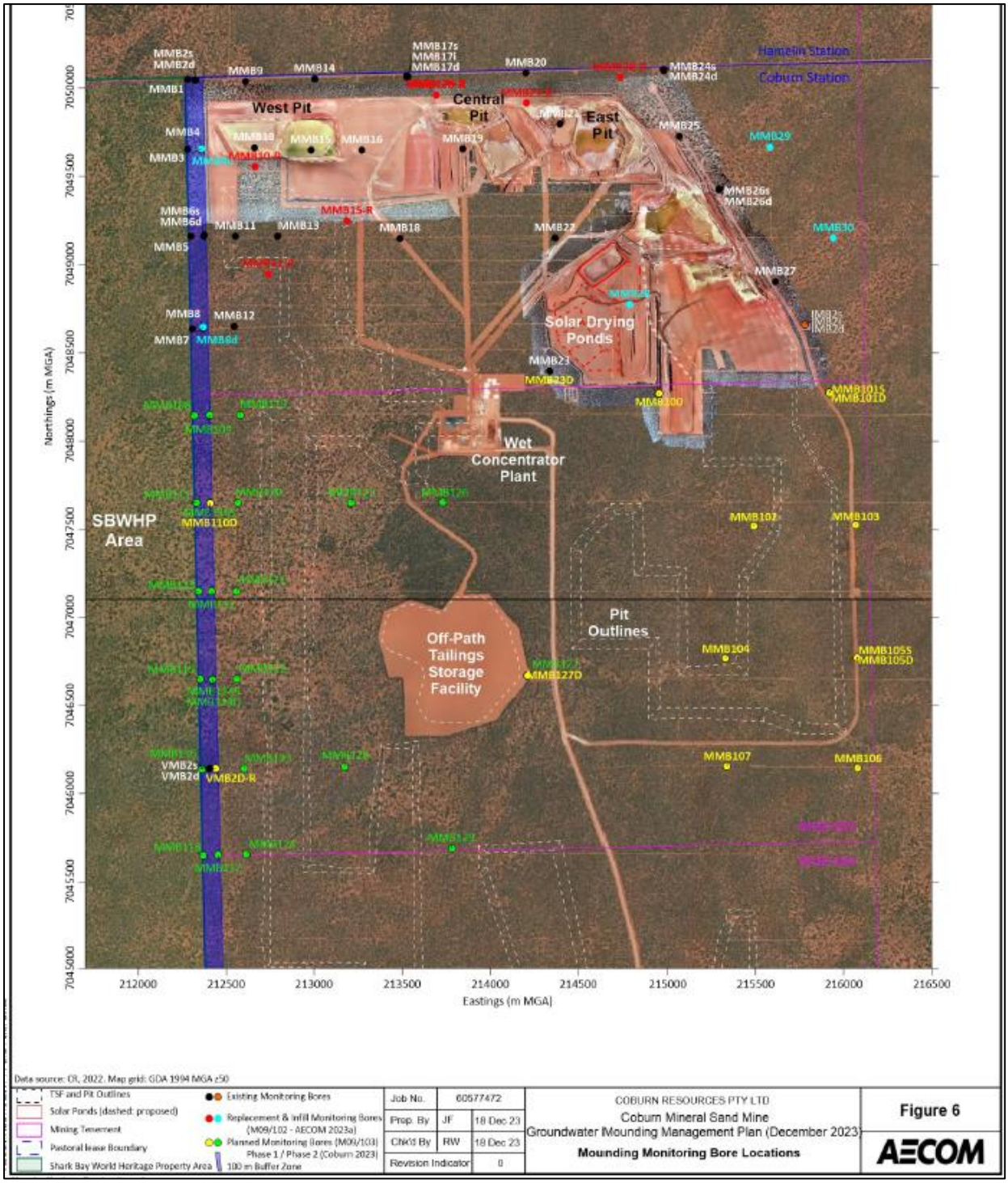

Figure 6: Existing and proposed extension to the groundwater monitoring bore network

Extension of mining area

In the licence amendment application, there is a request to no longer restrict mining to tenement M09/102. The Delegated Officer considers an expansion of mining activities to have negligible environmental impacts, however, the tailings deposition into the subsequently available mining voids requires careful consideration.

It is noted that the 2022 groundwater mounding modelling included tenement M09/103. It is also noted that the groundwater monitoring bore network will be extended into this tenement. The Delegated Officer considers this to provide sufficient safeguards to allow mining to progress into M09/103, but not beyond this tenement. It is noted that this will, by extension, allow the

deposition of tailings into this area (either by deposition of wet slurry, or cyclone stacking) and the creation of in-pit settlement ponds.

The Delegated Officer acknowledges that particularly along the SBWHP boundary, this activity has a High Risk of environmental impact. But the modelling that has been completed provides the Licence Holder with a clear indication of which areas are likely to be of highest risk (see figure 7, below). High risk areas with thin sand cover include the northeast corner of M09/102 and the southwest region of M09/103. Coupled with groundwater monitoring, the Licence Holder should be able to take action to prevent impacts to vegetation, either through reducing deposition to specific locations on the premises, or through recovering mounded groundwater to lined facilities. Limits and trigger values on groundwater levels have been proposed by the Licence Holder and are in accordance with requirements under MS 723.

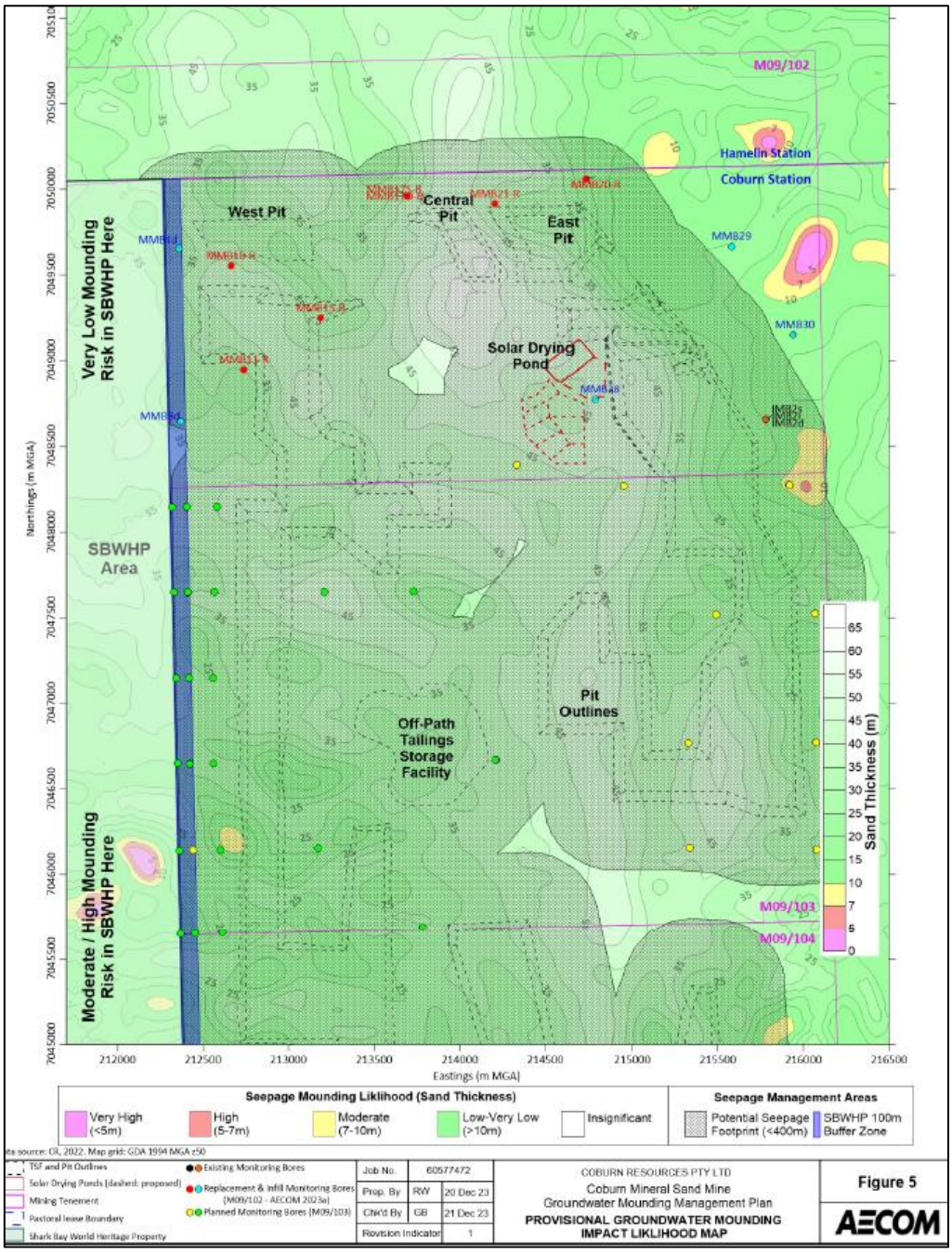

Figure 7: Groundwater mounding modelling indicating areas of high risk of impacting vegetation

As part of the licence amendment application, maps were submitted to the department indicating that mining had been planned outside of the MS 723 development envelope (see figure 7, below). The Licence Holder needs to be mindful that an approval to expand mining into tenement M09/103 on the licence does not endorse the maps submitted as part of the application or negate obligations under MS 723. Rehabilitation obligations that apply to the expanded mining area are detailed in MS 723 and will not be duplicated on the licence.

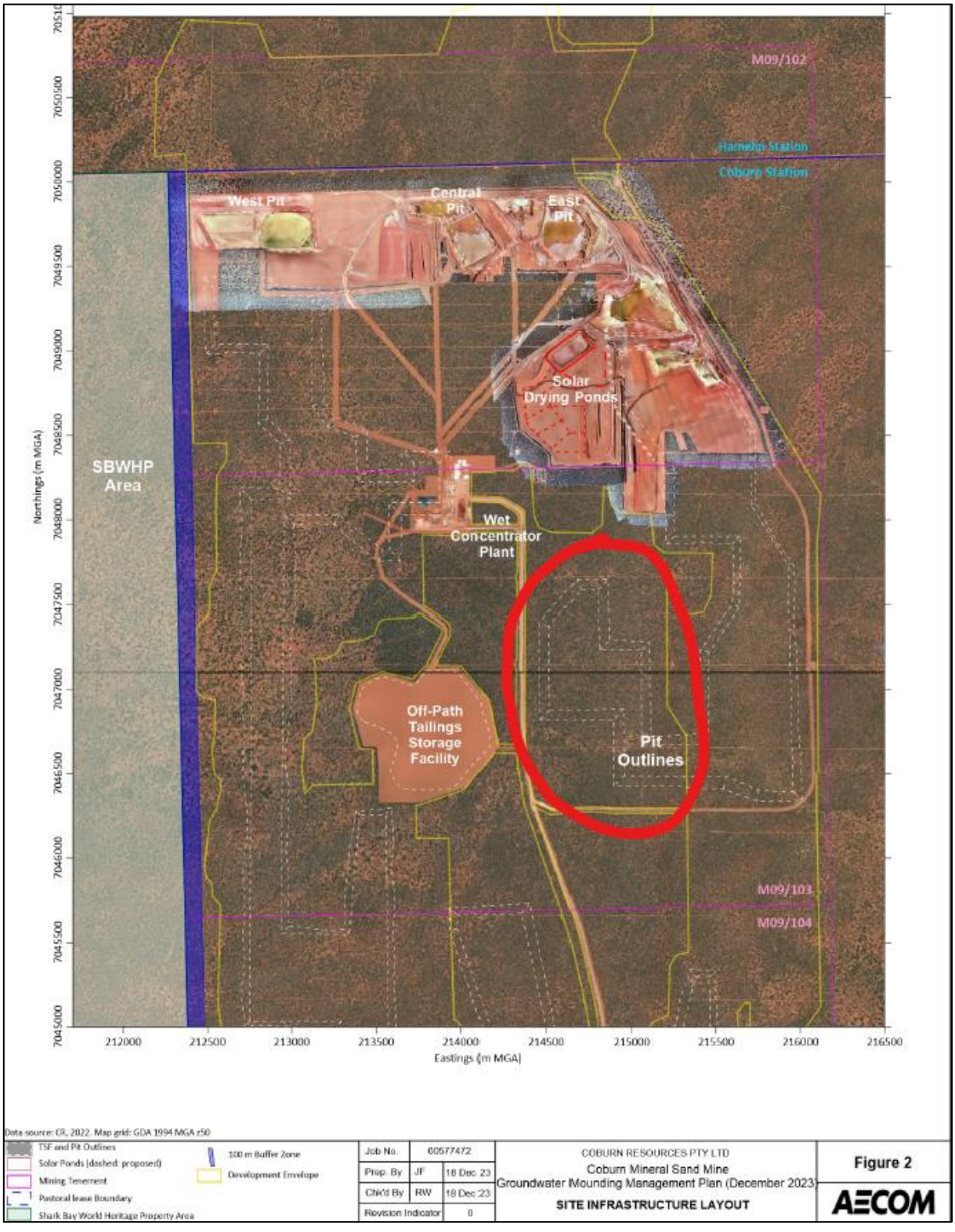

Figure 7: Planned pits overlayed against the MS 723 development envelope

Seepage impacts to groundwater

The Licence Holder's *Solar Ponds and Settlement Cells Groundwater Assessment* (AECOM 2023) provides a detailed examination of measured impacts of the in-pit settling cells up to October 2023, and an assessment of potential impacts going forward.

It generally finds that the clay layers forming in the tailings is significantly reducing seepage, but the geology beneath is mostly free draining, with some patches of calcrete which may occasionally result in perched aquifers. The key finding is that seepage will be reduced only if tailings or high clay process water has been deposited first, over a long enough period to create a sufficient clay lining. The assessment found that when process water without slimes was deposited into the West Pit, the mounding occurred largely as modelled.

It is noted that deposition to the West Pit has not resulted in significantly elevated standing water levels in any of the bores along the western premises boundary nor along the premises boundary directly north of the pit after 7 months of deposition. While this is encouraging, it is unclear if this is due to reduced levels of seepage or whether it is primarily due to mounded water migrating to the northeast down a palaeovalley crossing the area directly around MMB20 (as the modelling predicted) or whether it is both.

The assessment attempts to quantify likely mounding from tailings deposition, the use of in-pit settlement ponds and the SDPs, based on an assumption that the mounding is perfectly radial and has already reached steady-state conditions. However, the department's review of the data suggests that these assumptions could result in an underestimation of the extent of mounding. Further data will likely be necessary to accurately quantify the extent of the mounding.

For this reason, the Delegated Officer is not prepared to authorise the Licence Holder's request to allow SDPs to be constructed in any location of the Licence Holder's choosing, with the exclusion of a 400 m buffer around the SBWHP at this stage. SDPs will be authorised for continued operation in the location proposed to the south of the East Pit only. It is noted that this is an area with a particularly thick layer of sand (40 to 55 m) at a great distance from the SBWHP, making it a particularly low-risk location. The additional planned groundwater monitoring bores around this SDP area will likely provide valuable information that can inform future assessments. The Delegated Officer is prepared to review this decision when further information is available to more accurately predict groundwater mounding at the premises.

It is understood that a number of the proposed SDPs have already been constructed, or are currently under construction. The Delegated Officer is unable to grant a retrospective approval for their construction, however, the future operation of these SDPs has been assessed and conditioned on the licence. The construction of any additional SDPs will require a new works approval application or licence amendment so that the location of any proposed SDP can be assessed for suitability.

Groundwater Limits and Triggers

The Licence Holder has updated the Groundwater Mounding Management Plan (GMMP) required by MS 723. It is a comprehensive document that includes both groundwater and vegetation monitoring to understand the potential impacts of groundwater mounding to vegetation. It contains proposed limits, thresholds and triggers with specific management actions, as required under MS 723, with particular focus on the SBWHP. (See table 6, below)

Table 5 Trigger, threshold and limit criteria for groundwater and vegetation

Criteria	Vegetation			Groundwater		
	Within the Project Site	Eastern and Northern Perimeter Zones	100 m Buffer Zone and SBWHP	Within 400m of Sources in the Project	Eastern and Northern Perimeter Zones	100 m Buffer Zone and SBWHP
Trigger	• A decline of more than 10% in indicator species health beyond the natural variation in the Amy Zone attributed to groundwater mounding arising from mining activities. • A change of more than 10% in species composition beyond the natural variation in the Amy Zone attributed to groundwater mounding arising from mining activities.	• A decline of more than 10% in indicator species health beyond natural variation within the Eastern Perimeter Zone attributed to groundwater mounding arising from mining activities. • A change of more than 10% in species composition beyond natural variation within the Eastern Perimeter Zone attributed to groundwater mounding arising from mining activities.	• The vegetation trigger will be breached is the depth to the water table is less than 10 m below ground level in the 100 m Buffer Zone	• The groundwater trigger will activate if the level rises more than 16 m above the Toolonga Calcilutite. • The rate of rise in nominated monitoring bores should remain below 12 m in three months.	• The groundwater trigger will activate if the level rises to more than 8 m above the Toolonga Calcilutite in the Eastern Zone and 9 m in the Northern Zone. • The rate of rise in nominated monitoring bores should also remain below 5 m in three months in the Eastern Zone and 9 m in three months in the Northern Zone.	• Although the water table is predicted to rise into the superficial sand in the 100 m buffer zone, the trigger will activate if the level rises to more than 7 m above the Toolonga Calcilutite. • The rate of rise in nominated monitoring bores should also remain below 5 m in three months.
Threshold	• Not applicable	• Not applicable.	• The vegetation threshold will be breached is the depth to the water table is less than 7 m below ground level in the 100 m Buffer Zone	• Not applicable	• Not applicable	• The groundwater threshold will be breached is the depth to the water table is less than 7 m below ground level in the 100 m buffer zone.
Limit	• Not applicable.	• Not applicable.	• Loss of vegetation in the 100 m Buffer Zone or the SBWHP beyond the natural variation that can be attributed to groundwater mounding arising from mining activities.	• Not applicable	• Not applicable	• The groundwater threshold will be breached is the depth to the water table is less than 5 m below ground level in the 100 m buffer zone

Table 6 Site-specific groundwater triggers (M09/102) (after AECOM, 2023b)

Criteria	Within the Project Site	Northern Boundary	Eastern Perimeter Zone	Western 100m Buffer and SBWHP
Applicable bores	MMB12, MMB13, MMB18, MMB19, MMB22, MMB23	MMB9, MMB14, MMB17s, MMB18, MMB20	MMB24s, MMB25, MMB26s, MMB27	MMB1, MMB2s, MMB3, MMB4, MMB5, MMB6s, MMB7, MMB8
Mound Height Trigger	15 m*	9 m**	8 m	7 m
Mound Rate of Rise Trigger	10 m in a three-month period	9 m in a three-month period	5 m in a three-month period	5 m in a three-month period

* - 15m trigger also assigned to MMB19 based on recent monitoring results rather than 16 m as predicted
** - 9m trigger also assigned to MMB20 applied based on recent monitoring results rather than 16 m as predicted.

Table 6: Proposed limits, thresholds and triggers in the GMMP for the Coburn Mineral Sands Project

Limits and trigger levels that are included on the licence for the prescribed premises are separate to those on MS 723 and require actions to be taken as outlined on the licence, not as required under MS 723. Vegetation monitoring requirements will not be duplicated on the licence. The licence will include only essential conditions around groundwater monitoring that align with, and compliment, requirements under MS 723. The conditions on the licence will be risk-based and outcome-based in line with department guidelines.

The Licence Holder has identified that standing water levels of less than 5 meters below ground level (mbgl) have a potential to impact vegetation, and this level has been set as the limit on groundwater levels in the 100 m buffer zone between the prescribed premises and the SBWHP, which is regulated by MS 723. This level will be applied to the licence as a limit that must not be exceeded for key bores on the eastern and northern perimeters of the prescribed premises boundary to protect vegetation in those areas (which is not regulated by MS 723).

The Delegated Officer notes that there are other parameters detailed in the GMMP, with detailed and sometimes extensive management actions attached to them if they are exceeded. It is not the intention for the licence to regulate internal company environmental management procedures. The Delegated Officer has, however, taken the key criteria that will safeguard the environment and conditioned them on the licence. It is up to the licence holder to determine through what methods the criteria will be met.

5. Consultation

Table 6 provides a summary of the consultation undertaken by the department.

Table 6: Consultation

Consultation method	Comments received	Department response
Hamelin Station property owner	None received	NA

advised of proposal (09/01/2024)		
Licence Holder was provided with draft amendment on 28/03/2024.	Comments received 22 April 2024 and 1 May 2024.	Refer to Appendix 1

6. 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.

6.1 Summary of amendments

Table 7 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 7: Summary of licence amendments

Condition no.	Proposed amendments
1	WCP, MSP, process water ponds, pipelines, cyclone stackers, desalination plant, gas generators, LNG facility, diesel storage facility, SDPs and in-pit settlement ponds added to the infrastructure table
2	Mining area extended to M09/103
3	Additional groundwater monitoring bores to be installed
4	Reporting requirements for groundwater monitoring bore installation
9	Modified to apply to all operations on site
15	Tailings and process water discharge points
17	Process monitoring requirements added
19	Ambient groundwater monitoring schedule
20	Ambient groundwater monitoring limits
21	Ambient groundwater monitoring limit actions
29	Changed to annual reporting requirements
Definitions	Additional definitions included
Figure 1	Prescribed premises map updated
Figure 2	Mining footprint map
Figure 3	Location of SDPs
Figure 4	Groundwater monitoring network map
Schedule 2	Removed

General	Updated condition, table and figure numbering as required.

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. URS 2005, *Groundwater Resources Impact Assessments, Coburn Mineral Sand Project*, Unpublished report prepared for Gunson Resources Ltd.
5. AECOM 2022, *Coburn Mineral Sands Project Groundwater Mounding Model Update*, Unpublished report for Coburn Resources Pty Ltd.
6. AECOM 2023a, *2023 Interim Groundwater Mounding Monitoring Review*, Unpublished report for Coburn Resources Pty Ltd.
7. AECOM 2023b, *Solar Ponds and Settlement Cells Groundwater Assessment*, Unpublished report for Coburn Resources Pty Ltd.
8. AECOM 2023c, *Groundwater Mounding Management Plan Coburn Mineral Sand Project*, Unpublished report for Coburn Resources Pty Ltd.

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

Condition	Summary of Licence Holder's comment	Department's response
Condition 1, table 1	Request to change "telemetry and pressure sensors" to "telemetry and flow meters"	This is considered an equivalent change, wording revised.
Condition 2	Request to change "mining only permitted" to "tailing or process water discharge to mine voids only permitted"	Condition 2 is intended to restrict and define the area that may be mined at this time, whereas condition 15, table 7 defines the discharge points for tailings and process water. The condition will not be revised.
Condition 3, table 2	Revise bore names in line with new map (provided) and include additional bores that were missed. Remove reference to ASTM D5092 and replace with Minimum Construction Requirements for Water Bores in Australia. Include wording to permit the placement of bores within the 100 m buffer zone to the SBWHP.	List of bores revised as requested and map updated. The Delegated Officer agrees that this is the preferred standard. Reference revised. Wording revised.
Condition 15, table 7	Update map (provided) showing the area for the Solar Drying Ponds	Map updated.
Condition 19, table 11	Revise bore names as outlined for condition 3. Change monitoring of SWL from weekly to monthly. Remove nickel and radium monitoring from list of groundwater monitoring parameters as they are not included in the Groundwater Mounding Management Plan approved under MS 723. Radium is monitored under the Radiation Management Plan and reported to DEMIRS.	List of bores revised as requested. Measurement of SWLs on W6475/2020/1 was required to be undertaken on a weekly basis during operations. The Delegated Officer is satisfied that measuring SWLs on a monthly basis going forward will provide sufficient information to manage the risk of groundwater mounding. Wording has been revised. Technical advice from internal experts have advised that nickel, cobalt and radium isotopes are known to leach from monazite and xenotime at heavy mineral sands mines and should be included in the monitoring parameters. DEMIRS generally assesses radium monitoring from a health and safety

Condition	Summary of Licence Holder's comment	Department's response
		perspective, whereas monitoring of the groundwater under the Part V licence will allow a review of potential environmental impacts. When there is sufficient monitoring data to indicate that these parameters are not being released from the activities at the premises, the monitoring schedule can be revised to remove them.
Condition 20, table 12	Request to remove condition 20 and 21 as groundwater mounding is managed and regulated under MS 723. Alternatively, apply 5mbgl limit only to selected eastern and northern bores including bores MMB29 and MMB30 (constructed under alternative legislation).	The Delegated Officer agrees that mounding limits on the boundary of the SBWHP is regulated under MS 723, and these limits will be removed from the licence to avoid duplication. The Delegated Officer is of the opinion that the lack of limits and thresholds on the northern and eastern boundaries of the premises under MS 723 should be regulated on the licence and these limits will be designed to complement the regulation provided on MS 723. Note that limits under condition 20 require the action outlined in condition 21 to be undertaken, and do not require an immediate cessation of all mining activities as required under MS 723. The Delegated Officer agrees that bores MMB29 and MMB30 are better placed for the purpose of regulating mounding limits than MMB24 to MMB27. Trigger levels have also been removed to allow operational flexibility in groundwater level management while maintaining the requirement to protect vegetation.
Condition 24	Add a reference to the RIWI (Approved Meters) Order of 2009 for the calibration of flow meters.	Wording revised.

Appendix 2: Application validation summary

<table>
<tr><th colspan="6">SECTION 1: APPLICATION SUMMARY</th></tr>
<tr><td colspan="6">Application type</td></tr>
<tr><td rowspan="2">Amendment to licence</td><td rowspan="2">☒</td><td>Current licence number:</td><td colspan="3">L9373/2022/1</td></tr>
<tr><td>Relevant works approval number:</td><td>W6475/2020/1</td><td>N/A</td><td>☐</td></tr>
<tr><td colspan="2">Date application received</td><td colspan="4">13/06/2023 and 8/12/2023</td></tr>
<tr><td colspan="6">Applicant and Premises details</td></tr>
<tr><td colspan="2">Applicant name/s (full legal name/s)</td><td colspan="4">Coburn Resources Pty Ltd</td></tr>
<tr><td colspan="2">Premises name</td><td colspan="4">Coburn Minerals Sands Project</td></tr>
<tr><td colspan="2">Premises location</td><td colspan="4">Current premises: Part of Mining Lease 09/105; and Part of Mining Lease 09/106
Expansion to: M09/102, M09/103, M09/104, M 09/105, M 09/106, M09/111 and M09/112</td></tr>
<tr><td colspan="2">Local Government Authority</td><td colspan="4">Shire of Shark Bay</td></tr>
<tr><td colspan="6">Application documents</td></tr>
<tr><td colspan="2">HPCM file reference number:</td><td colspan="4">DER2022/000583</td></tr>
<tr><td colspan="2">Key application documents (additional to application form):</td><td colspan="4">• 0367_CMS_LIC_SUP_Licence Supporting Document_9 June 2023
• 0367_CMS_LIC_SUP_Licence Supporting Document_231208
• Groundwater Mounding Management Plan Final (2012)
• Ministerial Statement 723 and amendments
• Solar Pond + Settlement Cells Groundwater Assessment
• Groundwater Mounding Management Plan (AECOM, 2023a)
• Solar Ponds and Settlement Cells Groundwater Assessment (AECOM, 2023b);
• GDP19 Solar Drying Pond Design Guidance (REC, 2023);
• Stakeholder Engagement Register;
• Dust Management Plan;
• Hydrocarbon Management Plan; and
• Category checklist (tailings storage facilities).

The applicant has also submitted all of the ECR’s and commissioning reports outlined in W6475/2020/1 that relate to the infrastructure in this application.</td></tr>
<tr><td colspan="6">Scope of application/assessment</td></tr>
</table>

Summary of proposed activities or changes to existing operations.	Licence amendment The licence for this site currently covers category 85 (sewage) and 89 (landfill) activities. The applicant is seeking to transition the majority of the infrastructure that has been constructed under W6475/2020/1 on to the existing licence. This includes: - the wet concentrator plant (WCP) and associated processing ponds, - the minerals separation plant (MSP) and associated processing ponds, - the pipelines for ore, tailings and return water between the mining area and processing plants, - the reverse osmosis (RO) plant, - the gas generators and - the associated LNG storage tanks, - new solar drying ponds, - in-pit settlement ponds, - the use of cyclone stackers, - an expansion of the mining area. The prescribed premises boundary for L9373/2022/1 will need to be expanded to accommodate this amendment, however, it is consistent with W6475/2020/1.

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity
Category 8: Mineral sands mining or processing	Category added (consistent with W6475/2020/1)	23.4 million tonnes per year
Category 52: Electric power generation	Category added (consistent with W6475/2020/1)	20 MW
Category 85b: Water desalination plant	Category added (consistent with W6475/2020/1)	0.62 GL per year
Category 85: Sewage facility	75 m^3/day	No change
Category 89: Putrescible landfill site	2,700 tonnes per annual period	No change

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☒ No ☐	Referral decision No: 1491 Managed under Part V ☐ Assessed under Part IV ☒
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☒ No ☐	Ministerial statement No: 723 EPA Report No: 1211
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☒ No ☐	Reference No: EPBC 2003/1221
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☒ Expiry: 24/10/2025 or 19/07/2026 Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why? Mining Proposal
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A Clearing is managed under the Ministerial Statement
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A Not a CAWS Act area
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☒ No ☐	Application reference No: Licence/permit No: GWL159157(7)
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☒ No ☐	Name: Gascoyne Groundwater Area Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☒ N/A ☐ Regional office: Mid-West Gascoyne

Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☒
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	*Dangerous Goods Safety Act 2004,* *Environmental Protection (Unauthorised Discharges) Regulations 2004* *Environment Protection and Biodiversity Conservation Act 1999*
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☐ No ☒	Classification: N/A Date of classification: N/A