Amendment Report

Application for Licence Amendment

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

Licence Number	L7798/1993/6
Licence Holder	Silver Lake (Deflector) Pty Ltd
ACN	101 224 999
File Number	2010/003052-1
Premises	Gullewa Gold-Copper Operations M59/49, L59/49, L59/64, M59/68, M59/132, M59/294, M59/356, M59/391, M59/392, M59/335, M59/442, L59/35, M59/507, M59/336, M59/522, L59/71, L59/158, L59/159 and L59/160 Morawa – Yalgoo Road YALGOO WA 6635
Date of Report	20 April 2023
Decision	Revised licence granted

Carmen Standring

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Date: 2023.04.20 15:47:58 +08'00'

A/SENIOR MANAGER, RESOURCE INDUSTRIES
REGULATORY SERVICES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

Licence L7798/1993/6 is held by Silver Lake (Deflector) Pty Ltd (Licence Holder) for the Gullewa Gold-Copper Operations (the Premises), located approximately 46 km south-west of Yalgoo.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the Premises. As a result of this assessment, Revised Licence L7798/1993/6 has been granted.

The Revised Licence issued as a result of this amendment consolidates and supersedes the existing Licence previously granted in relation to the Premises. The Revised Licence has been granted in a new format with existing conditions being transferred, and reassessed with new conditions, to the new format.

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

On 29 June 2022, the Licence Holder applied (Silver Lake (Deflector) Pty Ltd, June 2022) to the department to amend Licence L7798/1993/6 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The following amendments are being sought:

- Increase throughput of (details in Table 1):
    - Category 5: from 760,000 to 877,000 tonnes per annual period.
    - Category 6: from 750,000 to 1,540,000 tonnes per annual period.
    - Category 85: from 50 to 60 cubic metres per day.
- Operation/Inclusion of:
    - **A Carbon in Pulp (CIP) Leach Upgrade circuit (CIP Circuit)** and storage of reagents at the Deflector Processing Facility.
    - **Tailings Storage Facility 2 (TSF2)** constructed under works approval W6407/2018/1, with a groundwater monitoring bore network and tailings and decant return water pipelines.
    - **Category 64: Type 2 Special Waste** (biomedical waste - less than 1 tonne/year) with supervised burial within the Deflector landfill (Figure 2).
    - **Sludge drying bed** with bunded pipeline & water returned to the Wastewater Treatment Plant (WWTP) balance tank. Dried material is to be disposed to an appropriate offsite facility via a controlled waste contractor.
- Removal of conditions as justified in Table 2 below:
    - 2.2.2.
    - 3.2.1 and Table 3.2.1 (Monitoring of emissions to land at the historical Salt River discharge point).
    - 3.4.1 and photo monitoring sites at the historical Salt River discharge point in Table 3.4.2.
    - 3.4.1 and soil monitoring sites at the historical Salt River discharge point in Table 3.4.3.
    - 4.2.4 non-annual reporting requirements for condition 3.4.1, Table 3.4.3 in Table 4.2.2.

Table 1: Proposed design or throughput capacity changes

Category	Current design/ throughput capacity	Proposed design/ throughput capacity	Description of proposed amendment
5	760,000 tonnes per annual period	877,000 tonnes per annual period	The Licence Holder has commissioned the CIP circuit with blend components of new ores from the Rothsay mine that are softer than Deflector ores. As such the estimated throughput is anticipated to increase to 820 kt/annum (95 tph) and a maximum design capacity increase to 877 kt/annum (100 tph) is proposed.
6	750,000 tonnes per annual period	1,540,000 tonnes per annual period	The Licence Holder has reviewed the original (2017) groundwater modelling which indicated increased dewatering requirements for 2022 to 2027.
64	4,000 tonnes per annual period	4,000 tonnes per annual period	No change. Less than 1 tonne of special waste is proposed and is expected to not exceed the 4,000 tpa allowance.
85	50 cubic metres per day	60 cubic metres per day	The Licence Holder has upgraded the existing WWTP at the Premises, which has a design capacity of 60 m^3 /day.

Table 2: Conditions proposed for removal

Condition	Current requirement	Proposed change	Justification
2.2.2	The Licence Holder shall ensure that all dewatering discharges to Salt River flow through a rock-armoured gabion outlet.	Remove	No longer required as this refers to the historical flood plain discharge location. The location and rock armoured gabion have been removed.
3.2.1 and Table 3.2.1 Monitoring of emissions to land	The Licence Holder shall undertake the monitoring in Table 3.2.1 according to the specifications in that table and present this information in the Annual Environmental Report, including a comparison against the previous years' monitoring data.	Remove	No longer required as this refers to the historical flood plain discharge location. Monitoring is replaced by the existing condition 3.6.1 and Table 3.6.1 Monitoring of emissions to surface water of the Licence.
3.4.1 – Table 3.4.2 and associated map	Photo monitoring sites: Salt River Discharge on tenement L59/64 - PS1, PS2, PS3, PS4, PS5,	Remove monitoring locations and	Vegetation monitoring of the historical groundwater discharge location was required for the Department's site DMO 11089 – classified under the

Monitoring of ambient vegetation quality	PS6, PS7, PS8, PS9, PS10, PS11, and PSC9	reference to L59/64	*Contaminated Sites Act 2003* as 'Possibly contaminated –investigation required' A Vegetation Condition Review was conducted in September 2021 of the historical groundwater discharge area concluding overall there is an increase in species richness, improvement of vegetation condition and retreat of impact area. The report recommended the area be left to recover naturally. Weeds were identified and management has been discussed with the Department of Biodiversity Conservation and Attractions (DBCA) as the land managers at closure.
Condition 3.4.1 – Table 3.4.3 and associated map Monitoring of ambient soil quality	Soil monitoring sites: PSC9, DEFD01, DEFD07, DEFD10, DEFD16, DEFD18, DEFD21, and DEFD22	Remove soil monitoring locations	Discharge of dewatered groundwater to the environment ceased at this location in April 2020. Soil/sediment monitoring of the historical groundwater discharge location is required for the DWER site DMO 11089 – classified under the *Contaminated Sites Act 2003* as 'Possibly contaminated – investigation required' An Ecological Risk Assessment was conducted in July 2021 to 'assess the potential for unacceptable risks to identified ecological receptors of concern'. The analysis concluded the risk to the terrestrial ecosystem of residual metals in the soil is low and acceptable and therefore propose the classification of site DMO 11089 be reclassified as 'Not contaminated – unrestricted use.' No further monitoring was recommended. If required, any further soil investigations will be conducted following direction of DWER under the *Contaminated Sites Act 2003*.
4.2.4 – Table 4.2.2 Non-annual reporting requirements	Quarterly submission of the following: • Copies of monitoring results from monitoring undertaken by the Licence Holder; or • Copies of originals submitted to the Licence Holder by third parties	Remove condition	As appendices to the Annual Environmental Report (AER) in line with other licences held by the Licence Holder or its subsidiaries. The Licence Holder comments that notification requirements included in Table 4.3.1 adequately address the provision of risk-relevant information in a timely manner to the Department.

The amendment relates to the categories 5, 6, 64 and 85 and assessed production / design capacity under Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations) which are defined in Existing licence L7798/1993/6. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in licence L7798/1993/6.

2.2.1 Construction compliance

The Tailings Storage Facility 2 (TSF2) and associated infrastructure, the Carbon in Pulp (CIP) leach upgrade and reagents store, and Process Water Pond, were all constructed in 2021 under Works Approval W6407/2020/1. DWER received the Environmental Construction Reports (ECRs) between May and July 2021. All items in the ECRs were deemed compliant upon review in December 2021, with minor incomplete items, including installation of vibrating wire piezometers, which have since been installed or embankment raises which will be constructed over the lifetime of TSF2. The CIP circuit was constructed within the Deflector Processing Facility as shown in Figure 1 below. Increase in category 5, screening and crushing would potentially increase dust output. The risk is assessed in section 3 below.

2.2.2 Increased throughput of ore

The CIP circuit was commissioned under works approval W6407/2020/1 using up to four blends of Deflector ore from Deflector Mine and Rothsay ore from the Rothsay Mine. Rothsay ore is currently softer than Deflector ores which requires less re-circulation into the mill for crushing, therefore a higher throughput of ore can be processed. Licence Holder estimates 820 kt/annum (95 tph) can be processed in total from both ores, and proposes a maximum design capacity of 877 kt/annum (100 tph). No extra emissions such as noise or dust are anticipated.

A further two ore blends have not yet been achieved and will not be considered further in this assessment.

In 2020, DMIRS approved Mining Proposal REG ID 88751 for the construction of TSF 2. The design was based on tailings production of 700,000 tpa and tailings containing 40% solids. Since TSF 2 was designed for a smaller throughput, DMIRS questioned whether the increase in production may affect tailings consolidation, rate of rise, the life of TSF2 and to the potential for increased seepage.

The Delegated Officer notes the same ore types, Deflector and Rothsay, will be put through the mill as fresh ores which will have higher settled densities that the mix the oxide/transitional and of fresh rock. The resulting tailings are also expected to have higher tailings strengths.

TSF2 is a two cell tailings storage and has a tailings drying area larger than would be typically sized for a single cell. Based on a conservative tailings density of 1.35-1.4 t/m^3 (dry) the average tailings rate of rise is approximately 1.4 m/year (average) at the final embankment crest levels (tailings drying area 42.2 ha). The Licence Holder claims TSF2 should therefore have a similar storage capacity as the original design.

The water balance was updated for a tailings production rate of 820,000 tpa and the result indicated potential annual average water returns of approximately 45% of the tailings slurry water deposited into the facility can be expected under average climatic conditions. This is an increase of about 20% or an additional 175 m^3 /day (min.) of return water when compared with the previous water balance for the production rate of 720,000 tpa.

Provided water return is maximised and additional pumping capacity is provided for TSF2, any increase in seepage is expected by the Licence Holder to be negligible. The return water system currently has sufficient capacity to accommodate the increase in return water and a network of six monitoring bores have been installed for seepage detection.

Advice was sought from the Department's Contaminated Sites Branch on the geotechnical and geochemical testing undertaken for Works Approval W6407. Testing of the chemical

composition of the pore water that would be present in TSF2 has indicated that the proposed increased concentration of free cyanide in tailings pore-water in TSF2 will likely enhance the leaching of copper and nickel from tailings particles into the pore-water. However, the Delegated Officer does not consider that the increased concentrations of copper and nickel in pore-water in TSF2 will significantly change the environmental risks associated with seepage from this facility. This is due to the hypersaline nature of groundwater beneath TSF2 and the absence of groundwater dependent environmental receptors near the facility.

Comments received from the Department's Mid-West Gascoyne Licensing Branch informed an amendment to the water licence was being processed and would avoid duplication of conditions with this licence by removing process TSF monitoring from the water licence.

2.2.3 Type 2 special waste

Less than 1 tonne of biomedical waste is proposed and is expected to not exceed the 4,000 tpa allowance. Biomedical waste will be buried in the Deflector landfill shown in Figure 2 below.

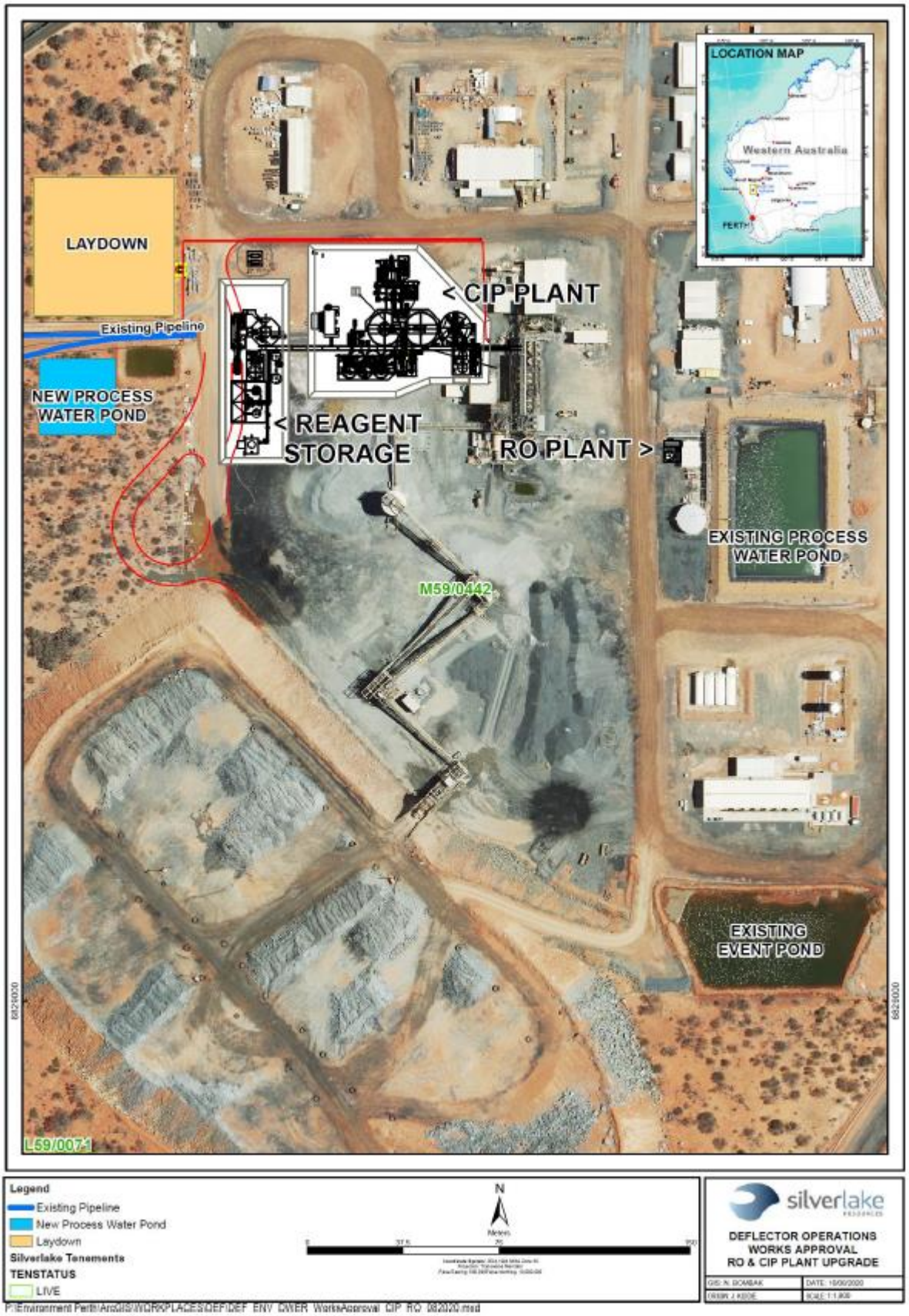

Figure 1: The location of the CIP plant and reagent store at the Deflector Processing Facility

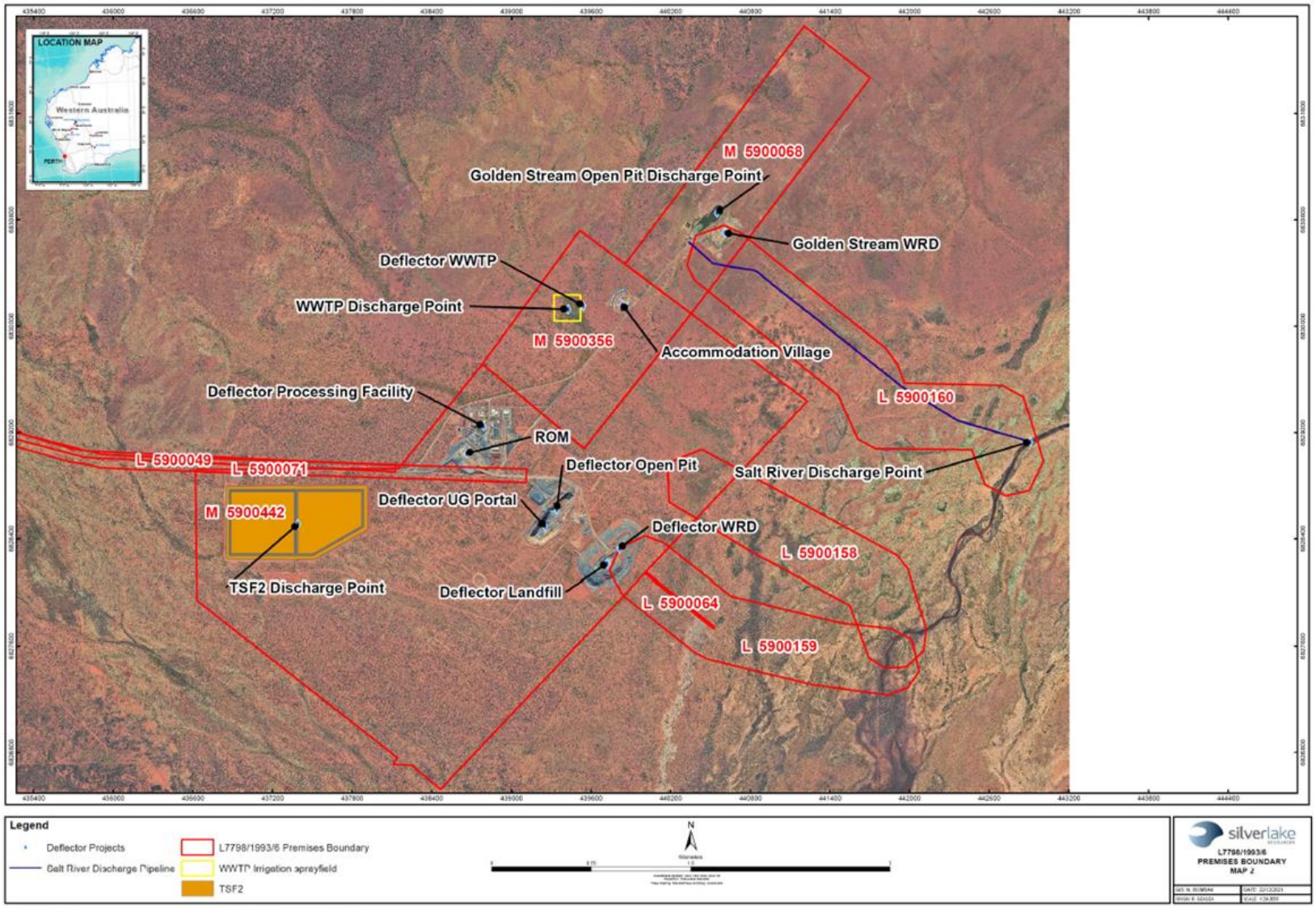

Figure 2: Location of Deflector landfill

2.2.4 Increase in WWTP irrigation discharge

Under time limited operations of Works Approval W6407/2020/1, discharge of treated wastewater from the on-site sewage facility increased to 60 m^3 per day. A review of the treated wastewater was undertaken for the duration of the Works Approval from 2020 to 2022. The data shows fluctuations in *Escherichia coli* (*E. coli*) and biological/biochemical oxygen demand (BOD) which correlate to village occupancy (Silver Lake, 2021). Reduction of total phosphorus and total nitrogen are a notable improvement when compared to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality for Primary Industries (ANZECC, 2000) shown in Table 3 below. Fluctuations of During Q2 of 2021, *Escherichia coli* (E. coli) exceeded livestock drinking limits, the fluctuations correlate to village occupancy (Silver Lake, 2021). Monthly discharge volumes under time limited operations were below 60 m^3 per day, averaging 50.25 m^3 in 2021 and 54 m^3/day in 2022.

Table 3: Discharge quality of treated wastewater from 2020 to 2022 at Deflector mine during time limited operations

Sample Quarter	pH	E. coli	BOD Free	Chlorine	Total P	Total N	TSS
ANZECC guideline limits	6.5 to 8.5	<1000 cfu[1]/100 mL^2	<15 mg/L^3	<25 mg/L^4	0.8-12 mg/L^5	25-125 mg/L^6	N/A
Q1 - 2020	7.7	>1,209	150	<0.1	21	82	790
Q2 - 2020	8	<1	160	0.9	20	94	750
Q3 - 2020	8	<1	<5	14	2.1	66	54
Q4 - 2020	7.9	>12,098	86	<0.1	17	99	470
Q1 - 2021	7.5	500	5	0.4	10	13	160
Q2 - 2021	6.7	>24,000	17	1	4.8	11	130
Q3 - 2021	7.8	<10	<5	0.2	3.7	7.6	61
Q4 - 2021	7	<1000	8	0.4	1.6	5.5	47
Q1 - 2022	7.9	<10	22	6.9	3.8	21	110
Q2 - 2022	7.8	<10	8	1.9	1.3	34	40

*Note A: 1) Colony forming units 2) Trigger value for non-dairy cattle 3) general recommendation for freshwater 4) quality reduction begins for the most sensitive plants 5) and 6) recommended for short-term (20 years) irrigation (*ANZECC, 2000*).*
Note B: Shaded cells are values which have exceeded recommended guidelines, sourced from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality for Primary Industries (ANZECC, 2000).

2.2.5 Historical dewatering discharge

Dewatering of the open pits at the Premises commenced in late 2002 with dewatering discharge at a rate of 300,000 tonnes per annual period (tpa) to the flood plains of the Salt River (described as 'Salt River discharge location' in the Licence at the time), 1.5 km to the west of the Salt River channel proper.

Between 2012 and 2017 the dewatering discharge rate was increased and decreased numerous times. In 2012, underground mining of the Deflector mine required an increase in dewatering discharge to 600,000 tpa. Completion of the new processing facility saw mining operations recommenced in September 2015 with the dewatering of the Deflector pit lake in preparation for mining underground in early 2016. The dewatering water was discharged at a rate of up to 360,000 kL (tonnes) per annum.

The Golden Pit Stream was included to the Licence in January 2016 as a storage node to receive water from the dewatering of the underground mine. Stored water is then used in the process plant and for dust suppression, with any excess sent to the Salt River discharge location to maintain a net zero discharge quantity (i.e. the volume received at the Golden Stream pit is consistent with volumes pumped out). Dewatering discharge to the Golden Stream Pit and the rock-armoured gabions at the Salt River discharge location were limited to a maximum of

300,000 tpa.

While the associated Works Approval authorised the construction of infrastructure at the Premises so the dewatering discharge rate could be increased to 600,000 tpa, a compliance document was not submitted by the Licence Holder. An Amendment Notice to the Works Approval was issued on 30 June 2017 which extended the expiry date of the Works Approval and authorised the construction of a lift to the TSF. Conditions authorising other construction at the Premises, which included increasing the throughput for category 6 to 600,000 tpa, and the requirement for submitting compliance documentation for those works, were deleted from the Works Approval.

Amendment Notice 4, granted in December 2019, included a new dewatering discharge location to the Salt River proper. Dewatering commenced at this location from March 2020 and discharge to land ceased on 1 April 2020. The dewatering pipeline terminated with a T-piece with holes used to dissipate water energy and reduce scour and erosion of the riverbank and riverbed.

Historic compliance inspection

In 2016 and 2017 the Licence Holder notified DWER of vegetation health decline and dewatering discharge exceedances. The Licence Holder had exceeded the dewatering discharge limit of 300,000 tonnes per annum with 314,000 kL and 314,680 kL having been discharged to the Salt River discharge location respectively. The latter was due to dewatering rates consistently exceeding estimates and inflow rates steadily rising as the depth of the Deflector Underground Mine increased.

The 2016 Annual Environmental Report (AER) showed that during the 2016 calendar year, 943,976 kL was discharged via the Salt River discharge location and information provided in the Deflector Dewatering Management Plan, August 2017 (DDMP) shows that for the period January – July 2017, a total of 825,156 kL of water was discharged to the Salt River discharge location.

DWER officers conducted site inspections in April and October 2017 and reviewed satellite imagery. The officers observed that up to 75 ha of vegetation up to 5 km downstream of the Salt River discharge point was stressed and dying, with large areas of pooled water at the dewatering discharge location. Only salt tolerant species were surviving.

At the time of the inspection the officers alleged vegetation stress and death due to the constant inundation caused by the dewatering discharge exceedance, or the elevated TDS levels in the discharged water. A third-party report included in the requested DDMP suggested that some metals may be elevated in the discharge water.

Discussions between DWER and the Licence Holder following these observations included addressing the non-compliance and a timeframe for when these corrective actions would be implemented. Consequently, the Licence Holder began planning new alternative methods to reduce excess dewatering discharges.

In the interim, changes include maximizing water use at the Premises where possible through increased dust suppression, increased use in the processing plant during the summer months, the trialling of six turbo mist evaporators at the TSF, discharging the water over the waste rock facility and sourcing all water used underground from the Golden Stream storage pit settlement pond. Prior to these changes, dewatering water was being discharged to the Salt River discharge location at rates of up to 66 L/s.

Later, the Licence Holder trialled the use of a clarifier to reduce the concentration of metals in the dewatering discharge water as well as sent dewatering water to settlement ponds to settle suspended materials prior to discharge to land.

As of March 2018, the dewatering discharge rate continued to exceed the Licence limit of 300,000 tpa at a rate around 13.5 L/s. This rate is equivalent to approximately 425,000 tpa

Amendment Notice 2 for Licence L7798/1993/6 was granted in July 2018 which assessed the impacts of continued overland discharge for a period of 18 months at a throughput capacity of 750,000 tpa (based on an average discharge volume of 23.8 litres per second). This would provide the Licence Holder time to implement alternative methods of dewatering discharge. The assessment recognised the discharge water was high in TDS and had some elevated metals which have caused soil contamination at the discharge site. However, discharge between 2015 and 2016 had not substantially increased the concentration of metals within the soils above background levels except at the immediate discharge point. Continued discharge was deemed acceptable due to the degraded nature of the discharge site, no threatened or priority flora species and the lower expected dewatering extent.

Soil contamination investigation

Due to historical dewatering to land, the Department flagged the discharge to land site as 'potentially contaminated – investigation required', prompting the Licence Holder to investigate the soils. An ecological risk assessment was undertaken, where four years of soil data from 2017 to 2021 from the historical discharge site, a control site, sediments from the Salt River and Burra Lake, were analysed to understand the presence of any potential contaminants and the ecological risk any elevated levels may pose.

The Licence Holder reported that most metal concentrations were elevated in comparison with background locations with the highest elevation at the discharge location. Chromium, copper, and zinc concentrations were noted as comparable to background levels. Cadmium levels were elevated and lower than Salt River sediment and elevated nickel concentrations were double the Salt River sediments. Nickel and cadmium were identified as naturally occurring in the region. The bioavailability of metals within the sediment was generally lower than the total metals.

Total Petroleum Hydrocarbons were found in the historical discharge sediments. pH ranged from 5.5 - 8.7 with most being mildly to moderately alkaline, characteristic of the Yalgoo bioregion. Salinity and sulphate concentrations were high, however indicative of the wider ecosystem.

The analysis concluded the risk to the terrestrial ecosystem of residual metals in the soil is low and acceptable and therefore proposed the classification of site DMO 11089 be reclassified as 'Not contaminated – unrestricted use.'

In addition, a Vegetation Condition Review (Botanica, 2021a) was conducted in September 2021 of the historical groundwater discharge area. Water inundation and salt crusting were the two main factors responsible for degradation and death of non-salt tolerant species and an ecological shift towards salt tolerant species. Approximately half of the photo locations closest to the discharge point were areas of low (<5%) salt crusting, which saw new growth of non-salt tolerant species. All the rest of the sites except the furthest site, saw approximately 50%-80% salt cover with germination of salt tolerant species. Drier areas saw the emergence of some annual grass. The location furthest from the historical discharge point had 100% salt crusting and plant death.

While the report concluded overall a retreat of impact area, an increase in species richness, and improvement of vegetation condition from "completely degraded" to "poor" or "good" since the 2017 survey, and recommended the area be left to recover naturally.

Technical advice on dewatering discharge options

Technical advice was sought four times between February 2017 and March 2018 in relation to dewatering discharge to land.

Advice received on 21 February 2017 regarding a possible reinjection trial was found to not increase environmental risks. However, reinjection was also deemed not to be viable, mainly due to difficulties in intersecting sufficiently transmissive sediments to inject dewater to. A

consequence of this included maintenance of open screens, surface expression of the injected water, bacterial clogging leading to eventual bore failure and increase operation costs.

Advice requested on 30 October 2017 for of dewatering discharge to land for 12 to 18 months following vegetation degradation and death over a 75-ha area. Heavy metals in the discharge water were of concern, however it was considered short-term discharge to land was of lower risk than direct discharge to surface water in the Salt River. A decision of alternative discharge options was yet to be reported. The alternative discharge options were three discharge points to the Salt River (Stantec, 2019b).

Advice requested on 24 January 2018 was for reduction in discharge flow rate and install a clarifier to reduce metals in the dewater. Advice received on 31 January 2018 explained that reducing a substantial proportion of copper quickly via pH modification and co-precipitation is difficult due to strong bonds with chloride ions in saline solution. Another method to reduce copper was advised.

Advice requested on 2 March 2018 for the extension of dewatering discharge to land up to a further 18 months, while Licence Holder assesses the suitability of discharging to more suitable locations other than discharge to land. The Licence Holder complied to a direction from the Department to cease dewatering during December 2017, only resuming on 6 January 2018. The Licence Holder achieved a reduction in discharge rates from a previous high of 66 L/s down to 10 L/s through:

- increasing the water use in the processing plant during the summer months
- discharging the water over the waste rock facility
- trialling the use of 6 turbo mist evaporators at the TSF
- all water used underground is sourced from the Golden Stream storage pit (settlement pond prior to discharge to the Salt River) rather than other sources.

The Licence Holder also trialled the use of a clarifier to reduce the concentrations of metals in the dewatering water, evaluated more efficient evaporation equipment and assessed alternative storage pits.

2.2.1 Targeted Tecticornia survey

A low diversity of Tecticornia taxa was present along Salt River within the maximum proposed 50 L/s area of inundation (Botanica, 2020). The majority of the specimens were represented by one common taxa (Botanica, 2020). The absence of any known Threatened or Priority Tecticornia taxa within the local region implies the potential for significant Tecticornia to be impacted by the proposed discharge is low (Botanica, 2020).

2.2.2 Aquatic ecology

A baseline ecological assessment of Salt River was undertaken to review the relocation of a mine dewatering discharge outlet (disposing average 40,000 mg/L TDS). Downstream of the discharge location (SR08 in Licence L7798/1993/6) or the lower reaches of Salt River, the ecological value was described as low to moderate in contrast to the high value of the upstream aquatic environment. The assessment by Stantec Australia Pty Ltd (Stantec 2019) showed that the aquatic ecology of Salt River (algae, macrophytes, aquatic invertebrates, fish and amphibians, waterbirds and riparian vegetation) studied in both minor and major flood events in 2018, that there were no aquatic species of conservation significance identified and most taxa had been previously recorded from the Yalgoo bioregion or inland WA. Three new species of ostracod and gastropod were identified and were abundant and widespread from the study findings. Groundwater flow (to the southeast) from the proposed TSF2 would be in the direction of the lower-value aquatic environment of the Salt River, downstream of the discharge location (SR08 in Licence L7798/1993/6).

The current impacts to the aquatic ecology in the Salt River from dewatering discharges are described as generally positive. Local species flourish during flood events and survive in

semipermanent and permanent pools upstream, as well as permanent water created by dewatering discharge, which provide refuge for aquatic biota (Stantec 2019b). The increase in discharge water will only provide extra water, whether that be more and larger permanent pools offering refuge for aquatic biota. Regionally, the discharge volumes from the Deflector mine are considered insignificant with a temporary, localised increase to the inundation periods (Stantec, 2019b).

Due to the defined nature of the river channel and the assessed inundation period at 50 L/s and less, terrestrial vegetation is not proposed to be impacted (Stantec, 2021).

2.3 CEO-initiated amendments

In addition to the changes proposed by the Licence Holder in their application outlined above in section 2.2, the department has included additional conditions in response to a referral of matters raised by the Department of Mines, Industry Regulation and Safety (DMIRS). DMIRS conducted a site inspection of the Premises in March 2023 and noted the following matters which relate to emissions from Prescribed Premises activities:

- Tailings dust mobilisation from Gullewa TSF; and
- Surface expression of seepage from the eastern wall of TSF 2.

Tailings dust emissions from Gullewa TSF has been considered further in the risk assessment of emissions and discharges outlined in Table 6. The department has also had regard for seepage emissions from TSF 2 in the Table 6 risk assessment and applied appropriate regulatory controls as conditions on the licence where required.

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 pathway during premises operation which have been considered in this Amendment Report are detailed in Table 4 below. Table 3 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 4: Licence Holder controls

Sources	Emission	Potential pathways	Proposed controls
Operation			
Increase in Mine Dewatering Groundwater Discharge	Increase in raw, hypersaline (33,000-40,000 ppm of salt) groundwater, with Total Suspended Solids (TSS) above 5,000 mg/L, copper above 0.07 mg/L, elevated nitrogen and other metals.	Leaks and spills from pipelines including Salt River Pipeline route resulting in direct discharge to land.	All pipelines are bunded.
		Seepage or overflow from holding tank or settlement ponds resulting in direct discharge to land.	All holding tanks are bunded.
		Direct Discharge into Salt River impacting water quality or ecosystem health and diversity.	Raw water to pass through a clarifier and settling pond to reduce TSS. Installed energy dissipating infrastructure consisting of a 20 m long, 0.5 m deep rock lined trapezoidal drain perpendicular to the riverbank with the rock lining extending over the riverbank to the bed of Salt River. The drain is lined with geotextile fabric to ensure seepage is minimised. The period of inundation will be temporary with the relatively short Life of Mine at Deflector being 5 years currently planned. Various baseline and monitoring studies as well as an ecotoxicity study have been conducted to compare, track, and predict the health of the Salt River ecosystem as a result of dewatering discharges.
		Direct discharge resulting in erosion of the natural Salt River channel	An energy dissipating pipe terminal has been installed which discharges into the rock lined drain allowing groundwater to flow through the dissipator and free flow into the river under gravity. Flow rate is reduced by the rock lining to reduce erosion impacts associated with fast flowing water. Mesh netting/booms are installed in the rock lined dissipater to catch any inadvertent debris and/or pipe scale that may be discharged. Discharge rate will be less than the modelled 50 L/s on average.

<table>
<tr><th>Sources</th><th>Emission</th><th>Potential pathways</th><th>Proposed controls</th></tr>
<tr><td></td><td></td><td>Detection of sulfide mineral growth indicating development of ASS.</td><td>Annual ASS sampling in Salt River.

If detected during this monitoring, ASS will be investigated further, with the potential to develop additional management actions for closure planning, if required.</td></tr>
<tr><td>Increase in WWTP capacity</td><td rowspan="3">Increase in raw sewage or undertreated effluent</td><td rowspan="2">Storage failure/leaks, spills and overflows resulting in direct discharge to land</td><td>WWTP housed in a containerised plant room, fully insulated and airconditioned in a fenced compound.

Bunded containerised store for reagents.</td></tr>
<tr><td>Sludge drying bed</td><td>Concrete lined cells with steel reinforced concrete walls, sealed and waterproof coated, 50 mm fall from feed end to discharge end of floor level.

Freeboard limit of 300 mm and is to be included in existing daily inspections of the WWTP.

Material from the sludge tanks shall be transferred to the drying beds via bunded pipeline & water returned to the WWTP balance tank. Dried material is to be disposed to an appropriate offsite facility via a controlled waste contractor, therefore no discharge to the environment is proposed.</td></tr>
<tr><td>Increase discharge at the irrigation spray field</td><td>Direct discharge to land</td><td>Existing 4 ha irrigation sprayfield on site and no increase in area is required for the upgraded WWTP.

The WWTP is located approximately 150 m away from the nearest accommodation room (an increase in distance from the current treatment facility) and the sprayfield is located to the west, away from the accommodation camp.

Monitoring of effluent quality will be undertaken at the WWTP, as follows:
<table>
<tr><th>Parameter</th><th>Limit</th><th>Units</th><th>Frequency</th></tr>
<tr><td>pH</td><td>6.5-8.5</td><td>-</td><td rowspan="8">Quarterly</td></tr>
<tr><td>E. coli</td><td>1000</td><td>Cfu/100mL</td></tr>
<tr><td>Biochemical Oxygen Demand</td><td>20</td><td rowspan="5">mg/L</td></tr>
<tr><td>Residual chlorine</td><td>0.2 to 2</td></tr>
<tr><td>Total Phosphorus</td><td>12</td></tr>
<tr><td>Total Nitrogen</td><td>30</td></tr>
<tr><td>Total Suspended Solids</td><td>30</td></tr>
<tr><td>Volumes of wastewater discharged to the environment</td><td>-</td><td>m^3</td><td>Continuous</td></tr>
</table></td></tr>
</table>

Sources	Emission	Potential pathways	Proposed controls
TSF2: Storage of tailings/ decant water	<u>Rothsay Tailings</u> Tailings which contain cyanide, trace sulphides (0.66%) and relatively low Acid Neutralising Capacity (7 kg H_2SO_4/tonne). <u>Deflector Tailings</u> Tailings slightly enriched with As, Se, Co, Cu, Ag, Bi and other heavy metals.	Leaching/ seepage of tailings through base and walls of TSF	• Tailings solids of 40%, tailings water content of 60%. • Tailings slurry discharged sub-aerially and cyclically in thin >300 mm layers with each layer subject to a drying cycle. • A 150 m diameter High Density Polyethylene (HDPE) liner with a permeability of 1 x 10^{-8} m/s or less constructed around each decant structure within in each cell. • Seepage recovery system at southwest corner of the TSF2 site. The recovery system comprises a shallow trench backfilled with clean competent waste grading to a sump. Water recovered in the sump will be pumped back into TSF2. • Perimeter cut-off trench, up to 1.2 mbgl to the Ferricrete layer. • Multipoint spigots from the cell perimeter embankment with continuous water recovery from a central decant within each cell. • Re-use of decant water in the Deflector Processing Facility (DPF). • Decant water removed by a decant structure within each cell, with the pond maintained away from the perimeter of the embankments. • A diesel-powered generator floating intake decant pump has been installed to recover supernatant water until sufficient decant water for a permanent decant pump. • Water return should be monitored, and a minimum water return of 45% of slurry water inflow targeted. • A reconciliation of the tailings in-situ density should be conducted at least annually. Tailings density of 1.35-1.4 t/m3 (dry) should be targeted. • If there is a change in ore types in the future, additional assessments will be required, particularly if oxide ores are processed.
	Tailings/decant water with Cyanide (CN) and heavy metals.	Overtopping during extreme weather events resulting in discharge to soils and groundwater	Provision of a minimum of 500 mm total freeboard comprising minimum operational freeboard (vertical height between the tailings beach and embankment crest) of 300 mm and a minimum beach freeboard of 200 mm plus and allowance for the 1:100 yr. AEP 72-hour event of 159 mm. Any stormwater will be captured and utilised at the DPF.
TSF2 / CIP circuit	Process water pond water with CN, Cu and Ni.	Seepage of process water through process ponds to soils and groundwater.	• Return water will be pumped to a new 4,000 m^3 HDPE -lined pond with a permeability of 1 x 10^{-8} m/s or less for reuse in the processing plant. • Re-use of decant water in the DPF.
		Direct discharge via overtopping of process water through process ponds.	Freeboard of 500 mm is always maintained. This pond includes level sensors to indicate when a high level is apparent, coupled with automation that will turn off the decant pump at the TSF. An emergency overflow channel is inbuilt to the pond that flows into to the present tailings scour pit to the west of the DPF.

Sources	Emission	Potential pathways	Proposed controls
	Contaminated stormwater	Surface water flow passing through/by infrastructure discharging contaminating materials to soils.	Surface bunds have been installed 1 m high and 6 m from the toe of the embankments to divert stormwater away from the TSF embankments. Rock armouring is not required (low velocity sheetwash) and may be installed for maintenance requirements. A drainage channel (0.7 m deep) is installed to assist with diversion of stormwater away from the TSF.
CIP circuit chemical storage	Reagent/ chemical spills	Storage failure at the CIP circuit causing a chemical spill to soils / groundwater.	All reagents, storage tanks, mixing tanks, pumps and pipes are located within concrete bunds designed and constructed in accordance with AS 1940:2017. Potentially contaminated stormwater is directed to an existing event pond (volume of 1,320 m^3) to the south of the facility. This event pond at present services the proposed CIP circuit; however, the area containing the proposed CIP circuit and new reagents area will be concrete bunded and separated from the catchment reporting to the existing event pond, reducing the overall catchment reporting to the event pond.
Pipelines	Tailings/decant water with CN and heavy metals	Pipeline rupture resulting in direct discharge to soils.	Groundwater is hypersaline (Total dissolved solids (TDS) ~40,000 mg/L). CIP circuit process adds cyanide (approximately 395 ppm). Tailings delivery and decant return water pipelines will be located within bunds, and secondary alarms and/or and telemetry installed. Sumps will be installed at low points within the pipe route for spill management and/or maintenance. The dewatering pipework will be physically inspected once a shift for leaks or equipment malfunctions and will be logged as per current practices and licence conditions.
Disposal of biomedical waste into Deflector landfill	Hazardous chemicals	Seepage of hazardous chemicals from the landfill resulting in leachate discharge to soils / groundwater.	Biomedical waste is generally in the form of self-contained units which are proposed to be bagged and encapsulated for burial within the boundary of the landfill facility.
Gullewa	Dust	Air/windbourn	No controls proposed.

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 5 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)). Figure 3 shows a map of sensitive environmental receptors near the premises.

Table 5: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	**Distance from prescribed activity**
-	No human receptors will be impacted.[1] The nearest town (Yalgoo) is 41.5 km from the premises.
Environmental receptors	**Distance from prescribed activity**
Surface water: Salt River, Burra Lake	The Salt River is located approximately 3 km away in an east to south easterly direction from the Premises, 4.5 km southeast of the TSF and 4 km southeast of the upgraded Deflector Processing Facility. Dewater from the Deflector mining operations is discharged into the Salt River at a rate of 22.5 L/s which has been modelled to travel approximately 3 km downstream. Burra Lake is a large shallow evaporative basin 23 km downstream of the discharge point, forming the natural terminus of the Salt River system. During flooding events, the lake is highly productive, with primary producers comprising benthic algal mats and macrophytes providing a food source for a range of aquatic invertebrates (i.e., native brine shrimp *Parartemia informis*).and waterbirds. The riparian zone is dominated by samphire (*Tecticornia*) and several chenopod species. Burra Lake has been affected by secondary salinisation, with the addition of salts from the river and the surrounding catchment via runoff. Burra Lake is located on a working pastoral station which is currently stocked with cattle.
Groundwater	Groundwater at the Deflector Mine is saline with TDS concentrations ranging between 37,000 and 46,000mg/L. The high salinity is likely associated with naturally occurring saline groundwater associated with the aquifer underlying the Salt River (Groundwater Resource Management, 2018). Salinities measured from groundwater at the Deflector underground are higher than those observed at the production bores and other open pits suggesting groundwater encountered at Deflector is either "down hydraulic gradient" and/or not associated with the production bores or open pits in the region of Gullewa (Aquaterra 2006). No groundwater dependent ecosystems have been identified during previous environmental assessments. The groundwater levels at the Gullewa region are deep and typically not accessible by vegetation (Groundwater Resource Management, 2018).
Native vegetation[2]	In the vicinity of Deflector, 102 vascular plant taxa have been identified (including two introduced species), representing 67 plant genera, the majority of which belonged to the Fabaceae, Asteraceae and Chenopodiaceae families. No threatened or priority-listed flora of conservation significance have been found, with habitat in the area considered extensive throughout the Yalgoo bioregion (Stantec 2017b). No threatened flora taxa listed under the *Wildlife Conservation Act 1950* or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded on the premises. One priority listed flora taxon of conservation significance, *Acacia subsessilis*, was recorded from the western end of the pipeline route. *Acacia subses*silis is a Priority 3 flora species known to occur from the Morawa and Yalgoo regions. One point location consisting

	of approximately 25 plants was recorded from the lower slopes of a rocky hill. The approximate 25 individuals were recorded from an area approximately 50 m in diameter. *Acacia subsessilis* is recorded extensively throughout the Yalgoo bioregion (ALA 2017, WAH 2017). No other flora species of conservation significance were recorded on the premises.

Note 1: Aboriginal heritage artefact scatter 600 m to the east of TSF2, will not be impacted by the proposed activities.

Note 2: TSF2 is about 5.5 km northeast of the nearest Gullewa vegetation complexes (banded ironstone formation).

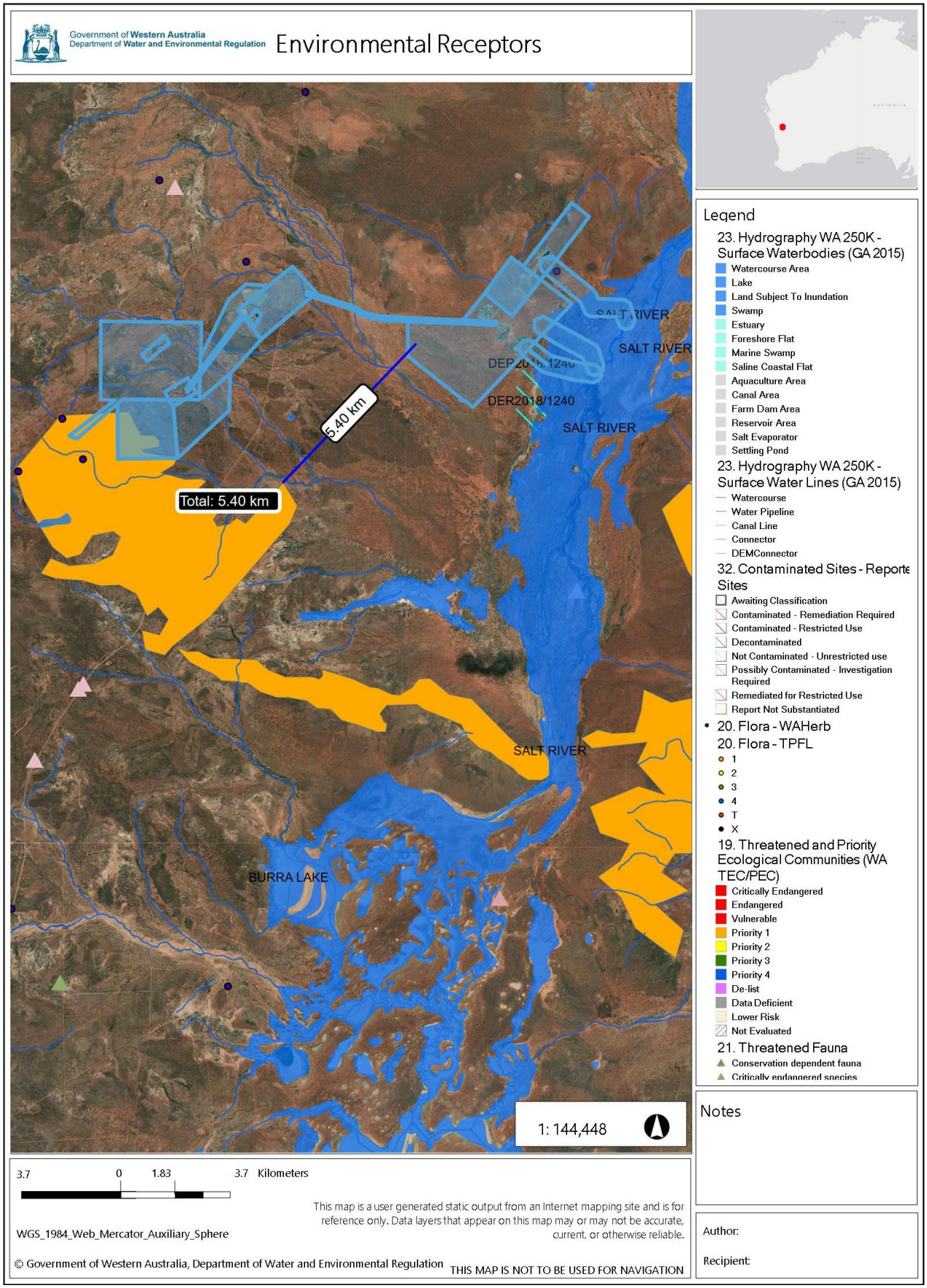

Figure 3: Distance to sensitive receptors

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 6.

The Revised Licence L7798/1993/6 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. category 5, 6, 64 and 85 activities.

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

Table 6: Risk assessment of potential emissions and discharges from the Premises during construction and operation

Risk events					**Risk rating [1]** **C = consequence** **L = likelihood**	**Applicant controls sufficient?**	**Conditions[2] of licence**	**Justification for additional regulatory controls**
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Operation								
Increase in Underground Mine Dewatering Groundwater Discharge to Salt River Discharge Point	Increase in raw, hypersaline groundwater, with TSS above 5,000 mg/L, copper above 0.07 mg/L, elevated nitrogen, and other metals.	Leaks and spills from pipelines and, including Salt River Pipeline route contaminating soil at the root zone and reducing plant health.	Native vegetation, Salt River	*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	Conditions 5, 21	**Condition 5:** Requirements for all pipelines containing dewatering effluent. **Condition 21:** Daily visual inspections and logbook kept for dewatering pipeline and discharge points.
		Seepage or overflow from holding tank or settlement ponds.	Native vegetation	*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	**Condition 4**	**Condition 4:** *Table 2* requirements to maintain a minimum freeboard of 300 mm in settlement ponds.
		Direct Discharge into Salt River reducing water quality and ecosystem health.	Native vegetation, ecology of Salt River, groundwater	*Refer to Section 3.1*	C = Moderate L = Unlikely **Medium Risk**	N	Conditions 2, 3, 4, **10**, 13, **21, 22**, 24, 31	**Refer to section 3.3.** **Condition 2:** Licence Holder shall record and investigate exceedances. **Condition 3:** *Table 1* Dewatering limit to Salt River. **Condition 4:** *Table 2* Discharge requirements to direct and retain dewater to Golden Stream Pit and Settlement Ponds to reduce TSS to less than 5,000 mg/L.

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								Condition 10: record and investigate exceedances. **Condition 13:** *Table 9* Emissions to surface water – specifying authorised discharge point **Condition 21:** *Table 12* Daily visual inspections of dewatering pipelines and discharge point and logbook kept. **Condition 22:** *Table 15 and 16* Monitoring of ambient soil and surface water quality. Frequency increased to quarterly for monitoring of ambient surface water quality at Salt River due to increased risk from significantly higher discharge rates. **Condition 24:** *Table 18* Monitoring of emissions to surface water (Salt River). Trigger level added for Zinc concentrations. **Condition 31:** AER requirements.
		Erosion of the natural Salt River channel.	Salt River	*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	**Condition 9, 10**	**Condition 9:** *Table 6* Infrastructure and equipment requirements to diffuse water energy entering the Salt River.

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								Condition 10: record and investigate exceedances.
		Detection of sulfide mineral growth indicating development of ASS.	Salt River, Burra Lake	*Refer to Section 3.1*	C = Minor L = Possible **Medium Risk**	Y	Condition 22	Condition 22: *Table 15* Annual monitoring for KCl extractible sulphur.
Increase in WWTP capacity.	Increase in raw sewage or undertreated effluent.	Storage failure/leaks, spills overflows and chlorine dosing system.	Native vegetation	*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	Condition 3, 9, **10, 20**	**Condition 3:** *Table 1* Sewage processing capacity. **Condition 9:** *Table 6* Requirements for WWTP. **Condition 10:** record and investigate exceedances. **Condition 20:** Monitoring of point source emissions to land.
Sludge drying bed				*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y		
Increase discharge at the irrigation spray field.		Direct discharge to land/ spray drift/ pooling reducing groundwater quality and ecosystem health.	Native vegetation, groundwater	*Refer to Section 3.1*	C = Slight L = Possible **Low Risk**	Y	Condition 9, **10**, 11	**Condition 9:** *Table 6* Infrastructure and equipment requirements table (irrigation spray field requirements). **Condition 10:** record and investigate exceedances. **Condition 11:** *Table 7* Emissions to land – specifying authorised discharge point.

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
TSF2: Storage of tailings/ decant water	Increased free cyanide concentrations leaching copper and nickel from tailings into pore-water. Rothsay Tailings Tailings which contain cyanide, trace sulphides (0.66%) and relatively low Acid Neutralising Capacity (7 kg H2SO4/tonne). Deflector Tailings Tailings slightly enriched with As, Se, Co, Cu, Ag, Bi and other heavy metals.	Leaching/ seepage of tailings through base and walls of TSF2 reducing groundwater quality and ecosystem health.	Native vegetation, groundwater	*Refer to Section 3.1*	C = Moderate L = Possible **Medium Risk**	N	**Condition 4, 10**, 12, **21, 22, 31**	**Condition 10:** record and investigate exceedances. **Condition 12:** *Table 8* Allowing mist evaporators to operate on TSF to enhance evaporation of TSF decant pond. **Condition 21** *Table 12* Process monitoring - Daily visual inspections of dewatering pipelines and discharge point and logbook kept. Monthly recording of tailings discharges, decant recovered and tailings solids content. **Condition 22** *Table 13* Monitoring of ambient groundwater quality around TSF and standing groundwater level limit of 4 mbgl or greater. **Condition 31:** AER requirements, i.e. water balance, report on tailings deposited, density and solids content, report on seepage recovery.
	Tailings/decant water with CN and heavy metals.	Overtopping during extreme weather events, degrading native vegetation	Native vegetation	*Refer to Section 3.1*	C = Minor L = Unlikely	Y	**Condition 4, 10, 21**	**Condition 4:** *Table 2* Containment infrastructure requirements to maintain a minimum top of

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		quality.			**Medium Risk**			embankment freeboard of 300 mm. Maintaining minimum tailings solids. **Condition 10:** record and investigate exceedances. **Condition 21** *Table 12* Process monitoring- Daily visual inspections of dewatering pipelines and discharge point and logbook kept. Monthly recording of tailings discharges, decant recovered and tailings solids content.
TSF/ CIP circuit	Process water pond water with CN, Cu and Ni.	Seepage of process water through process ponds, degrading native vegetation quality.	Native vegetation	*Refer to Section 3.1*	C = Minor L = Unlikely **Medium Risk**	N	**Condition 4, 10**	**Condition 4:** *Table 2* Containment infrastructure requirements to maintain toe drains and cut-offs. **Condition 10:** record and investigate exceedances.
		Overtopping of process water through process ponds, degrading native vegetation quality.		*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	**Condition 4, 10**	**Condition 4:** *Table 2* Containment infrastructure requirements to maintain a minimum top of embankment freeboard of 300 mm. **Condition 10:** record and investigate exceedances.

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
	Contaminated stormwater	Surface water flow passing through/by infrastructure containing contaminating materials, degrading native vegetation quality.	Native vegetation	*Refer to Section 3.1*	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 1, **4, 10**	**Condition 1:** Potentially contaminated stormwater to be diverted and treated for disposal or reuse. **Condition 4:** *Table 2* Containment infrastructure requirements for stormwater to be diverted away from the TSF to minimise loss of tailings. **Condition 10:** record and investigate exceedances.
Pipelines	Tailings/decant water with CN and heavy metals.	Pipeline rupture reducing groundwater quality and ecosystem health.	Native vegetation, Salt River	*Refer to Section 3.1*	C = Minor L = Unlikely **Medium Risk**	Y	Conditions 5, **10**, 20	**Condition 5:** All pipelines are to be provided with automatic cut-offs, bunding or telemetry systems in the event of pipe failure. **Condition 10:** record and investigate exceedances. **Condition 21:** Daily visual inspections and logbook kept.
CIP circuit chemical storage	Reagent/ chemical spills	Storage failure at the CIP circuit causing a chemical spill, degrading native vegetation quality.	Native vegetation	*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	Condition 1, 9, **10**	**Condition 1:** Potentially contaminated stormwater to be diverted and treated for disposal or reuse. **Condition 9:** *Table 6* Requirements for CIP circuit with Reagent Store. **Condition 10:** record and

Risk events					Risk rating [1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
								investigate exceedances.
Disposal of biomedical waste into landfill	Hazardous chemicals.	Seepage of hazardous chemicals from the landfill, reducing groundwater quality and ecosystem health.	Native vegetation, groundwater	*Refer to Section 3.1*	C = Slight L = Unlikely **Low Risk**	Y	Condition 3, 6	**Condition 3:** Annual limit into landfill. **Condition 6:** *Table 3* Acceptance of Type 2 Special waste into the landfill.
Gullewa TSF	Tailings dust	Air/wind-borne	Native vegetation	*Refer to Section 3.1*	C = Minor L = Likely **Medium Risk**	N	**Condition 13**	**Condition 13:** Dust management on Gullewa TSF

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 of increased dewatering discharge into the Salt River

3.3.1 Surface water quality

One of the proposals by Licence Holder is to increase mine dewatering discharge to Salt River, from 750,000 to 1,540,000 tonnes per annual period for approximately five years. This increase is approximately double the current output; therefore, it is important to understand the existing water quality impacts to the Salt River at the current discharge rate, to determine if increased discharges are likely to be acceptable. The discharge point is located near sample site SR08 shown in Figure 4 below, along with other sample sites for Salt River.

The following Annual Environmental Reports (AERs) were reviewed to provide historical dewatering discharge water quality to land and Salt River proper (Salt River), and ambient surface water quality from the Salt River:

- The 2015 AER (Doray Minerals Ltd, 2016) provided dewatering discharge water quality data to land (historic Salt River discharge point) for 2015.
- The 2017 AER (Doray Minerals Ltd, 2018) provided dewatering discharge water quality data to land (historic Salt River discharge point) from 2016 to 2017.
- The 2018 AER (Doray Minerals Ltd, 2019) provided dewatering discharge water quality data to land (historic Salt River discharge point) from 2017 to 2018.
- The 2019 AER (Doray Minerals Ltd, 2020) provided dewatering discharge water quality data to land (historic Salt River discharge point) from 2018 to 2019.
- The 2020 AER (Silver Lake Pty Ltd, 2021) provided dewatering discharge water quality data to both land and surface water from 2019 to 2020. Dewatering discharge to land ceased on 1 April 2020 and commenced at the Salt River from 31 March 2020. Surface water quality data from the Salt River was collected quarterly from Q2 2019 and data up to Q4 2020 was reported on in the 2020 AER.
- The 2021 AER (Silver Lake Pty Ltd, 2022) provided dewatering discharge water quality data to surface water from 2020 to 2021. Surface water quality data from the Salt River was provided from Q2 2020 to Q4 2021.

In all three reports, the following water quality parameters were provided as per the Licence: pH, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Aluminium, Arsenic, Cadmium, Calcium, Chloride, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Nickel, Potassium, Selenium, Sodium and Zinc.

To identify any elevated water quality parameters downstream due to dewatering discharge, surface water quality data from the Salt River was divided up into ‘upstream’ and ‘downstream’ of the discharge point. The upstream surface water quality (all years) and any surface water quality data prior to Q2 2020 was treated as background or control data and was used to compare the dewatering discharge quality and subsequent downstream surface water quality since discharge began in Q2 2020. It should be noted that the data for the Salt River downstream and Burra Lake were collated due to dry conditions at Burra Lake only producing enough water for a spot sample at three of five sample sites for Q2 of 2021. The surface water quality and dewatering discharge water quality value comparisons are summarised below in Table 7.

To determine how far downstream elevated surface water quality parameters were travelling, the downstream surface water quality data was broken down by sampling sites (Table 8). The distance of the downstream sample sites from the discharge point are shown in Figure 5.

To compare whether the discharge quality has changed over time between the historic and

current sites, dewatering discharge data was divided into discharge to land (the historical discharge site between 2015 and April 2020) and discharge to Salt River (current as of from March 2020 to Q4 2021). The dewatering discharge water quality values have been compared and summarised below in Table 8.

Figure 4: The Salt River and Burra Lake sample sites.

To analyse whether discharge quality has changed between historical discharge to land and to the discharge at the Salt River, historical dewatering quality discharge to land was compared to dewatering discharge quality to the Salt River (Table 7). Data for discharge over land was taken from Q3 2015 to when discharge ceased on 20 April 2020, and discharge to the Salt River between Q2 2020 to Q4 2021.

The dewatering discharge to the Salt River was found to show increases in minimum concentrations of all parameters with the exception of aluminium and arsenic. On average, significant increases are noted for calcium, manganese, nickel, copper, cadmium, and lead. The increase in heavy metals was identified in the licence application and is attributed to encountering the respective orebodies as mining proceeds deeper underground.

Table 7: Comparison of dewatering discharge quality (mg/L) to land from Q3 2015 to 1 April 2020 and to Salt River Q2 2020 to Q4 2021

	Discharge to land from Q3 2015 to 20 April 2020			Discharge to Salt River Q2 2020 to Q4 2021		
Parameter	**Minimum**	**Maximum**	**Average**	**Minimum**	**Maximum**	**Average**
pH	7.1	9.1	8.19	7.90	8.41	8.07
TDS	2,900	390,000	98,275	40,000	44,000	42,091
TSS	5	100	30	8	44	16
Na	830	90,000	24,277	9,200	12,000	10,655
Mg	84	31,000	4,062	1,600	1,700	1,673
Al	0.052	0.052	0.052	0.005	0.022	0.011
Cl	1600	200000	53288	21,000	25,000	22,727
K	32	8,200	1,161	230.0	270.0	247.3
Ca	65	1700	753	920	1,100	1,065
Cr	0.001	0.001	0.001	0.002	0.002	0.002
Mn	0.001	0.25	0.056	0.009	0.600	0.305
Fe	0.011	0.094	0.038	0.014	0.029	0.020
Ni	0.001	0.006	0.003	0.210	0.330	0.265
Cu	0.001	0.016	0.005	0.004	0.095	0.031
Zn	0.01	0.096	0.037	0.020	0.069	0.046
As	0.002	0.024	0.008	0.001	0.005	0.002
Se	0.002	0.017	0.006	0.003	0.018	0.007
Cd	0.000	0	0.000	0.002	0.023	0.008
Pb	0	0	0	0.001	0.007	0.004

Note: Values in green are lower than the comparative historical value. Values in orange are not significantly higher (by one order of magnitude for decimal values, or >10% for values over 0.1) than the comparative historical value. Values in red are significantly higher than the comparative historical value.

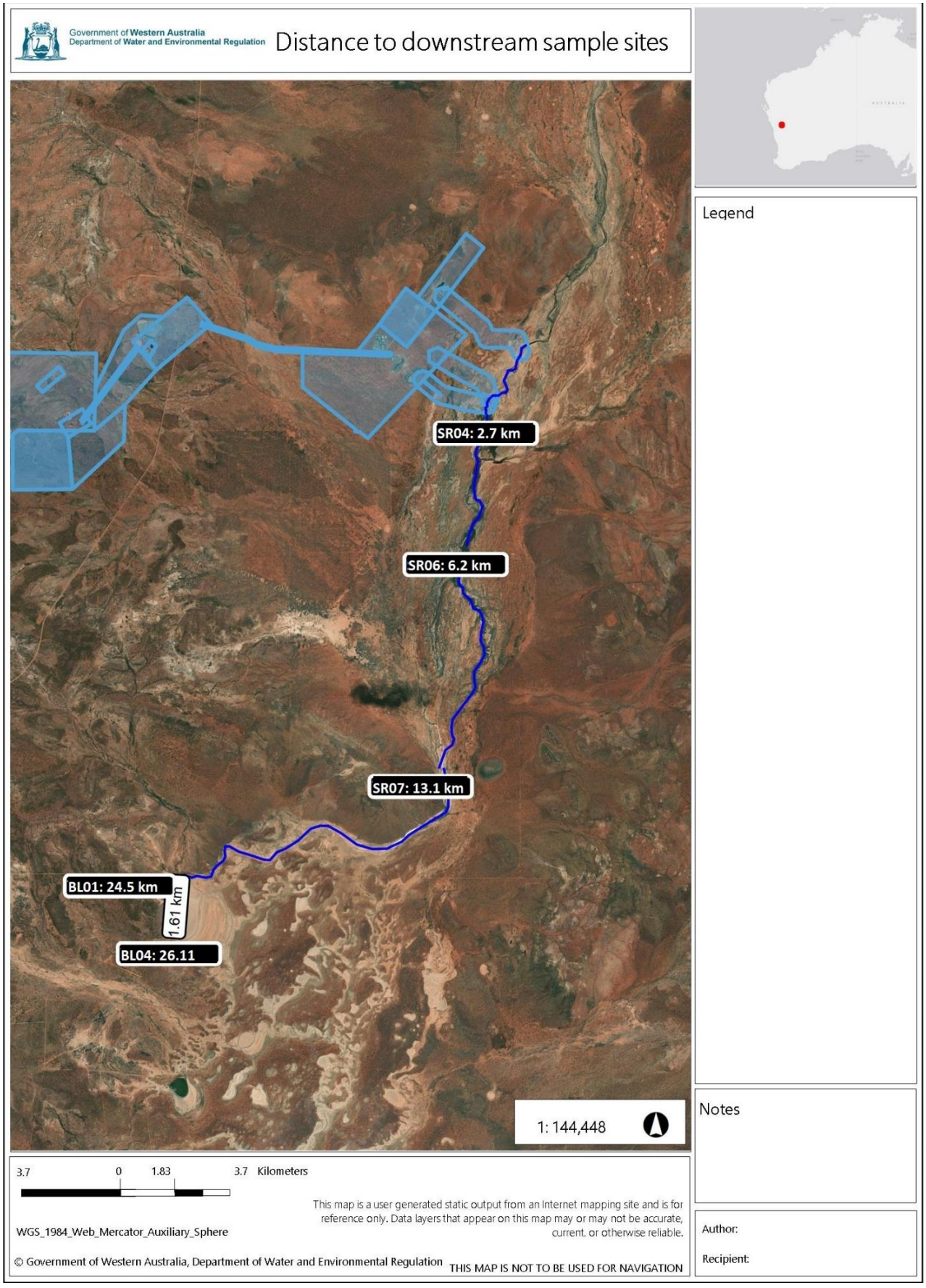

Figure 5: Distance to downstream sampling sites

To analyse the distance downstream of which the discharge dewater influences the surface water quality in the Salt River, the dewatering discharge quality was compared to the upstream and surface water downstream water qualities since discharge began at the Salt River proper in March 2020 (Table 7). The parameters have been ordered from lightest to heaviest elements.

Observations of the dewatering discharge upon the surface water quality include:

- There are insignificant quantities of aluminium, chromium, iron, and arsenic above background levels.
- No travel of chromium or lead has been observed downstream. These elements are likely too heavy to remain suspended and drop quickly into the sediments.
- Manganese, copper, zinc and selenium were only detected within the vicinity of the discharge site.
- The lightest elements sodium, magnesium, chlorine, potassium, and calcium saw increases in minimum values all the way to the Burra Lakes, indicating an increase in frequency and baseload of parameters. While average calcium values were elevated the furthest was 2.7 km downstream and within the Burra Lakes.
- Heavy metals nickel and cadmium were observed consistently elevated the second furthest to approximately 2.7 km downstream.
- Elevated TSS was inconsistently detected to Burra Lake.

Background data of downstream surface water quality including Burra Lake prior to dewatering discharge in Q2 2020 was almost completely absent with the exception for 2019 data for SR07 (approximately 13.1 km downstream). SR06 is approximately 6.2 km downstream is also particularly data poor due to insufficient water available for sampling and could potentially explain why elevated values were not observed at this sample site. The same is true for sites SR02 and SR03 upstream which the data was relied upon for background data for comparison. Therefore, there is not full certainty whether the observed elevated pH and calcium values downstream are naturally occurring or have accumulated in certain parts of the Salt River and in Burra Lake from the dewatering discharge.

However, the data available suggests trigger values may need to be applied for nickel, and cadmium, for which elevated maximum and average values reach the furthest downstream. The potential impact to receptors is discussed below with the comparison to the 2019 Ecotoxicity Study.

Table 8: Comparison of upstream surface water quality (mg/L), discharge water quality (mg/L), and downstream surface water quality (mg/L) by sample site including Burra Lake Q2 2021 spot samples. Surface water quality upstream and downstream of discharge point Q2 2019-Q4 2021. Dewater discharge quality to Salt River proper Q2 2020 to Q4 2021

	Controls (Upstream)			Dewatering discharge			SR08 (0 km)			SR04 (2.7 km)			SR06 (6.2 km)			SR07 (13.1 km)			Burra Lake (24.5 km)		
Para.	Min.	Max.	Ave.	Min.	Max.	Ave.	Mix.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.	Min.	Max.	Ave.
pH	7.10	9.10	8.19	7.90	8.41	8.07	7.90	8.10	8.00	8.00	8.70	8.28	8.20	8.20	8.20	8.20	9.30	8.60	8.00	8.20	8.10
TDS	2,900	390,000	98,275	40,000	44,000	42,091	14,000	44,000	35,500	7,500	74,000	48,625	5,600	5,600	5,600	5,100	28,000	18,525	44,000	48,000	46,333
TSS	5	100	30	8	44	16.11	15	58	27	15	59	37	0	0	0	13	110	39	12	45	28.5
Na	830	90,000	24,277	9,200	12,000	10,655	3,900	11,000	9,225	2,100	20,000	13,275	1,600	1,600	1,600	1,200	7,700	5,150	13,000	14,000	13,333
Mg	84	31,000	4,062	1,600	1,700	1,673	560	1,700	1,415	290	3,000	1,948	200	200	200	140	1,000	648	1,000	1,100	1,067
Al	0.052	0.052	0.052	0.005	0.022	0.011	0.026	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cl	1,600	200,000	53,288	21,000	25,000	22,727	8,000	24,000	19,250	3,900	40,000	26,725	3,000	3,000	3,000	2,300	17,000	10,050	24,000	25,000	24,500
K	32	8,200	1,161	230	270	247.27	95	250	209	54	460	299	46	46	46	44	250	176	430	450	440
Ca	65	1,700	753	920	1,100	1,065	390	1,100	923	200	2,000	1,300	160	160	160	120	500	260	1,500	1,600	1,567
Cr	0.001	0.001	0.001	0.002	0.002	0.002	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Mn	0.001	0.250	0.056	0.009	0.600	0.305	0.030	0.630	0.293	0.007	0.023	0.015	0.000	0.000	0.000	0.003	0.005	0.004	0.001	0.001	0.001
Fe	0.011	0.094	0.038	0.014	0.029	0.020	0.017	0.017	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.012	0.012	0.011	0.011	0.011
Ni	0.001	0.006	0.003	0.210	0.330	0.265	0.086	0.360	0.247	0.028	0.120	0.065	0.004	0.004	0.004	0.001	0.001	0.001	0.000	0.000	0.000
Cu	0.001	0.016	0.005	0.004	0.095	0.031	0.005	0.077	0.025	0.003	0.009	0.006	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.006	0.006
Zn	0.010	0.096	0.037	0.020	0.069	0.046	0.019	0.068	0.043	0.006	0.022	0.015	0.000	0.000	0.000	0.007	0.011	0.009	0.015	0.020	0.018
As	0.002	0.024	0.008	0.001	0.005	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.003	0.003	0.003	0.002	0.002	0.002
Se	0.002	0.017	0.006	0.003	0.018	0.007	0.015	0.015	0.015	0.006	0.006	0.006	0.000	0.000	0.000	0.003	0.003	0.003	0.003	0.006	0.004
Cd	0.000	0.000	0.000	0.002	0.023	0.008	0.003	0.018	0.007	0.001	0.017	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pb	0.000	0.000	0.000	0.001	0.007	0.004	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

Note: Values in green are lower than the comparative upstream value. Values in orange are not significantly higher (by one order of magnitude for decimal values, or >10% for values over 0.1) than the comparative upstream value. Values in red are significantly higher than the comparative upstream value.

3.3.2 Sediment quality

Sediment quality parameters cadmium, copper and nickel were analysed as per the requirements of licence L7798/1993/6. Sediment quality data for Salt River was taken from the 2020 to 2022 AERs (Silver Lake, 2021; Silver Lake 2022).

To determine soil contamination levels at the Salt River, soils at the current discharge site were compared with the soils at the historical discharge site and the historical control site (PSC) (Table 9).

Sediment quality at the historical and current discharge site (SR08) on average had high levels of nickel, copper and cadmium when compared to the control site, with higher on average, quantity of copper and nickel. The current discharge location therefore could be deemed contaminated.

Table 9: Average sediment quality (mg/L) comparison between the historical discharge to land and the control site

Parameter	PSC (Control site)	Historic discharge site	Salt River Discharge (SR08)
Ni	4.12	18.96	32.6
Cu	6.01	24.59	26.1
Cd	<0.3	0.76	0.7

Note: Values in green are lower than the comparative Salt River upstream sediment value. Values in red are significantly (>10%) higher than the comparative Salt River upstream sediment value.

To determine soil quality downstream of discharge, Salt River sediment samples were divided into upstream and downstream by sample site of the dewatering discharge point (Table 10). Upstream sediments were used as background data to compare in the effects of the dewatering discharge quality.

Table 10: Average sediment quality (mg/L) comparison between the upstream (control) and downstream sample sites at the Salt River

Parameter	Upstream (Control)	Discharge SR08 (0 km)	Downstream SR04 (2.7 km)	SR06 (6.2 km)	SR07 (13.1 km)	Burra Lake (24.5 km)
Ni	17.65	32.6	21.61	17.36	7.34	15.388
Cu	18.97	26.1	11.09	24.51	10.51	22.536
Cd	0.54	0.7	0.45	0.4	<0.3	0.46

Note: Values in green are lower than the comparative Salt River upstream soil value. Values in red are significantly (>10%) higher than the comparative Salt River upstream sediment value.

It is noted that the upstream sediment quality is somewhat comparable to the average contamination levels of the historical discharge site to land. Elevated copper was observed as far as Burra Lake; however, copper is naturally elevated in the Salt River system due to the presence of copper orebodies. Elevated nickel was also observed about 2.7 km downstream.

The above sediment observations were comparable to the ecotoxicity study conducted by Stantec in 2019. Copper, nickel, and zinc at the discharge outfall exceed the interim sediment quality guidelines triggers. High copper concentrations were attributed to the natural mineralisation in the orebody (Stantec, 2019a), which is likely to explain the elevated presence of copper upstream of the discharge point and downstream in Burra Lake. Naturally high concentrations of copper due to the copper orebody is why the Department did not compare discharge water quality or sediment data to the Livestock Drinking Water Guidelines. Copper from the discharge water may become available to biota in the Salt River if removal of suspended solids and other pre-treatment of discharge water is not undertaken (Stantec, 2019a).

A doubling of dewater discharge is expected to see further increases of metals in the sediments

further downstream from the dewatering discharge. It is therefore important that the quarterly sediment monitoring for nickel, cadmium and copper is continued at the Salt River sampling sites, with results reported annually to the department, along with a discussion of any trends identified over time.

3.3.3 Hydrological discharge modelling

The Licence Holder utilised a surface water model and a groundwater model to predict discharge plume distances from the discharge point under three dewatering scenarios; 15 L/s, 25 L/s and 50 L/s (Stantec, 2019c) (Figure 6).

Inputs to the conceptual models included SILO rainfall and evaporation data, high resolution terrain data of the Salt River via LiDAR technology, and regional rainfall and climate data from nearby Bureau of Meteorology (BoM) stations (Stantec, 2019c). Local weather was characterised by predominately dry conditions, with highly variable rainfall; however, the Salt River flows following high rainfall only 2% of the time (Stantec, 2019c). Local hydrogeology was characterised by lateralised alluvial sediments that vary from 2.5-10 m thick, with estimated infiltration rates ranging from 12 to 26 mm/day (Stantec, 2019c).

Results of the modelling indicated:

- the potential for a wetted footprint that extends approximately 3.2 km, 4.5 km and 6.2 km downstream of the proposed discharge point for the 15, 25 and 50 L/s discharge, respectively;
- potential wetted footprints that extend between 40% and 60% further downstream compared to the respective surface water model results; and
- complete dissipation of the dewatering discharge is feasible upstream of Burra Lake for discharge rates up to 50 L/s (Stantec, 2019c) (Figure 7).

The Licence Holder claims their current observed discharge distance at 22.5 L/s, closely aligns with the modelled 25 L/s discharge scenario (Stantec, 2019c).

The Licence Holder assessed the extent of inundation of a downstream plume discharged at a worst-case scenario of 50 L/s, which does not consider water reuse on site such as for dust suppression, therefore less discharge may be likely (Stantec, 2019c).

Given the increased discharge to 50 L/s, is likely to correspond to a 6.2 km plume, and due to predicted and observed dewatering plume extents being comparable, the Licence Holder believes that the proposed discharge remains unlikely to reach and impact Burra Lake (Stantec, 2019c). Monitoring requirements specified in the licence, including trigger values set for nickel, cadmium and zinc, and annual reporting requirements will be reviewed to validate this assumption and inform future risk assessments.

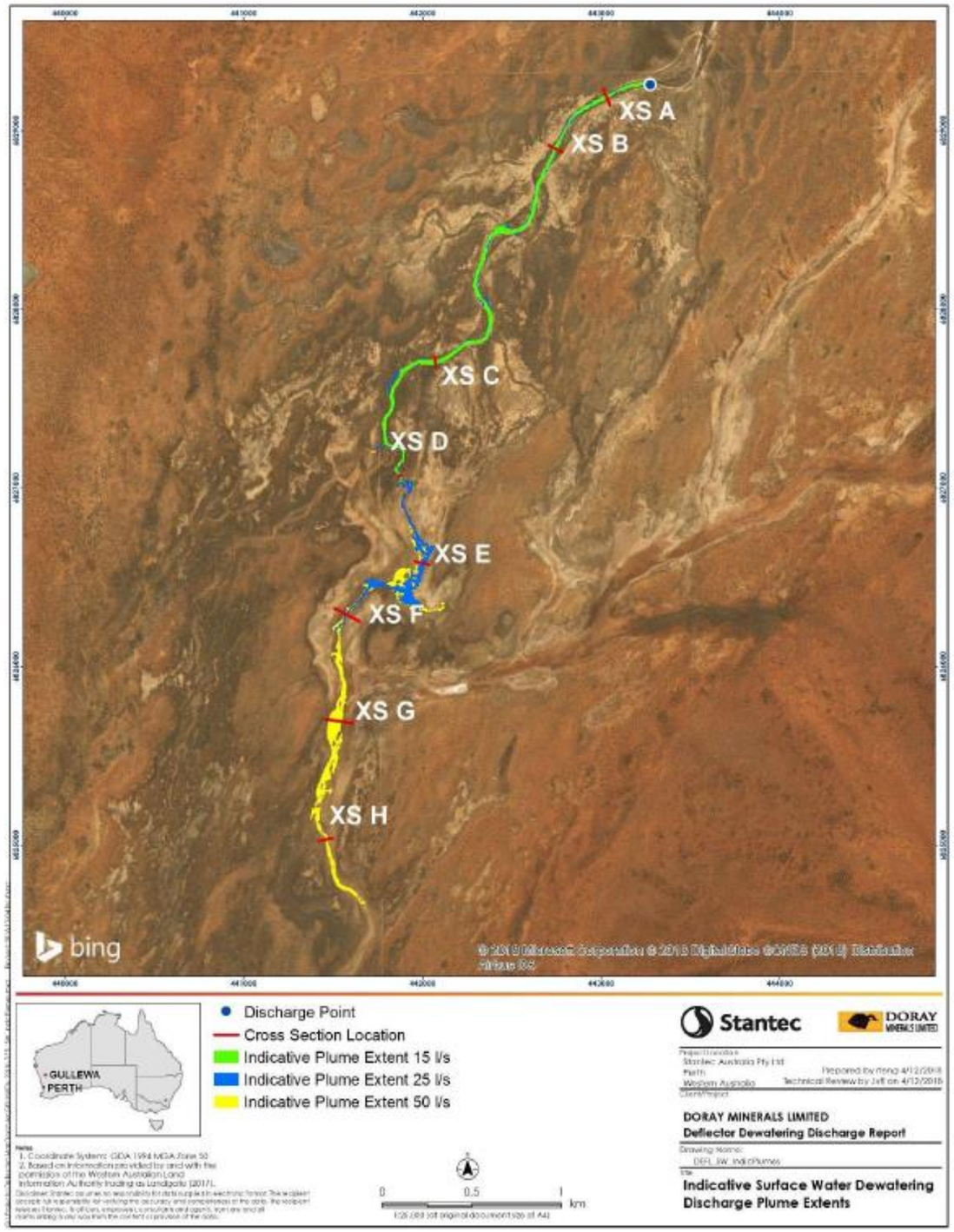

Figure 6: Modelled inundation in the Salt River

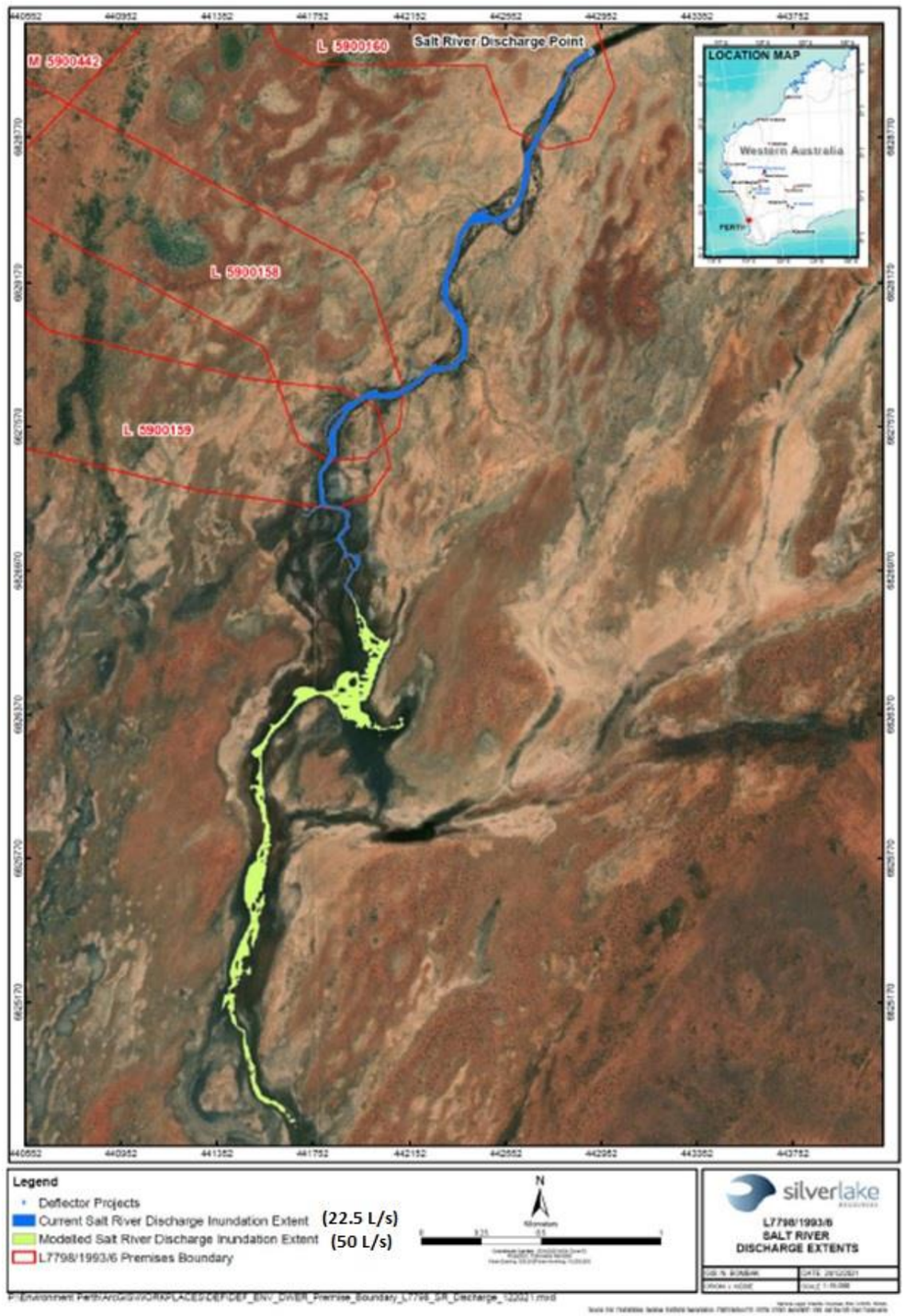

Figure 7: Current and modelled Salt River discharge inundation extent

3.3.4 Ecotoxicity study and consideration of appropriate trigger values in dewatering discharges

Prior to discharge commencing, the Licence Holder conducted a study on the ecotoxicity of discharge water on representative green alga (*Dunaliella salina)* and brine shrimp (*Artemia salina)* species to the Salt River and Burra Lake. Chronic and acute toxicity tests were performed on *D. salina* and *A. salina* respectively to investigate the impact of select heavy metals upon algal growth and brine shrimp mobility (Stantec, 2019a).

Dunaliella salina

Dunaliella salina was one of 41 algal taxa recorded from phytoplankton samples of Salt River. This genus was also present in the benthic algal mats of Burra Lake (Stantec 2019b). This species is considered to be highly salt tolerant. The study indicated a lack of any discernible toxic effects and a likely inherent tolerance to salts and metals.

When the results of the study were compared to the observed discharge and subsequent surface water quality, there were no parameters which were near levels detrimental to cell yield of the green alga *D. salina*. Heavy metals were at least one order of magnitude below toxic thresholds.

Given the doubling of the dewatering discharge does not increase the heavy metal to the toxic thresholds, the alga is likely to remain unaffected. However, given heavy metals have the potential to bioaccumulate in fish and crustaceans, trigger values for some parameters have been recommended as discussed in below.

Artemia salina

The Ecotoxicity study selected *Artemia salina* as a surrogate species to the native brine shrimp (*Parartemia informis*) and is commonly used for toxicity testing. *Parartemia informis* only occurs in Burra Lake and are known to reproduce at copper levels as high as 0.014 mg/L. Their eggs typically have a fatty layer that is resistant to desiccation and potentially to high metal concentrations; which may accumulate in the sediment pore water during a drying event in the Salt River. The eggs of *P. informis* will only hatch following cues including repeated flooding and reduced salinities, during which time there is likely to be significant dilution of metals in the surface water. While copper is claimed to be low in Salt River sediments (with the highest concentrations recorded upstream at a control site), bioavailability and potential toxicity of metals are also likely lowered to aquatic biota by high salinity, high pH, elevated nutrients, and clay. The Licence Holder claims the toxicity risk to juvenile and adult life stages is extremely low during dewatering discharge.

The study indicated there is a low toxicity and bioaccumulation risk to representative algal and brine shrimp species, particularly to the naturally elevated copper (due to deposits in the area) and to potentially inherited resilience (Stantec, 2019a). The study identified raw water before any settling of sediments did not increase the risk of toxicity to the representative species indicated the river system has natural adaptations to elevated metal levels in the water (Stantec, 2019a). The Licence Holder claims that for heavy metals to pose a risk to organisms within the Salt River ecosystem, it must be bioavailable (Stantec, 2019a). Bioavailable metal concentrations were claimed to be low compared to total metals in the sediments of the river (Stantec, 2019a).

As per the *D. salina*, the observed dewatering discharge quality and subsequent downstream surface water quality contained heavy metals concentrations that were elevated when compared to background levels, but which were at least one order of magnitude below toxic thresholds. However, if the discharge rate is doubled, copper concentrations may increase as mining proceeds deeper underground. Higher copper concentrations may also migrate further downstream. The 0.07 mg/L trigger value for copper will therefore be retained in the licence as a threshold to ensure continued protection of the brine shrimp in Salt River and Burra Lake.

Zinc is another heavy metal with the potential to bioaccumulate in fish and crustaceans. The Ecotoxicity study demonstrated a toxicity threshold of 0.24 mg/L for brine shrimp. In order to ensure these toxicity levels are not exceeded it is considered appropriate a trigger value is applied for zinc concentrations. The Delegated Officer has therefore applied a trigger value slightly lower than the demonstrated toxicity concentration for zinc of 0.20 mg/L (noting the average discharge concentrations are around 0.046 mg/L). This trigger value has been applied to the licence for dewatering discharges to Salt River (Condition 23).

While cadmium and nickel do not present an immediate concern in the ecotoxicity studies, they are heavy metals with potential to bioaccumulate in aquatic systems. With the proposed doubling of discharge rates over a 5-year operational Life of Mine period; the Delegated Officer considers it appropriate to also include trigger values to ensure the Licence Holder is alerted to significant increases in metal concentrations within the discharge to the Salt River ecosystem and can consider further investigations or corrective actions to negate any impacts. Appropriate trigger values can be derived from the ANZECC & ARMCANZ (2000) physical and chemical stressor default guideline values (DGVs) (for slightly to moderately disturbed ecosystems) (marine waters). The ANZECC & ARMCANZ (2000) DGVs are 0.56 mg/L for nickel and 0.036 mg/L for cadmium. These concentrations have been applied as trigger values to the licence for dewatering discharges to Salt River (Condition 23).

Condition 24 has also been added to the licence; a specified action for the Licence Holder to investigate exceedances in trigger values when they occur, and report any environmental impact, any management actions and preventative measures undertaken to resolve and prevent the exceedances from occurring again.

3.3.5 Cessation of discharge and potential acid sulphate soils

During dewatering, there is the potential for microorganisms to produce sulfide minerals within parts of the Salt River which contain neutral to alkaline, iron rich and organically rich sediments (associated with halophytic fringing vegetation) within inundated areas of the Salt River. During formation of the sulfides, any trace metals within the sediments may be transformed to unstable sulfide minerals. Once dewatering operations have ceased, the sulfides will oxidise and upon the significant rain events, will mobilise the sulfide minerals which may impact organisms downstream in the path of inundation, such as to Burra Lake.

The Salt River is a naturally alkaline system (pH >8), containing calcrete and high concentrations of carbonates and bicarbonates throughout the catchment (Figure 8) (Table 11) (Stantec, 2021, 2022). The Licence Holder claims the presence of sulphates in the Salt River and Burra Lake have been within historic baseline ranges with exception at the discharge location (SR08) in 2021 and 2022 where sulphates are elevated (Stantec, 2021, 2022). At the historical discharge site to land, extractible sulphur (an indicator of acid sulphate soils (ASS)) was found in only a few samples (5% of 233) (Senversa, 2022).

The Licence Holder considers that Salt River is likely to have the capacity to buffer the potential risk of acid sulfate soil production. As well as reducing sulfidic material build up during drying periods such as from cessation of dewatering (Baldwin and Capon, 2011). Monitoring of KCL Extractible Sulphur in the top portion of sediment, which is exposed to oxygen, will be important for determining future management if sulphur were to arise. A limit of 0.06 equivalent sulphur (%S) (oven-dry basis) has been determined and applied to the licence (Condition 21, Table 15), based on the presence of sandy loams on the site, containing between 5 and 40% clay content (DWER, 2015).

Figure 8: Calcrete deposition along the banks of the Salt River

Table 11: Water and sediment quality

Parameters	Water Quality						Sediment					
	Baseline		2021		2022		Baseline		2021		2022	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
pH												
Salt River	8	9.7	8.1	8.9	7.9	8.9	7.7	8.8	8.5	9.5	8	9.1
Burra Lake	8.3	8.6	-	-	8.3	8.6	8	8.8	-	-	8.3	8.8
Salinity												
Salt River	10.300	39,000	5,700	46,000	8,900	61,000	2,320	102,000	2,000	41,000	6,500	71,000
Burra Lake	13,800	53,700	-	-	11,000	11,000	3,440	68,800	-	-	2,400	23,000
Bicarbonates												
Salt River	45	241	82	470	63	260	26	301	200	910	330	930
Burra Lake	65	90	-	-	99	120	16	76	-	-	100	370
Carbonates												
Salt River	8	106	<1	32	<1	58	<1	20	<25	52	<1	20
Burra Lake	4	21	-	-	1	10	<1	7	-	-	<25	<25
Sulfates												
Salt River	85	2,470	160	2,700	460	3,400	200	14,300	160	3,300	590	13,000
Burra Lake	152	4,320	-	-	690	700	760	22,600	-	-	210	12,000

Note: Shaded values are above baseline values.

4. Consultation

Table 12 provides a summary of the consultation undertaken by the department.

Table 12: Consultation

Consultation method	Summary of comments received	Department response
The Department's Contaminated Sites Branch (CSB) was provided with a memo for comment and a link to the ERA upon the proposed reclassification of contaminated site DMO 11089, on 12 September 2022.	This response provided on 12 October 2022 advised: Ongoing soil and vegetation monitoring under a licence condition is unlikely to be required and should be covered under the *Contaminated Sites Act 2003* (CS Act). Under the CS Act classification, DWER will require an additional vegetation survey to be conducted in 2-3 years to confirm natural regeneration is occurring. This is in line with the recommendations in section 7.0 of the [Environmental Risk Assessment] ERA.	The removal of the soil and vegetation monitoring conditions from the licence is considered justified by the Delegated Officer. It is more appropriate that ongoing monitoring are survey requirements from a historical contamination event are managed under the CS Act.
CSB was provided with a technical advice request for testing of tailings and decant water for TSF2 in November 2022.	This testing was carried out using a laboratory-based method with deionised water. However, it is not known whether other geotechnical properties that are relevant to the stability of TSF2 were measured by the Licence Holder.	Licence Holder advised to determine if estimated geotechnical properties likely to be affected by laboratory results utilising deionised water instead of water more reflective of field properties.
CSB was provided with a technical advice request for the hydrogeological discharge modelling and ecotoxicity studies on 1 December 2022.	The hydrological models that were developed are considered to only have a limited ability to predict the effects of dewatering discharges on creek flows near the Gullewa mine site. This is because of the likely deficiencies of the conceptual model that was used to develop the groundwater flow model; The brine shrimp toxicity testing has not adequately considered the likely exposure of either Artemia species nauplii or unhatched cysts to elevated metal concentrations in sediment pore-water during a drying event immediately after surface water flows have ceased. Consequently, it is recommended that the Licence Holder is required to undertake further sediment sampling to determine the extent to which sulfide minerals are forming in saturated alluvial sediments downstream of the dewatering discharge area.	The department sent a request for further information in December 2022 outlining these comments and met with the Licence Holder to discuss in January 2023. Further information provided by Licence Holder and discussed in sections 3.3.3 and 3.3.4.

Catchment Solutions was provided with a technical advice request for the hydrogeological discharge modelling with the advice provided from CSB, on 8 December 2022.	Response provided on 13 December 2022 agreed with advice provided by CSB. Further information on the status of risk is required by way of sampling and analysis of the wetted sediments in the existing discharge area in order to assess the projected impacts of the increase in dewatering discharge.	The department sent a request for further information in December 2022 outlining these comments and met with the Licence Holder to discuss in January 2023.
Estuary Science was provided with a technical advice request for the hydrogeological discharge modelling with the advice provided from CSB, on 8 December 2022.	Response provided 16 December 2022 agreed with CSB in principle. Adding: • Chronic tests are always more appropriate than acute tests; • It is good practise to incorporate multiple species (across different trophic levels), • While artemia are representative of this receiving environment, they are notoriously insensitive (especially the acute test applied here). • if there was an artemia test that incorporated unhatched cyst life stages, then this would be more appropriate – especially if the primary exposure route is likely to be from sediment contaminants. • Toxicity tests conducted on leachates can be performed by the ecotox laboratory for concerns about metals in the sediments.	The department sent a request for further information in December 2022 outlining these comments and met with the Licence Holder to discuss in January 2023.
The Department of Mines, Industry Regulation and Safety (DMIRS) was provided with the application on 20 December 2022.	On 16 January 2023, DMIRS responded with the following: In relation to Licence Amendment L7798 - Silver Lake (Deflector), I have comments related to the proposed changes to Category 5. The proposed amendment is to increase plant production from 760,000 tpa to 820,000 tpa - Cat 5 topic 4.2.2 In 2020 DMIRS approved Mining Proposal REG ID 88751 for the construction of TSF 2. TSF 2 design was based on tailings production of 700,000 tpa and tailings containing 40% solids (DEFLECTOR MINE, WA – TSF 2 DETAILED DESIGN REPORT 13 May 2020 (CMW Geoscience)). Since TSF 2 was design for a smaller throughput, any increase will affect tailings consolidation, rate of rise and the life of TSF2. It may also lead seepage increase. Therefore, Licence Holder should provide a document prepared by the TSF 2 designer addressing the following: ○ discuss any changes in solid content in tailings that are different from the approved. If	Licence Holder advised to determine if changes to TSF2 operations / increased tailings deposition likely to impact design assumptions and / or stability aspects. DWER recommends changes to be assessed at next TSF audit.

	different, how it will impact TSF 2 operation ○ review TSF 2 rate of rise and provide an updated life of TSF ○ prepare a revised water balance highlighting approved, current and new prediction ○ adequacy of the seepage recovery infrastructure for the proposed throughput Without such validation, it is not possible to evaluate the risk and suitability of mitigation methods. The throughput is not regulated by DMIRS. When a TSF proposal is approved it is to be built and operated according to a design report and Operation Manual (OM). If the company changes the process/ throughput without changing the tailings properties and operate according to the OM, then there is unlikely to be any issues. However, any changes in discharge rate, solid content, particle size characteristics should be passed to the designer for review to: ○ validate (or not) the changes are acceptable ○ and / or recommend further works to address the changes (if required).	
N/A.	On 18 January 2023, Mid-West Licencing Branch contacted the Department with the following: I am working on the groundwater licence for this site, and it seems that you ladies are working on an amendment to the environmental licence. The amendment for the groundwater licence that I am working on is for the following changes: ○ Adding new TSF recovery trenches as abstraction locations ○ Reducing water quality monitoring: field EC from monthly to quarterly, and lab analysis from quarterly to annual ○ Reducing water monitoring when in care and maintenance ○ Removing TSF monitoring and contingency plans as this is covered by the environmental licence for the site. We have no issue with any of the proposed changes. We wanted to confirm that we support the TSF monitoring and management approach outlined in the environmental licence with respect to potential groundwater impacts. To save duplication and streamline our process TSF monitoring will no longer be included in the groundwater licence.	Noted, process TSF monitoring will only be in this licence.

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.

5.1 Summary of amendments

Table 13 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 13: Summary of licence amendments

Condition no.	Proposed amendments
N/A	Assessed production and design capacities.
N/A	Adjustment of Licence History entry into chronological order.
Table 1	Maximum ore processing limits from 760,000 to 877,000 tonnes of ore per annual period. Maximum dewatering discharge increased from 750,000 to 1,540,000 tonnes per annual period. Sewage processing increased from 50 to 60 cubic meters per day.
Table 2	Defining 'TSF' as 'Gullewa TSF' to differentiate with TSF2. Inclusion of TSF2 to Containment Infrastructure for management of waste. The following are in response to referral by DMIRS: • Removal of specificity of seepage recovery in the 'south west corner', to allow seepage collection and recovery on all sides of TSF2. • Inclusion of minimum tailings solids to manage water content in TSF2. • Recovered seepage not to return to TSF2 and to be redirected to Monarch pit to manage observed seepage in TSF2.
Table 3	Inclusion of up to 1 tonne per year of Type 2 Special Waste (biomedical waste only), under supervised burial.
Table 5	Defining 'TSF' as 'Gullewa TSF' to differentiate with TSF2.
Table 6	WWTP processing throughput value increased from 50 to 60 cubic meters per day. Inclusion of the Carbon in Pulp Leach Circuit with Reagent Storage and Sludge Drying bed to the infrastructure and equipment requirements table.
Condition 10	Rewording of "section 2" to "Emissions and discharges".
Condition 13	The following are in response to referral by DMIRS: • Inclusion of dust management condition for dust mobilisation observed at the Gullewa TSF.
Table 9	Maximum dewatering discharge increased from 750,000 to 1,540,000 tonnes per annual period.
Table 12	Inclusion of TSF2 for process monitoring. Defining 'TSF' as 'Gullewa TSF' to differentiate with TSF2. Inclusion of TSF2. The following are in response to referral by DMIRS after site inspection:

	• Inclusion of monthly recording of tailings discharged, solids content and decant recovered.
Table 13	Inclusion of six monitoring bores for TSF2 to the groundwater monitoring program.
Table 14	Inclusion of photo monitoring locations at TSF2 for consistency of photo monitoring around TSFs on site. Defining 'TSF' as 'Gullewa TSF' to differential with TSF2.
Table 16	Increase of sampling frequency to "3 months when water is present" due to proposed increase in dewatering discharge.
Table 17	Updated units for pH from "-" to "pH units" for consistency in the licence.
Table 18	The first 6 months of monitoring frequency to the Salt River has expired; monitoring frequency changed to quarterly for all parameters excluding cumulative volume. Inclusion of trigger value for zinc due to potential doubling of dewatering discharge to the Salt River which may approach the toxicity threshold for the Brine Shrimp. Inclusion of 80% species protection trigger levels for Cadmium and Nickel to prompt Licence Holder of increased metals in Salt River surface waters.
Table 19	Removal of Table 3.2.1 from reporting requirements. The following monitoring requirements have been added for TSF management: • Inclusion of water balance; • tailings report requirements; and • seepage recovery.
Condition 25	Inclusion of specified action reporting condition for the investigation and reporting of trigger value exceedances.
Condition 26	Update the Audit of Compliance condition to the current standard.
Condition 27	Update the complaints condition to the current standard.
Condition 28	Inclusion of new condition to maintain accurate and auditable books.
Condition 29	Inclusion of new condition about book requirements.
Condition 31	Inclusion to 30b) the "discussion of any trends identified over time" so trends can be related back to mining activities.
Table 20	Removal of non-annual reporting related to condition 3.4.1, Table 3.4.3 due to the deletion of soil monitoring points PSC9, DEFD01-DEFD22 from Table 3.4.3.
Table 21	Removal of Notification requirements for Table 3.4.2 due to the deletion of photo monitoring points PS1-PS11 and PSC9 from table 3.4.2.
Table 22	New and updated definitions.
Table 23	Inclusion of "pH units" for the monitoring parameter pH. Inclusion of Trigger values for Cadmium, Nickel, and zinc.
Schedule 1	Inclusion of Figure numbers and descriptive text.
	Figure 3 updated to include labels of the WWTP, Sprayfield Discharge Point and Accommodation Village.

	Figure 4: figure updated so in-map labels refer to Discharge Points and Gullewa Plant site. Figure description updated for direct referencing to ‘air’ emission, ‘groundwater’ and ‘vegetation’ monitoring points.
	Figure 6 updated with a higher resolution map
	Figure 7 New figure to show the location of the TSF2 Discharge Point, pipeline, and monitoring bore locations.
	Figure 8 New figure to show the location of the CIP Circuit and reagents store.
	Vegetation monitoring points removed following removal of condition 3.4.1, Table 3.4.2.
	Soil Monitoring Points removed following removal of condition 3.4.1, Table 3.4.3.

Table 14: Consolidation of licence conditions in this amendment

Existing condition	Condition summary	Revised licence condition	Conversion notes
N/A	Contents	N/A	Revised to current licensing format. Deleted contents table.
N/A	Introduction	N/A	Revised to current licensing format. Deleted introduction.
N/A	Severance	N/A	Revised to current licensing format. Deleted severance.
1 1.1	General Interpretation	Infrastructure and Equipment Interpretation section	Redundant titles. Revised to current licensing format.
1.1.1 1.1.2	Interpretation and definitions	Interpretation section, Definitions section. Table 23.	Redundant conditions. Revised to current licensing format.
1.1.3	Australian or other standard	Interpretation section, Definitions section.	Redundant condition. Revised to current licensing format.
1.1.4	Reference to code of practice	Interpretation section, Definitions section.	Redundant condition. Revised to current licensing format.
1.2 1.2.1	General conditions Stormwater	N/A Condition 1	Revised to current licensing format.
1.3 1.3.1	Premises Operation Exceedances	N/A Condition 2	Revised to current licensing format.
1.3.2 Table 1.3.1	Authorised Activities	Condition 3 Table 1	Revised to current licensing format.
1.3.3 Table 1.3.2	Storage of waste Containment infrastructure for management of waste	Condition 4 Table 2	Revised to current licensing format.
1.3.4	Pipeline requirements	Condition 5	Revised to current licensing format.

Existing condition	Condition summary	Revised licence condition	Conversion notes
1.3.5 Table 1.3.3	Waste acceptance	Condition 6 Table 3	Revised to current licensing format.
1.3.6 Table 1.3.4	Cover requirements	Condition 7 Table 4	Revised to current licensing format.
1.3.7 Table 1.3.5	Infrastructure and equipment requirements	Condition 8 Table 5	Revised to current licensing format.
1.3.8 Table 1.3.6	Infrastructure and equipment requirements	Condition 9 Table 6	Revised to current licensing format.
1.3.9	Operation and compliance	N/A	Compliance documents received for the listed items; condition to be removed.
2 2.1	Emissions and Discharges General	N/A N/A	Revised to current licensing format.
2.1.1	Exceedances	Condition 10	Revised to current licensing format.
2.2 2.2.1 Table 2.2.1	Emissions to land Emissions to land	N/A Condition 11 Table 7	Revised to current licensing format.
2.2.2	Discharges to Salt River flow through a rock-armoured gabion outlet	N/A	Condition to be removed.
2.3 2.3.1 Table 2.3.1	Emissions to air Emissions to air	N/A Condition 12 Table 8	Revised to current licensing format.
2.4 2.4.1 Table 2.4.1	Emission to surface water Emissions to surface water	N/A Condition 14 Table 9	Revised to current licensing format.
2.5 2.5.1 Table 2.5.1	Emission to groundwater Emissions to groundwater	N/A Condition 15 Table 10	Revised to current licensing format.
3 3.1	Monitoring General Monitoring	N/A N/A	Revised to current licensing format.
3.1.1	AS/NZS standards	Condition 16	Revised to current licensing format.
3.1.2	Monitoring	Condition 17	Revised to current licensing format.
3.1.3	Monitoring equipment	Condition 18	Revised to current licensing format.
3.1.4	Calibration	Condition 19	Revised to current licensing format.

Existing condition	Condition summary	Revised licence condition	Conversion notes
3.1.9	Operation of items following submission of compliance documents	N/A	
3.2 3.2.1 Table 3.2.1	Monitoring of emissions to land Monitoring of emissions to land	N/A N/A N/A	Revised to current licensing format. Discharge to land ceased on 20 April 2020; condition and table to be removed.
3.2.2 Table 3.2.2	Monitoring of point source emissions to land	Condition 20 Table 11	Revised to current licensing format.
3.3 3.3.1 Table 3.3.1	Process Monitoring	N/A Condition 21 Table 12	Revised to current licensing format.
3.4 3.4.1 Table 3.4.1	Ambient environmental quality monitoring Monitoring of ambient groundwater quality	N/A Condition 22 Table 13	Revised to current licensing format. Updating reference from ANZECC 2000 to ANZG 2020.
Table 3.4.2	Monitoring of ambient vegetation quality	Table 14	Revised to current licensing format. Removal of photo monitoring sites PS1-PS11 and PSC9.
Table 3.4.3	Monitoring of ambient soil quality	Table 15	Revised to current licensing format. Removal of soil monitoring sites PSC9, DEFD01-DEFD22.
Table 3.4.4	Monitoring of ambient surface water quality	Table 16	Revised to current licensing format.
3.5 3.5.1 Table 3.5.1	Monitoring of emissions to groundwater Monitoring of point source emissions to groundwater	N/A Condition 23 Table 17	Revised to current licensing format.
3.6 3.6.1 Table 3.6.1	Monitoring of emission to surface water Monitoring of emissions to surface water	N/A Condition 24 Table 18	Revised to current licensing format.
4 4.1	Information Records	Records and Reporting N/A	Redundant title. Revised to current licensing format.
4.1.1	Information and records	Condition 26	Revised to current licensing format.
4.1.2	Annual Audit Compliance Report	Condition 27	Revised to current licensing format.
4.1.3	Complaints management	Condition 28	Revised to current licensing format.

Existing condition	Condition summary	Revised licence condition	Conversion notes
4.2 4.2.1 Table 4.2.1	Reporting Annual Environmental Report	N/A Condition 31 Table 19	Revised to current licensing format.
4.2.3	Annual Environmental Report	Condition 32	Revised to current licensing format.
4.2.4 Table 4.2.2	Non-annual reporting requirements	Condition 33 Table 20	Revised to current licensing format. Removal of quarterly submissions related to 3.4.1, Table 3.4.3.
4.3 4.3.1 Table 4.3.1	Notification Notification Requirements	N/A Condition 34 Table 21	Revised to current licensing format. Removal of Table 3.4.2 from notification requirements.
Schedule 2 Reporting & notification forms	Form N1 Notification	Reporting & notification	Updated N1 form format. Forms accessed at www.dwer.wa.gov.au

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

Condition	Summary of Licence Holder's comment	Department's response
Condition 9, Table 6	Infrastructure and equipment requirements Carbon in Pulp Leach circuit with Reagent Storage at the Processing Plant. This section of the table combines two separate infrastructure areas, as identified by Works Approval W6407 Table 1. SLR comments that the reagents storage area is bunded in accordance with AS1940. The CIP circuit did not include a requirement to be bunded to this standard in W6407. It is requested that the table be separated to detail the individual design and construction details of each discrete area.	CIP circuit and reagent store separated to individual items in table 6.
12	Formatting error – should be included in Condition 11	Formatting error corrected.
23	Formatting error – should be included in Condition 22	Formatting error corrected.
25, 26 27 & 28	Formatting error – should be included in Condition 24	Formatting error corrected.
Condition 28, Table 15	Soil quality monitoring – KCl extractable Sulphur Following geochemical review and discussion with Steve Appleyard (DWER) SLR propose the alternate use of Chromium Reducible Sulphur. Geochemical advice (Michael North & Dave Allen, MBS) considers the use of the KCl extraction measurement as likely to lead to false positives due to high presence of calcrete in river banks and sediment and instead recommends the measurement of a CRS suite for determination of sulphide content and net acidity and any increases in these over time and in relation to upstream reference sites and the 0.06% S net acidity criteria.	Updated KCl extractable Sulphur to use Chromium Reducible Sulphur.
	Use of trigger values: SLR comments that the use of trigger values carries the connotation that an exceedance is a non-conformance, including notification requirements per Condition 41, Table 21 and inclusion in the AACR as a reportable nonconformance. As described in the decision report, the inclusion of "trigger" values is to prompt an investigation of potential impacts, to be included in the annual environmental report. SLR request that "trigger" values be identified as "investigation" values to better reflect the purpose of Condition 31.	"Trigger" value updated to "investigation" values.

Condition	Summary of Licence Holder's comment	Department's response
Condition 30, Table 18	Monitoring of emissions to surface water Zinc value in draft licence is 0.02 mg/L. SLR comments that this is potentially a transcription error as the decision report identifies proposed Zinc value as 0.2 mg/L. It is also noted that a trigger value of 0.02 mg/L would exceed upstream (background) Zinc levels.	Error corrected to 0.2.
	Use of trigger values (as above Condition 28)	Formatting error corrected.
Condition 38	Formatting error – should be included in Condition 37	Formatting error corrected.
Condition 38, Table 19	Annual Environmental Report Multiple formatting errors	Formatting error corrected.
Condition 41, Table 21	Notification requirements Formatting error	Formatting error corrected.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)					
Application type					
Works approval	☐				
Licence	☐	Relevant works approval number:		None	☐
		Has the works approval been complied with?		Yes ☐ No ☐	
		Has time limited operations under the works approval demonstrated acceptable operations?		Yes ☐ No ☐ N/A ☐	
		Environmental Compliance Report / Critical Containment Infrastructure Report submitted?		Yes ☐ No ☐	
		Date Report received:			
Renewal	☐	Current licence number:			
Amendment to works approval	☐	Current works approval number:			
Amendment to licence	☒	Current licence number:	L7798/1993/6		
		Relevant works approval number:	W6407/2020/1	N/A	☐
Registration	☐	Current works approval number:		None	☒
Date application received		29/06/2022			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Silver Lake (Deflector) Pty Ltd			
Premises name		Gullewa Gold-Copper Operations			
Premises location		Morawa - Yalgoo Road			
Local Government Authority		Shire of Yalgoo			
Application documents					
HPCM file reference number:		2010/003052-1~4			
Key application documents (additional to application form):		• Proof of Occupier Status • Hydrogeological Study (CDM Smith 2021b) • WWTP Sludge Drying Bed Conceptual Design • Vegetation Condition Review (Botanica 2021) • Ecological Risk Assessment – Historic Groundwater Effluent Discharge Area (Senversa 2021) • Stakeholder Consultation Register • Baseline Hydrological Assessment - Salt River and Burra Lake (Stantec 2019c) • Ecological Monitoring of Salt River, 2021 (Stantec 2021) • Salt River Sediment and Water Quality			

	• Baseline Aquatic Ecology and Discharge Impact Assessment of Salt River and Burra Lake (Stantec 2019b) • Memorandum: 2020 Targeted Tecticornia Survey for Silver Lake Resources Pty Ltd (Botanica 2020) • Ecotoxicity Study of Salt River Aquatic Biota (Stantec 2019d)
Scope of application/assessment	
Summary of proposed activities or changes to existing operations.	*Licence amendment* <u>Increase throughput of:</u> Cat 5: to 877,000 tonnes per annual period. Cat 6: to 1,540,000 tonnes per annual period. Cat 64: no change. Cat 85: to 60 cubic metres per day. <u>Operation/Inclusion of:</u> • **Deflector Processing Facility** to include a Carbon in Pulp (CIP) Leach Upgrade circuit (CIP Circuit) and subsequent storage of reagents (as per W6407/2018/1 Construction Compliance reports). • **TSF2** with a groundwater monitoring bore network and tailings and decant return water pipelines. • **Type 2 Special Waste** (biomedical waste - less than 1 tonne/year) with supervised burial. • **WWTP** upgraded to maximum design capacity**.** • **Sludge drying bed** with bunded pipeline & water returned to the WWTP (balance tank). <u>Removal of conditions:</u> • 2.2.2 • 3.2.1 and Table 3.2.1 • 3.4.1 and Table 3.4.2 • 3.4.1 and Table 3.4.3 • Table 4.2.1 • 4.2.4 and Table 4.2.2

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: Processing or beneficiation of metallic or non-metallic ore	760,000 tonnes per annual period.	877,000 tonnes per annual period
Category 6: Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore.	750,000 tonnes per annual period to Salt River.	1,540,000 tonnes per annual period.
Category 64: Class II or III putrescible landfill site.	4,000 tonnes per annual period.	No change.
Category 85: Sewage facility	50 cubic metres per day.	60 cubic metres per day.

Legislative context and other approvals

Has Licence Holder referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does Licence Holder hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has Licence Holder demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: **Mining lease / tenement ☒ Expiry:** M 59/49 – 18/03/2029 M 59/68 – 08/12/2029 M 59/132 – 25/01/2031 M 59/294 – 06/12/2035 M 59/356 – 05/12/2036 M 59/335 – 17/10/2036 M 59/336 – 17/10/2036 M 59/336 – 05/12/2036 M 59/391 – 06/02/2038 M 59/392 – 06/02/2038 M 59/442 – 04/11/2039

		M 59/507 – 13/12/2040 M 59/522 - 08/03/2022 (08 March 2043 on Minedex) L 59/35 – 24/10/2024 L 59/49 – 01/03/2042 L 59/64 – 18/04/2033 L 59/71 – 19/09/2031 L 59/158 – 22/05/2040 L 59/159 – 22/05/2040 L 59/160 – 22/05/2040 Other evidence ☐ Expiry:
Has Licence Holder obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why?
Has Licence Holder applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☒ No ☐	CPS No: CPS 5128/5
Has Licence Holder applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: No clearing required.
Has Licence Holder applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☒ No ☐	Application reference No: Licence/permit No: GWL 18757(6)
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☒	Name: Gascoyne Groundwater Area Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☒ Regional office: Mid-West Gascoyne
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: P1 / P2 / P3 / N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☒

Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☐ No ☐	
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	North east corner of site 11089 clips with part of L 59/159. Classification: possibly contaminated – investigation required (PC–IR) Date of classification: 2 Sep 2020