



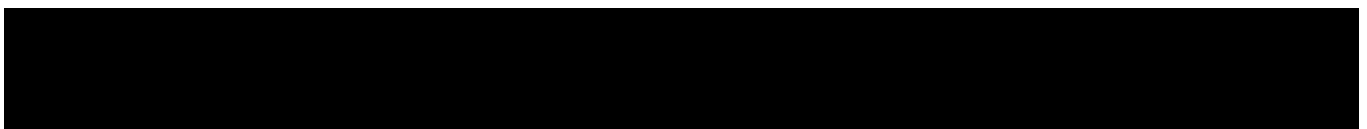
NORTHERN STAR
R E S O U R C E S L T D

MOUNT CHARLOTTE OPERATIONS

LICENCE APPLICATION

3B SUPPORTING DOCUMENT

APRIL 2026



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1 Introduction

1.1 Background and Context

Kalgoorlie Consolidated Gold Mines Pty Ltd (KCGM) is a wholly owned subsidiary of Northern Star Resources Ltd and is responsible for operating the Fimiston Gold Mine Operations, located adjacent to the City of Kalgoorlie-Boulder in the Eastern Goldfields Region of Western Australia. Gold ore from the Fimiston Open Pit and the Mt Charlotte Underground Mine are processed at the Fimiston Processing Plant which is located on the eastern side of the Fimiston Open Pit. The Mt Charlotte operations are located within 2 km to the City of Kalgoorlie-Boulder approximately 600 km east of Perth, Western Australia (WA).

Recently the water volume at Mt Charlotte underground mine has increased. This is due to increased underground drilling activity (exploration). The suspended solids load has proportionally increased, to the point that settlement of solids is required prior to the water re-entering the existing saline water reticulation circuit. Due to insufficient space and safety considerations, settlement underground is not a viable option.

Water management at Mt Charlotte is regulated through GWL63555. Prior to this project, water was pumped from Mt Charlotte by means of an underground pump and traveled north and then east through an existing bunded pipeline corridor to enter a larger saline reticulation circuit along Yarri Road (northern route).

This project will connect this existing pipeline with a new pipeline to Mt Percy Union Club pit and create a new southern route (west-east route, with less elevation changes). Both routes will be retained and utilised in the licence.

1.2 Licence Application

This application is for a licence to allow mine dewatering following the granting of works approval W6827/2023/1. A compliance report was sent to the Department of Water and Environmental Regulation (DWER) on 25 March 2026 for partial completion of the project. The balance of the works will be conducted in the FY27.

Table 1: Prescribed premises categories

Prescribed Premises category and description	Proposed production or design capacity
Category 6: Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore.	2,000,000 tonnes per year

1.4 Applicant Details

Kalgoorlie Consolidated Gold Mines Pty Ltd
 Black Street
 Kalgoorlie WA 6430

Table 2: Tenement and Tenement Holder information

Tenement	Tenement Holders
M26/60	NORTHERN STAR (KLV) PTY LTD NORTHERN STAR (SARACEN KALGOORLIE) PTY LTD
M26/61	NORTHERN STAR (KLV) PTY LTD NORTHERN STAR (SARACEN KALGOORLIE) PTY LTD
M26/131	NORTHERN STAR (KLV) PTY LTD NORTHERN STAR (SARACEN KALGOORLIE) PTY LTD
M26/261	NORTHERN STAR (KLV) PTY LTD NORTHERN STAR (SARACEN KALGOORLIE) PTY LTD
M26/383	NORTHERN STAR (KLV) PTY LTD NORTHERN STAR (SARACEN KALGOORLIE) PTY LTD
M26/353	NORTHERN STAR (KLV) PTY LTD NORTHERN STAR (SARACEN KALGOORLIE) PTY LTD

1.5 Relevant Approvals

Table 3: Required approvals for the Mount Charlotte Operations

Agency	Approval	Status
Department of Water and Environmental Regulation (DWER)	W6827/2023/1	Active
Department of Mines Petroleum and Exploration (DMPE)	RegID 1107768	Active

1.6 Location

The Mt Charlotte operations are located within 2 km to the City of Kalgoorlie-Boulder approximately 600 km east of Perth, WA (**Figure 1**).

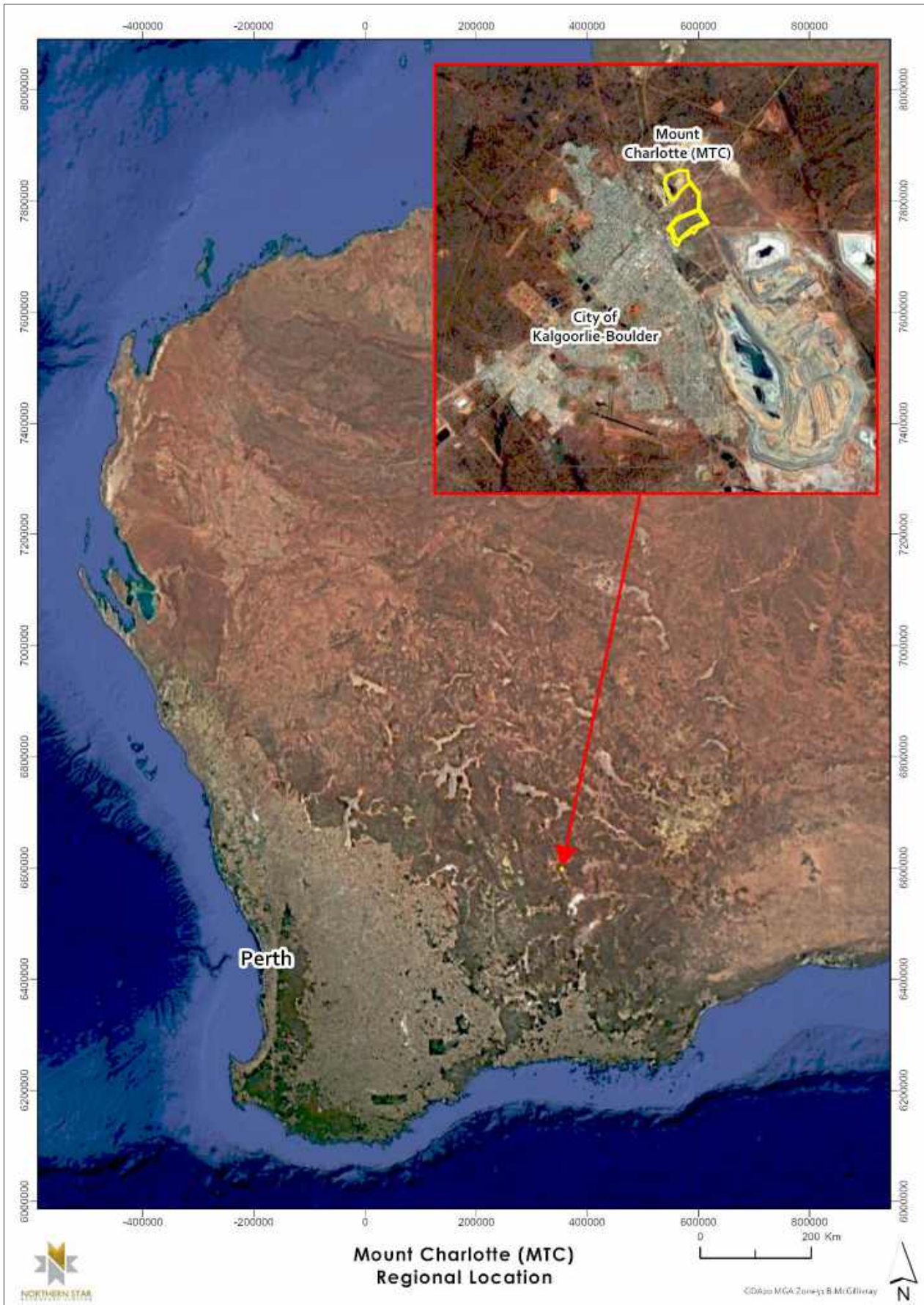


Figure 1: Location Map

1.7 Premises Map

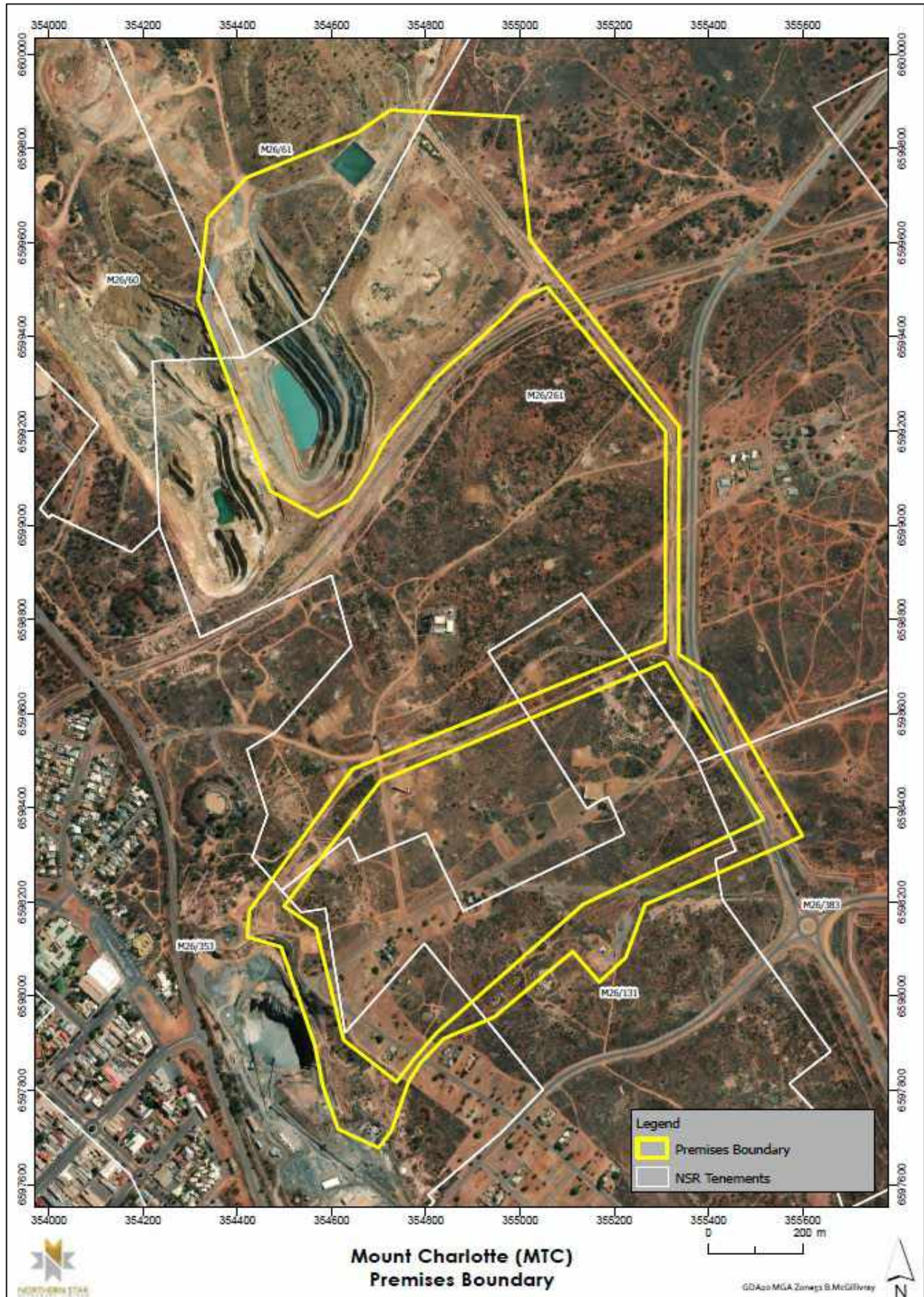


Figure 2: Premises Map

2 Activities

The project consists of installation of a dewatering line from the Mt Charlotte pump station ('surface reticulation tie-in' in **Figure 3**) to the Mt Percy Union Club Pit and pump the water to the Gravity Dam. From Gravity Dam the dewatering/return water lines will be installed along an east-west corridor (southern route).

Completed works consist of (detailed in Attachment 6A):

- Existing old or active bunded pipeline routes that form part of an existing saline reticulation circuit were used to house the new pipeline to transfer the high suspended solids water to the Union Pit at Mt Percy (a mine site in care and maintenance). The discharge point into the pit is located on the southern end of the pit.
- Suspended solids settle out in the Union Club Pit and clarified water is pumped from the northern end of the pit.
- The clarified water is pumped from Union Club Pit into the existing saline reticulation circuit at Gravity Dam for reuse.

Due to time constraints and other limitations, works still to be completed consist of:

- A west - east route (southern route), with less elevation changes (to decrease pumping head), utilising a historic pipeline corridor will be implemented in FY27, completing the new return circuit to underground.

Limited ground disturbance was required for the revised pipeline route and environmental controls for the management of the pipeline corridors have been approved under DMPE RegID 1107768.

3 Environmental Risks and Management

3.1 Emissions and Discharges

Emissions and discharge points, as well as the pipeline corridors for dewatering at MTC can be found below in **Figure 3**.

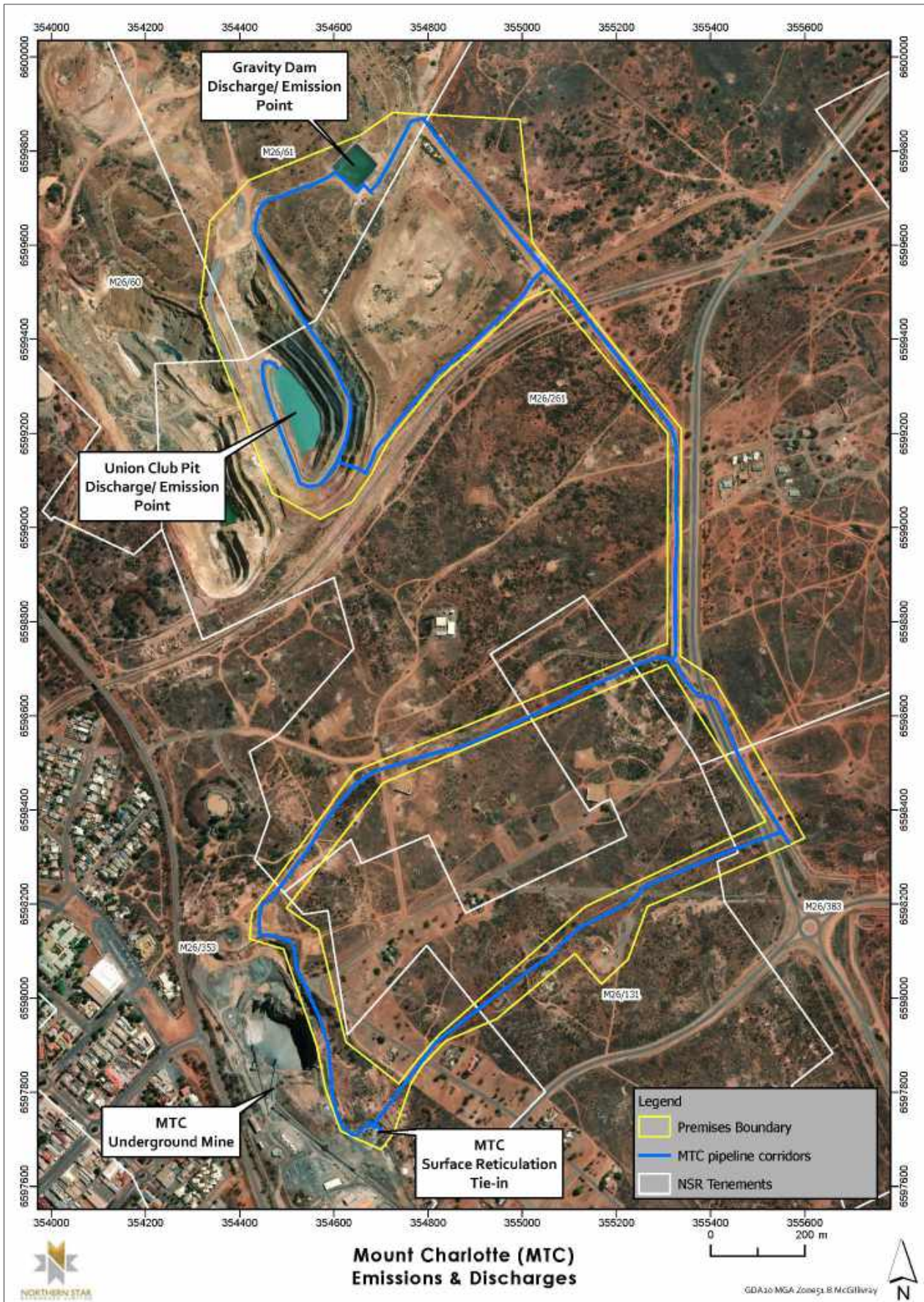


Figure 3. Mount Charlotte emissions and discharge points.

3.2 Source-pathways and receptors

The risks of emissions from the prescribed premises have been detailed below 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.

3.2.1 Emissions and controls

The key emissions and associated actual or likely pathway during operation which have been considered in this application are in **Table 4**. **Table 4** also details the control measures proposed to assist in controlling these emissions, where necessary.

Table 4: Proposed Controls

Emission	Source	Potential pathway	Proposed Control
Operation			
Noise	Water management infrastructure	Air / windborne pathway	<ul style="list-style-type: none"> Minimal noise emissions are expected during operation of the southern pipeline. Operation is to be compliant to the <i>Environmental Protection (Noise) Regulations 1997</i>. The pump for the system is located underground, making the system almost silent.
Hypersaline water	Pipeline leaks	Direct discharge to land	<ul style="list-style-type: none"> Regular inspections every 48 hrs of the pipelines will occur for leak detection. Pipelines are to be located within bunded areas, which together with connected scour pits provide adequate containment in the event of pipeline failure. Leaks are identified using leak detection systems connected to the Distributed Control System (DCS) which is continuously monitored.
	Overtopping of Gravity Dam		<ul style="list-style-type: none"> Dam levels are controlled through the DCS with alarms and interlocks in place. A freeboard of 300 mm from the top of the dam embankment is maintained by the DCS. Should the dam experience total failure, there is an emergency catchment in the form of an overflow channel. Location downhill which can accommodate the full volume of the dam. Visual inspections every 48 hours to ensure freeboard has not breached.
	Seepage through base of Gravity Dam	Seepage through soils	HDPE lined
	Overtopping of Union Club Pit	Direct discharge to land	Water level in the Union Club Pit will be monitored by a telemetric water level meter to

Emission	Source	Potential pathway	Proposed Control
Operation			
Hypersaline water with high suspended solids	Seepage through base and walls of Union Club Pit	Seepage through soils	ensure water levels to not exceed 312 m AHD (approximately 920mbgl). <ul style="list-style-type: none"> • Union Club Pit is a groundwater sink. Pit lake level will be maintained below groundwater level at 312 mAHD or below. • Groundwater level is approximately 340 mAHD or 950 meters below ground level.

4 Environmental Risks and Management

4.1 Risk Assessment

A risk assessment for the approval operate a dewatering line from the Mt Charlotte valve station to the Mt Percy Union Club Pit and pump the water to the Gravity Dam has been undertaken to identify, evaluate and outline the key risks, impacts and mitigation measures from the proposed operations. The risk assessment process has approached the source, pathway and receptor model, considering the likelihood of an environmental or human impact and the relative consequence of the event. The risk assessment is provided in **Table 5**. The definitions for Likelihood and Consequence have been provided in **Table 6** and **Table 7**. The proposed works have been determined to be a **LOW** risk to the sensitive receptor.

Table 5: Risk Assessment for the approval to dewater.

Source/Activity	Risk	Risk pathway	Receptor	Likelihood	Consequence	Risk	Actions to be implemented/Treatment
Transport of saline/hypersaline mine dewater via pipelines (surface, underground)	Hypersaline water/mine dewater	Discharge to land: Pipeline leak or rupture, resulting in overland runoff potentially impacting nearby flora.	Native Vegetation	D	5	Low	<p>Controls:</p> <p>All saline pipelines are in bunded areas, v-drains or buried, which provides adequate containment in the event of a pipeline failure. Leaks are identified using automated telemetry leak detection systems and KCGM are alerted to any leaks in the system by the Distributed Control System (DCS), which is continuously monitored by the Control Room Operators and Site Services.</p> <p>Pipeline corridors are inspected regularly for leaks.</p> <p>All water management infrastructure is located within already cleared and disturbed land within the mining footprint.</p> <p>Based on the above controls Impacts to nearby Native Vegetation is unlikely and is considered a LOW risk</p>
Deposition of mine dewater to Union Club Pit.		Discharge to land: Pipeline leak or rupture, resulting in overland runoff potentially impacting nearby flora.	Native vegetation	D	5	Low	<p>Controls:</p> <p>The dewatering discharge rate is expected to be in the range 400,000 m³/year to 800,000 m³/year, with a maximum system capacity of 2,000,000 m³/year, and the flows are planned to be pumped out at the same rate.</p>

Source/Activity	Risk	Risk pathway	Receptor	Likelihood	Consequence	Risk	Actions to be implemented/Treatment
							<p>The water level in the Union Club Pit will not exceed 312m AHD to maintain integrity of the pit wall.</p> <p>If pumping out ceases. Discharge of mine dewater into the pit will not exceed the number of days to maintain stable water levels.</p>
		<p>Seepage to Groundwater: Seepage and infiltration, lateral movement of pit lake water through the pit walls. Potentially impacting pit wall stability.</p> <p>Pit Lake water potentially seeping to groundwater resources.</p>	Groundwater Resources.	D	4	Low	<p>Water balance modelling conducted has determined that it is unlikely that the Union Club pit will overtop to the adjacent Mystery Pit. Overtopping was a potential risk at 372m AHD, and this is unlikely with the elevation limited to 312m AHD.</p> <p>The water management infrastructure will form part of KCGM water monitoring program where flow rates, water volumes, elevation levels and water quality will be monitored.</p> <p>The pit lake is currently acting as a groundwater sink, and it is expected to remain a sink and not seep any water to the underlying groundwater resources.</p> <p>No problematic materials were identified from geochemical (Refer to Attachment 8B). All rocks were non-acid forming with neutral to alkaline pH and low to moderate salinity levels. Surrounding groundwater is hypersaline</p> <p>The addition of dewatering discharge to the pit lake will rapidly increase TDS concentrations to match the discharge quality. Major ion proportions will remain similar to the existing lake. There will be a proportionally larger increase in nitrate concentrations and in bicarbonate concentrations which will provide additional alkalinity to neutralise any potential acidity generated from mineralised zones exposed in the pit slopes.</p> <p>In the long term, the TDS concentrations in the Union Club Pit driven by evapoconcentration will be very similar regardless of whether dewatering flows are discharged to the pit.</p> <p>The Mt Percy pits are groundwater sinks for local hypersaline groundwater. Water circulating through the pits will not discharge into the surrounding rock formations / low yielding (deep, 950m below ground) hypersaline aquifers for this reason.</p>

Source/Activity	Risk	Risk pathway	Receptor	Likelihood	Consequence	Risk	Actions to be implemented/Treatment
							Based on the above controls Impacts to nearby Native Vegetation and Groundwater Resources is unlikely and is considered a LOW risk.
Deposition of mine dewater to Gravity Dam		Discharge to land: Dam water (hypersaline/saline) overflows, resulting in overland runoff potentially impacting nearby flora.		E	5	Low	<p>The Gravity Dam (a balancing dam within an existing water management system) is lined with a HDPE liner and does not interact with Groundwater resources.</p> <p>Telemetric System is installed at the dam to prevent risk of overtopping, leaks and spills, which automatically ensures there a freeboard is maintained. There is an emergency containment area for the full volume, located downhill of the Gravity Dam, should there be a total failure.</p> <p>Dam is monitored and inspected regularly.</p> <p>Fauna egress mats are installed.</p> <p>Based on the above controls Impacts to nearby Native Vegetation and Groundwater Resources is unlikely and is considered a LOW risk.</p>
Noise from water management infrastructure	Noise Emissions	Noise Emissions: Air /windborne pathway causing Noise emissions impacting health and amenity.	City of Kalgoorlie Boulder >2km	E	5	Low	<p>All operations will be compliant to the Noise Regulations (1997).</p> <p>The pump for the system is located underground, making the system almost silent. Surface water management infrastructure is not expected to contribute to noise emissions.</p> <p>It is unlikely that the water management infrastructure will contribute additional noise emissions impacting nearby residents. This is considered a low risk.</p>

Table 6: Measures of Consequence


Measures of Consequence					
CONSEQUENCE RATING	Insignificant	Minor	Moderate	2Major	Catastrophic
	5	4	3	2	1
Safety	First Aid Injury	Restricted Work Injury	Lost Time Injury >48hrs.	Single Fatality -or- Permanent Disability	Multiple Fatalities - or - Multiple Permanent Disabling Injuries
Health	Reversible health effects with little to no ongoing concern	Significant, reversible health effect with potential to result in a medical treatment/ restricted work illness -or- illness/ exposure that requires regulatory reporting	Severe, reversible health effects with potential to result in a lost time injury/ illness -or- Diagnosable psychiatric condition	Single Fatality -or- Specific diagnosable condition with irreversible health effects -or- Requires admission >48hrs. at a medical treatment facility	Multiple fatalities - or - Health effects resulting in a specific diagnosable condition leading to early mortality
Community	No negative socio-economic impact or inconvenience to the community - or - no media attention	Minor negative socio-economic impact or disturbance to the community - or - local media attention	Negative socio-economic impact or disturbance to the community - or - negative local media attention with enquiries from NGO's	Major negative socio-economic impact and serious community relations impacts - or - negative national headlines with high levels of NGO attention	Loss of social licence to operate with disastrous community relations impacts - or - negative international media headlines
Environment	Localised environmental impact, contained, with no regulatory reporting	Minor on-site environmental impact, reportable to regulators	Moderate environmental impacts, extends beyond site boundary - or - regulatory violations with fines	Serious medium term environmental impacts - or - major regulatory violations	Severe irreversible environmental impacts - or - severe breach of regulations with operation suspended
Emergency and Crisis Management	Emergency response may be required with routine notification of line management. No crisis or Emergency	The Registered Manager and Managing Director are notified	The Registered Manager is notified, and the Emergency Management Team may be activated. The Managing Director is	The Emergency Management Team and Crisis Management Team are activated.	As for Level 2 / Major incident

		Management Activation required		notified. Action by off-site persons is necessary		
Financial (% of Market Cap)		< 5%	5% - 10%	10% - 20%	20% - 33%	> 33%
Loss or Business Disruption	Company	<\$100,000	>\$100,000	>\$1,000,000	>\$5,000,000	>\$25,000,000
	Site	<\$50,000	>\$50,000	>\$500,000	>\$2,500,000	>\$10,000,000
	Process Loss (time)	Loss Equivalent up to 6 hours production	Loss Equivalent up to 24 hours production	Loss Equivalent to 7days production	Loss Equivalent up to 1 month's production	Loss Equivalent to greater than 1 month's production
Legal Compliance		Minor legal compliance issue unlikely to attract a regulatory response	Legal compliance issue which may attract an administrative response from regulator	Breach of regulation with possible prosecution and penalties - or - continuing occurrences of minor breaches of regulation	Major breach of regulation resulting in investigation by regulator - or - major regulatory penalties - or - in the U.S., investigation and possible prosecution for knowing violation pursuant to § 110© of the Federal Mine Safety and Health Act of 1977.	Serious breach of regulation resulting in operation suspended and/ or licences revoked - or - in the U.S., investigation and possible prosecution for knowing violation pursuant to § 110© of the Federal Mine Safety and Health Act of 1977.
Security		Violations of internal policies and procedures	Minor criminal offenses eg. trespassing, theft under \$50,000, minor property damage, etc.	Low intensity civil unrest - or - theft over \$50,000 value - or - appreciable property damage	High intensity civil unrest - or - Significant criminal offenses committed against persons - or - Significant property damage resulting in operational shutdown - or - high level fraud	Major criminal offences - or - forced evacuation of all personnel - or - fatalities

Table 7: Measures of Likelihood

Measures of Likelihood			
LIKELIHOOD	Description	Criteria (read as either/ or)	
	Almost Certain	A	The event is expected to occur in most circumstances Once per week
	Likely	B	The event will probably occur in most circumstances Once per month
	Possible	C	The event could possibly occur at some time Once per year
	Unlikely	D	The event could possibly occur at some time but is unlikely Once every 5-10 years
	Rare	E	The event may occur in exceptional circumstances >10 years

Table 8: Risk Matrix

			CONSEQUENCE				
			Insignificant	Minor	Moderate	Major	Catastrophic
			5	4	3	2	1
LIKELIHOOD	Almost Certain - Expected occurrences - once per week	A	5A Medium	4A Medium	3A High	2A High	1A High
	Likely - Probable occurrences - once per month	B	5B Medium	4B Medium	3B High	2B High	1B High
	Possible - Possible occurrences - once per year	C	5C Low	4C Medium	3C Medium	2C Medium	1C High
	Unlikely - Unlikely to occur - once every 5-10 years	D	5D Low	4D Low	3D Low	2D Medium	1D Medium
	Rare - May occur in exceptional circumstances - >10 years	E	5E Low	4E Low	3E Low	2E Medium	1E Medium

5 Receptors

Table 9 and **Figure 4** provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (Guideline: *Environmental Siting* (DWER 2020)).

Table 9: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Residential Premises (Williamstown)	<ul style="list-style-type: none"> The closest residential premises are located approximately 50 m from the proposed southern pipeline route detailed in 4. This same residential premises is approximately 140 m to the east of the underground mine. The closest residential premises from Union Club Pit is approximately 950 m to the south-east.
Environmental receptors	Distance from prescribed activity
Underlying groundwater (hypersaline)	Approximately 950 mbgl and 100,000 mg/L TDS.
Native vegetation	Approximately 2 m from the proposed pipeline.



Figure 4: Distance to sensitive receptors

5.1 Rainfall and evaporation

Climate data recorded at the Kalgoorlie Airport Station collected by the Bureau of Meteorology have been used as the primary source to characterise precipitation conditions for the Mt Percy

Operations. This station is located within 10 km of the Mt Percy facilities and daily climate records are available from 1939 up to the current date. Pan evaporation data are not currently recorded at Kalgoorlie Airport, and pan evaporation data have been sourced from an interpolation of all available evaporation pans in the region provided from SILO (Scientific Information for Land Owners, Jeffrey et al, 2001).

Analyses of the climate conditions show that the Kalgoorlie area has a semi-arid climate, experiencing warm to hot summers and cold to mild winters. Rain is recorded in Kalgoorlie on average during every month of the year. Summer rains are usually associated with thunderstorms or tropical depressions and tend to be relatively intense. Tropical depressions, often the result of decaying tropical cyclones crossing the coast in northwest Western Australia, can cause widespread rains, whereas rain from thunderstorms is generally localised. Winter rains are usually the result of cold fronts from depressions in the Southern Ocean and tend to be widespread but less intense than summer rains.

Annual rainfall at Kalgoorlie since 1940 has ranged from 109 mm in 1940 to 531 mm in 1992, with a long-term average of 267 mm. Monthly averages of precipitation and evaporation calculated from 1996 (i.e. for the period following the completion of mining and closure works at the Mt Percy facilities) are presented in **Table 10**. During the Mt Percy closure period, monthly evaporation has exceeded monthly precipitation on average in all months, and annual evaporation on average exceeds annual precipitation by a factor of nine.

Temperatures in Kalgoorlie can range from a summer maximum of 46°C to a winter minimum of -3°C with occasional frosts experienced during the winter months. Winds are strongest during winter, though not usually exceeding 30 km/h and are mainly from the north, west or northwest. In summer, winds are predominantly from the east. The relative humidity averages less than 30% at 3 pm during summer while the 9 am winter figures are typically around 70%. (KCGM Mt Percy Hydrogeological Review Rev1 (Final), Big Dog Hydrology, April 2022)

Table 10: Average monthly climate conditions since 1996

Month	Average Precipitation (mm)	Average Evaporation (mm)
Jan	39	344
Feb	35	270
Mar	35	239
Apr	16	159
May	16	108
Jun	17	80
Jul	21	85
Aug	20	116
Sep	12	168
Oct	15	243
Nov	23	285
Dec	18	339
Annual	266	2436

5.2 Hydrology and Geohydrological Assessment

The Mt Charlotte water management system also supports operations after underground exploration has been completed. Attachment 6A maps outlines the completed water management activities.

The Mt Percy Pits (Mystery and Union Club Pits) are both groundwater sinks. The Hydrological Review (Attached 8B(a)) and email summary sent to DWER (Attachment 8B(b)) provided a discussion of the pit lake elevation in relation to the local saline groundwater. In summary:

- The undisturbed groundwater elevation within the local groundwater system is 340 mAHD. The current pit lake elevation is 307 mAHD. The pit lake therefore functions as a groundwater sink, with groundwater flowing from the local groundwater system into the lake.
- The water balance model indicates that the pre-constructions rate of groundwater inflow to the Union Club Pit lake is 0.25 L/s. This inflow is balanced by evaporation from the lake surface, which maintains the pit lake level in equilibrium at 307 mAHD.
- The operating design for dewatering discharge requires the rate of pumping clarified water out of the Union Club Pit lake matches the rate of pumping in. This is because the pit is not being used for storage, but to settle suspended sediment. The design for the dewatering discharge requires the pit lake elevation to be maintained at 307 mAHD.
- During normal operation there are no changes in the rate of groundwater inflow to the pit, which continues to occur at 0.25 L/s.
- In unusual operating conditions, when the rate of pumping out from the Union Club Pit lake does not match the rate of pumping in, the lake elevation will rise. However, the design scheme places a maximum lake elevation limit of 312 mAHD in order to protect the geotechnical stability of the pit slopes, and the lake will not be allowed to rise any further than 312 mAHD.
- In these unusual operation conditions, the lake elevation of 312 mAHD remains below the undisturbed groundwater elevation of 340 mAHD, and the lake will continue to function as a groundwater sink. The water balance model predicts that in these conditions the rate of groundwater inflow will reduce slightly from 0.25 L/s to 0.22 L/s.
- Under both normal and unusual operating conditions there will therefore effectively be no change in groundwater conditions at the Union Club pit associated with the dewatering discharge.

5.3 Groundwater Quality

Implementation of the project does not result in changes to groundwater quality. The pit lake acts as a groundwater sink with an average groundwater inflow of 0.2 L/s. The pit lake has a stable elevation at 307 mAHD, compared to the estimated natural groundwater elevation of the surrounding area of approximately 340 mAHD. As groundwater flows from the surrounding groundwater systems into the lake, the dewatered water that is discharged to the pit lake does not enter the receiving groundwater system. No impacts to the environment are expected from the project.

5.4 Dewatering

The dewatering discharge rate ranges from 400,000 m³/yr to 800,000 m³/yr, with a maximum system capacity of 2,000,000 m³/yr. The water level of Union Club Pit does not fluctuate significantly through operations as the flow rate of the dewatered water into the pit lake is the same rate as the water pumped out of the pit lake into the saline water circuit. KCGM has committed to manage the Union Club Pit to prevent the pit lake rising by more than 5 m (from the current elevation of 307 mAHD to a maximum elevation of 312 mAHD) and potentially affecting the stability of the pit walls. This recommendation by the KCGM geotechnical engineer was endorsed by the DMIRS geotechnical review when considering the application for a Mining

Proposal that regulates this proposed activity. (The Mining Proposal was approved on 19 October 2022 – Appendix 8C).

The project required water management activities and infrastructure as follows:

- Existing pipeline route (Northern route) connecting Mt Charlotte with an existing operational pipeline corridor along Yarri Road.
- The pipe infrastructure has been installed in 2 stages:
 - New pipeline to connect Mt Charlotte existing northern pipeline with the Union Club Pit within the existing Yarri Road pipeline corridor and installation of the pump and pipeline from the pit to the Gravity Dam was constructed, with final signoff 05/12/2025 (Attachment 6A)
 - Installation of the west-east section (southern route) of pipeline along the refurbished pipeline route to tie directly into the reticulated saline water circuit along Yarri Road will be constructed in the FY27.

The constructed pipeline is used to transfer water from the Mt Charlotte underground via the balancing tanks located at the Mt Charlotte vent shaft to the discharge point in the Union Club Pit, as indicated in Attachment 6A.

The hypersaline water is being discharged at a rate of 400,000 m³/yr (TDS 100,000 mg/L) into Mt Percy pits to settle the solids. The rate of discharge will increase to 800,000 m³/yr in the longer term. The discharge point is close to the water level at construction in the southern end of the pit to minimise erosion of the pit wall.

The pump-off arrangement is located on a backfill area at the northern end of the Union Club Pit. Currently the arrangement is supported by a diesel generator and an electrical pump and will later be replaced with a mains power connection. The diesel generator/electric pump arrangement has been set up to ensure that there is adequate bunding and containment of all hydrocarbons. This ensures that any inadvertent hydrocarbon spill is destined for the Union Club Pit (due to the generator being located on a backfilled portion of the pit).

5.5 Groundwater Discharge Assessment

Monitoring data for groundwater elevations and pit lake hydrochemistry at the Mt Percy Pits have been reviewed to develop a conceptual hydrogeological model of the flow regime. Three shallow lakes are present in the Mystery Pit, and a 15 m deep lake is present in the Union Club Pit. These lakes all reflect the combined inflows of pit slope runoff, direct precipitation, groundwater inflow which are being balanced by evaporation.

The relative influences of both pit slope runoff and groundwater inflow are clearly defined from the changes in EC, TDS concentrations and pH for the hydrochemistry of the Union Club Pit lake.

A water balance model has been constructed and calibrated for the Union Club Pit lake. It identifies that the lake elevation is stable at around 307 mAHD, due to rates of evaporation (average 0.5 L/s) being matched by rates of groundwater inflow (average 0.2 L/s) and the combined rates of direct precipitation and runoff (total average 0.3 L/s). The pit lake is currently acting as a groundwater sink. Groundwater is flowing from the receiving groundwater system into the lake, and the lake water is not entering the receiving groundwater system.

During closure, under a range of precipitation conditions the Union Club Pit lake is expected to have an elevation in the range 306 mAHD to 309 mAHD. The lake will continue to function as a groundwater sink and there is no potential for discharge into the adjacent Mystery Pit. The TDS concentration of the lake will increase from 50,000 mg/L in 2022 to around 240,000 mg/L in 2055, as a result of evapoconcentration. In the long term the TDS concentration will reach an

equilibrium maximum driven by the saturation and precipitation of minerals including gypsum. Further information can be found in Attachment 8B(a) Mt Percy Hydrogeological pit review Rev 1 Final and Attachment 8B(b) Email to DWER regarding Mt Percy pit lake elevations.

5.6 Water Levels and Quality

All saline water pipelines have been constructed within bunded areas, which along with connected scour pits, provide adequate containment in the event of a pipeline failure. Leaks are identified using leak detection systems and KCGM are alerted to any leaks in the system by the Distributed Control System (DCS), which is continuously monitored by the KCGM Site Services team. Pipeline corridors are regularly inspected for leaks.

In addition to the site wide standard controls above, the following controls have also been imposed, specifically on this system:

- The water level in the Union Club Pit at Mt Percy is monitored by a telemetric water level meter to ensure water levels do not exceed 312 mAHD.
- The maximum duration for which discharge will continue if pumping out is not occurring ranges from 12 days at a discharge rate of 2,000,000 m³/yr to 59 days at a discharge rate of 400,000 m³/yr, before the nominated maximum pit lake elevation of 312 mAHD is reached.
- If pumping out of the Union Pit Lake is stopped for a period of time, it will be necessary to pump out at a greater rate than pumping in, or the pit lake will not return to the operating elevation of 307 mAHD.
- Water flow rates, water levels, water quality and quantities will be monitored to comply with DWER licence requirements.
- Should non-standard conditions, such as excessive rain or a breakdown arise, pump out volumes will be adjusted accordingly, to ensure the system is maintained within geotechnical control parameter (i.e. to maintain water levels within 5 m of current water level to a maximum of 312 mAHD). The water reticulation Distributed Control System (DCS) has control logic built in to enable these adjustments to occur automatically.

Gravity Dam

The Gravity Dam is a lined balancing dam within the existing regional saline reticulation circuit and a nominal capacity of 16,000 m³. The dam levels are controlled through the same DCS as the rest of the regional circuit, with appropriate alarms and interlocks in place.

The dam dimensions are 4 m x 4 m with an approximately depth of 3 m. A freeboard of the dam is maintained by the DSC. The dam is located at a high point in the landscape and provides a suitable point for reintroduction of the clarified Mt Charlotte saline water into the regional saline reticulation circuit. Should the dam experience total failure, there is an emergency catchment located downhill which can accommodate the full volume of the dam. Design details for the dam are provided in Attachment 8F.

The Gravity Dam provides the most practical location, close to Union Club Pit, to reintroduce the Mt Charlotte water into the saline reticulation circuit.

5.7 Potential effects on groundwater resource and water users

As groundwater flows from the surrounding groundwater systems into the lake, the dewatered water that is discharged to the pit lake does not enter the receiving groundwater system. No impacts to the environment are expected from the project.

5.8 Surface water

The Mt Charlotte Operational Areas lies within the Hannan Lake catchment. Drainage is poorly defined in the Mt Charlotte area but generally flows eastward to the Eastern Floodway.

5.9 Ecosystem Conservation Values

Flora

The vegetation in the vicinity of the Mt Charlotte is significantly degraded due to anthropogenic influences, in particular historic mining activities. The two main vegetation types in the vicinity are 'cleared vegetation' or revegetated 'mosaic of native and non-local species'.

Terrestrial Fauna

No recent fauna studies have been undertaken at Mt Charlotte area. Recent verbal advice received from Phoenix Environmental Services is that the area has been too disturbed to consider it to be significant habitat. The area around the Mt Charlotte Underground Mine has been disturbed by historical mining, and other anthropogenic activities. These disturbances have resulted in the disruption to, or removal of many fauna habitats in the Kalgoorlie-Boulder area.

Public Drinking Water Supply Areas

The proposed activities are not located on a Public Drinking Water Supply Area.

5.10 Dust and Noise Emissions

Dust

Due to the enclosed pipeline, there is expected to be no dust issues once operational. The only dust will be from vehicles inspecting the pipeline.

Noise

Minimal noise emissions are expected during operation of the proposed southern pipeline. Operation is to be compliant to the Environmental Protection (Noise) Regulations 1997. The pump for the system is located underground, making the system almost silent.

5.11 Sensitive Human and Environmental Receptors

Environmentally Sensitive Areas

The proposed activities do not occur in an Environmental Sensitive Area (ESA). A review of DMPE Tengraph, identified no ESAs, apart from the City of Kalgoorlie Boulder adjacent to the proposed activities. The proposed activities are largely within an existing cleared/disturbed mine infrastructure footprint.

Conservation significant flora and fauna

There are no known fauna and flora of environmental significance in the proposed activity area.

5.12 Aboriginal Heritage

Reserves and Other Considerations

The proposed activities are not located on a Reserve.

KCGM conducts regular consultation and survey work with the determined claimant group, the Marilinyu Ghoorlie group, regarding all future works, including this project.

5.13 Non-Aboriginal heritage

There are no known heritage listings within the prescribed premises.

6 References

DEMIRS. (2024, 12). *Mining Development and Closure Proposals*. Retrieved from Guideline for preparing Mining Development and Closure Proposals:
https://www.dmp.wa.gov.au/Documents/Environment/MDCP_guideline.pdf

APPENDIX A - PREMISES BOUNDARY COORDINATES

Table 11: Premises boundary coordinates (GDA2020)

Vertex	Easting (m)	Northing (m)	Zone
1	354,571	6,599,018	51
2	354,470	6,599,073	51
3	354,317	6,599,479	51
4	354,337	6,599,651	51
5	354,420	6,599,738	51
6	354,655	6,599,833	51
7	354,726	6,599,882	51
8	354,995	6,599,867	51
9	355,021	6,599,606	51
10	355,337	6,599,210	51
11	355,337	6,598,726	51
12	355,406	6,598,680	51
13	355,600	6,598,341	51
14	355,553	6,598,318	51
15	355,266	6,598,194	51
16	355,225	6,598,082	51
17	355,168	6,598,030	51
18	355,112	6,598,095	51
19	354,946	6,597,956	51
20	354,838	6,597,910	51
21	354,790	6,597,859	51
22	354,763	6,597,818	51
23	354,727	6,597,714	51
24	354,700	6,597,678	51
25	354,614	6,597,718	51
26	354,582	6,597,807	51
27	354,564	6,597,897	51
28	354,493	6,598,105	51
29	354,421	6,598,126	51
30	354,426	6,598,182	51
31	354,644	6,598,482	51
32	355,308	6,598,754	51
33	355,309	6,599,199	51
34	355,058	6,599,506	51
35	355,034	6,599,496	51
36	355,006	6,599,483	51
37	354,965	6,599,442	51
38	354,901	6,599,382	51
39	354,849	6,599,339	51
40	354,819	6,599,310	51
41	354,778	6,599,260	51
42	354,731	6,599,203	51
43	354,711	6,599,174	51
44	354,680	6,599,115	51
45	354,638	6,599,054	51
46	355,308	6,598,709	51
47	354,704	6,598,457	51
48	354,499	6,598,191	51

49	354,567	6,598,145	51
50	354,626	6,597,907	51
51	354,738	6,597,818	51
52	354,776	6,597,868	51
53	354,824	6,597,923	51
54	355,134	6,598,195	51
55	355,517	6,598,376	51