



Application for Licence Amendment

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

Licence Number	L4247/1991/13
Licence Holder	Talison Lithium Australia
ACN	139 401 308
File Number	2012/0071641
Premises	Talison Lithium Mine, Maranup Ford Road, GREENBUSHES WA 6254. Legal description - Mining Tenements M01/3, M01/6, M01/7, M01/8, M01/9, M1/16, G01/1 and G01/02 (As defined by the premises maps attached to the Revised Licence)
Date of Report	19 December 2022
Proposed Decision	Revised licence granted

**A/MANAGER, RESOURCE INDUSTRIES
INDUSTRY REGULATION**

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

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1. Decision summary

Licence L4247/1991/13 is held by Talison Lithium Australia Pty Ltd (Licence Holder) for the Talison Lithium Mine (the Premises), located adjacent to the Greenbushes township on mining tenements M01/3, M01/6, M01/7, M01/8, M01/9, M1/16, G01/1 and G01/02.

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 tailings retreatment plant and increase in annual throughput at the premises. As a result of this assessment, Revised Licence L4247/1991/13 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 Application summary

The Licence Holder has submitted two applications to the department to amend Licence L4247/1991/13 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The applications were received by the department on 18 and 19 January 2022. For the sake of efficiency, the department will assess both requested amendments within this decision report and produce one amended instrument.

The amendments being sought are summarised in Table 1 below.

Table 1 Proposed amendments

Amendment date	Amendments proposed
18 January 2022	<ul style="list-style-type: none">operation of the tailings retreatment plant (TRP) (layout and location shown within Figure 1 and Figure 2), constructed under works approval W6283/2018/1;increase in throughput from 4.7 million tonnes per annual period (Mtpa) to 5 Mtpa beneficiated (an additional 300,000 tonnes); anddisposal of TRP tailings (originating from tailings storage facility 1 [TSF1]) into TSF2. There will be no increase to the overall throughput of tailings deposited, as the amendment relates to beneficiation throughput only (Table 2).
19 January 2022	<ul style="list-style-type: none">operation of a Water Treatment Plant (WTP) to treat contaminated process water within the mine water circuit (on-site process water dams). Construction of the WTP was approved under Amendment Notice 3 in 2018 and has now been built. Location is shown in Figure 1;disposal of treated process water from the WTP into the mine water circuit (specifically Cowan Brook Dam, Southampton Dam and Austins Dam);treatment of the combined liquid effluent from the WTP (concentrated with lithium) and Arsenic Remediation Unit (ARU; concentrated with arsenic) by separation of solid and liquid using a flocculant and a

	<p>series of tanks (the “Water Treatment Facility”). The solid waste will be bagged and disposed of at a licensed off-site facility. The liquid decant from the settling tanks will be piped to Clear Water Dam;</p> <ul style="list-style-type: none"> • removal of condition 1.3.13, which has construction and operational requirements for the ARU; and • removal of conditions relating to the construction requirements for infrastructure/equipment that has been built (conditions 1.3.8, 1.3.9, 1.3.11, 1.3.12, 4.2.6 and 4.2.7).
31 October 2022	<ul style="list-style-type: none"> • In comments on the draft, Talison submitted a minor request to increase the landfill throughput from 200 tonnes per year to 450 tonnes per year of inert waste type 1, 2 and clean fill. The request does not yet trigger a requirement for category 63 (500 tonnes or more per year for a class I inert landfill).

This amendment is limited only to changes to Category 5 activities from the existing Licence. Table 2 below outlines the proposed throughput changes to the existing Licence.

Table 2: Proposed design or throughput capacity changes

Category	Current throughput/design capacity	Proposed design throughput/design capacity
5	<p>4,700,000 tonnes beneficiated per annual period</p> <p>5,000,000 tonnes of tailings deposited per annum</p>	<p>5,000,000 tonnes beneficiated per annual period</p> <p>5,000,000 tonnes of tailings deposited per annum</p>

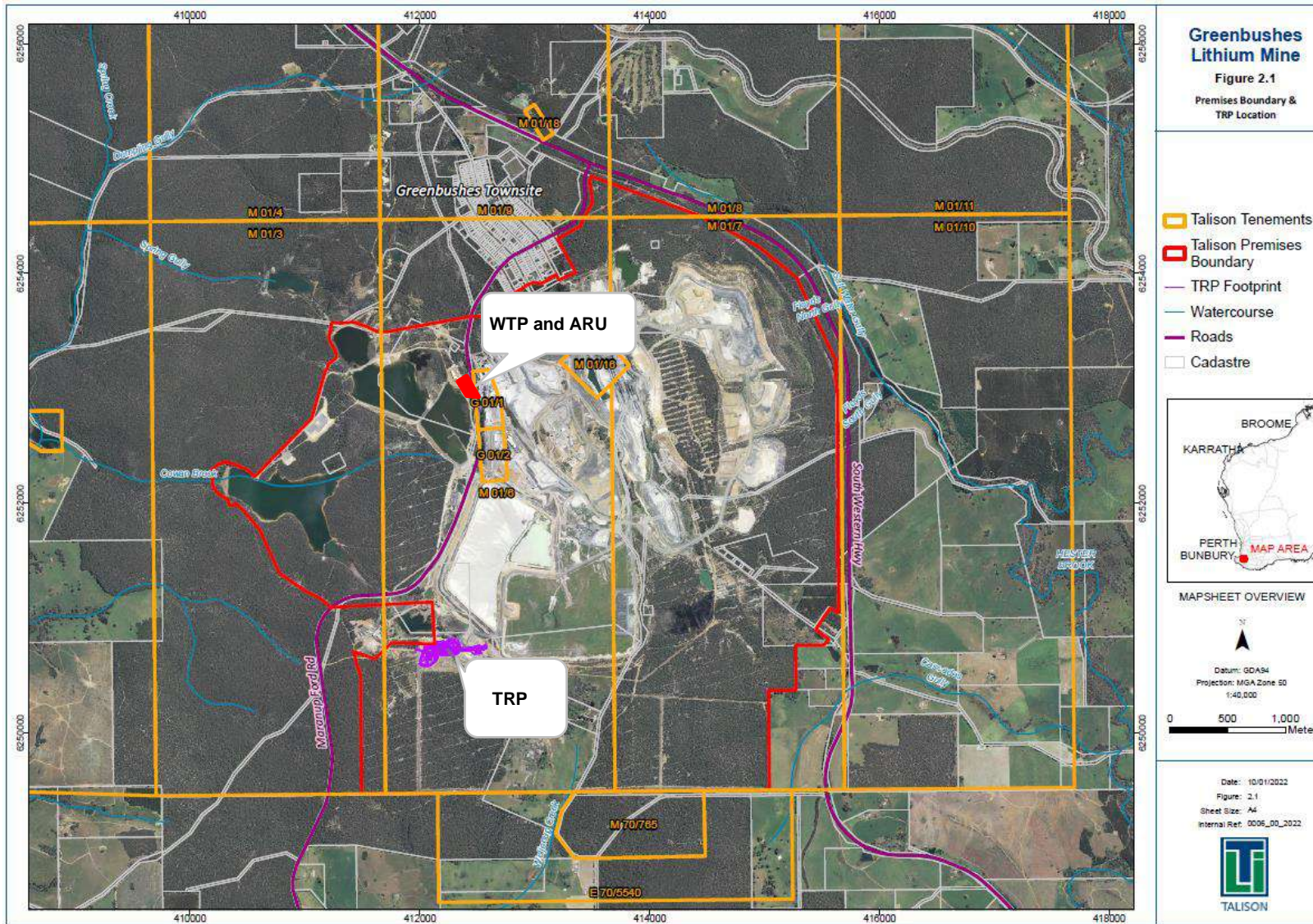


Figure 1 Site boundary and location of the tailings retreatment plant (TRP), water treatment plant (WTP) and arsenic remediation unit (ARU)

L4247/1991/13

2.2.1 Tailings retreatment plant

The TRP will reprocess tailings from TSF1 which has been in care and maintenance since 2006¹. The Licence Holder has indicated that the upper seven metres of the tailings in TSF1 can be retreated to produce a 6% lithium oxide product. To recover the tailings, dozers will be used to push material to excavators that will load trucks for transport to a Run of Mine (ROM) Bin or a ROM stockpile. From the ROM Bin the feed will undergo preparation, including screening, before being transferred to the main plant. Size reduction of the feed by crushing or grinding will not be undertaken. Tailings output from the TRP will be deposited into tailings storage facility 2 (TSF2).

Tailings from the TRP are expected to have similar geochemical properties to the those from the CGP2 (i.e. the current tailings deposited into TSF2). Table 3 provides a comparison of the tailings expected to be produced from the TRP to those from the active Chemical Grade Plant 2 (CGP2) (Table 3). A comparison of the mineralogical contents of the Greenbushes ores and TSF1 are provided below (Table 4). The Licence Holder has also provided results of geochemical characterisation of the tailings contained with TSF1 (Appendix 3).

Table 3 Tailings Chemistry of expected TRP output compared to Chemical Grade Plant 2

	Ta ₂ O ₅	Fe ₂ O ₃	MnO	TiO ₂	CaO	SnO ₂	K ₂ O	Al ₂ O ₃	SiO ₂	P ₂ O ₅	Na ₂ O	MgO	Li ₂ O
TRP	0.005	1.384	0.113	0.085	0.97	0.005	1.915	16.61	71	0.527	3.989	0.412	1.52
CGP2	0.010	1.318	0.048	0.086	0.731	0.013	3.123	14.471	74.206	0.201	3.134	0.522	0.944

Note: All units mg/kg

Table 4 Comparison of Greenbushes ores to that within TSF1

Mineral content %	TG ore	CGP1 ore	CGP2/3/4 ore	TRP/TSF1
%Li ₂ O	3.8-4.2	2.2-3.0	1.5-2.0	1.2-1.8
% Spodumene	50	30-40	20-30	15-25
% Quartz	Up to 40	25-35	Up to 40	15-25
% Albite	3-7	10-20	10-25	30-35
% K-Feldspar	3-10	10-20	15-30	10-25
% Phosphates	<0.2	0.5	0.5	1.0
% Mica	<0.2	<1	2	3
% Waste Hi Fe	1-2	5-10	10-15	10

Infrastructure associated with the TRP includes a ROM stockpile, high density polyethylene (HDPE) pipeline (connecting TRP with TSF2), HDPE lined settlement pond and reagent storage area. The settlement pond is used to collect stormwater from the operational areas and stockpiles.

The TRP is supplied with a portion of the water from Clear Water Dam (see section 3.3.1) and is stored in tanks. Recycled water and tailings recovered from the process area will be returned to the processing plant or to the TSF.

¹ Condition 1.3.1 of the licence currently only allows “emergency tailings deposition of up to a depth of 300mm for a period not exceeding 6 months”.

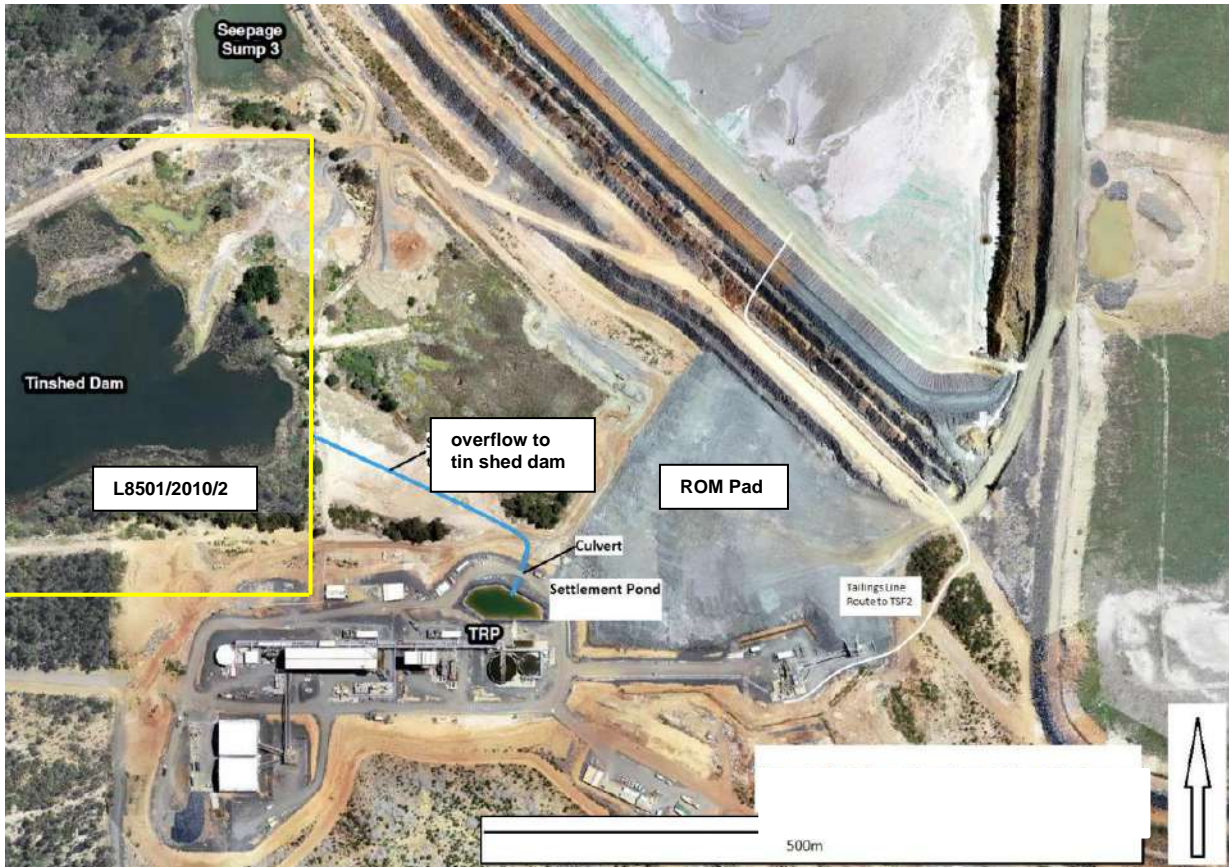


Figure 2 Tailings retreatment plant layout

Compliance with Works Approval

Works approval W6283/2019/1 was granted on 2 April 2020. The works approval was for a mine expansion including additional processing plants, a crusher and a TRP to eventually increase the processing capacity of spodumene ore to a maximum of 11.6 Mtpa.

The decision report for W6283/2019/1 indicates that due to insufficient information available at the time of the assessment, process water emissions offsite (which contains contaminants including lithium and metals/metalloids) could not be assessed. It noted that a detailed risk assessment would be undertaken using information submitted for the licence amendment application. A detailed risk assessment associated with the process water from the mine water circuit has consequently been undertaken as part of this amendment.

The Licence Holder submitted an Environmental Compliance Report on 11 January 2022 for the TRP. The report concluded that the works had been constructed with no material defects and to the requirements specified in conditions 1a -1d, 2a and 2b and 3a – 3c of works approval W6283/2019/1. The department assessed the Environmental Compliance Report against the requirements of the Works Approval, informing the Licence Holder on 3 February 2022 that the report satisfied conditions relating to the TRP.

Department of Mines, Industry Regulation and Safety

DMIRS granted approval for the extraction of tailings from TSF1 on 25 February 2022 under registration identification number (Reg ID) 102901. Deposition of TRP waste into Tailings Storage Facility 2 (TSF2) is approved under Reg ID 80328 and 96748.

2.2.2 Water treatment plant (WTP)

The application seeks authorisation for operation of the WTP, including onsite disposal of the liquid effluent generated from the treatment process. Construction and commissioning of the water treatment plant was authorised under Amendment Notice 3 (12 March 2018). The Licence Holder submitted an Environmental Compliance Report on 19 October 2021. The report concluded that the works had been constructed with no material defects and to the requirements specified in condition 1.3.8, 4.2.6 and 4.2.7 of L4247/1991/13.

The WTP is designed to treat (by reverse osmosis and an evaporator and crystalliser) 1,095,000 m³/year (3,000 m³/day) of contaminated process water to less than <2 mg/L, depending on temperature and inlet concentration (Table 5). Permeate (output water) is typically <0.5mg/L.

Table 5 Water Quality Performance Guarantees¹

Outlet Lithium concentration	Units	Water Quality Objective*	
		Temperature 10-25C	Temperature 10-25C
Lithium inlet concentration 0-15 ppm	mg/L	<0.9	<1.4
Lithium inlet concentration 15-25 ppm	mg/L	<1.5	<2.0

* RO feedwater temperature

Note 1: Any exceedance of these values would contradict the designers (Veolia) performance guarantee.

Treatment is as follows:

- The WTP will receive process water from the Clear Water Dam (or other dams from the mine water circuit) for treatment;
- Treated process water will be directed from the WTP to the various dams in the mine water circuit, specifically Cowan Brook Dam, Southampton Dam and Austins Dam; and
- The liquid effluent from the WTP (liquid waste created from the operation of the WTP, including water used for cleaning and scaling and brine reject) will be combined with effluent from the ARU and treated by separation of solid and liquid at the Water Treatment Facility using a flocculant² and a series of tanks (see section 2.2.4). The solid waste will be bagged and disposed of at a licensed off-site facility. The liquid decant from the settlement tanks will be piped to Clear Water Dam. Talison notes that this process is primarily intended for solid removal rather than lithium removal and the liquid decant from the settlement tanks is likely to be <24mg/L lithium.

Volumetric design outputs from the WTP operation include:

- 1,007,400 m³/year (2,760 m³/day) of treated process water;
- 1,825 tonnes/year (5 tonnes/day) of solid waste (solid lithium salt); and
- 87,600 m³/year (240m³/day) of liquid effluent.

The department notes that the Licence Holder has been operating the WTP since late 2021 without authorisation under the licence. DWER notes that the Licence Holder has been

² HYDREX 6161 0.01% solution. An anionic polymer that has a Green SDS classification that is non-toxic and biodegradable. It will be dosed at approximately 500L/hr as a 0.01% solution into the effluent flow of ~64,000L/hr.

disposing of the WTP and ARU liquid effluent directly to TSF2. This is not authorised on the licence. Talison has notified DWER on 30 June 2022 that this activity has ceased (DWER ref A2110509).

2.2.3 Arsenic remediation unit (ARU)

The application seeks the following in relation to the ARU:

- removal of the condition 1.3.13, which has construction as well as operational requirements for the ARU; and
- authorisation for the disposal of liquid effluent (arsenic concentrated) generated from the operation of the ARU to Clear Water Dam.

Construction and operation of the ARU was approved via a licence amendment on 29 April 2020. DWER notes that compliance documentation indicates discharge of ARU effluent to the tailings storage facility. This is not authorised on the licence. Talison notified DWER on 30 June 2022 that this activity has ceased (DWER ref A2110509). DWER notes that condition 1.3.13 has on-going operational components and its removal will be further risk assessed in this decision report.

The ARU is designed to treat ~3,500,000 m³/year (9,600 m³/day) of process water (to reduce arsenic concentrations). The ARU generates about 2,550,000 m³/year treated water (for discharge back to the mine water circuit) and 473,040 m³/year (1,296 m³/day) liquid effluent. It is proposed that the liquid effluent (combined with effluent from the WTP) is further treated by separation of solid and liquid using a flocculant and a series of tanks (see section 2.2.4). The solid waste (163 tonnes/year including carbon, 10 tonnes/year including arsenic, lithium and other potential contaminants) from the settling tanks will be bagged and disposed of at a licensed off-site facility. The liquid decant from the settling tanks is proposed to be piped to Clear Water Dam.

2.2.4 Water treatment facility (WTF)

Talison proposes to treat the combined WTP and ARU effluent streams at a “Water Treatment Facility” (WTF), as an interim solution until an alternative strategy can be designed and implemented in 2023. Talison proposes to separate the solid and water fractions of the WTF effluent via flocculation and settling in a series of tanks. The solid WTF effluent fraction that settles in these tanks will be pumped out, bagged and disposed of to a licensed offsite facility. The liquid decant from the settling tanks will be piped to Clear Water Dam (CWD). The process is expected to produce up to 600,000 m³/year decant and 163 tonnes/year solids from settlement tanks. The majority of the solid waste will be activated carbon, with approximately 10 tonnes/year of arsenic, lithium and other potential contaminants.

The layout of the settlement tanks is shown in Figure 3 below. The settling tank arrangement comprises two 50 kilolitre (kL) primary settling tanks and two 50kL secondary settling tanks.

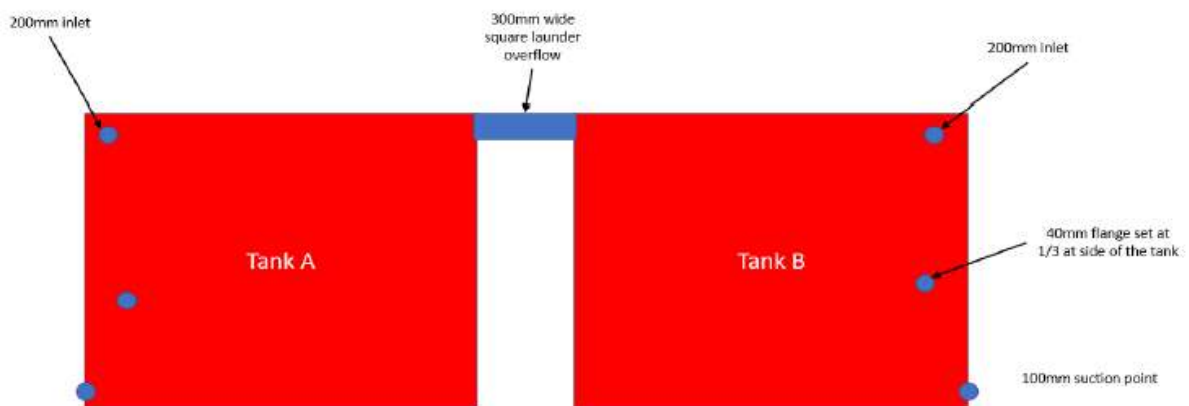
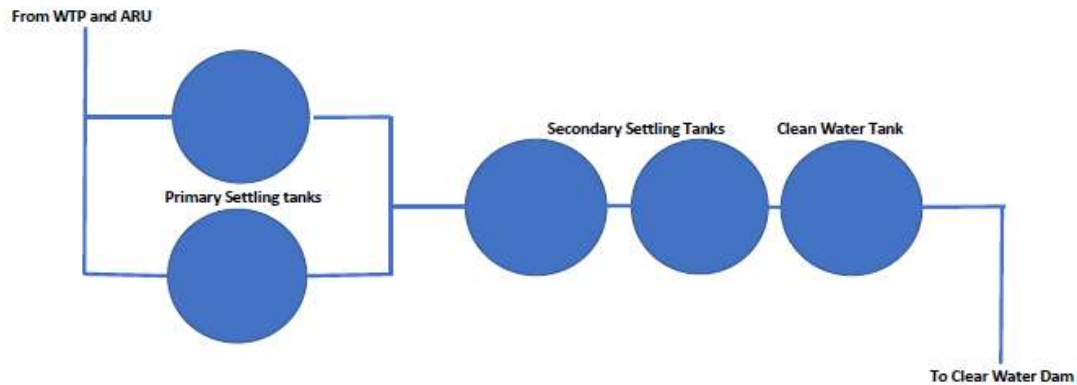


Figure 3 Water Treatment Facility (WTF) Settlement Tanks

The settlement tanks will be three-quarter ($\frac{3}{4}$) drained periodically (nominally every three (3) months) to enable the settled flocculated particulate effluent fraction to be pumped out by a vacuum truck. This material will then be emptied into salt bags for filtering and drying³. The dewatered (spade-able) solids will then be disposed of offsite to a licensed waste facility. The WTF effluent liquid fraction will be pumped from the final (secondary) settling tank to the Clean Water Tank, from where it will be pumped into Clear Water Dam.

2.2.5 Compliance with conditions on Licence

The Licence Holder seeks removal of conditions 1.3.8, 1.3.9, 1.3.11, 1.3.12, 4.2.6, 4.2.7 and Figures 2 and 6 from the licence, indicating that compliance for these conditions has been met. Table 6 below provides a summary of compliance detail for these conditions.

Table 6 Compliance detail

Condition	Condition summary	Compliance detail
1.3.8	Infrastructure and equipment requirements	Compliance demonstrated. DWER assessed and confirmed compliance for: <ul style="list-style-type: none"> Clear Water Dam (19 May 2019, DWER ref A1789836);

³ Talison has advised excess liquids from this practice will be “managed and contained within the WTP”

		<ul style="list-style-type: none"> Water Treatment Plant (21 February 2022, DWER ref A2085118) Remaining infrastructure for the condition, associated with the Chemical Grade Processing Plant (15 March 2019, DWER ref A1946327) <p>Condition 1.3.8 has been removed from the licence.</p>
1.3.9	Capacity of construction site drains	<p>Compliance demonstrated (15 March 2019, DWER ref A1946327). Condition 1.3.9 will be removed from the licence.</p> <p>However, a requirement to continue to inspect to ensure sufficient capacity of the Concentrate Storage Area wedge pit, Plant Wide Wedge Pit and South West Detention pond has been included within new condition 1.3.8.</p>
1.3.11	Maintain a record of all inspections	<p>Condition 1.3.11 will be removed from the licence. A requirement to maintain records of inspections will be included within new condition 1.3.8.</p>
1.3.12	Noise assessment following commissioning of the “new crusher circuit”	<p>Talison submitted the noise assessment to the department on 31 December 2019 (DWER ref DWERDT239616). The assessment indicated that the operation would be able to comply under the Regulation 17 exemption for the premises (approved 16 February 2015 for a duration of 10 years from the start day). The condition will be removed from the licence.</p> <p>DWER notes that condition 1.3.14 is associated with compliance of condition 1.3.12 and has also been removed from the licence.</p>
4.2.6 and 4.2.7	Reporting requirements for condition 1.3.8	<p>Compliance demonstrated (21 February 2022, DWER ref A2085118). The conditions will be removed from the licence.</p>

2.3 Noise emissions

Operational noise from the premises (excluding blasting) is regulated under a Regulation 17 exemption (approved 16 February 2015 for a duration of 10 years from the start day) of the *Environmental Protection (Noise) Regulations 1997* (reference MINDER113/15). The Licence Holder has not proposed changes to the noise monitoring program implemented under this approval.

2.4 Part IV of the EP Act

In June 2018 the Licence Holder referred the proposal for expansion activities at the existing premises to the Environmental Protection Authority (EPA). The proposal included the development and operation of additional infrastructure, including the tailings retreatment plant, for which Ministerial Statement (MS 1111) which was granted 19 August 2019.

The EPA report 1635 identified the following key environmental factors relevant to the proposal:

- Flora, Vegetation and Terrestrial Fauna: direct loss of up to 350 ha of native vegetation and priority species as well as potential indirect impacts to vegetation and flora (habitat for matters of national environmental significance). This requires:
 - a Conservation Significant Terrestrial Fauna Management Plan.
- Terrestrial Environmental Quality: impacts from potential contamination of soil from tailings and waste storage.
- Social Surroundings: potential impacts from changes to visual amenity, vibration levels, and noise. This requires:
 - Visual amenity requires management plan (MS 1111).
 - Noise impacts on human receptors requires a Noise Management Plan to meet specified limits set out in current Regulation 17 approval.

Requirements of MS 1111 are not assessed in this decision report and are not duplicated as conditions in the licence. However, the report refers to Part V of the EP Act for detailed assessment and management for the following:

- Inland Waters for potential impacts to surface and groundwater quality through mining operations. This is particularly with respect to the process water treatment, the mine water circuit and surface water ecological surveys.
- Air Quality for potential impacts from dust emissions and changes to air quality. This refers to a Dust Management Plan and detailed assessment by DWER.

2.5 Contaminated Sites

The premises was classified as 'Contaminated- restricted use' in 2020 (ID 34013) under the *Contaminated Sites Act 2003*. The identified contamination includes hydrocarbons and metals in soils, elevated concentrations of metals in groundwater beneath, and in surface water at the site. This requires the applicant to implement a Surface Water Management Plan (SWMP) which is required to be regularly reviewed and updated to reflect changes at the premises and risks to environment, human health or any environmental values.

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.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathways during premises operation which have been considered in this Amendment Report are detailed in Table 7 below. Table 7 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 7: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Tailings retreatment			
Dust	Tailings retreatment: excavation of tailings from TSF1, including increased dust lift off from TSF surface	Air/windborne pathway	<u>Applicant proposed controls</u> <ul style="list-style-type: none"> • minimising the area of the active mining face/s to “the extent practicable”; • use of water carts within the mining and haulage areas to wet down dust-generating surfaces; • application of mulch or dust suppressants to non-trafficked areas; • use of weather forecasting to predict extreme weather conditions likely to result in increased dust emissions so actions can be taken to reduce the impact through application of additional dust controls or modified activities; and • reduced vehicle speed limits in areas of unconsolidated soil.
	Tailings retreatment: tailings preparation by screening		<u>Applicant proposed controls</u> <ul style="list-style-type: none"> • no controls specific to tailings preparation by screening have been proposed
	Operation of the tailings retreatment plant and associated increased beneficiation throughput (additional 300,000 tpa)		<u>Applicant proposed controls</u> <ul style="list-style-type: none"> • the feed bin to the reclaimed tailings stockpile will have a spray system to maintain tailings moisture; • application of dust suppressant to non-active stockpiles; • use of weather forecasting to predict extreme weather conditions likely to result in increased dust emissions so actions can be taken to reduce the impact through application of additional dust controls or modified activities; • employee education on dust management procedures implemented; • all community complaints relating to dust will be recorded and investigated; • final product will be stockpiled within a covered bund with 5-8% moisture content; and • application of crushed rock to unsealed/cleared areas of the TRP. <u>Existing licence controls</u> <ul style="list-style-type: none"> • A single high-volume dust sampler recording 24-hour averaged PM10 concentrations, including a 90µg/m3 limit <u>Existing works approval controls</u> <ul style="list-style-type: none"> • W6283/2019/1 includes Osiris real time monitoring TSP and TEOM PM10 at locations given in Figure 4

Emission	Sources	Potential pathways	Proposed controls
Noise		Air/windborne pathway	<u>Existing controls</u> <ul style="list-style-type: none"> Talison's existing regulation 17 exemption requires noise monitoring and compliance with the stated noise emission levels (including approved levels for blasting and non-blasting activities).
Lithium and metal/metalloid contaminated process water	Operation of HDPE lined settlement pond associated with TRP	Overtopping and discharge to land	<u>Applicant proposed controls:</u> <ul style="list-style-type: none"> routine facility inspection and maintenance programs to identify and remediate areas of increased risk.
Hydrocarbons and reagent/process fluids	Operation of reagent storage area associated with TRP	Accidental spills/release – direct discharge to land	<u>Applicant proposed controls:</u> <ul style="list-style-type: none"> reagent storages will be concrete bunded to 110% capacity of the largest tank; spill kits will be located in the vicinity of reagent storage areas; contaminated soil will be remediated at the site bioremediation area or disposed of to a licensed facility; vehicles, plant and other will be operated and serviced in as per manufacturer specifications; employee education on spill procedures; hydrocarbons will be stored in accordance with ENV-PR-3001 Hydrocarbon Management – Storage, which includes the requirements of AS 1940:2017 (Standards Australia, 2017); spills will be cleaned up and reported in accordance with ENV-PR-3004 Spill Clean Up and Reporting. In the event of a leak/spill, the source will be isolated and any contaminated soil remediated or disposed of. Soil contaminated by hydrocarbons or other chemicals will be remediated or disposed of to a licensed facility. Hydrocarbon and chemical spills are reported internally as an environmental incident and larger spills with the potential to cause contamination are reported externally to DWER.
Tailings or process water	Operation of tailings pipeline connecting TRP to TSF2	Pipeline leak/rupture	<u>Applicant proposed controls:</u> <ul style="list-style-type: none"> monitored in accordance with the TSF Operating manual <ul style="list-style-type: none"> the operating manual mentions that valves to be used to control flow supply in the delivery line as well as isolation valves. daily inspections of tailings pipelines are listed in the manual
Contaminated water (tailings/process water)	Deposition of tailings from TRP into TSF2	Seepage through base and embankments to groundwater	<u>Existing licence controls</u> <ul style="list-style-type: none"> Condition 1.3.1 includes the following infrastructure requirements for TSF2: <ul style="list-style-type: none"> Two seepage collection trenches equipped with drainage pipes; pipelines (Figure 7) One upstream drainage trench positioned 25 m and 35 m from the raise centreline along the southern and western walls at RL 1270 m (blue line, Figure 7) One upstream drainage trench positioned 25 m from the raise centreline along the southern, western

Emission	Sources	Potential pathways	Proposed controls
			<p>and northern wall (red line, Figure 7)</p> <ul style="list-style-type: none"> ▪ Trenches leading to Sump 01 (S1), Sump 02 (S2), Sump 03 (S3) ▪ Collected water at S1, S2 and S3 is pumped back to Mine Water circuit <p>No additional controls have been proposed for deposition of TRP tailings to TSF2.</p>
Water treatment plant			
Treated process water (lithium removed)	Operation of WTP to remove lithium	Discharge to the mine water circuit (specifically Cowan Brook Dam, Southampton Dam and Austins Dam)	<p><u>Applicant proposed controls:</u></p> <ul style="list-style-type: none"> • treated water will be directed to water storage dams across the mine water circuit to manage water levels and quality across the premises; • treated water lithium concentration to meet 0.5 mg/L; • amend process water monitoring and reporting associated with condition 3.3.1 and 4.2.3 to include monitoring of the water volume treated by the WTP. • amend annual environmental reporting condition to include an annual assessment that summarises the performance of the WTP in reducing lithium in treated process water. This assessment would include a graphical representation of lithium concentrations in feed water and treated water over time. <p><u>Existing licence controls</u></p> <ul style="list-style-type: none"> • monitoring of water quality process water dams (excluding Clear Water Dam) and offsite Norilup dam • annual Ecological Assessments including up and downstream surface water monitoring locations
Liquid effluent – concentrated with lithium		Discharge of liquid wastes, via WTF, to mine water circuit (specifically Clear Water Dam)	<p><u>Applicant proposed controls:</u></p> <p>Effluent to be further treated by separation of solid and liquid using a flocculant and a series of tanks. The liquid decant from the settling tanks will be piped back to Clear Water Dam (an unlined earthen dam).</p> <p>See further discussion surrounding treatment performance in section 3.3.</p>
Process water – treated and effluent		Discharge of treated process water and effluent to the mine water circuit (specifically Clear Water Dam) resulting in risk of overtopping from Clear Water Dam	<p><u>Existing licence conditions</u></p> <p>Condition 2.2.2 indicates that the "licence holder is not permitted to discharge off the premises from Southampton Dam or from Cowan Brook Dam"</p>
Process water (treated, partially)		Rupture of pipelines	<p><u>Applicant proposed controls:</u></p> <p>Pipelines to and from the WTP will be inspected on a regular basis and records maintained.</p>

Emission	Sources	Potential pathways	Proposed controls
treated, untreated)		Failure of WTP containment, accidental spills/release	<u>Applicant proposed controls:</u> <ul style="list-style-type: none"> • routine facility inspection and maintenance programs to identify and remediate areas of increased risk; • spills will be controlled, contained, cleaned up and reported in accordance with procedures; and • floors, floor drains and sumps are concrete lined and maintained clean.
Solid (lithium solid waste)		Contamination of soil, infiltration through soil to groundwater	<u>Applicant proposed controls:</u> Bagged and transported offsite to an appropriately licensed facility.
Treatment chemicals		Failure of WTP containment, accidental spills/release	<u>Applicant proposed controls:</u> <ul style="list-style-type: none"> • chemicals will be banded to 110% capacity of the largest tank; and • spill kits will be in the vicinity of chemical storage areas. • routine facility inspection and maintenance programs to identify and remediate areas of increased risk. spills will be controlled, contained, cleaned up and reported in accordance with procedures.
Arsenic remediation unit			
Treated process water (arsenic removed)	Operation of the ARU: treatment of process water to remove arsenic	Discharge, via WTF, to the mine water circuit (specifically Cowan Brook Dam, Southampton Dam and Austins Dam)	DWER notes that placement of treated water back into the mine water circuit is unlikely to increase seepage but will result in a change in composition due to removal of arsenic. <u>Applicant proposed controls:</u> Treated water arsenic concentration to meet 0.1mg/L
Liquid effluent – concentrated with arsenic (from ARU)		Discharge of liquid wastes to mine water circuit (specifically Clear Water Dam)	<u>Applicant proposed controls:</u> Effluent to be further treated by separation of solid and liquid using a flocculant and a series of tanks. The solid waste will be bagged and disposed of at a licensed off-site facility. The liquid decant from the settling tanks will be piped to Clear Water Dam.
Solid (arsenic waste)		Contamination of soil, infiltration through soil to groundwater	<u>Applicant proposed controls:</u> Solid waste: Bagged and transported offsite to an appropriately licensed facility.
Discharge along eastern premises boundary			
Contaminated water and surface	Discharge of contaminated water along the eastern	Direct discharge into adjacent creeklines	Direct discharge of contaminated process water to the east of site is currently allowed under condition 2.2.1 and monitoring takes place under condition 3.2.1. See section 3.4 for further discussion.

Emission	Sources	Potential pathways	Proposed controls
water	boundary (Carters Farm, Floyds North, Floyds South, Cemetery)		
Inert landfill			
Dust	Increased throughput for inert landfill to 450 tonnes per year (not prescribed, but ancillary to prescribed activities)	Air/windborne pathway causing impacts to amenity	<u>Existing licence controls:</u>
Windblown waste			<ul style="list-style-type: none"> Disposal of waste by landfilling shall only take place within the waste rock dump area; Waste shall be placed in a defined trench or within an area defined by earthen bunds; and The active tipping area shall be restricted to a maximum linear length of 30 metres.
Leachate		Seepage through base and embankments to soil and groundwater	<u>Existing licence controls:</u>
Contaminated surface water		Surface water run off causing contamination of nearby ephemeral creek lines	<u>Existing licence controls:</u>
			<ul style="list-style-type: none"> Construction, operation and decommissioning of landfill cells can occur within the defined landfill area providing there is no waste within 3m of the highest level of the water table aquifer
			<ul style="list-style-type: none"> Construction, operation and decommissioning of landfill cells can occur within the defined landfill area providing there is no waste within o 100 m of any surface water body

3.1.2 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 8 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 8: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
<p><u>Residential dwellings south of tailings retreatment plant</u></p> <p>Annual climate summary statistics⁴ indicate:</p> <ul style="list-style-type: none"> 9am prevailing wind direction is variable and can occur towards the north-west, west, south-east and south. 3pm prevailing wind direction is to the north and the south-east. 	<p>The Greenbushes townsite is ~3.2km north of the TRP.</p> <p>The closest residential dwelling is ~1.9km to the south of the TRP (Figure 4)</p> <p>R1: Lot 504 on Plan 73712 (Talison owned) Lot boundary: ~1.9km south-west of TRP Residential dwelling: ~2.0km south-west of TRP</p> <p>R2: Lot 11888 on Plan 162545 (Talison owned) Lot boundary: ~1.6km south of TRP Residential dwelling: ~1.9km south of TRP</p> <p>R3: Lot 5220 on Plan 136672 Lot boundary: 1.9km south-east of TRP Residential dwelling: 2.4km south-east of TRP</p>
<p>Surface and groundwater users</p>	<p>For detail regarding surface water and groundwater quality, flow and depth, see section 3.3.3.</p> <p>Whilst the groundwater underlying the site is not recognised as a strategic resource area (not listed as a proclaimed area) there are a number of residential surface and groundwater users surrounding the site.</p> <p>Figure 5 shows the location of the surface and groundwater users in relation to the premises and surface water bodies.</p> <p>The results of a water survey carried out by the licence holder in 2021 indicates that downstream users access surface water from Norilup Brook, Hester Brook and Woljenup Creek for purposes including drinking water, domestic uses such as showering, laundry, water for gardens, recreational activities (including swimming), aquaculture activities, irrigation for crops and stock water. See section 3.3.5 for further detail.</p>

⁴ Taken from the closest weather station at Bridgetown (12.9km from Greenbushes), site ID 009617.

Environmental receptors	Distance from prescribed activity
Tributaries of Blackwood River	
Spring Gully, Schwenke's Dam and Mt Jones Dam (water quality and ecology)	To the north-west of the premises boundary (offsite). See Figure 6 and Figure 7. Seepage from Southampton Dam (currently occurring) flows into Spring Gully and into Schwenke's Dam (flow from Schwenke's Dam goes to Mt Jones Dams before flowing into Norilup Dam).
Cowan Brook, Norilup Dam and Norilup Brook (water quality and ecology)	At the western edge of the premises boundary (offsite). Figure 6 and Figure 7. Seepage from Cowan Brook Dam (currently occurring) flows into Cowan Brook and into Norilup Dam
Hester brook (water quality and ecology)	To the east of the premises boundary (Figure 6 and Figure 7)
Woljenup Creek (water quality and ecology)	To the south of the premises boundary (Figure 7)
Other	
<u>DBCA Legislated Tenure</u> Greenbushes State Forest	<i>This has been addressed in the EPA report and is regulated under Part IV. Therefore these environmental receptors have not been further assessed in this decision report.</i>
Threatened/priority flora and fauna	

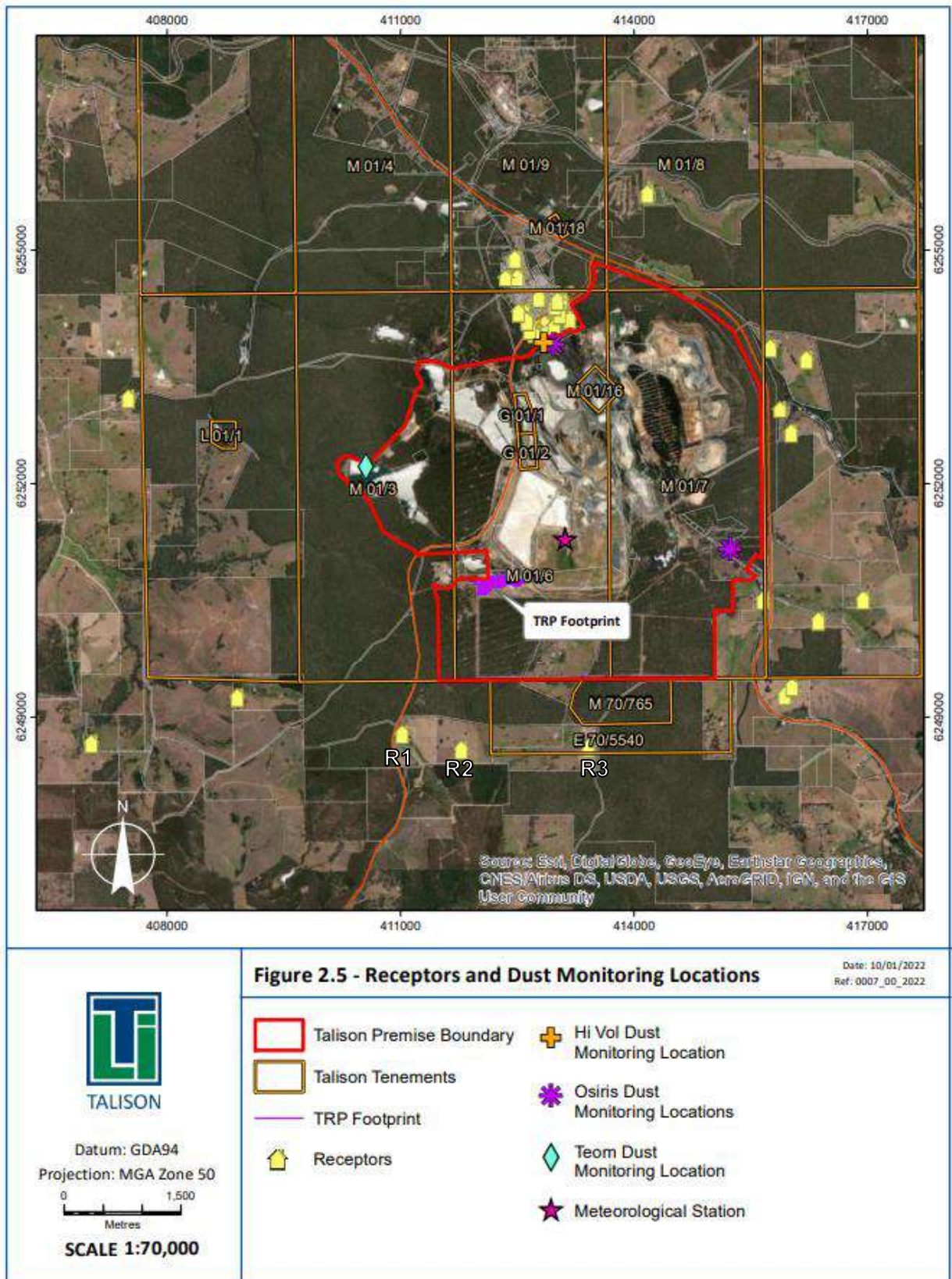


Figure 4: Distance to residential receptors

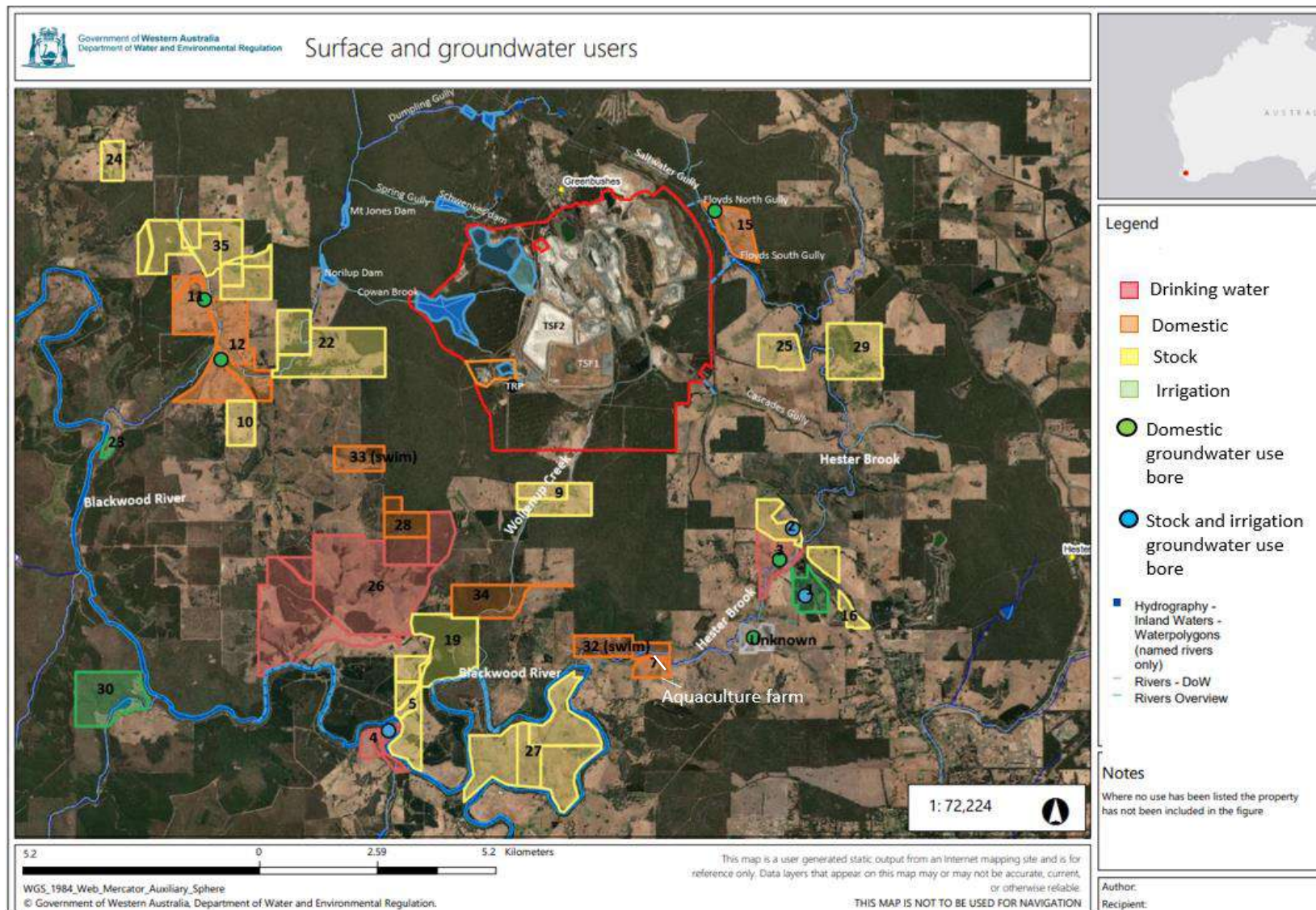


Figure 5 Surface and groundwater users (data from Talison 2021 survey). Where multiple uses take place, the most sensitive use has been displayed (drinking water > domestic > stock > irrigation)

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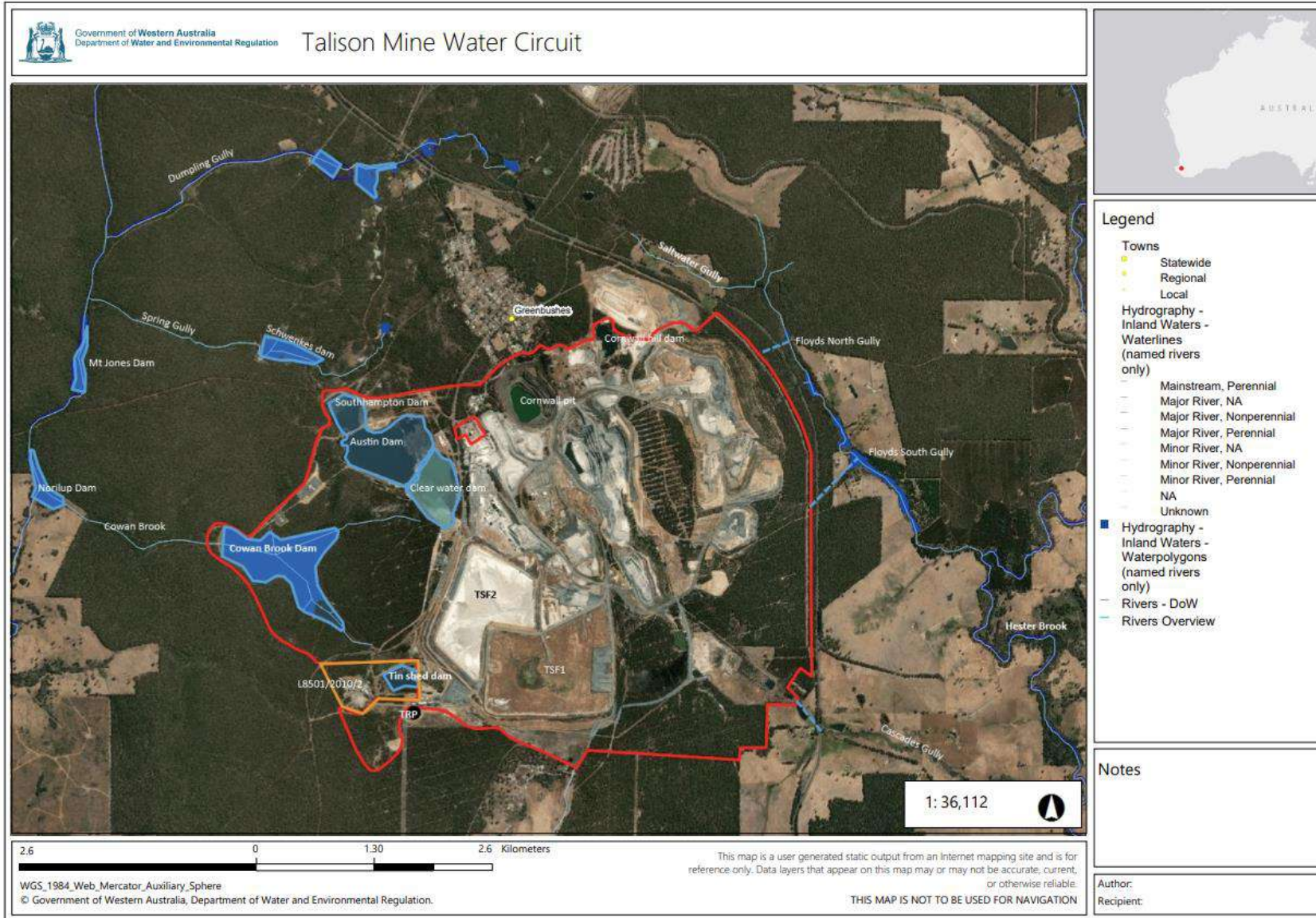


Figure 6 On premises water Dam storage and off-site surface water

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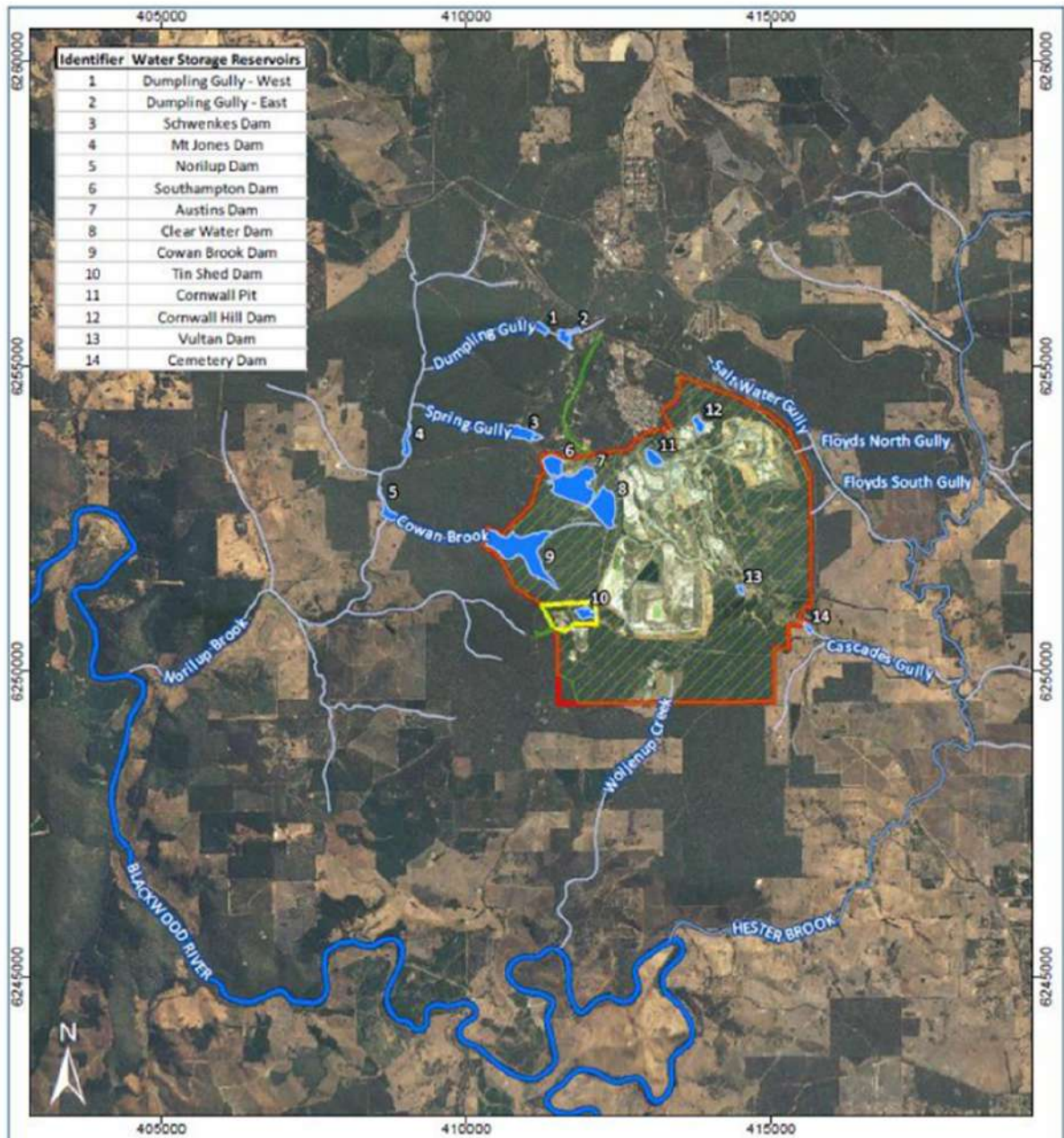


Figure 4: Regional Surface Water System and Water Storage Reservoirs



Figure 7 On premises water storage and offsite surface water receptors (zoomed extent)

3.2 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 3.1. 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 3.1), 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 9.

The Revised Licence L4247/1991/13 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises. The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 9. 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				
Tailings Retreatment								
Tailings retreatment: excavation of tailings from TSF1 including increased dust lift off from TSF surface	Dust	Air/windborne pathway causing impacts to health and amenity	Closest residences are ~1.9km south of TRP	Refer to section 3.1.1	C = Moderate L = Unlikely Medium Risk	Y	New condition 1.3.10 – item 1: excavation equipment	<p>DWER notes that the works approval W6283/2019/1 scope included, in addition to the tailings retreatment plant, a mine expansion with additional processing plants, a crusher and an increase the processing capacity of spodumene ore to a maximum of 11.6 Mtpa. Risk associated with dust was consequently assessed as "high".</p> <p>This amendment for excavation of tailings retreatment plant and associated smaller increase in beneficiation throughput (300,000tpa) are considered lower risk for dust emission impacts. The TRP is located ~1.9km from the closest residential receptor (and 3.2km south of the Greenbushes townsite) ,will be operating at a less than maximum capacity (increase in 300 000 tonnes pa) and applicant controls (including sprays, dust suppression etc) are considered sufficient to mitigate the risk. These controls have been conditioned within the licence.</p> <p>Dust will be further risk assessed with future amendments for other operations generating significant dust, including larger throughput amendments.</p> <p><u>DWER control:</u></p> <p>DWER notes that the applicant has not included controls specific to screening of excavated tailings. A requirement for use of spray systems on the screening</p>
Tailings retreatment: tailings preparation by screening	Dust	Air/windborne pathway causing impacts to health and amenity		Refer to section 3.1.1	C = Moderate L = Unlikely Medium Risk	N	<u>New condition 1.3.10 – item 2: screening equipment</u>	
Operation of the tailings retreatment plant (retreatment of TSF1 tailings) and associated increased beneficiation production capacity to 5 Mtpa (additional 300,000tpa)	Dust	Air/windborne pathway causing impacts to health and amenity		Refer to section 3.1.1	C = Minor L = Unlikely Medium Risk	Y	New condition 1.3.10 – operational requirements, dust management	

Risk Event					Risk rating ¹	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	C = consequence L = likelihood			
								plant has therefore been included within the licence as a regulatory control.
	Noise	Air/windborne pathway causing impacts to nearby residences	Closest residences are ~1.9km south of TRP	Refer to section 3.1.1	C = Minor L = Unlikely Medium Risk	Y	N/A	Talison operates under a regulation 17 exemption for noise generating activities at the site. This exemption requires noise monitoring and compliance with the stated noise emission levels (including approved levels for blasting and non-blasting activities). Given the existing controls under the exemption, no additional regulatory controls are required for this amendment.
Deposition of tailings from TRP into TSF2	Changed chemical composition of tailings seepage (as a result of TRP tailings deposition into TSF2)	Seepage through base and embankments to groundwater cause impacts to groundwater quality and surface water	Minor surface water body about ~1.1 km south west of TSF2 Woljenup Creek about ~1.6km south east of TSF2	Refer to section 3.1.1	C = Minor L = Unlikely Medium Risk	N/A	Condition 1.3.1: TSF2 infrastructure requirements Condition 3.4.1: Groundwater monitoring	The decision report for W6283/2019/1 indicates seepage from TSF2 is occurring, which is transported to Cowan Brook Dam via an underlying surficial aquifer. Seepage recovery in place has been noted as insufficient. As discussed in section 2.2.1, the characteristics of the TRP tailings output will be similar to that currently being disposed to TSF2 and therefore it is not expected that this change in tailings composition will have any addition impact on the receiving environment. As, for this amendment, there will be no increase in the throughput of tailings deposition to TSF2 (currently approved up to 5 Mtpa), impacts associated with additional seepage from TSF2 (from any increase in tailings deposition) will be addressed in expected upcoming amendments to the licence regarding an increase in tailings deposition to TSF2.

Risk Event					Risk rating ¹	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	C = consequence L = likelihood			
Operation of the HDPE lined settlement pond associated with the TRP	Lithium and metal/metalloid contaminated process water	Overtopping and discharge to land	Minor surface water body about 1.1 km south west of TRP Woljenup Creek about 1.6km south east of TRP	Refer to section 3.1.	C = Moderate L = Unlikely Medium Risk	N	<u>New condition</u> Condition 1.3.8 – infrastructure inspection	The applicant has indicated that the pond is designed to overtop into Tin Shed Dam (located on a separate, but operationally related premises under licence L8501/2010/2). DWER notes that licence L8501/2010/2 will require amending to reflect discharge of potentially contaminated stormwater into Tin Shed Dam. A risk assessment on this discharge will be carried out at this time. <u>DWER control:</u> The applicant has indicated “routine facility inspections” but has not placed a frequency. Daily inspections of the pond to confirm the integrity of the liner, the need for sediment removal and whether the pond is overflowing been placed on the licence as a regulatory control.
Operation of reagent storage area associated with TRP	Hydrocarbons and reagent/process fluids	Accidental spills/release – direct discharge to land		Refer to section 3.1.	C = Minor L = Unlikely Medium Risk	Y	<u>Modification to existing conditions</u> Condition 1.2.1 – recovery/removal of spills	The licence holder is required to comply with the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> and the <i>Dangerous Goods Safety Act 2004</i> . The applicant proposed control for recovery of hydrocarbons and chemical reagents has been placed on the licence as a regulatory control (via modification to existing condition 1.2.1).
Operation of tailings pipeline connecting TRP to TSF2	Tailings or process water	Pipeline leak/rupture resulting in direct discharge to land	Adjacent native vegetation	Refer to section 3.1.	C = Moderate L = Unlikely Medium Risk	N	<u>New condition:</u> Condition 1.3.11 – pipeline requirements Condition 1.3.8 –	The applicant proposed control for isolation valves has been placed on the licence as a regulatory control. Applicant proposed daily inspections have been placed on the licence as a regulatory control.

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				
							pipeline inspections	<u>DWER control:</u> DWER considers existing licence conditions and external reference to the TSF operation manual as insufficient to mitigation risk. Talison has subsequently proposed an assessment of all pipelines and submission of plan to retrofit these pipelines. DWER has placed this on the licence as a regulatory control.
Water treatment plant (including WTF)								
Operation of WTP: treatment of process water to remove lithium	Treated process water (lithium removed)	Discharge to the mine water circuit (specifically Cowan Brook Dam, Southampton Dam and Austins Dam)	Water quality and ecology of creeklines and surface water bodies (tributaries of Blackwood River) Surface and groundwater users (human receptors)	Refer to section 3.1.	C = Minor L = Unlikely Medium Risk	Y	<u>Modification to existing conditions:</u> Condition 1.3.1 – modified to authorise discharge of treated process water to Austins dam, Southampton dam and Cowan Brook dam. Condition 3.3.1 – modified to include process monitoring for the WTP <u>New condition</u> Condition 1.3.10 – allowing operation of the WTP	Limited data indicates treated process water will contain a lithium content 0.14-0.16mg/L (treatment target of ≤0.5mg/L). Discharge of treated process water (with reduced lithium concentration), originally taken from the mine water circuit, back to the mine water circuit is likely to lower the contaminant loading of seepage, as long as water treatment is effective. The applicant proposed control for process monitoring of the water treatment plant have been placed on the licence as a regulatory control. Section 3.3.2 discusses efficacy of current lithium removal further.
	Liquid effluent – concentrated with lithium	Discharge, via WTF, of liquid wastes to mine water circuit (specifically Clear Water Dam), resulting in reduced efficiency			Refer to section 3.1.	C = Major L = Possible High risk	N	See section 3.3

Risk Event					Risk rating ¹	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	C = consequence L = likelihood			
		of water treatment						
	Process water (treated and effluent)	Discharge of liquid wastes to the mine water circuit (specifically Clear Water Dam) with risk of overtopping for Clear Water Dam	Water quality and ecology of creeklines and surface water bodies (tributaries of Blackwood River) Surface and groundwater users (human receptors)	Refer to section 3.1.	C = Major L = Likely High Risk	N	<p><u>Existing conditions</u></p> <p>Condition 2.2.1 – no discharge permitted off premises from Southampton or Cowan Brook Dam</p> <p><u>Modification to existing condition:</u></p> <p><u>Condition 1.3.1 – updated to include freeboard requirement for process water dams</u></p> <p><u>New condition:</u></p> <p><u>Condition 3.3.2 – water balance monitoring for the mine water circuit</u></p>	<p>DWER notes that Talison currently has issues with mine water circuit capacity:</p> <ul style="list-style-type: none"> The most recent annual environmental report (2020-2021) reported that on 18 September 2020, 8,400m³ of process water overflowed from Austins Dam overland through native vegetation to Cowan Brook Dam. Talison notified DWER on 6 August 2021 (DWERDT488002) that it had “minimal remaining capacity” in the Mine water circuit to store the rainfall runoff forecast for the remainder of the 2021 winter season” and predicted overflow events from Cowan Brook Dam and Southampton Dam were likely. Talison notified DWER that Cowan Brook Dam overflowed and discharged outside of the premises boundary (to Cowan Brook) for 15 continuous days from 27 October 2021 to 10 November 2021. <p>Condition 2.2.1 does not permit discharge off the premises from Southampton Dam or Cowan Brook Dam. This condition was placed on the licence as risk to off-site ecological receptors was risk assessed as “high”.</p> <p>Talison have notified DWER that they intend to submit a works approval or licence amendment to raise the process dam walls to increase the capacity of the process water dams</p>

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				
	Process water (treated, partially treated, untreated)							before 31 December 2022. The current licence does not require Talison to record and capture the water balance or dam capacity for the process water dams. <u>DWER control</u> As there capacity issues associated with the mine water circuit which been assessed as high risk to adjacent ecological receptors and surface/groundwater users, DWER has conditioned detailed water balance for Clear Water Dam.
		Rupture of pipelines	Water quality and ecology of creeklines and surface water bodies (tributaries of Blackwood River)	Refer to section 3.1.	C = Moderate L = Unlikely Medium Risk	N	<u>New conditions:</u> Condition 1.3.11 – pipeline requirements Condition 1.3.8 – pipeline inspections	<u>DWER control:</u> The applicant has proposed “regular” inspections for pipelines to and from the WTP. Daily visual inspections have therefore been placed on the licence as a control. Talison has subsequently proposed an assessment of all pipelines and submission of plan to retrofit these pipelines. DWER has placed this on the licence as a regulatory control.
		Failure of WTP and WTF containment, accidental spills/release	Surface and groundwater users (human receptors)	Refer to section 3.1.	C = Moderate L = Unlikely Medium Risk	Y	<u>New conditions:</u> 1.3.9 – construction of water treatment facility Condition 1.3.10 – operational requirements	Licence Holder proposed controls for maintenance of sumps and drains are considered sufficient and have been placed on the licence as regulatory controls. <u>DWER control</u> No controls to mitigate risks associated with leaks/spills from the water treatment facility have been proposed by the licence holder. As the facility is intended as an interim measure until an

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				
								alternative strategy is implemented in 2023, DWER has conditioned construction requirements for manual inspection of tank levels (rather than a requirement for an alarm system) and earthen bunding (rather than concrete bunding) to contain leaks/spills.
	Solid (lithium solid waste)	Contamination of soil, infiltration through soil to groundwater		Refer to section 3.1.	C = Minor L = Unlikely Medium Risk	Y	Condition 1.3.10 – operational requirements	Licence Holder proposed control for removal of solid wastes off-site by a licensed contractor is considered sufficient and has been placed on the licence as regulatory control. A timeframe of 30 days as been placed for removal.
	Treatment chemicals	Failure of WTP containment, accidental spills/release		Refer to section 3.1	C = Minor L = Unlikely Medium Risk	Y	<u>Modification to existing condition:</u> Condition 1.2.1 – recovery of spills	The Licence Holder is required to comply with the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> and the <i>Dangerous Goods Safety Act 2004</i> . The applicant proposed control for recovery of chemical reagents has been placed on the licence as a regulatory control (via modification to existing condition 1.2.1).
Arsenic remediation unit								
Operation of the ARU: treatment of process water to remove arsenic	Treated process water (arsenic removed)	Discharge to the mine water circuit (specifically Cowan Brook Dam, Southampton Dam and Austins Dam).	Water quality and ecology of creeklines and surface water bodies (tributaries of Blackwood River) Surface and groundwater	Refer to section 3.1	C = Moderate L = Possible Medium Risk	Y	<u>Modification to existing conditions:</u> Condition 1.3.1 – modified to authorise discharge of treated process water to Austins dam, Southampton dam and Cowan Brook dam.	Data indicates treated the arsenic remediation unit is approximately meeting the treatment target of ≤0.1mg/L. Discharge of treated process water (with reduced arsenic concentration), originally taken from the mine water circuit, back to the mine water circuit is likely to lower the contaminant loading of seepage, as long as water treatment

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				
			users (human receptors)				Condition 3.3.1 – modified to include process monitoring for the WTP <u>New condition</u> Condition 1.3.10 – replacing construction condition (former 1.3.13) and allowing on-going operation of the ARU	is effective. The applicant proposed control for process monitoring of the water treatment plant have been placed on the licence as a regulatory control. Section 3.3.2 discusses efficacy of current arsenic removal further.
	Liquid effluent – concentrated with arsenic (from ARU)	Discharge, via WTF, of liquid wastes to mine water circuit (specifically Clear Water Dam) reducing efficiency of water treatment.		Refer to section 3.1	C = Major L = Possible High risk	N	<u>New condition:</u> 1.3.9 – construction of water treatment facility See section 3.3 for additional controls placed	<u>DWER control:</u> A requirement for minimum treatment capability for the water treatment facility has been placed on the licence as a regulatory control. See section 3.3 for further detail and risk assessment.
	Solid (arsenic waste produced after processing via settling tanks)	Contamination of soil, infiltration through soil to groundwater		Refer to section 3.1	C = Minor L = Unlikely Medium Risk	Y	Condition 1.3.10 – operational requirements	Licence Holder proposed control for removal of solid wastes off-site by a licensed contractor is considered sufficient and has been placed on the licence as regulatory control.
Discharge along eastern premises boundary								
Discharge of contaminated stormwater along the eastern boundary (Carters Farm, Floyds North, Floyds South, Cemetery)	Contaminated water and surface water	Direct discharge into adjacent creeklines	Water quality and ecology of creeklines and surface water bodies (tributaries of Blackwood River) Surface and groundwater	Refer to section 3.1.	C = Major L = Possible High risk	N	See section 3.4	See section 3.4 for further detail and risk assessment.

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				
			users (human receptors)					
Inert landfill								
Increase throughput for inert landfill to 450 tonnes per year (not prescribed)	Dust	Air/windborne pathway causing impacts to amenity	Residential receptors (closest is 1.3km north west from the land fill)	Refer to section 3.1	C = Minor L = Unlikely Medium Risk	Y	<u>Existing condition:</u> Condition 1.3.5 – waste placed within trenches/bunds, placed within waste rock dump	The increase in throughput for inert waste / clean fill will not trigger the activity to become prescribed (is ancillary to prescribed activities). The current licence controls are considered sufficient to mitigate risk associated with increased throughput.
	Windblown waste					Y		
	Leachate	Seepage through base and embankments to soil and groundwater	Water quality and ecology of creeklines and surface water bodies (tributaries of Blackwood River)	Refer to section 3.1	C = Minor L = Unlikely Medium Risk	Y	<u>Existing condition:</u> Condition 1.3.5 – landfill cell not within 3m of the highest water table level	
	Contaminated surface water	Surface water run off causing contamination of nearby creek lines	Surface and groundwater users (human receptors)	Refer to section 3.1	C = Minor L = Unlikely Medium Risk	Y	<u>Existing condition:</u> Condition 1.3.5 – not within 100m of any surface water body	

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.

3.3 Detailed risk assessment – impacts of process water seepage from the mine water circuit on ecological and surface/groundwater users

3.3.1 The mine water circuit

The mine water circuit at the premises is made up of several unlined earthen dams containing process water (Figure 6 and Figure 7). Process water generated at the premises is contaminated with metals and metalloids including lithium, arsenic, manganese and nickel. The process water from the mine water circuit is discharging via seepage (and overflow) to off-site surface water bodies and creeks. The WTP and ARU are designed to treat contaminated water from Clear Water Dam (the most contaminated dam) to reduce lithium and arsenic contamination in the mine water circuit (with cleaner treated process water being cycled back into the other process water dams on site). This consequently will reduce contaminant concentrations within the seepage.

The department notes from the discussion in the following sections that:

- Current emissions (associated with the mine water circuit) from site are not being appropriately managed;
- Discharge of effluent (contaminated with lithium and arsenic) from the WTP and ARU (via the WTF) back into Clear Water Dam is likely to reduce efficiency of water treatment and reintroduce contaminants to the mine water circuit;
- Further expansions of ore processing infrastructure are planned for the site which may increase the contaminant load of process water.

A schematic overview summarising inputs and outputs for the mine water circuit is included in Appendix 1. Clear Water Dam currently receives contaminated liquid waste streams including tailings decant, seepage, mine dewater, process water (seepage return and decant), contaminated stormwater and overflows from Lithium Processing Plant siltation trap. Water stored in Clear Water Dam flows via seepage (and overflow) into Austins Dam. Austins Dam flows via seepage (and overflow) into Southampton Dam and sporadically overflows (over land) into Cowan Brook Dam⁵.

3.3.2 Characterisation of the current mine water circuit

The licence requires water quality monitoring of the process water dams (Cowan Brook Dam, Southampton Dam and Austins Dam). Monitoring of the water quality of Clear Water Dam is not currently required by the licence but is undertaken by Talison and has recently been conditioned as part of works approval W6618/2021/1⁶ (approved 8 March 2022).

Consequence criteria

The following guidelines have been used for consequence assessment criteria for freshwater ecosystems and surface water quality:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018, 95% protection level trigger values (ANZG 2018).
- Specific for lithium: 0.42mg/L - there is no published water quality guideline for lithium;

⁵ The most recent annual environmental report (2020-2021) indicated there was an overflow event where 8,400m³ of water flowed overland through native vegetation to Cowan Brook Dam.

⁶ Works approval W6618/2021/1 authorises construction and time limited operations relating to category 5 related activities, namely a new tailings storage facility (TSF4) at Talison Lithium Mine.

this guideline value is derived from site specific ecotoxicity testing of tailings effluent (CERNMM, 2013).

The following guidelines have also been included for comparison⁷:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality Long Term Irrigation Water (ANZECC & ARMCANZ, 2000, LTI)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality Livestock drinking water quality (ANZECC & ARMCANZ, 2000, Livestock)
- National Health and Medical Research Council, Australian Drinking Water Guidelines 6, v 3.7, 2011, updated January 2022 (NHMRC, 2011)

Monitoring data – mine water circuit

Quarterly monitoring for the 2020-2021 period (AER, 2020-2021) is summarised in Table 5 below and indicates elevated concentrations of arsenic, manganese and lithium:

- Arsenic exceeded ANZG (2018) 95% freshwater protection values and drinking water guidelines for Austin Dam and Southampton Dam and for seepage from Cowan Brook Dam;
- Manganese levels exceed ANZG 2018 95% freshwater and long-term irrigation values;
- Lithium concentrations in the on-site process dams range from 6.4 – 11mg/L and seepage from Cowan Brook Dam recorded a maximum lithium concentration of 3.1mg/L. Concentrations exceeded the CERNMM (2018) derived value for lithium and ANZG 2018 long term irrigation values; and
- DWER notes that uranium has not been analysed at the correct level of reporting to allow appropriate comparison with ANZG 95% protection values.

Historical lithium and arsenic data for process dams on-site are displayed on Figure 8 and Figure 9.

⁷ Note that these guidelines have been used for assessment purposes and do not necessarily reflect environmental endpoints.

Table 10 Monitoring data (AER 2020-2021) – onsite dams and off-site Norilup Dam

Analyte	As	Cd	Cr	Cu	Mn	Ni	U	Li	Co	Fe	Th	CrVI	Mg	Cl	NO3	SO4	pH	Eh	DO	EC	
Unit	mg/L																pH units	mV	mg/L	µS/cm	
ANZG (2018) FW 95%	0.013	0.0002	0.001	0.0014	1.9	0.011	0.0005 ⁶	0.42 ²	0.0014	-	-	0.001	-	-	-	-	-	-	-	-	
ANZECC & ARMCANZ (2000) LTV Irrigation ³	0.1	0.01	0.1	0.2	0.2	0.2	0.01	2.5	0.05	-	-	-	-	700	-	-	-	-	-	-	
ANZECC & ARMCANZ (2000) Livestock ³	0.5-5	0.01	1	0.4-5	-	1	0.2	-	1	0.2	-	-	-	-	5	-	-	-	-	-	
NHMRC Drinking Water (2011) ³	0.01	0.002	0.05	2	0.5	0.02	0.02	-	-	-	0.5Bq/L ⁵	0.05	-	-	50	250 ⁴	6.5-8.5	-	-	-	
Licence	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6-9 ¹	-	-	-	
Clear Water Dam ⁷	18/01/2021	0.4	<0.005	-	<0.005	0.57	<0.005	<0.1	18.2	<0.005	0.19	<0.05	-	-	-	-	8.86	-	-	-	
	12/04/2021	0.12	<0.005	-	<0.005	0.134	<0.005	<0.1	18.8	<0.005	0.23	<0.05	-	-	-	-	7.8	-	-	-	
Cowan Brook Dam	1/07/2020	0.006	<0.0001	<0.001	<0.001	<0.001	<0.001	0.001	6.4	<0.001	0.02	<0.001	<0.001	36	410	0.025	120	8.3	407	9.9	1,900
	1/10/2020	0.003	<0.0001	<0.001	<0.001	<0.001	<0.001	0.001	4.6	<0.001	0.02	<0.001	<0.001	35	400	0.034	140	8.4	411	10	1,800
	13/01/2021	0.003	<0.0001	<0.001	0.003	<0.001	<0.001	<0.001	5.7	<0.001	0.01	<0.001	<0.001	35	410	<0.005	140	8.5	426	8.9	2,000
	12/04/2021	0.004	<0.0001	<0.001	<0.001	0.063	<0.001	<0.001	5.8	<0.001	0.01	<0.001	<0.001	36	400	0.017	140	8.4	410	10.8	2,000
Austins Dam	1/07/2020	0.04	<0.0001	<0.001	<0.001	<0.001	<0.001	0.006	11	<0.001	0.01	<0.001	<0.001	24	300	<0.005	180	8.7	405	11.5	1,700
	1/10/2020	0.036	<0.0001	<0.001	<0.001	<0.001	0.001	0.005	7.3	<0.001	0.01	<0.001	<0.001	20	240	<0.005	160	8.6	407	20.3	1,400
	13/01/2021	0.05	<0.0001	<0.001	<0.001	0.001	<0.001	0.004	9.6	<0.001	0.04	<0.001	<0.001	20	240	<0.005	160	8.9	400	9.5	1,500
	12/04/2021	0.061	<0.0001	<0.001	<0.001	<0.001	<0.001	0.003	8.3	<0.001	0.01	<0.001	<0.001	17	220	0.023	140	8.8	396	11.3	1,400
Southampton Dam	1/07/2020	0.03	<0.0001	<0.001	<0.001	<0.001	<0.001	0.004	11	<0.001	0.04	<0.001	<0.001	26	330	<0.005	180	8.5	403	10.3	1,800
	1/10/2020	0.027	<0.0001	<0.001	<0.001	<0.001	0.001	0.005	7.4	<0.001	0.01	<0.001	<0.001	22	270	<0.005	170	8.5	411	19.4	1,500
	13/01/2021	0.088	<0.0001	<0.001	<0.001	<0.001	<0.001	0.004	10	<0.001	0.01	<0.001	<0.001	22	270	<0.005	170	8.9	408	11.5	1,600
	12/04/2021	0.071	<0.0001	<0.001	<0.001	<0.001	<0.001	0.003	9.9	<0.001	0.01	<0.001	<0.001	22	280	0.035	160	8.5	405	11.2	1,700
Cowan Brook Seepage	1/07/2020	<0.001	<0.0001	<0.001	<0.001	0.42	<0.001	<0.001	2.7	-	-	-	-	-	-	-	-	-	-	-	-
	1/10/2020	0.027	<0.0001	<0.001	<0.001	0.6	0.002	<0.001	1.9	-	-	-	-	-	-	-	-	-	-	-	-
	13/01/2021	0.044	<0.0001	<0.001	<0.001	0.49	0.001	<0.001	2.2	-	-	-	-	-	-	-	-	-	-	-	-
	12/04/2021	0.014	<0.0001	<0.001	<0.001	0.45	0.001	<0.001	2.4	-	-	-	-	-	-	-	-	-	-	-	-
	8/06/2021	0.015	<0.0001	<0.001	<0.001	0.41	0.002	<0.001	3.1	-	-	-	-	-	-	-	-	-	-	-	-
Norilup Dam	1/07/2020	<0.001	<0.0001	<0.001	<0.001	0.016	<0.001	<0.001	0.17	<0.001	0.04	<0.001	<0.001	34	420	1	29	7.8	425	9.3	1,600
	1/10/2020	<0.001	<0.0001	<0.001	<0.001	0.008	<0.001	<0.001	0.11	<0.001	0.08	<0.001	<0.001	29	310	0.13	27	8.3	403	11.9	1,200
	13/01/2021	0.001	<0.0001	<0.001	0.007	0.006	<0.001	<0.001	0.2	<0.001	0.03	<0.001	<0.001	34	380	<0.005	25	8.5	407	9.7	1,500
	12/04/2021	0.002	<0.0001	<0.001	<0.001	0.01	<0.001	<0.001	0.26	<0.001	0.01	<0.001	<0.001	36	410	0.02	23	8.2	403	11.1	1,700

General note: where a value exceeds multiple criteria, shading from the higher criteria number is used.

Note 1: Limit does not apply to Cowan Brook Dam Seepage

Note 2: No published water quality guideline exists; guideline derived from site specific ecotoxicity testing of tailings effluent (CERNM, 2013)

Note 3: Listed for comparison purposes and not intended to reflect environmental endpoints

Note 4: Aesthetic value for sulfate. Purgative effectiveness may occur if the concentrations exceed 500mg/L.

Note 5: For drinking water there are no specific reference levels set for specific alpha or beta emitting radionuclides. Specific alpha or beta emitting radionuclides should be determined if the gross alpha screening value in drinking water exceeds 0.5 Bq/L, or if the gross beta screening value (with the contribution of potassium-40 subtracted) exceeds 0.5 Bq/L, or if there is a specific reason to analyse for individual radionuclides.

Note 6: DWER recommends that the laboratory limit of reporting is adjusted for future monitoring of Uranium as the current LOR is insufficient for comparison with relevant guidelines.

Note 7: Monitoring of Clear Water Dam is currently not included within the licence. Weekly monitoring of clear water dam has been undertaken from January 2021 - August 2022. Equivalent sampling dates have been included with this table so as to allow comparison.

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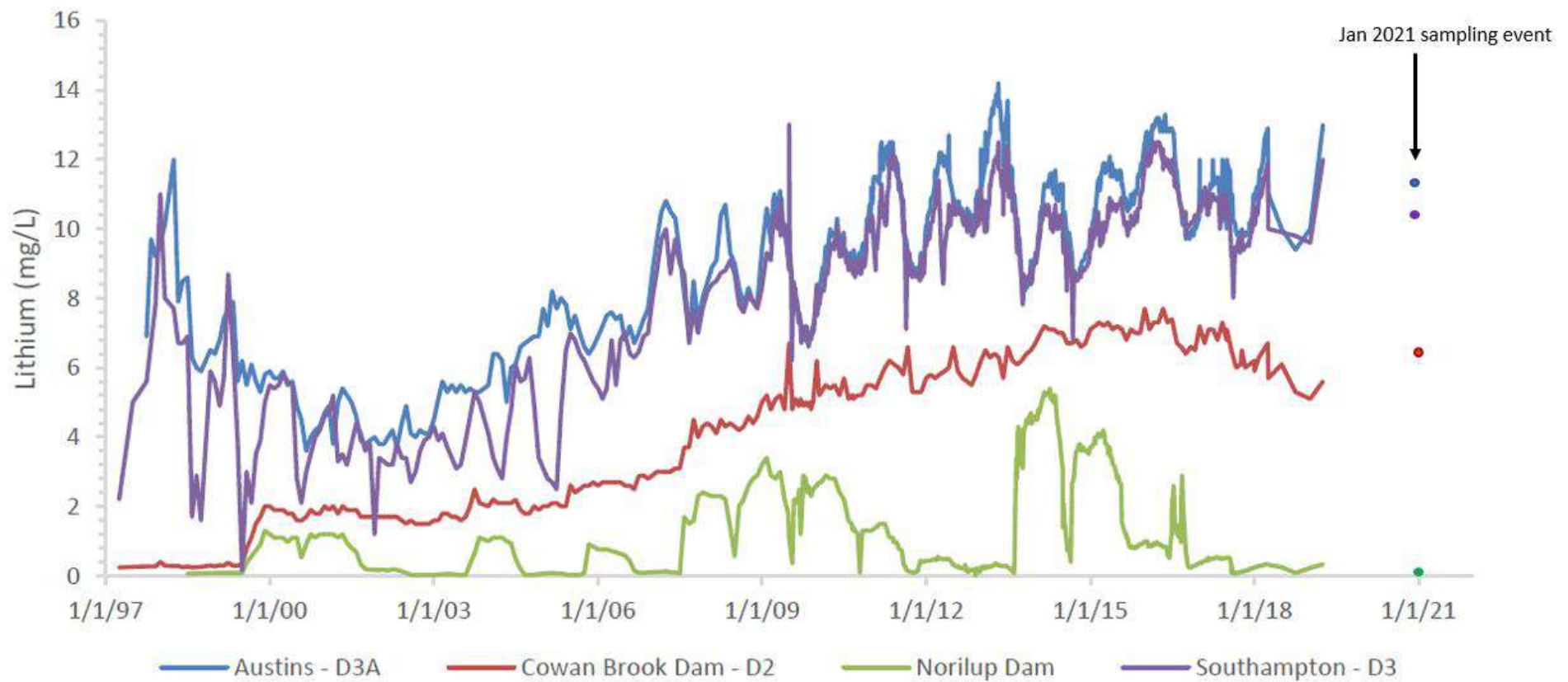


Figure 8 Historical lithium concentrations for process dams and Norilup Dam (adapted from GHD (2019) and AER 2020 – 2021 monitoring data [January 2021 sampling event added for comparison])

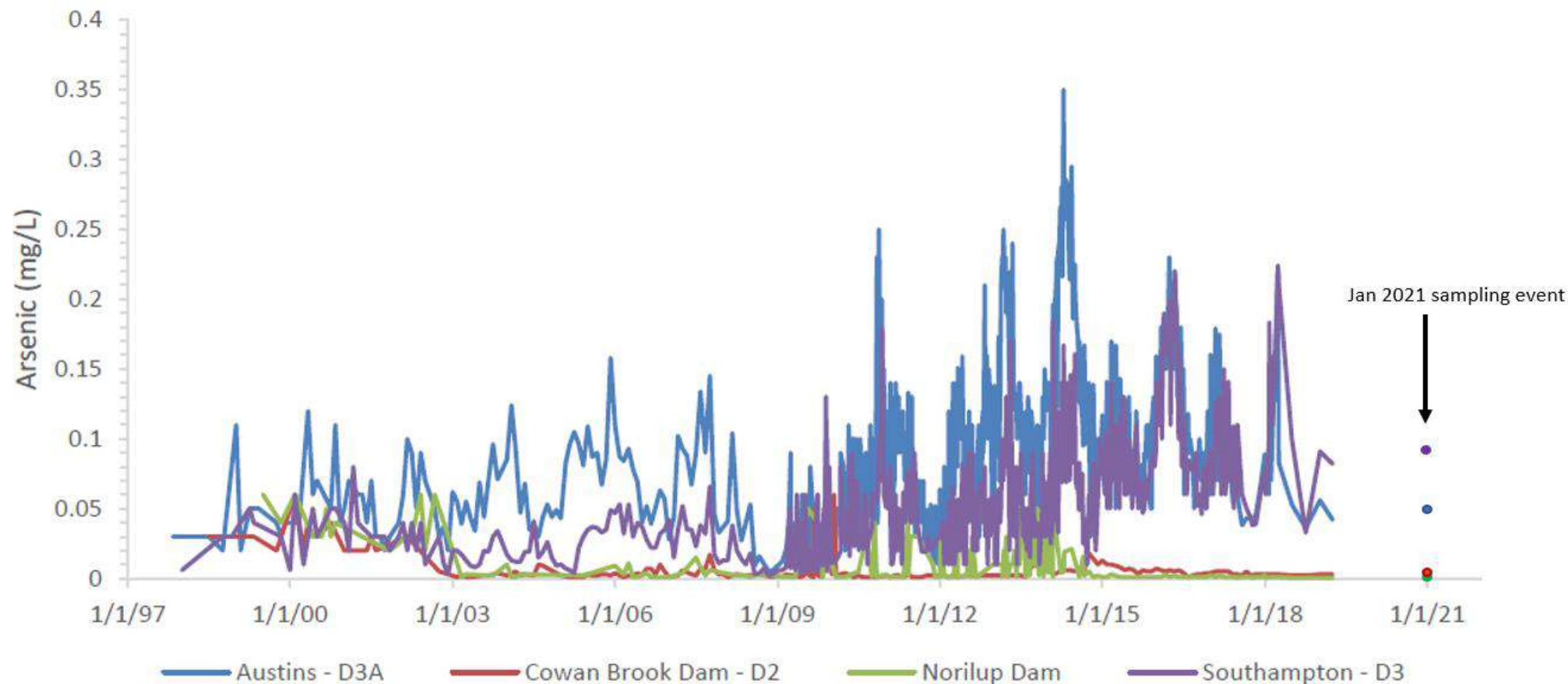


Figure 9 Historical arsenic concentrations for process dams and Norilup Dam (adapted from GHD (2019) and AER 2020 – 2021 monitoring data [January 2021 sampling event added for comparison])

3.3.3 Pathway of process water seepage to sensitive receptors

Surface water

Process water in the mine water circuit is discharging via seepage (and overflow) to off-site surface water bodies and creeks:

- Seepage from Cowan Brook Dam flows into Cowan Brook and into Norilup Dam. The most recent data as reported in the Annual Environmental Report (AER, 2020-2021) indicates that Cowan Brook Dam has a consistent seepage flow rate between 1.6 to 9 m³/hr from into Cowan Brook⁸.
- Seepage from Southampton Dam flows into Spring Gully and into Schwenke's Dam. Flow from Schwenke's Dam goes to Mt Jones Dam before flowing into Norilup Dam. The volume of seepage from Southampton Dam is not currently required to be monitored by the licence and a volume figure has not been provided by the licence holder.
- These off-site surface water brooks and dams flow into the Blackwood River (Figure 7).

Arsenic and lithium have been detected in creek lines and sediment samples downstream to the west of the site:

- Lithium concentrations ranging from 0.11 – 0.26mg/L were detected in water from the Norilup dam during the 2020-2021 period (Table 10). On the 17 February 2022 the Licence Holder notified the department that they had identified an exceedance to the lithium limit of 3mg/L specified in the Licence. Sampling carried out on 25 January 2022 showed a lithium level of 3.1mg/L in Norilup Dam.
- Surface water monitoring, undertaken for the annual ecological surveys (required by condition 3.4.3), reported lithium concentrations up to 1.3mg/L in 2021 (Table 11), exceeding the 0.42mg/L site specific guideline, in creeklines downstream of Cowan Dam (site 1 and 2 as shown in Figure 12).
- Sediment sampling, undertaken for the annual ecological surveys, reported arsenic concentrations up to 79.6mg/kg and lithium concentrations up to 22.6mg/kg, in 2021, within creeklines downstream of Cowan Brook Dam (Table 12 and Table 13).

There are no licenced surface water monitoring sites downstream of Southampton dam or along Woljenup Creek to the south of site. There are two surface water monitoring sites along Woljenup Creek (SW20/02 & SW20/03) regulated under works approval W6618/2021/1⁹ for which monitoring data has yet to be submitted.

Table 11 Lithium concentrations in surface water down stream of Cowan Dam

	2017	2018	2019	2020	2021
Sampling sites	Lithium (filtered mg/L)				
Site 1A	1	1.2	1	0.92	1.1
Site 2A	1.2	1.2	1	0.99	1.3
Site 7A	0.09	0.07	0.14	0.05	0.10
Site 8A	0.10	0.07	0.15	0.05	0.11
Site 9A	0.10	0.09	0.17	0.06	0.10

⁸ Cowan brook seepage is measured at a site located at the base of the Cowan Brook Dam. Seepage is monitored via manual flow gauging station on the downstream side of the Dam Wall. The station comprises a weir box enabling level height measurement from which flow rates can be estimated (stand v-notch weir). Water levels in the weir box are measured at least monthly

⁹ Works approval W6618/2021/1 authorises construction and time limited operations relating to category 5 related activities, namely a new tailings storage facility (TSF4) at the Talison Lithium Mine.

Site 10A	0.10	0.13	0.21	0.10	0.11
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Table 12 Arsenic concentrations in sediment down stream of Cowan Brook Dam

	2017	2018	2019	2020	2021
Sampling sites	Arsenic (total recoverable mg/kg)				
Site 1	14	11.6	322	37.8	5.8
Site 2	21.6	27.4	14.4	53.2	50
Site 7	5.80	3.60	5.40	7.20	4.00
Site 8	8.20	8.80	7.80	6.20	4.60
Site 9	6.40	6.40	5.80	9.00	5.40
Site 10	18.00	48.60	12.80	5.20	79.60

Table 13 Lithium concentrations in sediment down stream of Cowan Brook Dam

	2017	2018	2019	2020	2021
	Lithium (total recoverable mg/kg)				
Site 1	-	-	47.6	58.4	13.4
Site 2	-	-	93.2	49.6	55
Site 7	-	-	19.00	24.60	20.40
Site 8	-	-	20.00	16.00	11.00
Site 9	-	-	7.02	5.36	10.20
Site 10	-	-	19.20	6.78	22.60

Groundwater

Groundwater is hosted within shallow and deep aquifers on-site and is being impacted by seepage from both the mine water circuit and tailings storage facility 2 (TSF2). A hydrogeological investigation by GHD (2019a) indicates a lateritic profile beneath the site approximately 2 – 3 metres thick, underlain by saprolitic clays (weathered basement) generally 20 - 40 metres thick. Clays are underlain by basement rock. Groundwater flow mostly occurs at the base of the weathered profile near the contact with fresh granitic bedrock, and in fractures in the partially weathered bedrock.

GHD (2019a) indicate groundwater flow also occurs in a seasonal perched aquifer (during winter and spring) in near-surface regolith materials. This shallow sub-surface flow has the potential to be a significant transport pathway for contaminants from the premises. GHD (2019a) suggest that under usual conditions in the region, flow of this perched aquifer usually only takes place after a prolonged period of rainfall in winter and spring. However, discharge could take place throughout the year under conditions where there is a continuous source of seepage, such as from a TSF. It is likely that a significant component of the shallow subsurface flow discharges into creeks surrounding the site.

The premises currently has a network of groundwater monitoring bores, on the licence, screened at different intervals: shallow, intermediate and deep¹⁰ (Figure 10). Impacts have been detected for bores screened at all depths, with elevated levels of lithium, arsenic, manganese, nickel and total dissolved solids. Lithium and arsenic concentrations for 2020-2021 monitoring are given in Table 14. DWER notes, M17/07S, to the south of site, detected lithium concentrations ranging from 2.3 – 7.6mg/L for quarterly monitoring during the 2020-2021 period. GHD (2019a) has previously indicated, using the geochemical signature of the water, that bore MB17/08 is being impacted by the mine water circuit and that seven other bores are potentially

¹⁰ There are additional monitoring bores for the site which are currently not included on the licence or are associated with active works approvals which have not yet been added to the licence.

impacted (MB17/01S, MB17/02S, MB17/01I, MB17/02I, MB17/07D, MB97/5D, MB97/1D). There are no monitoring wells immediately down-gradient to the west from the mine water circuit.

Monitoring wells immediately adjacent to TSF2 indicate groundwater depths nearly at surface level (MB17/01S, MB17/01I, MB97/5D). Other wells recorded depths ranging from ~1.5 to 10m bgl. The deeper aquifer was recorded at depths ranging between 18 to 22 mbgl (MB97/2 and MB01/11).

A high degree of connectivity between surface water and groundwater has been identified at the premises. The model by GHD (2019a) indicates the direction of groundwater flow on-site is generally topographically controlled and consistent with the direction of surface drainage. Figure 11 groundwater generally flows radially outward from the site with topography.

Table 14 Lithium and arsenic concentrations in licenced quarterly groundwater monitoring 2020-2021

Screen depth		Jul 20	Oct 20	Feb 21	Apr 21	Jul 20	Oct 20	Feb 21	Apr 21
	ID	Lithium (mg/L)				Arsenic (mg/L)			
Shallow	MB17/01S	0.03	0.01	0.01	0.01	<0.001	<0.001	<0.001	<0.001
	MB17/02S	0.06	0.17	0.06	0.06	<0.001	<0.001	0.001	<0.001
	MB17/06S	0.17	0.09	0.09	0.39	0.014	0.005	0.013	0.006
	MB17/07S	4.5	2.3	3.5	7.6	0.002	0.002	0.002	0.003
	MB17/08S	0.06	0.03	0.04	0.05	<0.001	<0.001	0.002	0.007
Intermediate	MB17/01I	0.01	0.01	0.01	0.01	0.001	<0.001	<0.001	<0.001
	MB17/02I	<0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.001	<0.001
	MB17/03I	0.11	0.12	0.13	0.15	<0.001	<0.001	0.001	0.001
	MB17/04I	0.13	0.15	0.1	0.15	<0.005	<0.005	<0.005	0.001
	MB17/06I	0.11	0.1	0.12	0.12	0.005	0.003	0.005	0.005
Deep	MB97/5D	0.02	0.03	0.03	0.03	<0.001	<0.001	<0.001	<0.001
	MB17/02D	0.03	0.03	0.03	0.03	<0.001	<0.001	<0.001	<0.001
	MB97/4	0.02	0.14	0.16	0.16	0.01	0.001	0.002	0.001
	MB17/04D	0.1	0.12	0.13	0.15	0.006	0.006	0.007	0.006
	MB17/05D	0.01	0.01	0.05	0.01	<0.001	<0.001	<0.001	<0.001
	MB17/06D	0.16	0.13	0.16	0.15	0.009	0.008	0.007	0.008
	MB17/07D	0.49	0.35	0.46	0.45	<0.001	0.001	0.001	<0.001
	MB3	<0.001	0.04	0.04	0.02	<0.001	0.002	0.002	<0.001
	MB01/9	0.03	0.02	0.02	0.02	<0.001	<0.001	<0.001	<0.001
MB01/1	0.09	0.1	0.11	0.11	<0.001	<0.001	<0.001	<0.001	
Other	MB97/1	0.02	0.04	0.05	0.04	0.072	0.11	0.037	0.05
	MB97/2	0.2	0.21	0.22	0.22	<0.002	<0.001	<0.002	<0.002
	MB01/11	0.06	0.08	0.07	0.08	0.006	0.008	0.006	0.008

Note: shading indicates exceedance of 0.42mg/L site specific criteria for lithium and 0.013mg/L ANZG 95% Freshwater criteria for arsenic

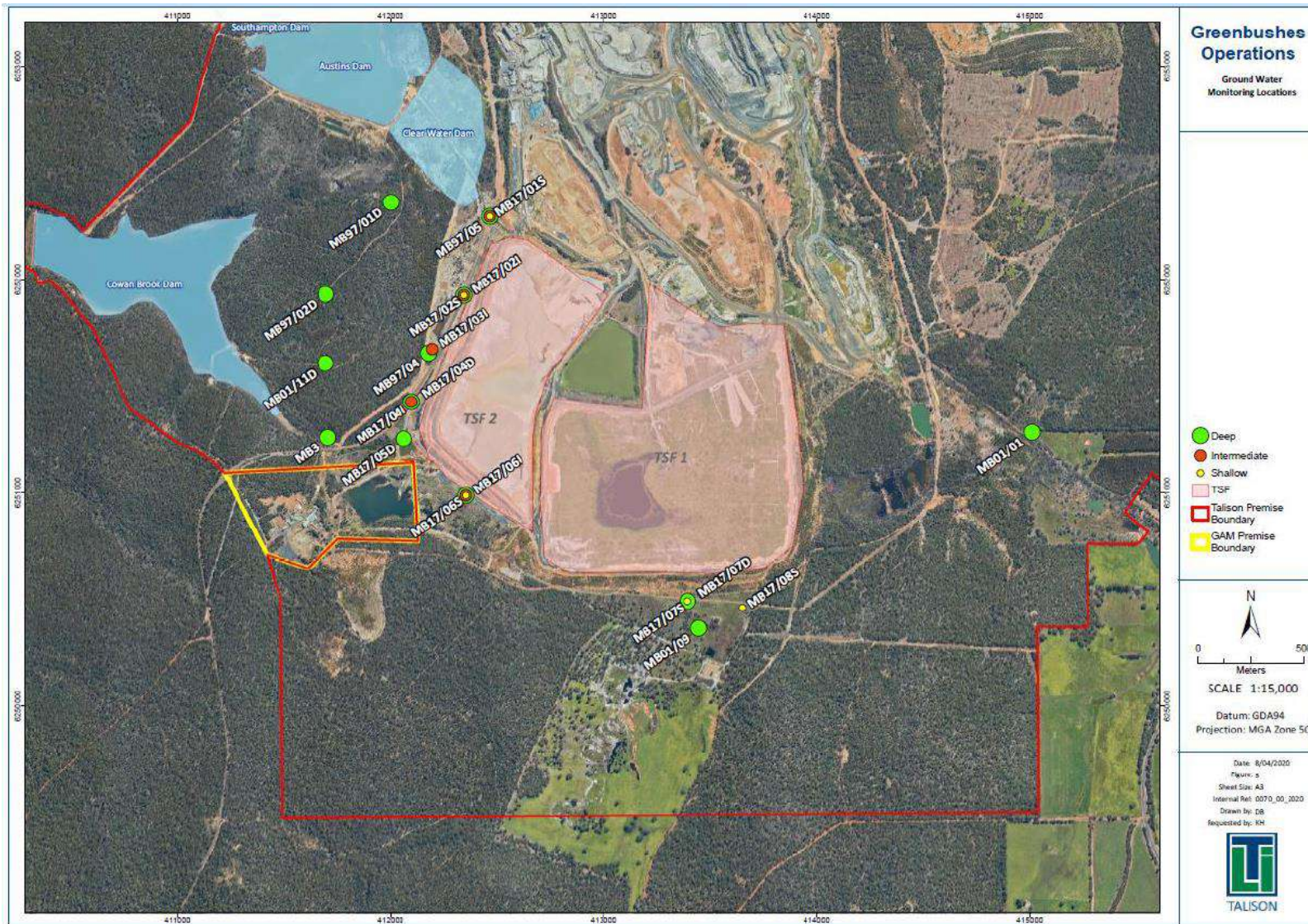


Figure 10 Groundwater monitoring locations on the current licence

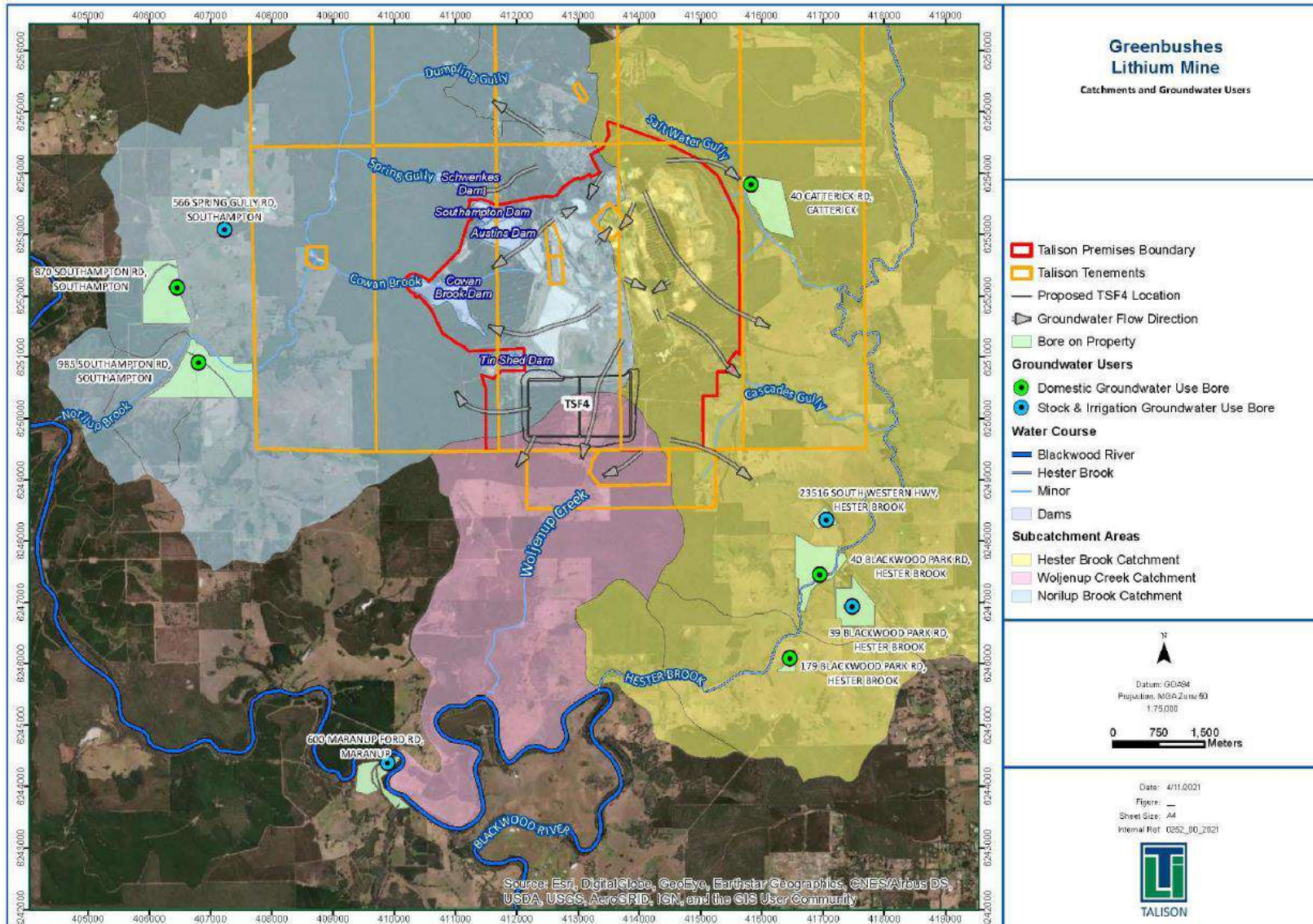


Figure 11 Groundwater flow direction at the premises and groundwater users (GHD, 2019a)

3.3.4 Potential impact to surface water ecology

Amendment Notice 3 (2018) permitted a throughput increase from 2.3 Mtpa to 4.7 Mtpa. The amendment report indicates that the approved increase was conditional on there being no off-site discharges of process water from the process water dams. The assessment found that the throughput increase posed a 'high risk' to freshwater aquatic species abundance and diversity, reduced ecological function and potential third-party impacts to surface water users (see section 3.3.5). Condition 2.2.2 was added to the Licence to support there being no off-site discharges and states "the licence holder is not permitted to discharge off the premises from Southampton Dam or from Cowan Brook Dam".

In addition, licence condition 3.4.3 requires an annual ecological assessment of 4 sites upstream and 6 sites downstream of Norilup Dam (Figure 12) for:

- water and sediment quality;
- macroinvertebrate and aquatic fauna diversity and abundance; and
- bioaccumulation of contaminants in fish and crayfish.

DWER has undertaken technical review of the 2017 – 2020 annual ecological assessments (CERNM, 2017-2020) provided to meet the requirements of this condition. The licence holder has also provided initial data from the 2021 assessment (CERNM, 2021; full report not yet provided to DWER). The ecological assessments show lithium and arsenic continue to be discharged to the surface water bodies and creeks on the western boundary of the premises. Contaminant concentrations within aquatic receiving environments continue to exceed natural/background levels and environmental guidelines. The ecological assessments suggest there is no clear evidence of a change in the structure of biological communities at the sites assessed and that although some minor differences in ecological indicators were found, there was no clear trend where upstream sites differed significantly from downstream sites.

The licence holder has indicated that they believe sites 3, 4 and 6 are considered upstream and therefore represent background lithium levels. From information provided by GHD (2019a) and assessment undertaken by DWER, it appears that surface and groundwater flow radially outward from the site with topography. These locations may therefore be downstream of the premises. It is therefore considered unlikely these locations represent naturally occurring background conditions.

DWER also notes there is clear evidence of elevated concentrations of lithium and arsenic in waters, sediments and in animal flesh surrounding the mine site (see Table 15 and Table 16 below) particularly in the area immediately below Cowan Brook Dam (see sampling locations in Figure 12). Notably, bioaccumulation data show that fish and crayfish west of the mine site have higher levels of As, Li and Fe in tissues and lower levels of Cd, Co, Mn, Mg and Ni.

Table 15 Concentrations (mean average) of bioaccumulated arsenic in fish and crayfish downstream of Cowan Brook Dam and Norilup Dam

		2017	2018	2019	2020	2021
Type	Site	Arsenic (mg/kg)				
Fish	Site 1	0.222	0.178	0.164	0.082	0.068
	Site 2	0.270	2.336	0.132	0.234	0.130
	Site 10	0.254	0.058	0.088	0.088	0.040
	Site 7	0.128	0.142	0.102	0.088	0.138
	Site 8	0.100	0.060	0.074	0.102	0.046
	Site 9	0.066	0.092	0.092	0.094	0.146
Crayfish	Site 1	0.554	0.394	1.220	0.768	0.412
	Site 2	0.474	1.062	0.544	0.600	0.664

	Site 10	0.216	0.258	0.406	0.462	0.188
	Site 7	0.184	0.158	0.312	0.298	0.290
	Site 8	0.234	0.174	0.384	0.338	0.262
	Site 9	0.236	0.238	0.535	0.340	0.210

Note: >0.2mg/kg: bolded, >0.4mg/kg shaded light orange, 0.5-1mg/kg shaded orange, >1mg/kg shaded red

Table 16 Concentrations (mean average) of bioaccumulated lithium in fish and crayfish downstream of Cowan Brook Dam and Norilup Dam

		2017	2018	2019	2020	2021
Type	Site	Lithium (mg/kg)				
Fish	Site 1	0.430	0.760	0.594	0.306	0.296
	Site 2	0.606	0.738	0.572	0.668	0.618
	Site 10	0.210	0.114	0.049	0.089	0.124
	Site 7	0.027	0.282	0.091	0.134	0.314
	Site 8	0.138	0.097	0.062	0.124	0.131
	Site 9	0.063	0.076	0.095	0.098	0.236
Crayfish	Site 1	0.404	0.354	0.514	0.474	0.640
	Site 2	0.288	0.468	0.604	0.396	0.330
	Site 10	0.049	0.101	0.148	0.182	0.198
	Site 7	0.087	0.178	0.236	0.144	0.116
	Site 8	0.073	0.062	0.198	0.196	0.117
	Site 9	0.043	0.069	0.164	0.130	0.099

Note: >0.2mg/kg: bolded, >0.4mg/kg shaded light orange, 0.5-1mg/kg shaded orange, >1mg/kg shaded red

DWER's notes that, as bioaccumulation is occurring, the biological responses may become more significant and obvious over time. This could be through chronic or delayed effects, or due to impacts that will occur if metals or other contaminants continue to accumulate in the system (i.e. when ecological tipping points are reached).

DWER's technical review has identified a number of data gaps with respect to monitoring locations selected. Assessments are limited to a single sampling event each year at a small number of sites which are relatively nested within different zones and with minimal description of habitat or sampling conditions in which to assess representatives. Off-site impacts could be occurring to the east (Hester Brook¹¹) and south (Woljenup Creek), which have yet to be appropriately investigated. Insufficient sampling locations along the western boundary were also noted, including sampling locations which would allow assessment of risk to Blackwood River.

Confidence in the quality of the data provided within the ecological assessments is reduced based on the considerations summarised in Appendix 3.

¹¹ Discharge of contaminated water also currently occurs to the east of site from at "Floyds North", "Floyds South" and "Carters Farm" (Figure 20). This is discussed further in section 3.4.

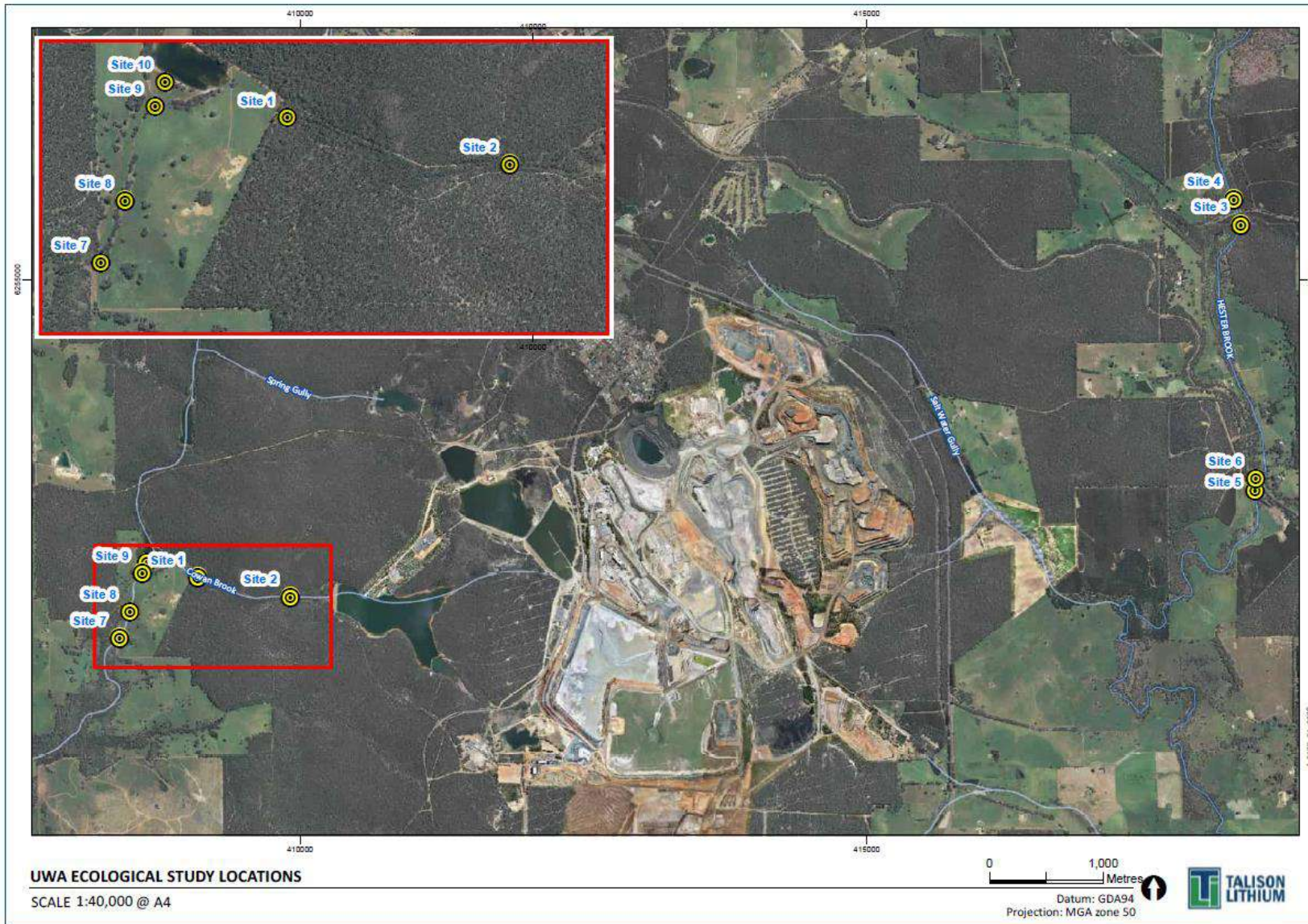


Figure 12 Sites investigated for the annual ecological assessment

L4247/1991/13

3.3.5 Potential impact to off-site surface water and groundwater users

A survey by Talison in 2021 identified surface and groundwater users downstream to the west, south and east of the site as shown in Figure 5. Surface and groundwater use included drinking water, domestic purposes (showering, household etc), stock, aquaculture (ID 7), swimming (ID's 32 and 33), stock and irrigation (Table 17).

Table 17 Summary of surface and groundwater users identified

	Surface Water use				
	Drinking water	Domestic (shower, household,..)	Stock	Irrigation	Other (swim)
Water User ID (as per Figure 5)	3, 4, 26	7, 12, 28, 34	5, 7, 9, 11, 12, 15, 19, 24, 25, 27, 28, 34	26, 15, 24, 30, 33	32, 33
Total users	3	4	12	5	2
	Groundwater use				
	Drinking water	Domestic (shower, household,..)	Stock	Irrigation	Total reliance on groundwater
Water User ID (as per Figure 5)	3	11, 12, 15, 28, 36	2, 4, 15, 28, 35	1, 4, 11, 12, 35	3, 11, 12, 15, 35
Total users	1	4	5	5	5

Limited water quality data for bore water and surface water used by these receptors has been submitted to DWER. Some sampling of farm dams (ID 9) has been undertaken to the south of site, adjacent to Woljenup creek. These include farm properties using surface water dams for stock use as well as for domestic use. Sampling was undertaken for these sites in 2017 (Figure 13) and 2020 (Figure 14). For sampling undertaken in 2017 (GHD, 2017), site 7 appears to be within the same surface water site as SW20/02 analysed in 2020 (Talison, 2020a). Site 4¹² (2017) is in close proximity to SW20/01 sampled in 2020.

Monitoring results from available surface water locations are summarised in Table 18. Lithium was detected in all farm dams sampled off site in 2020. No lithium was detected for monitoring undertaken in 2017. Arsenic was detected in all samples in 2020 but was below the detection limit in 2017.

DWER notes large information gaps with respect to available data to assess the quality of the water utilised by the other surface and groundwater users.

¹² Within the proposed TSF4 footprint approved under W6618/2021/1.

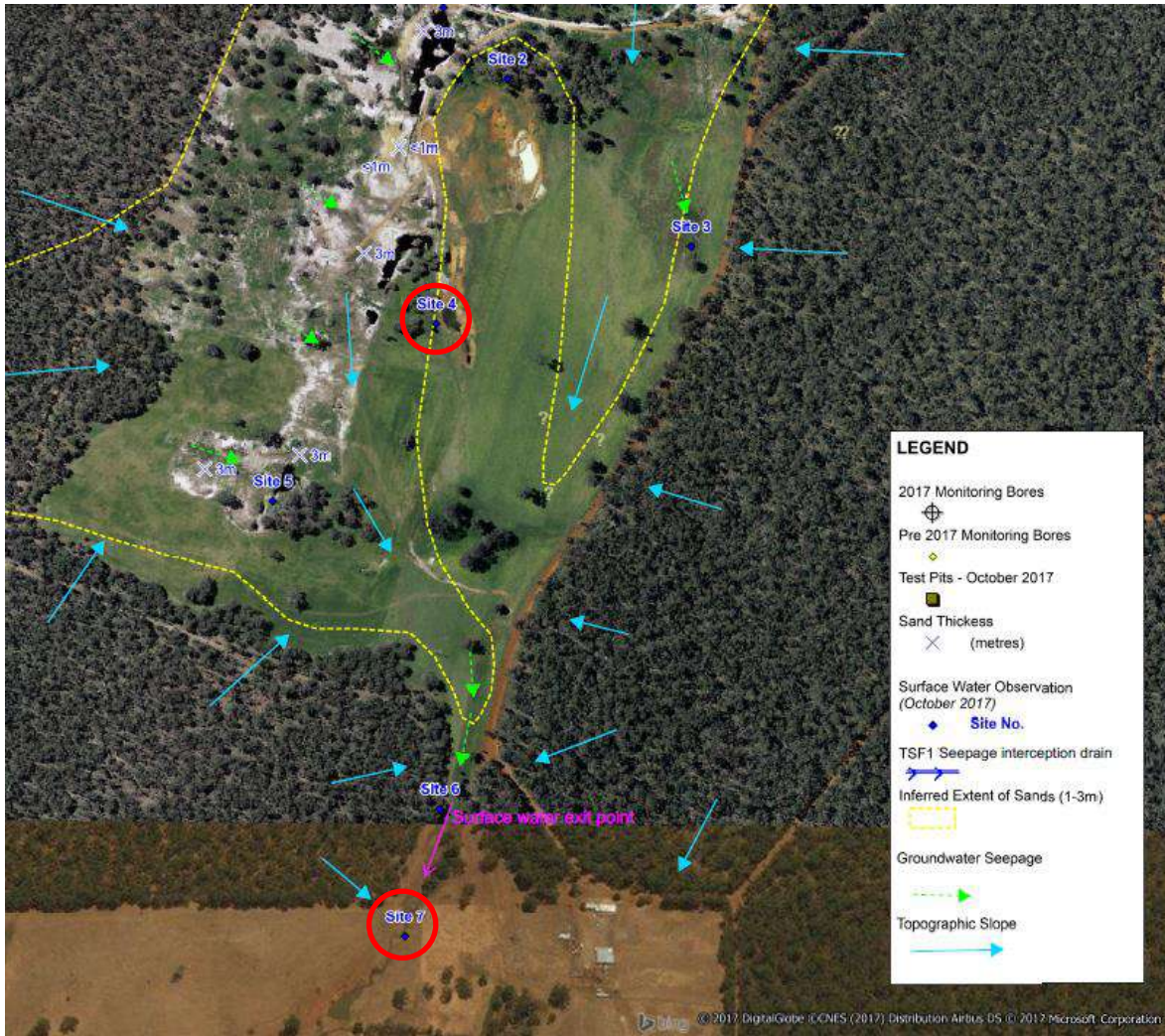


Figure 13 2017 surface water sampling locations (GHD, 2017)



Figure 14 2020 surface water sampling locations (Talison, 2020a)

Table 18 Samples collected from surface water and farm dams

Analyte	Unit	SW20/01 Within TSF4 footprint	Site 4 (2017)	SW20/02 Farm dam (private)	Site 7 (2017)	SW20/03 Farm dam (private)	SW20/04 Farm dam (Talison owned)
pH		7.9	5.83	8.0	6.76	8.3	7.4
Electrical Conductivity @ 25°C	µS/cm	550 – 570	216.9	920	236	1,100	2,700
Arsenic, As	mg/L	0.001	< 0.05	0.001	< 0.05	0.001	0.002
Cadmium, Cd		<0.0001	<0.005	<0.0001	<0.005	<0.0001	<0.0001
Chromium, Cr		<0.001	N/A	<0.001	N/A	<0.001	<0.001
Copper, Cu		0.002 – 0.004	<0.01	0.002	<0.01	0.003	0.002
Manganese, Mn		0.007 – 0.027	0.074	0.073	0.021	2.2	0.14
Nickel, Ni		<0.001	< 0.005	0.001	< 0.005	0.002	0.003
Uranium, U		<0.001	<0.01	<0.001	<0.01	0.001	<0.001
Lithium, Li		<0.005	<0.01	0.021	<0.01	0.007	0.013
Cobalt, Co		<0.001	<0.005	<0.001	<0.005	0.005	0.001
Iron, Fe		0.042 – 0.38	1.9	0.63	0.09	0.51	0.11
Thorium, Th		<0.001	N/A	<0.001	N/A	<0.001	<0.001
Chloride, Cl-		120 – 130	47	190	48	240	750
Nitrate Nitrogen, NO ₃ as N		<0.05	<0.2	0.1	<0.2	0.3	0.19
Sulfate, SO ₄ ²⁻		10 – 11	6.5	17	10.4	9	140
Magnesium, Mg		14 – 15	6.9	23	8.4	27	57
Sodium, Na		64 – 65	26	100	27	120	390
Sulfate: Chloride		0.084		0.089		0.038	0.187
Magnesium : Sodium		0.231		0.23		0.225	0.146

Note: Concentrations above LOR have been bolded

3.3.6 Applicant controls

Current licence requirements – mine water circuit

The Licence permits the storage of process water in dams and pits. For the Clear Water Dam, it specifies infrastructure requirements including an underdrainage system, seepage cut off trenches and an arsenic remediation unit for the treatment of the process water. The dams (classed as surface water infrastructure) are required to be inspected and managed in accordance with Talison's Surface Water Management Plan (SWMP).

The Licence does not permit discharges of process water from the process water dams, Southampton Dam or Cowan Brook Dam due to the risks to off-site surface water receptors including aquatic ecosystems. Despite this, it is known that seepage from these dams is currently occurring and are potentially impacting receptors outside of the premises. Also, overflow events from Cowan Brook Dam to offsite have occurred.

In the event of any discharge (overflow events and seepage) from Cowan Brook Dam, the Licence requires that monitoring is carried out each month for seepage flow (which goes off site to Cowan Brook and eventually into Norilup Dam) and monitoring at the time of each overflow event.

To monitor potential impacts to Norilup Dam (off site surface water body) from the discharges of process water, the Licence requires that monitoring of this dam occurs at least four times each annual period. It specifies limits for pH, arsenic, cadmium, chromium, copper, manganese, nickel, uranium, and lithium concentrations. The limit for lithium for the 2021/2022 period is 3mg/L. On the 17 February 2022 the Licence Holder notified the department that they had identified an exceedance to the lithium limit of 3mg/L for Norilup Dam (off site) specified in the Licence. The sampling was carried out on 25 January 2022 and showed a lithium level of 3.1mg/L (in Norilup Dam).

The Licence specifies that an annual ecological assessment of four sites upstream and six sites downstream of Norilup Dam is completed. Information on the water and sediment quality, macroinvertebrate and aquatic fauna diversity and abundance, and bioaccumulation of contaminants in fish and crayfish must be evaluated as part of the ecological assessment. Continuous monitoring to understand the volume of flows from Norilup Dam to Norilup Brook (downstream) is also required. Limitations associated with these ecological assessments are discussed in sections 3.3.4 and Appendix 3.

Water treatment

Treatment of the water is the Licence Holder's key and only control proposed to manage water quality within water in the mine water circuit. The Water Treatment Plant, Arsenic Remediation Unit are used to treat water within the mine water circuit, designed to reduce lithium and arsenic concentrations of the process water.

Table 19 summarises inputs and outputs associated the WTP, ARU and WTF. The WTP is designed to treat process water from Clear Water Dam to less than 0.5mg/L lithium. The ARU is designed to treat process water from Clear Water Dam to ≤ 0.1 mg/L arsenic. The Water Treatment Facility is intended to treat effluent streams from the WTP and ARU (see section 2.2.4)

Table 19 Summary of WTP and ARU inputs and outputs

Source	Treatment	Output		Destination
Clear Water Dam	Water treatment plant Designed to treat 1,095,000m ³ /year (3,000 m ³ /day)	Treated process water: lithium <2mg/L (typically less than ≤0.5mg/L)	~1,007,400m ³ /year (2,760 m ³ /day)	Cowan Brook Dam, Southampton Dam, Austins Dam
		Liquid effluent (concentrated with lithium)	~87,600 m ³ /year (240m ³ /day)	Further treatment with settlement tanks followed by discharge to Clear Water Dam
		Solid waste	1,825 tonnes/year (5 tonnes/day)	Disposed off-site at licensed waste facility
Clear Water Dam	Arsenic remediation unit Designed to treat ~3,500,000 m ³ /year (9,600 m ³ /day)	Treated process water: arsenic ≤ 0.1mg/L	~2,550,000 m ³ / year (~6986 m ³ /day)	Cowan Brook Dam, Southampton Dam, Austins Dam
		Arsenic effluent (concentrated with arsenic)	473,040 m ³ /year (1,296 m ³ /day)	Further treatment with settlement tanks followed by discharge to Clear Water Dam
Effluent from WTP and ARU	Water Treatment Facility - effluent treatment using settlement tanks Capacity to treat 600,000 m ³ / year	Treated effluent decant from WTP and ARU (<1.3mg/L arsenic and <24mg/L lithium [i.e. no lithium treatment])	~600,000 m ³ / year (1,644 m ³ /day)	Clear Water Dam
		Solid waste (arsenic and lithium)	163 tonnes/year including carbon 10 tonnes/year of arsenic, lithium and other potential contaminants	Disposed off-site at licensed waste facility

Arsenic removal

The ARU target output of treated process water to 0.1mg/L arsenic is mostly being met, according to data submitted to DWER in December 2021 (Figure 15). The average arsenic concentration for the treated output was 0.09mg/L from January to October 2022 (Talison, 2022).

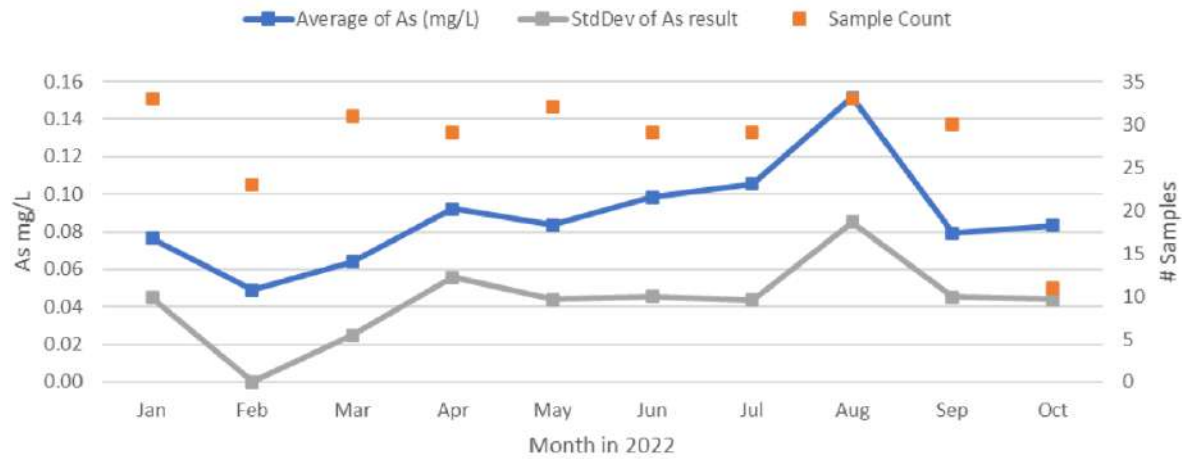


Figure 15 Arsenic Remediation Unit Removal Performance in 2022 (Talison, 2022)

Weekly monitoring of Clear Water Dam from January 2021 to August 2022 (Figure 16) show arsenic concentrations are generally reducing over time, though further monitoring over time is required to confirm the downward trend.

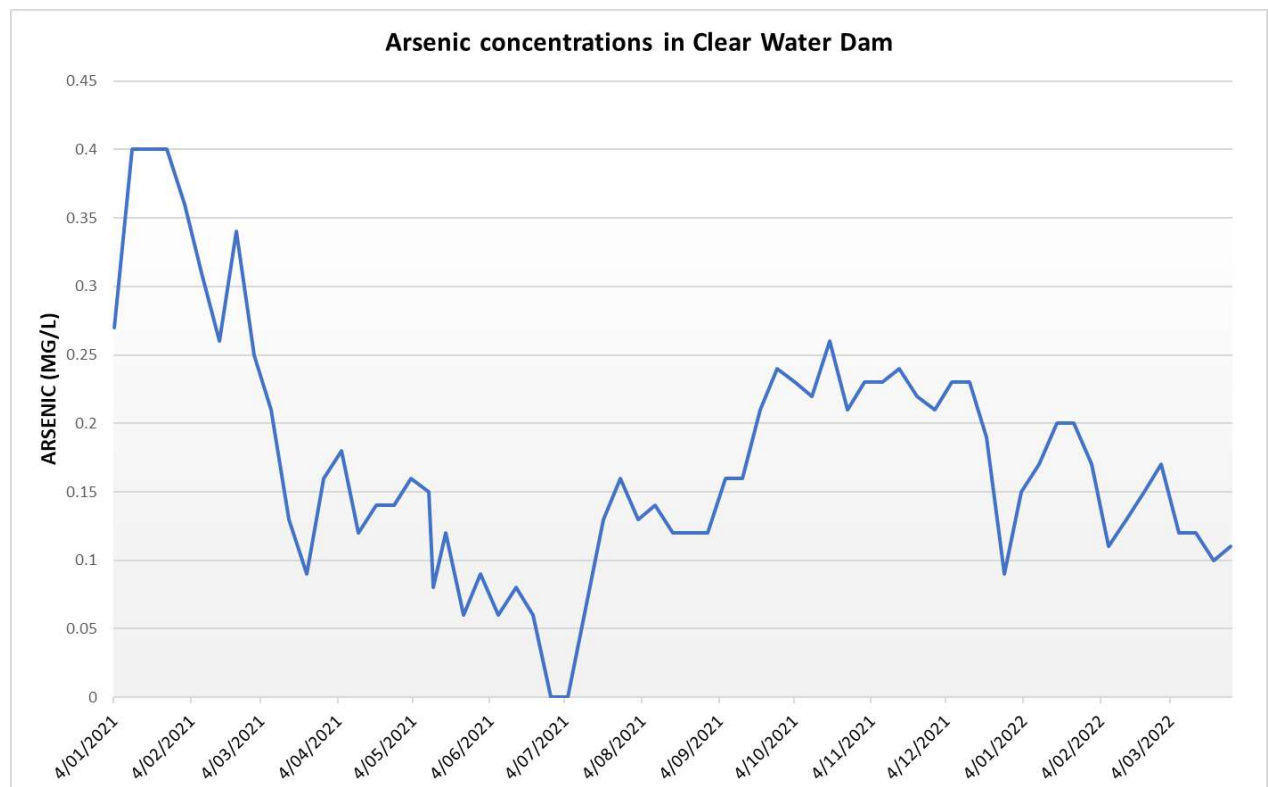


Figure 16 Arsenic concentrations in Clear Water Dam

Lithium removal

The department notes that the Licence Holder has been operating the WTP since late 2021 without authorisation under the licence (see section 2.2.2). The average lithium concentration

for the treated output was 0.45mg/L from January to October 2022 (Talison, 2022) (Figure 17).

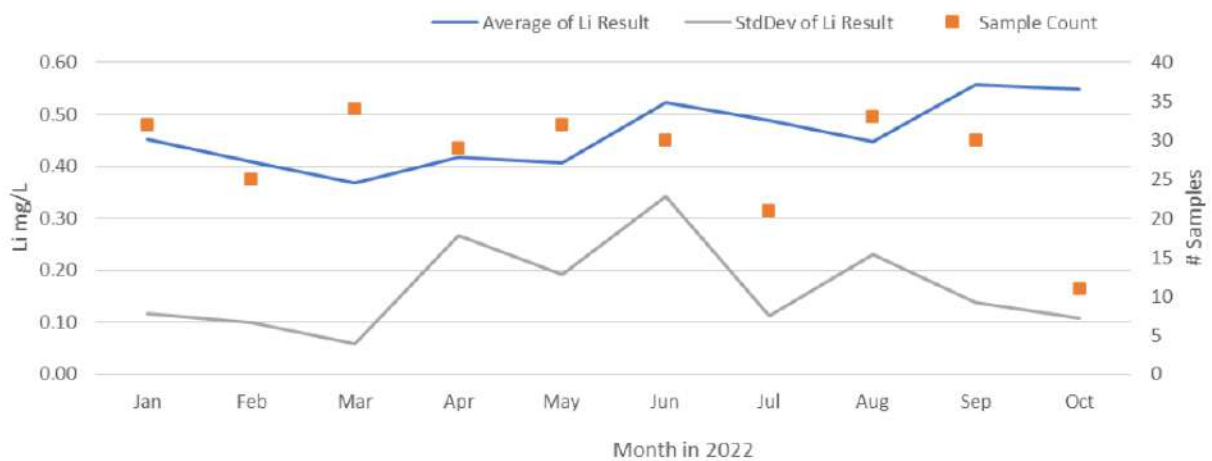


Figure 17 Water Treatment Plant Lithium Removal Performance in 2022 (Talison, 2022)

Weekly monitoring of Clear Water Dam from January 2021 – August 2022 (Figure 18) shows lower values for recent monitoring, particularly for August 2022, however the data is variable, and a clear trend has yet to be determined. Monitoring of Cowan Brook Dam indicates a slight decrease of lithium, from 7.1 mg/L in July 2021 to 6.3 mg/L in Nov 2021 (Talison, 2021a).

Due to delays in commissioning of the WTP, the results are limited and therefore do not provide enough data that is representative of the performance of the WTP and its ability to treat the process water with the mine water circuit. More data, over time is required to observe trends and to demonstrate that the WTP can consistently meet design parameters for lithium removal, metals/metalloids concentrations and adequately restrict lithium from entering the environment.



Figure 18 Lithium concentrations in Clear Water Dam

Effluent streams

Combined effluent streams from the WTP and ARU will be placed in the Water Treatment Facility for further treatment. Talison has provided water quality effluent samples from the WTP and ARU which have already been allowed to settle/separate and are intended to be indicative of decant produced by further treatment from the Water Treatment Facility. Table 20 compares the decant water quality with the water quality in Clear Water Dam from analyses undertaken from June 2020 to May 2022.

DWER notes that the average lithium concentration of the treated decant produced by the settlement tanks is 18mg/L whereas the average concentration of water in Clear Water Dam is 15.34mg/L. DWER also notes up to a maximum of 76.1mg/L of lithium has been recorded for the decant as compared to a maximum value of 20.2mg/L recorded for Clear Water Dam. The average arsenic concentration, 0.28mg/L, for treated decant is slightly higher than the average for Clear Water Dam, 0.17mg/L. Consequently, addition of this effluent decant back into Clear Water Dam will reintroduce contaminants back into the mine water circuit and may reduce the efficacy of water treatment.

Table 20 Water Treatment Facility effluent as compared to Clear Water Dam water quality – June 2021 to May 2022

Analyte	WTF Effluent				Clear Water Dam (CWD)			
	No. Analyses	Min (mg/L)	Max (mg/L)	Mean average (mg/L)	No. Analyses	Min (mg/L)	Max (mg/L)	Mean average (mg/L)
As	36	<0.05	1.6	0.28	87	0.06	0.4	0.17
Cd	32	0.005	0.01	0.01	87	0.006	0.011	0.01
Conductivity	30	1080	7970	1770.36	87	1185	2052	1674.95
Cu	36	0.01	0.01	0.01	87	<0.01	<0.01	<0.01
Fe	36	0.005	70.4	15.62	87	0.04	0.469	0.20
Li	36	5.00	76.1	18.33	87	10.4	20.2	15.34
Mn	36	0.005	2.1	0.46	87	0.134	1.6	0.58
Ni	36	0.01	0.02	0.01	Nil	0.005	0.009	no data
pH	37	7.76	9.15	8.54	87	7.8	9.35	8.33
Th	31	0.05	0.35	0.08	87	<0.05	<0.05	<0.05
U	31	0.01	0.03	0.12	87	<0.1	<0.1	<0.1

Note: For any given analyte, where some samples were recorded as below detection and some above, in calculating the averages, those below detection were assumed as the detection limit.

3.3.7 DWER assessed risk and regulatory controls

The department notes that:

- Current emissions from site are not being appropriately managed. The process water associated with historical and current operation has potential to impact sensitive receptors as it is not being contained and managed such that human and environmental receptor exposure is restricted;
- Discharge of effluent from the WTP and ARU (via the WTF) back into Clear Water Dam may significantly reduce efficiency of water treatment and reintroduce contaminants to the mine water circuit;
- Further expansions of ore processing infrastructure are planned for the site which may increase the contaminant load of process water.

Surface water ecology

As discussed in section 3.3.4, lithium and arsenic have been reported for surface water, sediments and most notably are bioaccumulating in the flesh of fish and crayfish downstream from the site. The assessed risk, based on current management to off-site aquatic ecological receptors is considered “High” risk, with a consequence rating of “Major” and likelihood of “Possible”.

The following DWER regulatory controls have therefore been placed on the licence.

Table 21 DWER regulatory controls

Condition/control	Justification
<p>New condition 2.3.1 – specified actions – Clear Water Dam emissions management plan</p> <p>New condition 2.3.2 – specified actions – Clear Water Dam water balance</p>	<p>Clear Water Dam is currently not sufficiently lined or isolated from the other process dams in the mine water circuit (Austins Dam in particular) to avoid contamination of other dams by seepage or overflow.</p> <p>Discharge of effluent from the WTP and ARU (via the WTF) back into Clear Water Dam may also significantly reduce efficiency of water treatment and reintroduce contaminants back into Clear Water Dam (and therefore the remaining mine water circuit).</p> <p>The water balance and seepage losses from Clear Water Dam are currently not well understood or captured by the licence.</p> <p><u>DWER control:</u></p> <p>DWER has consequently conditioned a specified action, requiring an emissions management plan, which includes limiting arsenic and lithium contaminated discharges from Clear Water Dam (seepage and overflows) and limiting and eventually stopping discharge of lithium and arsenic contaminated effluent (biproductions of water treatment) back into Clear Water Dam.</p> <p>Condition 2.3.2 requires a detailed water balance for Clear Water Dam (as determined by a suitably qualified hydrogeologist) to determine rate of seepage.</p>
<p>New condition 3.3.2 – mine water circuit water balance</p>	<p>The overall water balance for the mine water circuit is not well understood or appropriately captured on the licence.</p>

<p>monitoring</p>	<p><u>DWER control:</u></p> <p>DWER has consequently placed a general condition for water balance monitoring of the mine water circuit on the licence.</p> <p>Seepage from Austins Dam, Southampton Dam and Cowan Brook Dam is not currently well understood or being appropriately managed for the site. Talison has indicated it intends to submit an amendment to increase the embankment height of the process water dams before 31 December 2022. DWER intends to undertake further detailed seepage analysis and risk assessment at this time.</p>
<p>Modification to condition 3.2.1 – monitoring of seepage from Southampton Dam</p>	<p><u>DWER control:</u></p> <p>Whilst monitoring of seepage from Cowan Brook dam takes place, monitoring of seepage from Southampton Dam is not currently a requirement of the licence. To allow DWER to understand the volume of seepage from Southampton Dam and potential impacts to downstream, this has been placed on the licence as a regulatory control. Noting that this will be required after the embankment lifts to Southampton dam.</p>
<p>Modification to table 3.3.2 (originally table 3.4.2, now moved under condition 3.3.1) – monitoring of water quality within clear water dam</p>	<p><u>DWER control</u></p> <p>To allow DWER to determine the efficacy of water treatment over time, a requirement for monitoring of clear water dam has been placed on the licence as a regulatory control.</p>
<p>Condition 2.3.3 (revised Annual Ecological Assessments)</p>	<p><u>DWER control</u></p> <p>A condition has been added to require a new proposal to be developed for undertaking the Annual Ecological Assessment for the premises. Updates to methods and sampling locations for the Annual Ecological Assessments are required to:</p> <ul style="list-style-type: none"> • to monitor efficacy of water treatment with respect to current and expanding operations and better assess risk over time to ecological receptors; • address data gaps identified during DWER’s review by including additional sampling locations. <p>Note that whilst not conditioned, DWER’s preferred sampling locations are detailed in Table 22 and Figure 19 for locations:</p> <ul style="list-style-type: none"> ○ to the south and east at Woljenup creek and Hesterbrook; and ○ new monitoring locations along Blackwood river. <p>The new sampling regime must be implemented by spring 2023 and the licence will be amended to reflect the new sampling locations.</p> <p>Once the new sampling regime has been conditioned it is</p>

	intended that monitoring requirements be reviewed after 3 years. This should provide sufficient time to evaluate the new treatment systems and the additional potential contaminant pathways and related receiving environments that have been identified.
Modification to 3.1.1 (use of appropriate LORs) New conditions 3.4.5 (reporting) Modification to 4.2.1 (reporting)	<u>DWER control:</u> DWER has conditioned that: <ul style="list-style-type: none"> • samples should be analysed using the appropriate limit of reporting as to allow comparison with relevant guidelines; • additional measures regarding QAQC and reporting as per data considerations summarised in Appendix 3.

Table 22 DWER preferred ecological assessment sites

Location	Site ref	Location detail
Five sites within the Hester brook system	4	Hester Site A: Hester Brook upstream of confluence with unnamed tributary Hester Site (site 4 retained from previous program)
	6	Hester Site B: Hester Brook upstream of confluence saltwater gully (site 6 retained from previous program)
	21	Hester Site C: Hester Brook downstream of confluence with Saltwater Gully
	22	Hester Site D: Hester Brook downstream of confluence with Cascades Gully
	14	Hester Site D: Hester Brook downstream of confluence with Cascades Gully
Three sites on Cowan Brook downstream of Cowan Dam	10	Cowan Site A: Site 10 retained from previous program
	1	Cowan Site B: Site 1 retained from previous program
	2	Cowan Site C: Site 2 retained from previous program
Three sites on Norilup Brook upstream of Norilup Dam	11	Norilup US Site A: upstream of Dumpling Gully
	12	Norilup US Site B: upstream of Mt Jones Dam, downstream of Dumpling Gully
	13	Norilup US Site C: downstream of Spring Gully
Three sites on Norilup Brook downstream of Norilup Dam	9	Norilup DS Site A: Site 9 retained from previous program
	8	Norilup DS Site B: Site 8 retained from previous program
	15	Norilup DS Site C: further downstream
Three sites on Woljenup	18	Woljenup Site A: furthest upstream

Creek	19	Woljenuk Site B
	20	Woljenuk Site C: furthest downstream
Two sites on the Blackwood River	16	Blackwood US Site A: upstream of the Norilup Brook confluence
	17	Blackwood DS Site B: downstream of the Norilup Brook confluence

Note: Locations are shown in Figure 19. Sites 3, 5 and 7 from the original sampling program have not been included as part of the preferred monitoring program.

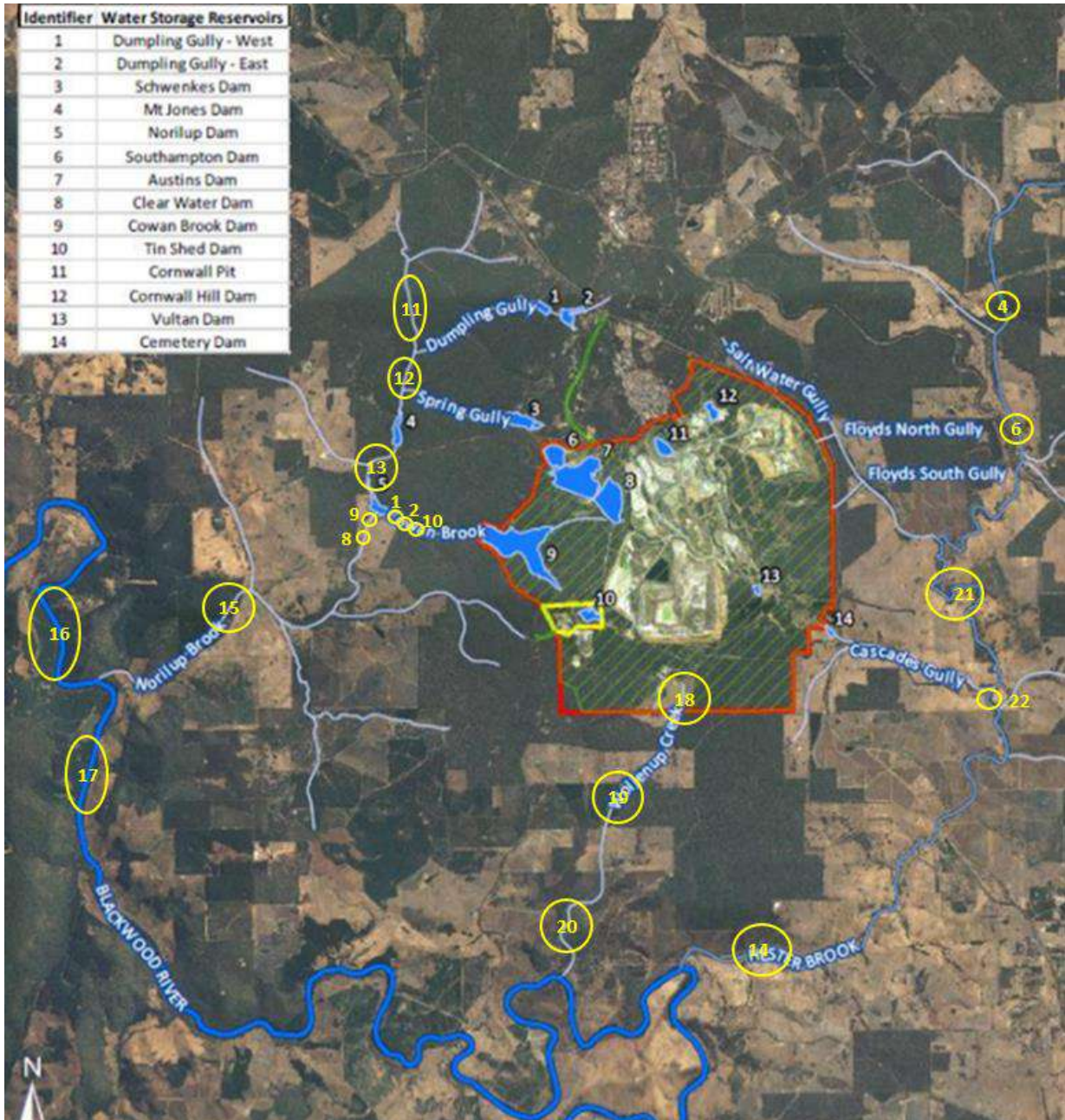


Figure 19 DWER preferred ecological assessments (yellow circles with numbers)

Off-site surface water and groundwater users

DWER notes large information gaps with respect to available data to assess the quality of the water utilised by the off-site surface and groundwater users. A high degree of uncertainty exists with respect to the potential impacts associated with sensitive groundwater uses including drinking water, aquaculture, recreational use (swimming), domestic purposes, stock watering and irrigation. This will be referred for further consideration under the *Contaminated Sites Act 2003* and to Department of Health (DoH).

3.4 Detailed risk assessment – impact of contaminated water discharge (eastern boundary) on ecological and surface/groundwater users

3.4.1 Characterisation of emission

Discharge of contaminated stormwater occurs along the eastern boundary of the premises. Talison advised that discharge of three hundred million litres per year takes place and that this volume is derived from estimating the catchment area (approximately 3.26 km²), rainfall (average of ~750mm/year) and likely % runoff (~13%). Talison has stated that no water from the mine pits or the mine water circuit is discharged along the eastern boundary.

Condition 2.2.1 of the licence allows discharge of “contaminated stormwater from disturbed mine work areas including mine waste dumps” to Carters Farm, Floyds North, Floyds south and Cemetery emission points (Figure 20). Discharge of seepage from Tailings Storage Facility 1 (TSF1) is also authorised at the cemetery emission point. Monitoring of this surface water discharge takes place under condition 3.2.1.

The department notes that:

- Current emissions from site on the eastern boundary are not being appropriately managed. Lithium concentrations discharged during the 2020-2021 AER exceeded the CERNM (2013) site specific guideline for lithium for discharge from both Floyds North and Floyds South discharge points (Table 23).
- Further expansions are planned for site which may increase the contaminant loading and discharge along the eastern boundary of the premises. DMIRS contacted DWER on 8 December 2022 indicating that Talison are proposing a significant expansion of the existing Floyds waste rock landform (WRL) as a result of expanding mining voids, in addition to other proposed activities at the site. DMIRS had concerns about the risk of discharge / seepage from Floyds WRL given the receptors in the area, particularly downstream of the operation.

Table 23 Monitoring data (AER 2020-2021) – discharge off-site to the east

Analyte			As	Li	Cd	Cr	Cu	Mn	Ni	U
ANZG (2018) FW 95%			0.013	0.42	0.0002	0.001	1.4	1.9	0.011	0.0005
Unit		Flow (m3)	mg/L							
Floyds North	1/07/2020	83,848	0.001	1.1	<0.0001	<0.001	<0.001	0.08	0.01	<0.001
	1/10/2020	39,871	<0.001	0.77	0.0002	<0.001	<0.001	0.18	0.024	<0.001
	9/02/2021	26,595	0.002	1.4	0.0003	<0.001	<0.001	0.18	0.03	<0.001
	12/04/2021	55,879	0.004	1.1	0.0003	<0.001	<0.001	0.28	0.028	0.001
Floyds South	1/07/2020	22,304	0.001	0.21	<0.0001	<0.001	<0.001	0.047	0.001	<0.001
	1/10/2020	2,475	0.001	0.07	<0.0001	<0.001	<0.001	0.29	0.003	<0.001
	9/02/2021	0	-	-	-	-	-	-	-	-
	12/04/2021	22,235	0.003	0.66	<0.0001	<0.001	0.001	0.11	0.11	<0.001
Carters farm	1/07/2020	Not given	<0.001	<0.01	<0.0001	<0.001	<0.001	0.002	<0.001	<0.001
	1/10/2020	Not given	<0.001	0.01	<0.0001	<0.001	<0.001	0.018	0.001	<0.001
	7/02/2021	Not given	Not collected							
	12/06/2021	Not given	<0.001	0.02	<0.0001	<0.001	<0.001	0.013	<0.001	<0.001
Cemetery	1/07/2020	Not given	<0.001	<0.01	<0.0001	<0.001	<0.001	0.57	0.001	<0.001
	1/10/2020	Not given	<0.001	<0.01	<0.0001	<0.001	<0.001	0.12	0.001	<0.001
	-	Not given	Not collected							
	19/05/2021	Not given	<0.001	0.01	<0.0001	<0.001	0.001	0.26	0.002	<0.001

Lithium: No published water quality guideline exists for lithium; guideline derived from site specific ecotoxicity testing of tailings effluent (CERNM, 2013)

3.4.2 Pathway of contaminated water to sensitive receptors

Surface water ecology

As detailed previously in section 3.3.3, groundwater and surface water generally flows radially outward from the site (Figure 11). Discharge from the eastern boundary flows to Hester Brook, which is a tributary of Blackwood River. The department notes lithium (Table 24) bioaccumulating in fish and crayfish at site 6 (Figure 12), from data given in the Annual Ecological Surveys. Site 6 is ~2.7km east from the closest discharge point (Floyds south). Elevated concentrations of arsenic and lithium have also been recorded in sediments to the east, where sediment monitoring sites 3 and 4 recorded lithium at 14.4mg/kg and 14mg/kg respectively for 2020-2021 monitoring (Table 25).

The licence holder has indicated that they believe sites 3, 4, 5 and 6 are considered upstream (being present at a higher elevation than saltwater gully discharge) and therefore represent background lithium levels. From information provided by GHD (2019a) and assessment undertaken by DWER, it appears that surface and groundwater flow radially outward from the site with topography and that there is a high degree of surface and groundwater connectivity. Whilst DWER believes the lithium concentrations detected in sediments (14mg/kg at sites 3 and 4) are unlikely to represent naturally occurring background conditions, further information regarding the hydrogeology along the eastern premises boundary is required to determine direction of contaminant flow off-site.

Table 24 Bioaccumulation of Lithium (mean average) in fish and crayfish to the east of premises

		2017	2018	2019	2020	2021
Type	Site	Lithium (mg/kg)				
Fish	site 3	0.018	0.034	0.011	0.052	0.024
	site 4	0.028	0.026	0.028	0.016	0.044
	site 5	0.025	0.050	0.022	0.018	0.016
	site 6	0.033	0.098	0.020	0.056	0.206
Crayfish	site 3	0.044	0.041	0.029	0.058	0.029
	site 4	0.019	0.012	0.068	0.063	0.025
	site 5	0.022	0.013	0.099	0.033	0.014

site 6	0.028	0.016	0.052	0.038	0.062
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Table 25 Arsenic and lithium concentrations in sediments to the east of premises

		2017	2018	2019	2020	2021
		mg/kg				
Arsenic	Site 3	1.8	3	2.5	1	<2
	Site 4	1.6	2	3.8	3.2	2
	Site 5	1	1	<1	1	<2
	Site 6	<1	1	1.75	<1	<2
Lithium	Site 3	-	-	6.74	1.72	14.4
	Site 4	-	-	12.2	8.3	14
	Site 5	-	-	0.66	1.68	3.4
	Site 6	-	-	6.04	1.46	5

Note: >2mg/kg detected has been bolded

Groundwater and surface water users

Available information has been detailed in section 3.3.5. Large data gaps exist with respect to potential impacts to groundwater and surface water users downstream to the east of site. A high degree of uncertainty exists with respect to impacts to these receptors.

3.4.3 DWER assessed risk and regulatory control

Surface water ecology

DWER notes that current surface water practices are not being appropriately managed to mitigate risks to off-site receptors, where elevated levels of lithium are present within the water discharged off-site. Bioaccumulation is occurring in the flesh of fish and crayfish off-site to the east (downstream of discharge). The assessed risk to off-site aquatic ecological receptors is therefore considered “High” risk, with a consequence rating of “Major” and likelihood of “Possible”.

The following DWER regulatory controls have therefore been placed on the licence.

Table 26 DWER regulatory controls

Condition/control	Justification
Revised condition 2.3.4 (Annual Ecological Assessments)	<p><u>DWER control</u></p> <p>A requirement to submit a proposal for revised Annual Ecological Assessments has been conditioned for Talison to address data gaps identified during DWER’s review.</p> <p>Additional data will help to inform future risk assessments and strengthen the breadth and quality of the data available to undertake further regulation of this issue in 2023 (see below).</p>
DWER initiated amendment	<p>Due to assessed “High” risk associated with discharge to off-site receptors, DWER intends to undertake a separate amendment to the licence. Regulation is likely to include a requirement to either restrict/ stop discharge off-site to the east or to treat the water to a certain discharge criteria.</p> <p>Talison have also acknowledged that investigation and</p>

	<p>management of this issue is required and have requested additional time to develop a management plan and further assess risk of discharge to the environment.</p> <p>At this time DWER notes there is a lack of information regarding suitable discharge criteria for lithium for the protection of aquatic receptors. The department's Aquatic Science Branch (AQB) is currently undertaking research into the toxicity of lithium for Western Australian aquatic species. In 2023 further information from AQB is likely to be available to assist with regulation of this discharge. DWER will undertake further assessment and regulation of eastern boundary discharge at this time.</p> <p>DWER will also use the data provided by AQB to further assess the site-specific value (0.42mg/L) derived by CERNM (2013). DWER notes the CERNM (2013) study involved three species only, and that the data provided was limited in its ability to enable an adequate assessment of factors such as reproductive function, or long-term consequences of elevated lithium on an ecosystem. (DWER reference A1045796)</p> <p>Additionally as part of this amendment DWER may also assess seepage / runoff from Floyds waste rock landform, given the proposed expansions to area and concerns raised by DMIRS. DWER notes that Talison may be required to apply for an amendment, as these changes may represent a modification to an emission from the premises, under section 53 of the <i>Environmental Protection Act 1986</i>.</p>
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Off-site surface water and groundwater users

DWER notes large information gaps with respect to available data to assess the quality of the water utilised by the off-site surface and groundwater users. A high degree of uncertainty exists with respect to the potential impacts associated with sensitive groundwater uses including drinking water, aquaculture, recreational use (swimming), domestic purposes, stock watering and irrigation. This has been referred for further consideration under the *Contaminated Sites Act 2003* and to Department of Health (DoH)



Figure 20 Surface water storages within the premises boundary and the locations of where contaminated surface water is discharged off premises, being Carters Farm, Floyds North, Floyds South, Cemetery to the east and Southampton Dam and Cowan Brook Dam to the west

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4. Consultation

Table 27 provides a summary of the consultation undertaken by the department.

Table 27: Consultation

Consultation method	Comments received	Department response
Department of Health (DoH) advised of proposal on 11/02/2022	No comments received	N/A
Greenbushes Primary School advised of proposal on 11/02/2022	No comments received	N/A
Department of Education advised of proposal on 11/02/2022	No comments received	N/A
Licence Holder was provided with draft amendment on 30/9/2022 and comments were received on 31/10/2022	See Appendix 4	See Appendix 4
Department of Mines, Industry Regulation and Safety (DMIRS) requested to comment on 10/11/2022.	Whilst no comments were received directly in relation to DWER's request, DMIRS separately contacted DWER on 8/12/2022 regarding a proposal to expand the waste rock landform and concerns regarding discharge of seepage along the eastern premises boundary.	DWER replied to DMIRS on 13/12/2022 (A2145209) regarding this issue. The response indicated that DWER had been assessing the eastern premises boundary discharge as part of this amendment, however given DWER's internal Aquatic Science Branch may have further guidance on lithium toxicity in 2023 and that DWER required further information to allow assessment, regulation of this issue has been deferred to 2023.
Licend Holder was provided with a second draft amendment on 28/11/2022 and comments were received on 9/12/2022.	See Appendix 4	See Appendix 4

5. 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.

DWER notes the following for future amendments to the licence:

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- DWER will undertake further risk assessment for dust for larger increases to category 5 throughput. This assessment was for a relatively small increase in beneficiation throughput associated with tailing retreatment;
- As, for this amendment, there will be no increase in the throughput of tailings deposition to TSF2 (currently approved up to 5 Mtpa), impacts associated with seepage from TSF2 will be addressed in expected upcoming amendments to tailings throughput.
- Seepage from the mine water circuit (Austins Dam, Southampton Dam, Cowan Brook Dam) is not currently well understood or being appropriately managed for the site. Talison has indicated it intends to submit an amendment to increase the embankment height of the process water dams (excluding Clear Water Dam) in 2023. DWER intends to undertake further detailed seepage analysis and risk assessment at this time. There will be consideration of management actions at this time where freeboard on ponds/dams are at risk of being breached.
- The applicant has indicated that the TRP settlement pond is designed to overtop into Tin Shed Dam located on a separate, but operationally related, premises under licence L8501/2010/2. DWER notes that licence L8501/2010/2 will also require amending to reflect discharge of potentially contaminated stormwater into Tin Shed Dam.
- A new specified action condition (2.3.4) has been added to the licence to require Talison to review the annual ecological assessment program (required by condition 3.4.3) and propose a revised and expanded sampling program by June 2023 for implementation to commence in Spring 2023. Once submitted DWER will review the program for suitability and will amend the licence to incorporate the new sampling locations etc.
- To manage discharge currently taking place along the eastern premises boundary, DWER intends to undertake a separate licence amendment. Regulation is likely to include a requirement to either restrict/ stop discharge off-site to the east or to treat the water to a certain discharge quality criteria. The department's Aquatic Science Branch (AQB) is currently undertaking research into the toxicity of lithium for Western Australian aquatic species. In 2023 further information from AQB is likely to be available to assist with regulation of this discharge. DWER will consequently undertake further assessment and regulation of eastern boundary discharge at this time.

5.1 Summary of amendments

Table 28 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 28: Summary of licence amendments

Condition no.	Proposed amendments
1.3.1	<ul style="list-style-type: none"> • Modification to include deposition of retreated tailings from TSF1 to TSF2 • Modification to include water level management for process water dams. • Modification to allow discharge of treated process water from the WTP and ARU (via the WTF) • Modification to indicate that tailings reprocessing must cease whilst emergency deposition of tailings takes place until sufficient primary and secondary containment between the reprocessing area and depositional areas have been established.
1.3.8 (former)	Compliance for infrastructure/equipment associated with condition 1.3.8 has been met. Former condition 1.3.8 has been removed.
1.3.8 (new)	New condition for on-going infrastructure inspection
1.3.9 (former)	Removed – compliance has been met

1.3.9 (new)	Construction condition for the water treatment facility
1.3.10 (former)	Removed – compliance has been met
1.3.10 (new)	New condition for operation of the water treatment plant, arsenic remediation unit, tailings retreatment plant and associated infrastructure.
1.3.11 – 1.3.14 (former)	Removed – compliance has been met
1.3.11 (new)	New condition for risk assessment and eventual retrofit of pipelines onsite
2.1.1	Modified to capture limit exceedances in section 3 (in addition to currently licenced section 2)
2.3.1 (new)	New condition requiring the licence holder to submit a “Clear Water Dam emissions management plan”
2.3.2 (new)	Requirement to submit a detailed water balance for Clear Water Dam
2.3.3 (new)	Revision of Annual Ecological Monitoring condition
3.1.1	Modified to include a requirement for the appropriate limit of reporting for laboratory samples, to allow comparison with relevant environmental guidelines.
3.2.1	<ul style="list-style-type: none"> Modification of existing condition to include seepage water quality monitoring for Southampton Dam.
3.3.1	<ul style="list-style-type: none"> Original table 3.4.2 (now Table 3.3.2) for process water dam monitoring was moved to process monitoring under condition 3.3.1, as it was originally included within ambient environmental monitoring under condition 3.4.1. Modification of original table 3.4.2 (now Table 3.3.2) water quality monitoring for Clear Water Dam. Modified to include process water monitoring (Table 3.3.1 treatment volumes and Table 3.3.2 water quality) for the WTP, ARU and WTF
3.4.1	Original table 3.4.2 (now Table 3.3.2) moved under condition 3.3.1.
3.4.5 (new)	Additional QAQC and reporting requirements for water quality monitoring and the annual ecological assessments.
4.2.1	Modification to annual reporting requirements.
4.2.6 and 4.2.7 (removed)	Compliance for these conditions has been met. Conditions removed.
Schedule 2	New Schedule with minimum requirements for the revised Annual Ecological Assessment (as required by conditions 2.3.4 and 3.4.6)
Schedule 3	<ul style="list-style-type: none"> Prescribed premises category throughput table amended and shifted from Schedule 3 to front licence page. Table 5 of Schedule 3 amended to remove transcription errors

References

In text reference	Document title	Availability
-	Regulation 17 Noise exemption, approved 16 February 2015	DWER reference: MINDER113/15
-	DWER internal technical review – aquatic sciences branch	DWER reference: A2117714
-	DWER internal memo – Talison lithium – new groundwater monitoring network and proposed lithium water quality targets	DWER reference: A1045796
(CERNM, 2013)	Centre of Excellence in Natural Resource Management, Site specific toxicity testing	-
(CERNM, 2017-2020)	Centre of Excellence in Natural Resource Management - Ecological Assessment Program for Norilup Brook	DWER reference: FA262939
(GHD, 2017)	Talison Lithium Mine TSF1 Groundwater Risk Assessment	DWER reference: A1568550
(GHD, 2019)	GHD, 2019. Talison Compliance Monitoring Report 2019 – Surface Water and Groundwater	DWER reference: DWERDT207227
(GHD, 2019a)	Talison Lithium Australia Pty Ltd Greenbushes Lithium Mine Expansion Hydrogeological Investigation 2018, Site-wide Hydrogeological Report, January 2019	DWER reference: A1773844
MS 1111	Ministerial Statement 1111	Accessed at www.epa.wa.gov.au
(Storer et al. 2022)	Storer T, O'Neill K, Christie, E, Galvin L & van Looij E 2022, The South West Index of River Condition, Module 2 – method summary: collection and analysis of aquatic biota, River Science Technical Series, report no. 2, Healthy Rivers program, Department of Water and Environmental Regulation, Perth.	Accessed at: https://rivers.dwer.wa.gov.au/wp-content/uploads/2022/05/SWIRC-collection-and-analysis-of-aquatic-biota-1.pdf
(Talison, 2020)	Talison Lithium Australia Pty Ltd Greenbushes – Water Management Plan	DWER reference: A1922082
(Talison, 2020a)	Talison Lithium Australia Pty Ltd Greenbushes – Surface water sampling (to the south of site and Jones dam)	DWER reference: DWERDT552315
(Talison, 2021)	Talison Community Water Survey Responses	DWER reference: A2120699
(Talison, 2021a)	W6618 additional information required WTP performance	DWER reference: DWERDT539725
(Talison, 2022)	Response to draft 21 days package – submitted to DWER on 31/10/2022	DWER reference: DWERDT679874
(Talison, 2022a)	Response to second 21 days package – submitted to DWER on 9/12/2022	DWER reference: A2144622

Appendix 1: Mine Water Schematic

Talison Lithium Australia - Greenbushes Mine Water Circuit Schematic

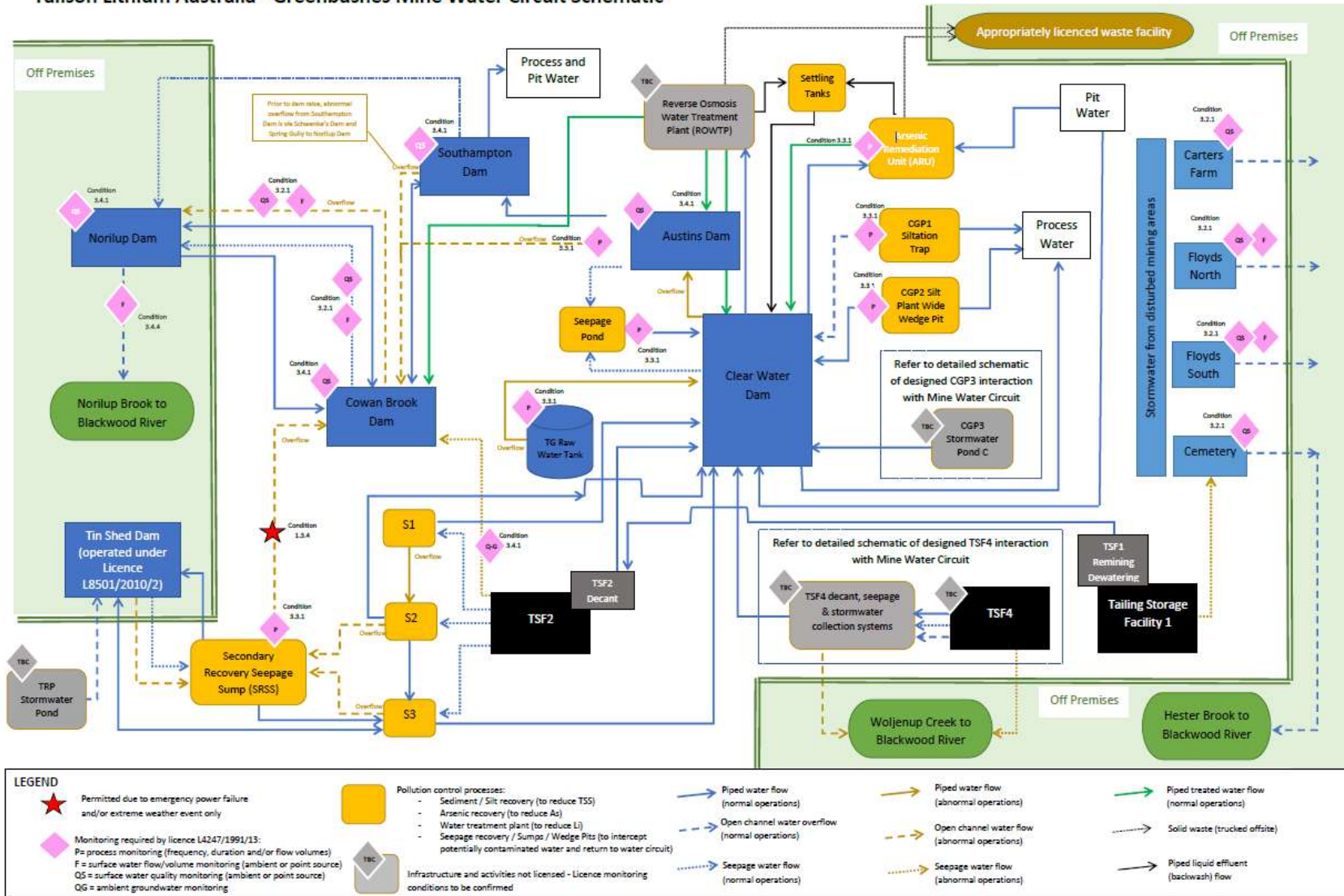


Figure 21 Mine Water Schematic

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IR-T15 Amendment report template v3.0 (May 2021)

Appendix 2: Ecological Data Considerations

A summary of considerations with respect to the annual ecological surveys is presented in Table 29.

Table 29 Ecological Data Considerations

Data consideration	Detail
<p>Reduced confidence in statements from CERNM regarding impacts from the mine site</p>	<ul style="list-style-type: none"> • upstream sites are only designed as ‘reference sites’ for the purposes of chemistry and bioaccumulation comparisons (as sites are responding to different drivers independent of mining) – the absence of habitat descriptions constrains even limited comparison between upstream and downstream communities. As such, trends in communities can only be assessed within a site over time; • impacts on growth and recruitment cannot be assessed as data on recruitment, size distribution and/or general health of fish/crayfish communities was not collected or has yet to be provided; • it is difficult to determine whether any changes to aquatic communities could be masked by recolonisation from further downstream; and • assessments are limited to a single sampling event each year at a few sites which are relatively nested within different zones and with minimal description of habitat or sampling conditions in which to assess representatives (including relationship to depositional hotspots etc.).
<p>Continuous exposure of freshwater fish to even low concentrations of some contaminants is known to elicit impacts that may not be apparent for long periods</p>	<ul style="list-style-type: none"> • For example, exposure to low concentrations of Arsenic is known to result in bioaccumulation (mostly in the liver and kidney tissue) which can affect various physiological systems of fish such as growth, reproduction, gene expression, ion regulation, immune system and histopathology (e.g. Kumari et al 2017).
<p>The abundance of macroinvertebrates in upstream sites is consistently higher than downstream of the mine site</p>	<ul style="list-style-type: none"> • This has yet to be explained but may represent a long-term impact due to mining (i.e., established prior to the current monitoring period as a trend since 2016 is not apparent). Note: downstream Cowan has generally lower richness than other areas. These differences could be due to natural habitat variations; however these data weren’t made available for interpretation.
<p>The review of ecological data was highly constrained by several factors</p>	<ul style="list-style-type: none"> • Lack of sediment particle size data (should target < 2mm sediment fraction) and % organic carbon data for interpreting sediment quality • Changing LORs over time – including above guideline values which almost certainly resulted in false negatives including levels exceeding environmental guidelines (e.g. arsenic) • Lack of habitat data to support interpretation. This was a particular problem for macroinvertebrate data. In addition, methods are unclear around sampling conditions - with confusion over whether macrophytes were included in samples (which they should not have been for the standard assessment,

	or ideally the macrophyte sample should have been collected separately – refer to Storer et al 2022)
Confidence in laboratory data quality	<p>Confidence in data quality is reduced based on:</p> <ul style="list-style-type: none"> ▪ Total (unfiltered concentrations) are lower than some filtered concentrations (e.g. As, Pb, Ni, Zn). ▪ Spike recovery regularly fails for some parameters: Cu, Zn, As

Appendix 3: Geochemistry of Tailings within TSF1

Element	Total Element Concentration (mg/kg)	Average Crustal Abundance (mg/kg)	Geochemical Abundance Index
Ag	0.2	0.1	1
Al	98,000	82,000	0
As	160	1.5	6
B	4,600	10	6
Ba	66	500	0
Be	280	2.6	6
Bi	3.5	0.048	6
Ca	16,000	41,000	0
Cd	7.6	0.1	6
Ce	27	68	0
Co	10	20	0
Cr	74	100	0
Cu	25	50	0
F	2,700	950	0
Fe	34,000	41,000	0
Hg	<0.01	0.05	0
K	6,600	21,000	0
Li	1,000	20	5
Mg	6,600	23,000	0
Mn	1,800	950	0
Mo	2.0	1.5	0
Na	38,000	23,000	0
Ni	15	80	0
P	4,900	1,000	2
Pb	24	14	0
Sb	37	0.2	6
Se	0.09	0.05	0
Sn	560	2.2	6
Sr	26	370	0
Ta	300	2	6
Th	22	12	0
Tl	12	0.6	4
U	27	2.4	3
V	70	160	0
W	11	1	3
Zn	140	75	0

Note: Average crustal abundances based on Bowen (1979)

Appendix 4: Summary of Licence Holder’s comments on risk assessment and draft conditions

Table 30 Summary of comments on first draft instrument and decision report

Condition	Summary of Licence Holder’s comment	Department’s response
Condition 1.3.1 Table 1.3.1	Request to revise emergency tailings deposition to TSF1 to 300,000 cubic metres (m3) limit rather than 300mm which would “equate to different volumes of emergency tailings at different times”.	Revision of this condition would require additional risk assessment (storage capacity, seepage issues etc) for tailings storage facility 1. Sufficient information has not been included in the application to complete this assessment. It therefore would significantly delay the issuing of this amendment. DWER recommends Talison includes this modification in one of the upcoming licence amendment applications it intends to submit for the site.
	Request removal of lithium and arsenic limits for disposed treated water to Austins Dam, Southampton Dam and Cowan Brook Dam as being a duplicate of performance criteria already listed in Table 1.3.10. Have also indicated that wording is ambiguous, as for example, the ARU does not treat lithium.	As performance criteria have already been stated in condition 1.3.10, the condition has been revised to “Treated process water from the Reverse Osmosis Treatment Plant and Arsenic Remediation Unit (via the water treatment facility)”
	Request revision of clear water dam material received to: “Tailings decant, mine dewater, contaminated stormwater, process water (seepage return and decant), site runoff, overflows from the Lithium processing plant siltation trap, treated water from the reverse osmosis water treatment plant and arsenic remediation unit and decant water from the WTF settlement tanks”	Requested change has been accepted noting that the discharge of decant water from the WTF settlement tanks may change as a result of the outcome of specified condition 2.3.1
Condition 1.3.1 (process water dam freeboard) Table 1.3.1 and Condition 1.3.8 (freeboard inspection) Table 1.3.7	Request to remove freeboard and associated inspection requirement as Talison will be unable to comply with freeboard for the following reasons: <ul style="list-style-type: none"> • “Cowan Brook Dam and Southampton Dam are the primary locations where dam overflow can leave the premises. Overflow from the other dams which are arguably higher risk in terms of potential contaminants of concern, remains within the dam circuit and premises; • Talison are actively managing the water quality in CBD and the mine water dams more broadly to reduce the risk of impact on the environment due to overtopping; and • The geometry of the dams, particularly Cowan Brook Dam, 	Condition 2.2.2 indicates that the licence holder is not permitted to discharge off the premises from Southampton Dam or from Cowan Brook Dam. This was placed on the licence in a previous amendment due to assessed high risk to sensitive offsite receptors. Regular overtopping and release of contaminated process water to the environment is not an appropriate practice and represents a risk to sensitive receptors. Whilst Talison are attempting to manage the process dam water quality, elevated concentrations of lithium and arsenic are still present within the process water dams (see Table 10 of section 3.3.2).

Condition	Summary of Licence Holder's comment	Department's response
	<p>means an arbitrary 0.5m additional freeboard represents a significant volume of water, and brings the freeboard required to more than double that required for a 1% ARI 72 hour rainfall event. This is considered excessive relative to the risk overflow presents to the environment.</p> <ul style="list-style-type: none"> • Talison will maintain a trigger response plan that will require water level management measures (pumping) to be implemented when all dam levels are within 0.3m freeboard. • Talison are developing proposals to increase storage capacity of the existing dams during 2023 and 2024 and develop additional dams in the medium term, with a view to increase water supply and decrease risk of overflow. • Talison intends to raise the wall height of Cowan Brook Dam by 31 December 2023 to enable freeboard to be maintained that is not less than to allow for a 1% AEP 72 hour event plus 0.5m. 	<p>DWER notes that Talison currently lack process water storage capacity to meet the freeboard requirement of 0.5m. As Talison plan to increase storage capacity by addition of new dams or increasing the embankment height of existing dams, the proposed trigger response plan, to manage water levels once dam levels reach 0.3m freeboard, has been conditioned instead and the 0.5m freeboard requirement removed. Freeboard will be reviewed again at later date once additional capacity is available.</p> <p>The applicant proposed a freeboard requirement for Cowan Brook Dam after 1 January 2024. DWER has conditioned this date for both freeboard and the associated inspection requirement.</p>
<p>Condition 1.3.5 Table 1.3.5</p>	<p>Talison requests revision of landfill condition/table from 200 tonnes per year to 450 tonnes per year disposal of all waste types by landfilling.</p>	<p>The increase in throughput for inert waste / clean fill will not trigger the activity to become prescribed (is ancillary to prescribed activities). The current licence controls are also considered sufficient to mitigate risk associated with increased throughput. The instrument and decision report have been revised to reflect the requested increase of inert waste type 1, 2 and clean fill waste types from 200 tonnes per year to 450 tonnes per year.</p>
<p>Settlement pond Condition 1.3.8 Table 1.3.7 and Condition 1.3.10 Table 1.3.10</p>	<p>Talison requests removal of freeboard requirement from the HDPE lined settlement pond, indicating that the pond is designed to overflow into Tin Shed Dam on neighbouring prescribed premises L8501/2010/2. They indicate that the stormwater is "not considered a contamination risk" and is "not considered contaminated stormwater as per L8501/2021/2".</p> <p>Talison has previously noted that Talison and GAM have various commercial agreements in place that address co-processing arrangements (DWER ref A2137088).</p>	<p>Tin Shed Dam is on an operationally related neighbouring premises, L8501/2010/2, authorised to accept "process water, tailings decant/seepage, contaminated stormwater" and indicates that it uses an "arsenic remediation unit to treat all process water / contaminated stormwater inflows prior to discharge to Tin Shed Dam".</p> <p>The freeboard requirement has been removed from the licence as it is noted that the settlement pond has been constructed with a spillway. However, DWER notes that amendment to L8501/2010/2 will be required as:</p> <ol style="list-style-type: none"> 1. Discharges to Tin Shed dam should be assessed within context of L8501/2010/2 rather than L4247/1991/13;

Condition	Summary of Licence Holder's comment	Department's response
		<ol style="list-style-type: none"> 2. The quality of the water within the TRP settlement pond has not been verified; and 3. Available capacity and current contamination status of Tin Shed Dam are not known and have not been assessed by DWER.
Condition 1.3.9 Table 1.3.9	Talison consider the settlement tanks to be a temporary facility until a longer term approach can be resolved. They have consequently requested: <ul style="list-style-type: none"> • Manual monitoring of tank volumes; and • In place of concrete bunding (which is considered wasteful for a temporary facility), they have suggested earthen bunding with overflow directed to Clear Water Dam. 	DWER considers manual monitoring of tank volumes and earthen bunding to be sufficient controls to mitigate the risk associated with the temporary facility. The condition has been revised to reflect the proposed controls.
Condition 1.3.10 Table 1.3.10 Tailings Retreatment Plant	Information provided as per DWER request regarding speed limits: 30km/hour and minimum excavation area of 3 active mining areas of 3 hectares each. Talison have indicated that for much of the time tailings are being mined at or below the phreatic surface and are unlikely to generate significant dust.	The condition has been updated to reflect the proposed controls.
Condition 1.3.10 Table 1.3.10 Water Treatment Plant	Talison requests revision of the <0.5mg/L lithium treatment criteria for the WTP at the discharge point be revised to <2mg/L and, to support this, referenced Section 5.3.5 of GHD 2017, DWER Licence Amendment Supporting Document Clear Water Dam 2. The document indicates that for higher inlet concentrations at higher temperatures, the water quality objective increases (i.e. for treatment of water containing 15-25mg/L lithium the water quality objective is raised to <2mg/L). Talison also request that this be averaged over a calendar month.	The condition has been revised to reflect varying treatment performance based on inlet concentration and temperature and for this to be an average over a calendar month.
	Talison has requested specific criteria for treatment of WTP liquid waste stream by the settlement tanks has been duplicated. Requests revision to "effluent to be further treated by Water Treatment Facility settlement tanks"	The condition has been revised to remove duplication of criteria.
Condition 1.3.10 Table 1.3.10	Talison requests revision of the <0.1mg/L arsenic treatment criteria for the ARU at the discharge point be revised to <0.5mg/L. They have indicated that treatment performance varies depending on input concentration, volume and water quality more broadly. They have also	The condition has been revised to reflect varying treatment performance based on inlet concentration and volume. Rather than calendar quarter, DWER considers an average over a calendar month to be more appropriate for tracking the ARU's performance.

Condition	Summary of Licence Holder's comment	Department's response
Arsenic Remediation Unit	requested that the treatment is averaged over a calendar quarter.	
	Talison has indicated that the ARU does not generate solid waste and have requested removal of the requirement for solid waste disposal. The arsenic concentrated liquid waste stream will be flocculated at the settlement tanks and then dewatered at the Water Treatment Plant.	The condition has been revised to remove the requirement relating to solid waste.
	Talison has requested specific criteria for treatment of ARU liquid waste stream by the settlement tanks has been duplicated. Requests revision to "effluent to be further treated by Water Treatment Facility settlement tanks"	The condition has been revised to remove duplication of criteria.
Condition 1.3.10 Table 1.3.10 Water Treatment Facility	<p>Talison have stated that the purpose of the WTF is to settle solids from effluent produced from the ARU and, to a lesser, extent WTP. This is not intended to remove Lithium from the effluent nor was it designed to. Lithium is removed by the WTP. The proposed Lithium criteria thereby reflect this. The treatment criteria proposed for the WTF by Talison are <24mg/L lithium and <1.3mg/L arsenic.</p> <p>Talison request monitoring data should be averaged over a quarter for assessment against the criteria.</p>	DWER notes that the settlement tanks act to partially remove solids from the effluent stream and have therefore removed the requirement for a specific treatment criteria
Condition 1.3.11 (pipelines)	<p>Talison have indicated that they cannot comply with the condition, does not consider the control appropriate relative to the risk and that such measures will take at least two years to scope, design, obtain any necessary approvals for, tender and construct. They have proposed an alternative condition that:</p> <p>"The Licence Holder shall:</p> <ul style="list-style-type: none"> a) Risk assess pipelines containing mine water, circuit process water, process liquors, WTP and ARU effluent, and tailings; and b) Develop a plan by July 2023 to the satisfaction of DWER to retrofit this infrastructure by 01 July 2025" 	DWER considers Talison's proposal acceptable and has revised the condition.
Condition 3.2.1 Table 3.2.1	Talison request that monitoring of seepage does not commence until the Southampton dam wall raise has been completed (will take place during 2023 to early 2024) as any infrastructure installed prior will be destroyed during construction.	The condition has been revised to indicate the requirement for Southampton Dam seepage monitoring to take place after Southampton Dam raise, and no later than 01 July 2024.

Condition	Summary of Licence Holder's comment	Department's response
Condition 3.4.3	Talison acknowledge that modification and/or expansion of the monitoring program for downstream surface water ecology is warranted. Talison request time to review the program and propose a revision by June 2023 for commencement Spring 2023.	<p>DWER accepts Talison's proposal to review and propose a revision to the annual ecological assessment required by condition 3.4.3. DWER has retained preferred locations in Table 22 and Figure 19 of this decision report but has not included these as requirements of the revised condition. Noting that these locations were suggested by DWER's internal aquatic science team and that a monitoring program proposed by Talison will be compared to the preferred proposed program. Talison will be required to demonstrate the revised monitoring program is adequate.</p> <p>Note that the original condition 3.4.3 will be retained on the licence until the new monitoring program has been implemented (required by Spring 2023).</p> <p>The revised program will also need to include minimum method and detail standards which have been included within Schedule 2 of the licence.</p> <p>A new specified action condition (2.3.4) has been added to the licence to require Talison to review the annual ecological assessment program (required by condition 3.4.3) and propose a revised sampling program by June 2023 for implementation to commence in Spring 2023.</p> <p>The licence will be amended to incorporate the new sampling locations and regime once the revised program, developed by Talison, has been assessed and approved by DWER.</p>
Decision report comments		
Section 3.4.1	<p>Talison indicate that the previous mine water schematic provided to DWER is misleading and that water from the mine water circuit is used for dust suppression at Floyds waste rock dump which is incidental and does not represent a significant contribution to runoff and seepage from Floyds to the eastern discharge points.</p> <p>Talison request the report be amended to remove the statement that water reports from Southhampton Dam via Floyds to the eastern discharge points.</p>	DWER has amended the decision report to reflect the revised mine water schematic provided by Talison. Assessment of discharge along the eastern premises will remain and will be treated as a DWER initiated amendment.

Condition	Summary of Licence Holder's comment	Department's response
Section 3.4.2 and 3.4.3	Talison have requested the text be revised to state that sites 3, 4 and 6 of the Annual Ecological Surveys are located upstream of the eastern discharge locations and represent background.	From information provided by GHD (2019a) and assessment undertaken by DWER, it appears that surface and groundwater flow radially outward from the site with topography. These locations may therefore be downstream of the contamination sources (including the 300 million litres of contaminated stormwater discharged along the eastern premises boundary). It is therefore considered unlikely these locations represent naturally occurring background conditions.
Decision report page 34 statement "addition of this effluent decant back into Clear Water Dam will reintroduce contaminants back into the mine water circuit and may significantly reduce the efficacy of water treatment".	<p>Talison do not consider that the addition of the effluent will considerably reduce the efficacy of the water treatment. The RO WTP and ARU will still remove the same mass of Lithium and Arsenic from the MWC. The Lithium and Arsenic within the effluent originate from the MWC. Similarly, the efficiency of the water treatment increases with increasing concentration.</p> <p>Consequently, Talison consider it is premature to prescribe that the effluent from the WTF settlement tanks is ultimately not discharged to CWD.</p> <p>Having said that, Talison will investigate and implement alternatives or demonstrate the environmental suitability of the current plan.</p>	<p>The WTP and ARU are designed to treat water and remove lithium and arsenic from the mine water circuit. They consequently both produce lithium and arsenic concentrated waste streams – i.e. the removed product. If the removed product is then placed back into the mine water circuit this undermines the efficiency of the original treatment. DWER therefore supports Talison's suggestion that an alternative proposal for effluent disposal be explored.</p> <p>See further discussion in relation to condition 2.3.1.</p>
Decision report page 39: Information gaps with respect to off-site surface and groundwater users	"Talison acknowledges potential gaps in groundwater monitoring west of the dams. However Talison indicates that the decision report has not identified downstream groundwater users, nor is this considered likely. While there is potential for there to be downstream users that drink the surface water, it should be acknowledged that the natural surface water quality is not particularly palatable and so this is unlikely. Talison request removal of reference to groundwater users".	<p>DWER has modified Figure 5 of section 3.1.2 to more clearly show the location of groundwater bores/users. Please also see Figure 11 by GHD 2019a.</p> <p>The assessment is referring to groundwater users who use the water for many uses (besides drinking water) such as stock watering and irrigation etc.</p> <p>Talison's own survey in 2021 indicates surface/groundwater water uses including drinking water, aquaculture, recreational use (swimming), domestic purposes, stock watering and irrigation</p> <p>Additionally during community consultation for works approval W6283/2019/1, two submissions were received from members of the public with concerns regarding water quality of Wolenu Creek and contaminant migration offsite as this water is used for irrigation of fruit and vegetables and for grazing stock.</p>

Table 31 Summary of comments on improvement conditions

Condition	Summary of Licence Holder's comment	Department's response
<p>Condition 2.3.1 (former, removed – eastern premises boundary discharge)</p>	<p>Talison acknowledge that additional study and management is required. As an estimated 300 million litres per year is discharged off the eastern side of the premises, Talison request additional time to conduct additional studies and to develop and implement the required management plans. This includes completing a risk assessment to determine discharge criteria to surface water and groundwater. The 0.42mg/L is considered a conservative value derived from applying a 100* multiplier to the study findings. An alternative condition has been proposed:</p> <p><i>“On or before 31 December 2023, the Licence Holder must submit to the CEO a management plan that includes, but is not limited to:</i></p> <ul style="list-style-type: none"> a) <i>Alternative water management strategies to progressively stop by 31 December 2025, the discharge of contaminated water from the eastern side of the Premises from emission points Carters Farm, Floyds North, Floyds South and Cemetery as defined by condition 2.2.1; or</i> b) <i>Strategies and treatment options to maintain the Lithium concentration within Salt Water Gully to below 2.0mg/L by 30 November 2023.</i> 	<p>It is also noted that Talison have acknowledged that investigation and management of this issue is required and have requested additional time to develop a management plan and further assess risk of discharge to the environment.</p> <p>It has been decided that draft condition 2.3.1 will be removed from the licence at this point in time. DWER intends to initiate a separate amendment to the licence to deal with this issue.</p> <p>Regulation is likely to include a requirement to either restrict and eventually stop discharge off-site to the east or to reduce the volume and treat the water to a certain discharge quality criteria.</p> <p>The department's Aquatic Science Branch (AQB) is currently undertaking research into the toxicity of lithium for Western Australian aquatic species. In 2023 further information from AQB is likely to be available to assist with regulation of this discharge. DWER will undertake further assessment and regulation of eastern boundary discharge at this time. DWER will also use the data provided by AQB to further assess the site-specific value (0.42mg/L) derived by CERNM (2013). DWER notes the CERNM (2013) study involved three species only, and that the data provided was limited in its ability to enable an adequate assessment of factors such as reproductive function, or long-term consequences of elevated lithium on an ecosystem. (DWER reference A1045796).</p> <p>Additionally this assessment may include the investigation into the seepage/runoff from the waste rock landform, given the proposed expansions to this area (including concerns raised by DMIRS).</p> <p>DWER notes that Talison may be required to apply for an amendment to it's licence (under section 53 of the <i>Environmental Protection Act 1986</i>), as the waste rock landform expansion may modify the composition of elements within the stormwater emission from the premises eastern discharge points.</p>

Condition	Summary of Licence Holder's comment	Department's response
<p>Condition 2.3.2 (former – now condition 2.3.1)</p>	<p>Talison acknowledge additional improvement is required in reducing concentration of Lithium in particular, within the mine water circuit, and the risk of discharge to the environment. Talison consider timing problematic however for the following reasons:</p> <ul style="list-style-type: none"> • “it has not been established that clear water dam represents a significant risk of discharge to the environment from seepage or overflow; • Conditions in Table 1.3.1 requires Talison to maintain freeboard effectively preventing overflow discharge from Clear Water Dam. As such, a plan to do the same is unnecessary; • Condition 2.3.2 requires Talison to develop a water balance for Clear Water Dam including modelling of seepage from Clear Water Dam within six months, three months later than putting a plan forward to limit seepage; • Talison's preferred disposal location for effluent from the WTF remains tailings storage facility 2 (TSF2); • Talison do not agree with DWER's assertion that the effluent will significantly increase the loading of contaminants withing Clear Water Dam and the Mine Water Circuit. Talison are confident that modelling of Lithium and Arsenic across the MWC that will be completed as set out in Conditions 2.3.2 will demonstrate this. Notwithstanding Talison consider the settlement tanks an interim measure and plan to investigate, design and implement an alternative strategy through 2023. This will involve either demonstrating that disposal via the TSF is appropriate to attenuate the risk or introduction of additional water treatment. Talison do not consider three months sufficient time to resolve these matters into a plan. • Talison indicate that wording of the condition regarding the date requirement is unclear and are unsure why November 2023 is the time given. <p>Talison have proposed an alternative condition: <i>“On or before [DATE SIX MONTHS FROM AMENDMENT] , the Licence Holder must submit to the CEO a Clear Water Dam emissions</i></p>	<p>Whilst there might not be an increase to the contaminant load via discharge of arsenic and lithium concentrated effluent back into the mine water circuit, the current contaminant load of the MWC and the current contamination of the surrounding groundwater presents an unacceptable risk to sensitive receptors, as discussed in sections 3.3 and 3.4 of this decision report. The WTP and ARU are primary controls to manage this risk and remove lithium and arsenic from the mine water circuit. If the removed arsenic and lithium contaminated decant water is then placed back into the mine water circuit this undermines the efficiency of the original treatment.</p> <p>DWER supports Talison's suggestion for an alternative proposal for effluent disposal be explored and welcomes further discussion and meetings regarding the alternative disposal strategies.</p> <p>The decision report for W6283/2019/1 indicates that seepage is not currently being adequately managed for TSF2. Should discharge of effluent to TSF2 be considered, appropriate seepage management, as deemed suitable by DWER, would need to be in place.</p> <p>DWER does not support the suggested date of 31/12/2025 for the limiting of discharges (seepage or overtopping) from clear water dam. This date does not reflect the level of risk as discussed in section 3.3. DWER have proposed an alternative date of 31/12/2024.</p> <p>The wording of condition 2.3.1 has been modified to allow Talison to demonstrate the environmental suitability of the long-term disposal of the effluent to CWD.</p>

Condition	Summary of Licence Holder's comment	Department's response
	<p><i>management plan which includes but is not limited to:</i></p> <ul style="list-style-type: none"> <i>a) Strategies to limit discharges, including seepage and overflow, of contaminated water containing lithium or arsenic from Clear Water Dam by 31 December 2025; and</i> <i>b) A plan to progressively stop discharge of water treatment effluent from the WTF back into Clear Water Dam or demonstrate this is sustainable by 30 June 2024; and</i> <i>c) A timeline for implementation of these strategies.”</i> 	

Table 32 Summary of comments on second draft licence and decision report

Condition	Summary of Licence Holder's comment	Department's response
Condition 1.3.1, Table 1.3.1	<p>In response to DWER's request for Talison to list freeboard in metres for process water dams (for a 1% annual exceedance probability 72 hour event), Talison have provided freeboard but requested these remain unstated on the licence as the required freeboard will change with the dam wall heights are modified in 2023 and 2024 and will require amending.</p> <p>The freeboard given are:</p> <ul style="list-style-type: none"> • Clear Water Dam: 0.43m; • Austins Dam: 0.44m; • Southampton Dam: 0.33m; and • Cowan Brook Dam: 0.53m. 	<p>DWER will place the freeboard proposed by Talison for a "1% annual exceedance probability 72 hour event" and will review freeboard again once new embankment wall heights are in place.</p>
	<p>In response to DWER's request for information regarding use of TSF1 for emergency tailings deposition whilst undertaking reprocessing, Talison have indicated that the exact location of deposition will depend on the location and progress of tailings excavation at that time. They have indicated that in an emergency deposition event, mining of tailings from TSF1 will cease until such a time that Talison is able to establish safe operating conditions to enable the concurrent mining and deposition to occur. This would involved establishing sufficient primary and secondary containment between the mining and depositional areas to ensure safety of personnel operating within the TSF.</p>	<p>DWER will place a requirement that "Tailings remaining in TSF1 must cease whilst emergency deposition of tailings takes place until sufficient primary and secondary containment between the reprocessing area and depositional areas have been established".</p>
Condition 1.3.5, Table 1.3.5	<p>In response to DWER's request to provide a figure with the landfill location, Talison have requested that this location be indicated at "an appropriate location within the Floyds WRL".</p>	<p>DWER has included that the location of the landfill is "approximately" at the location indicated within the figure. Should this change over time, Talison can provide updated figures to DWER bundled with upcoming licence amendments.</p>
Schedule 3	<p>In response to DWER's request for Talison to confirm premises boundary coordinates, Talison have identified that there were transcription errors for points 2, 17, 18, 20 and 23 and have provided correct coordinates.</p>	<p>DWER has included corrected coordinates within Schedule 3 of the licence.</p>
Decision report	Summary of Licence Holder's comment	Department's response
Comment on section 3.3.4	<p>Talison commented on the following text by DWER: <i>"From information provided by GHD (2019a) and assessment undertaken by DWER, it appears that surface and groundwater flow radially outward from the site with topography. These locations may therefore be downstream of the</i></p>	<p>Reports (GHD 2019a) have indicated that there is significant surface water and groundwater connectivity. DWER also considers that 14mg/kg lithium within sediments at sites 3 and 4 are unlikely to represent background conditions. However, having insufficient detailed information regarding the</p>

Condition	Summary of Licence Holder's comment	Department's response
	<p><i>premises. It is therefore considered unlikely these locations represent naturally occurring background conditions."</i></p> <p>Talison state that sites 3, 4 and 6 are located on Hester Brook upstream from Talison's operations and discharge points. These locations were specifically sited to represent upstream conditions. Talison's eastern activities, and discharge points (Floyds North, Floyds South, Cemetery and Carter's) are within the Salt Water Gully and Cascades Gully catchments. Both are tributaries of and intersect Hester Brook downstream of monitoring locations 3, 4 and 5. The geological setting and significant rise in topography between Salt Water Gully and monitoring locations 3, 4 and 6 preclude any groundwater connection.</p>	<p>hydrogeology along the eastern premises boundary and given that further assessment will take place as part of a separate licence amendment, DWER has modified text within the decision report surrounding this issue.</p>

Appendix 5: Application validation summary

SECTION 1: APPLICATION SUMMARY					
Application type					
Amendment to licence	<input checked="" type="checkbox"/>	Current licence number:	L4247/1991/13		
		Relevant works approval number:	W6283/2019/1	N/A	<input type="checkbox"/>
Date application received		18/01/2022			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Talisson Lithium Australia Pty Ltd			
Premises name		Talisson Lithium Mine			
Premises location		Maranup Ford Road, GREENBUSHES WA 6254. Legal description - Mining Tenements M01/3, M01/6, M01/7, M01/8, M01/9, M1/16, G01/1 and G01/02			
Local Government Authority		Shire of Bridgetown – Greenbushes			
Application documents					
HPCM file reference number:		2012/0071641			
Key application documents (additional to application form):		Appendix D: Geochemical Characterisation of Tantalum Tailings Appendix E: Dust Management Plan Appendix F: Spill Procedure Appendix G: Hydrocarbon Storage Procedure Appendix H: Talisson Operating Manual for Tailings Storage Facilities			
Scope of application/assessment					
Summary of proposed activities or changes to existing operations.		Licence amendment for: <ul style="list-style-type: none"> • Operation of tailings retreatment plant (TRP) and disposal of TRP tailings (originating from TSF1) into TSF2 • Increase in throughput from 4,700,000t to 5,000,000t beneficiated per annual period. (No increase in the tonnes of tailings deposited into TSF) 			
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 (amendments only)			
Category 5	4,700,000 tonnes beneficiated per annual period	Yes. 300,000 t			
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	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Referral decision No: Managed under Part V <input type="checkbox"/>			

significant proposal?		Assessed under Part IV <input checked="" type="checkbox"/>
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: 1111 EPA Report No: 1635
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Reference No: N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Mining lease / tenement <input checked="" type="checkbox"/> Expiry: 27/12/2026
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Approval: Expiry date: If N/A explain why?
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	CPS No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: N/A Licence/permit No: N/A Licence / permit not required.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Name: N/A
Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx</i>)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Part IV of the EP Act (MS 1111) Noise Regulations, Regulation 17 exemption Part V of the EP Act, Native Vegetation Clearing permit Department of the Environment and Energy (DoEE)- EPBC 2013/6904 – Clearing Mining Act 1978 Contaminated Sites Act 2003
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Classification: contaminated – restricted use (C–RU) ID 34013 Date of classification: June 2007, and classified again October 2020