Decision Report

Application for Works Approval

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

Works Approval Number	W6496/2021/1
Applicant	Kalgoorlie Consolidated Gold Mines Pty Ltd
ACN	009 377 619
File Number	DER2020/000663
Premises	Fimiston Processing Plant – Fimiston II TSF Extension Black Street, KALGOORLIE WA, 6430 Legal description - Mining tenements M26/308, M26/451, M26/503 and M26/778
Date of Report	7 July 2021
Decision	Works approval granted

Carmen Standring
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A/MANAGER, RESOURCE INDUSTRIES REGULATORY SERVICES

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

Table of Contents

1. Decision summary

This Decision Report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the Premises. As a result of this assessment, Works Approval W6496/2021/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Decision 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 and overview of Premises

On 16 December 2020, the applicant submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works relating to Category 5 (processing or beneficiation of metallic ore) at the Fimiston Processing Plant (the Premises) by extending the Fimiston II tailings storage facility (TSF) footprint to the east to allow the rate of rise in current TSFs to be managed more effectively.

The Premises is approximately 6.4 km east of Kalgoorlie-Boulder. The proposed works includes a two paddock extension of the current Fimiston II TSF. Tailings from the processing of gold ore are currently being stored in the Fimiston I, Fimiston II and Kaltails TSFs. The works approval holder's (KCGM's) preferred tailings management strategy is to split the tailings between the existing TSFs, with a proportional spilt to their depositional areas.

The Fimiston II TSF paddocks AB, C and D are approved under current Licence conditions (L6420/1988/14) to maximum heights of 51m, 53m and 51m respectively. The design height of the new paddocks E and F is 30m, but this works approval will only cover the starter embankment of each paddock with further raises being managed through amendment of the licence conditions. The starter embankment is designed to be 8m in height.

The Premises relates to the category and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in Works Approval W6496/2021/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guidance Statement: Risk Assessments* (DER 2017) are outlined in Works Approval W6469/2021/1.

2.3 Part IV of the EP Act

Ministerial Statement 782 (Fimiston Gold Mine Operations extension (Stage 3) and mine closure Planning), Attachment 7, approves the expansion of the proposals development envelope to include the Fimiston II TSF extension. The changes authorised within Attachment 7 are below:

- Expansion of the proposal's Development Envelope by 272 hectares to include a two-cell paddock expansion of the Fimiston II TSF and associated infrastructure.
- Increase in the authorised extent of clearing by 295 hectares to allow the construction of the two-cell paddock expansion of the Fimiston II TSF and associated infrastructure.
- Extension of the Fimiston Open Pit to include Fimiston South.
- Change to Figure 1 and Figure 2 to detail expansion of the Fimiston II TSF, expansion of Fimiston Open Pit, change to noise bund location and Development Envelope.

These authorisations do not restrict the management of potential environmental impacts relating to emissions from the Premises including seepage, dust and noise. These emissions will be considered in this assessment under the EP Act Part V licensing and approval process (refer to section 3.2).

3. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guidance Statement: Risk Assessments* (DER 2017).

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 construction and operation which have been considered in this Decision Report are detailed in Table 1 below. Table 1 also details the proposed control measures the applicant has proposed to assist in controlling these emissions, where necessary. Table 2 outlines the applicant's proposed monitoring plan for the Fimiston II TSF Extension

Table 1: Proposed applicant controls

Emission	Sources	Potential pathways	Proposed controls
Construction			
Dust	Vehicle movements, earthworks etc.	Air/windborne pathway	A Dust Monitoring and Management Programme is included in the Fimiston Air Quality Management Plan. The objective of the programme is to ensure 2-hour average PM_{10} concentrations as a result of Fimiston Operations are less than 50µg/m^3 at monitoring locations. Control strategies relevant to this works approval include: • Use of water trucks and water cannons in areas that produce dust; • Plan activities in high risk areas (e.g. digging/loading) during day shift when fugitive dust can be seen and managed where practicable; and • Use of additional dust control measures (i.e. a dust binding agent) where necessary.
Noise	Vehicle movements, earthworks etc.	Air/windborne pathway	The position of the Fimiston II TSF is on the far side of the Superpit open cut mine and the Fimiston Processing Plant to the nearest sensitive receptor, the City of Kalgoorlie-Boulder. The noises from these activities are a greater noise source than the construction activities are likely to be. There is also a noise

Emission	Sources	Potential pathways	Proposed controls
			bund situated between the mine and the city that further mitigates noise impacts. The premises operates under a Noise Regulation 17 Variation as published through the Government Gazette (22 March 2016) as the *Environmental Protection (Fimiston Gold Mine Noise Emissions) Approval 2016*. The works approval holder also has a Noise and Vibration Monitoring and Management Plan (2018) that includes the use of broadband reversing alarms.
Commissioning			
Tailings	Spills and leaks from pipelines	Direct contact with soil contaminating ground. Contamination of storm water. Direct contact with vegetation	In accordance with conditions of the Licence (L6420/1988/14), all pipelines containing environmentally hazardous substances are either: (a) Equipped with automatic cut-outs in the event of a pipe failure; or (b) Provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections. The main pipelines carrying tailings from the Fimiston Processing Plant to the Fimiston II TSF cells and decant water from the TSF to the processing plant are already established and operating, with detection equipment installed. Pipelines are located within earthen bunds so that any spills can be contained and cleaned up. Overland stormwater flow is redirected away from the TSF along the eastern edge of the facility or toward a proposed stormwater storage attenuation pond. This will reduce the potential for contact with spills within the pipeline corridors.
Decant water	Spills and leaks from pipelines		
Leachate	Seepage through base and sides of TSF	Groundwater mounding coming into contact with vegetation root zones	Refer to Section 3.3 of this report
Operation			
Tailings	Spills and leaks from pipelines	Direct contact with soil contaminating ground. Contamination of storm water. Direct contact with	As for commissioning.

Emission	Sources	Potential pathways	Proposed controls
		vegetation	
	Dust from dried surface of tailings	Air/windborne pathway	A Dust Monitoring and Management Programme is included in the Fimiston Air Quality Management Plan. The objective of the programme is to ensure 2-hour average PM_{10} concentrations as a result of Fimiston Operations are less than 50µg/m^3 at monitoring locations. Management of dust from the TSFs is under the Dust Monitoring and Management Plan. This recognizes dust from the TSFs as being generated by strong winds resulting in erosion producing fugitive dust emissions.
	Overtopping of TSF	Direct contact with soil contaminating ground. Contamination of storm water. Direct contact with vegetation	The minimum operational freeboard of 300mm is marked for easy assessment of the tailings height at each spigot. Minimum 500mm total freeboard is maintained by maintaining a supernatant pond of less than 15% of the cell surface. (Total freeboard is the vertical distance between the highest point of the water in the cell and the lowest point of the perimeter crest.)
Leachate	Seepage through base and sides of TSF	Groundwater mounding coming into contact with vegetation root zones	Refer to Section 3.3 of this report
Decant water	Spills and leaks from pipelines	Direct contact with soil contaminating ground. Contamination of storm water. Direct contact with vegetation	As for commissioning.

Table 2: Monitoring plan for the Fimiston II TSF Extension

Area	Monitoring Requirement	Frequency
Type 1: Short Term – Operation Monitoring		
Tailings	Pipeline integrity Visual check on tailings level versus embankment crest Off-take location Blockage of discharge Embankment integrity Seepage from embankments Access ramps and safety windrows	3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs 3 hrs
Decant	Location and size of supernatant pond	3 hrs
Type 2: Medium Term – Compliance Monitoring		
Embankment	Piezometer pore pressures Decant water analysis Survey control point General inspection by suitably qualified engineer	Monthly Quarterly Quarterly Monthly
Groundwater monitoring	Water level Water quality	*Quarterly
Type 3: Long Term – Performance Monitoring		
Tailings	Tailings solids (tonnes) Water in tailings (tonnes or m^3) Average tailings flow (m^3/s) Freeboard monitoring schedule survey ■ Regular ■ Comprehensive ■ Operational Audit by suitably qualified engineer.	Daily Daily Monthly Annually Fortnightly Annually Annually

3.1.2 Receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the applicant'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 3 and Figures 1 and 2 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guidance Statement: Environmental Siting* (DER 2016)).

Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from activity / prescribed premises
Hampton Hill Station – Pastoral Lease	Border of property: within proposed facility Homestead: Approximately 5km from Premises
Aboriginal heritage	2 sites of archaeological significance have been identified Approximately 300 m and 600 m south west of the Fimiston II TSF

Environmental receptors	Distance from activity / prescribed premises
Underlying groundwater (non-potable purposes)	The Fimiston II TSF is situated within KCGMs' Eastern Borefield. Historically groundwater has been approximately 25 m bgl around Fimiston II TSF but groundwater mounding as a result of seepage from the facility has caused it to be less than 13 m bgl in areas outside of the operational area of the TSF. The Operational Area of the Fimiston TSFs includes the footprint of the facilities plus a halo around the perimeter, where infrastructure associated with the operation of the facilities is located. The halo is a maximum of 100 m wide. Background groundwater quality is saline, with total dissolved solids (TDS) concentrations of 20,000 mg/L to 60,000 mg/L. There are no groundwater dependent ecosystems which rely on the shallow saline groundwater in the catchment where the Eastern Borefield is located. Salinity in the proximity of the TSFs is significantly higher than the surrounding background levels (Figure 8). Further details are discussed in Section 3.3 of this report.
Surface water Hannan Lake – TSF is within the catchment of the lake.	A number of minor surface flowlines are present in the area of the future TSF cells. Hannan Lake is approximately 4 km south west of the Premises.
Lakeside Timber Reserve (DBCA managed land)	Approximately 2 km south of Premises.
Short range endemic fauna (SREs)	No short-range endemic (SRE) fauna species have been recorded in the Fimiston II TSF Extension area. In 2018 a targeted SRE survey was conducted and nine specimens of taxa from the target SRE groups were collected from the surrounding areas. These included three trapdoor spiders, two millipedes and four scorpions. None of these species were found in the proposed TSF Extension area.
Priority 2 flora species *Eremophila praecox* (previously Priority 1)	Three plants are within the footprint of the TSF and a further eight within the surrounding area of the Premises.

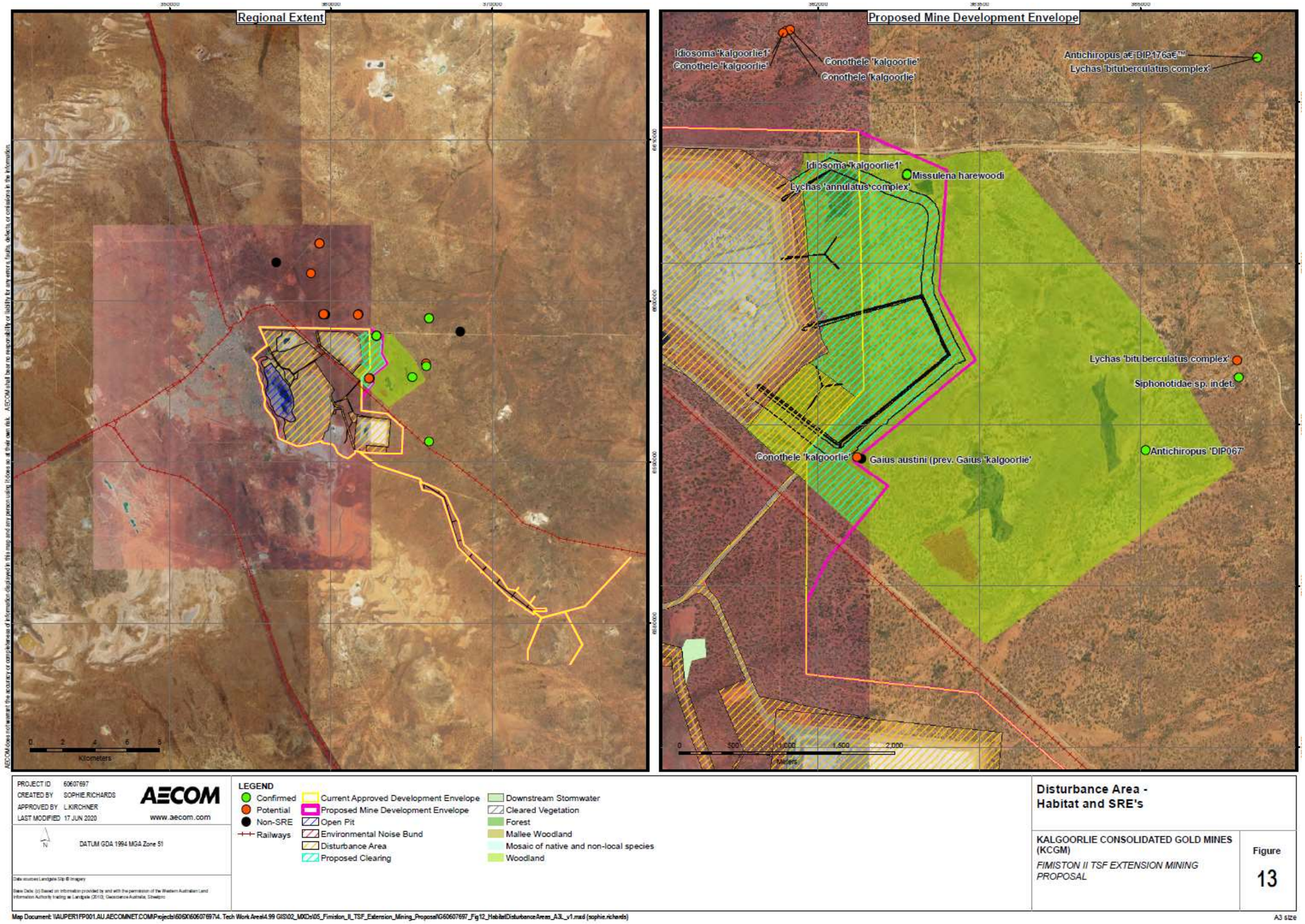

Figure 1: Short range endemic fauna (SREs)

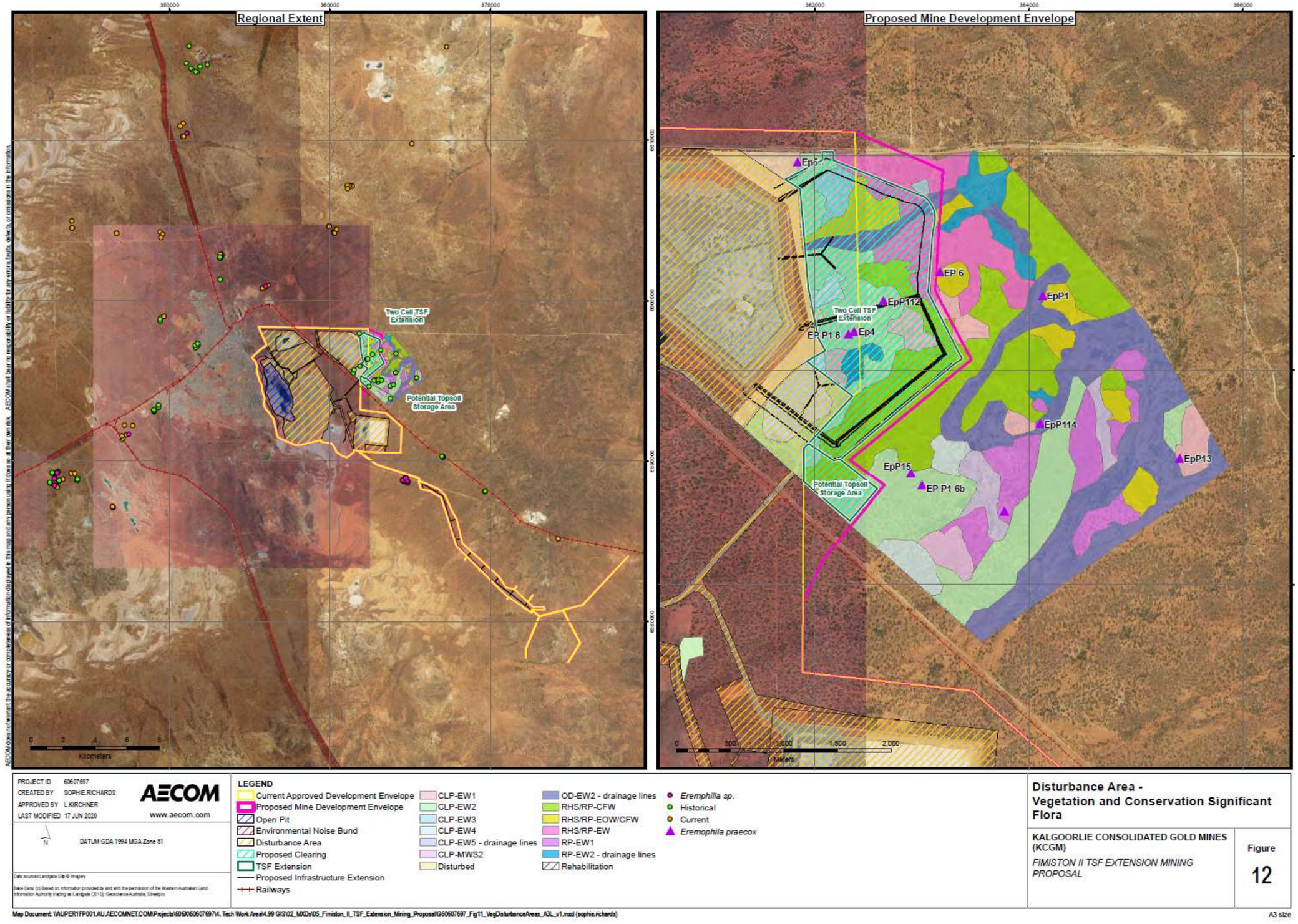

Figure 2: Vegetation and conservation significant flora

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant 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 applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

Works Approval W6496/2021/1 that accompanies this Decision Report authorises construction and time-limited operations. The conditions in the issued Works Approval, as outlined in Table 4 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the Premises i.e. Category 5 activities. A risk assessment for the operational phase has been included in this Decision Report, however licence conditions will not be finalised until the department assesses the licence application.

Table 4: Risk assessment of potential emissions and discharges from the Premises during construction, commissioning and operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval and licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction of TSF cells: Earthworks and vehicle movements	Dust	Air/windborne pathway causing impacts to health and amenity	Residences >5km	Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	None required.	The emissions are not likely to exceed those already produced by mining and processing activities and the Fimiston Air Quality Management Plan is active over the operations, including those not currently covered by the prescribed premises licence L6420/1988/14.
	Noise			Refer to Section 3.1	C = Slight L = Unlikely **Low Risk**	Y	None required	The emissions are not likely to exceed the noise from the mining and processing operations and the Noise and Vibration Management Plan is active across all activities, including those not currently covered by the prescribed premises licence L6420/1988/14.
Commissioning								
Commissioning of TSF and associated infrastructure (pipelines and pumps)	Tailings	Direct contact with soil contaminating ground. Contamination of storm water. Direct contact with vegetation	Surrounding soil and vegetation Storm water coming into contact with contaminated soil	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	Condition 8: Infrastructure table outlining the infrastructure to be constructed including the emissions management included in specifications. Condition 9: Emission and discharge limit condition.	These are standard conditions when commissioning is authorised under the works approval. The risk rating justifies the inclusion of emission limits.
	Decant water							
	Leachate	Seepage through base and sides of TSF entering soil and groundwater causing mounding of groundwater around the TSF.	Groundwater mounding coming into contact with root zones of surrounding vegetation causing health impacts and death.	Refer to Section 3.1	C = Moderate L = Unlikely **Medium Risk**	Y	**<u>Conditions 2 and 4</u>** **<u>Monitoring and production bore installation conditions</u>** Condition 7: Baseline ambient environmental conditions – provides for the monitoring of background groundwater conditions in the bores constructed under condition 2 prior to tailings discharge to the new TSF cells.	The management of the seepage and groundwater around the Fimiston II TSF is the primary means of reducing the impact of the TSF on the surrounding vegetation. There is an established Seepage and Groundwater Management Plan for the current Fimiston II TSF cells as discussed below and in **Section 3.3 of this report.** Prior to commissioning of the TSF, newly installed monitoring bores will provide the background conditions prior to discharge into the new TSF cells. The installation of the bores and monitoring of the groundwater is required prior to the commissioning of the new TSF cells. It is appropriate to include the installation conditions, including separate compliance and monitoring conditions for the groundwater bores – monitoring and production bores. Table 2 of Schedule 1 of the Licence (L6420/1988/14), identifies a total of 73 groundwater monitoring bores for the Eastern Borefield. Nine of these bores will be decommissioned during construction of the Fimiston II TSF Extension and replaced with 12 new bores. The locations of the proposed new monitoring bores were determined based on recommendations made within the Hydrogeology Review of the Fimiston II TSF (BDH, 2020) taking into account a review of infrastructure locations, tenement boundaries and access constraints. These monitoring bores will be added to the licence when it is amended to authorise operation of the new TSF infrastructure. There are also to be approximately 6 production bores developed for the new TSF to control seepage from the facility. These bores are to be used for recovery of seepage to manage potential groundwater mounding as a result of discharge of tailings to paddocks E and F. These bores will not be placed on the licence but are essential emission control infrastructure for the TSF.
Operation (including time-limited-operations operations)								
Discharge of tailings into the Fimiston II TSF paddocks E and F	Tailings and decant water from spills and leaks from pipelines	Direct contact with soil contaminating the ground surrounding the TSF and pipelines. Contamination of storm water from contact with contaminated soil. Direct contact with vegetation	Surrounding soil and vegetation causing impacts to health of vegetation including death of vegetation. Storm water coming into contact with contaminated soil causing spreading of contaminants into surrounding environment.	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Conditions 16 - 21: Identifies the emissions, discharge points and monitoring parameters required for operating the facility.	These are standard condition for works approvals where critical containment infrastructure is being authorised for time limited operations. The risk rating justifies the inclusion of emission management infrastructure such as bunding on pipelines, underdrainage and production bores.

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval and licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
	Leachate	Seepage through base and sides of TSF entering soil and groundwater causing mounding of groundwater around the TSF.	Groundwater mounding coming into contact with root zones of surrounding vegetation causing health impacts and death.	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Conditions 16 - 21: Identifies the emissions, discharge points and monitoring parameters required for operating the facility. **Condition 4** **Installation of production bores for the recovery of seepage from the discharge of tailings to the TSF cells**	These are standard condition for works approvals where critical containment infrastructure is being authorised for time limited operations. The risk rating justifies the inclusion of emission management infrastructure such as seepage and groundwater recovery systems. The management of the seepage and groundwater will be via the already established Seepage and Groundwater Management Plan as detailed in **Section 3.3** of this report.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guidance Statement: Risk Assessments* (DER 2017).

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

3.3 Detailed risk assessment for seepage of leachate and groundwater mounding

3.3.1 Design and construction of the Fimiston II TSF Extension

The design of the Fimiston II TSF Extension is two paddock style TSF cells (a third cell may be required in the future but is not included in this application) with starter embankments of 8 m and future upstream raises to a final height of 30 m (Figure 3). The decant tower will be centrally located.

The starter embankments will be constructed from locally borrowed clayey material with further raises to be constructed from dried tailings as per existing practice with the current Fimiston II TSF practices. The construction of the embankment raises will be an ongoing activity, requiring up to two raises of 1.5 m in height per year.

The starter embankment fill will be moisture conditioned to a minimum of ±2% of the optimum moisture content, placed in 300 mm thick layers and compacted to a minimum of 95% standard maximum dry density to form the starter embankment and initial decant access causeway.

The decant system will be a turret system with a skid mounted or surface pump in line with existing systems at the premises. This system can abstract water from a pond to a minimum depth of 250 mm and will allow the decant pond to be maintained at the minimum practical amounts. The decant water extracted from the TSF will be directed to the existing Decant Pond 3 for temporary storage and chemical cyanide destruction prior to transfer to the Fimiston Process Plant for re-use. Initial deposition may require the use of trenches and sumps to collect and pump out the decant water. It is proposed to continue to use the existing lined stormwater pond next to the Decant Pond connected by a spillway for the new paddocks. The stormwater pond is expected to be used during and following large rainfall events, allowing for increased rates of removal to maintain decant pond targets within the TSF cells.

The design of Paddocks E and F contains more seepage interception infrastructure than the previous cells of the Fimiston II TSF in the form of underdrainage. The underdrainage system is to extend beneath the TSF floor along the upstream toe of the starter embankment on the down-gradient side of the TSF, and into the TSF. It will also extend beneath the final decant ponds locations. The conceptual design for the underdrainage is illustrated in Figure 4 this design may need to be altered in accordance with the final basin arrangement in the TSF cell.

The purpose of the underdrainage system is to improve consolidation of the tailings, particularly during early operations, this will reduce the volume of water reporting to the groundwater through seepage.

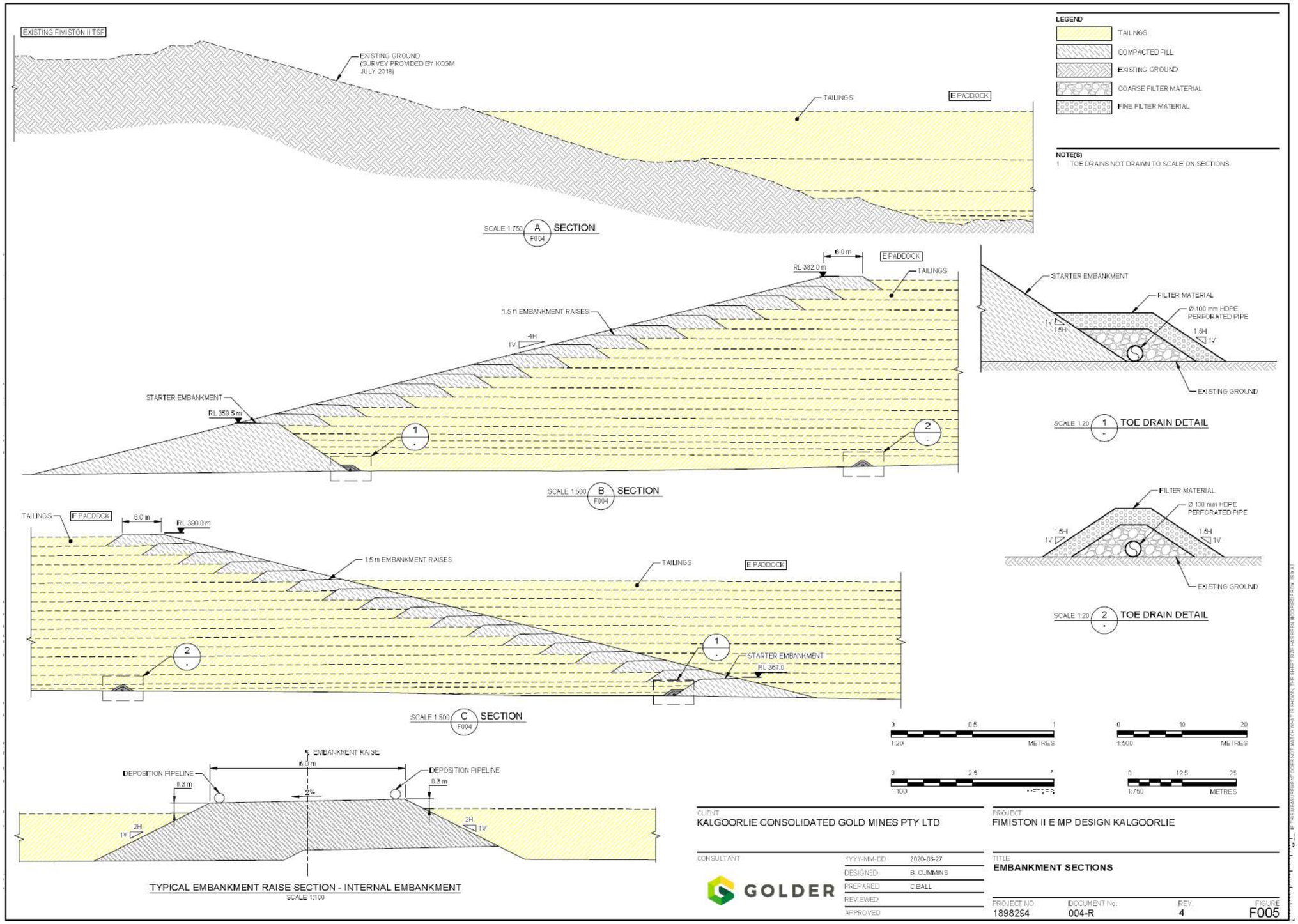

Figure 3: Paddock E and F walls and underdrainage sections.

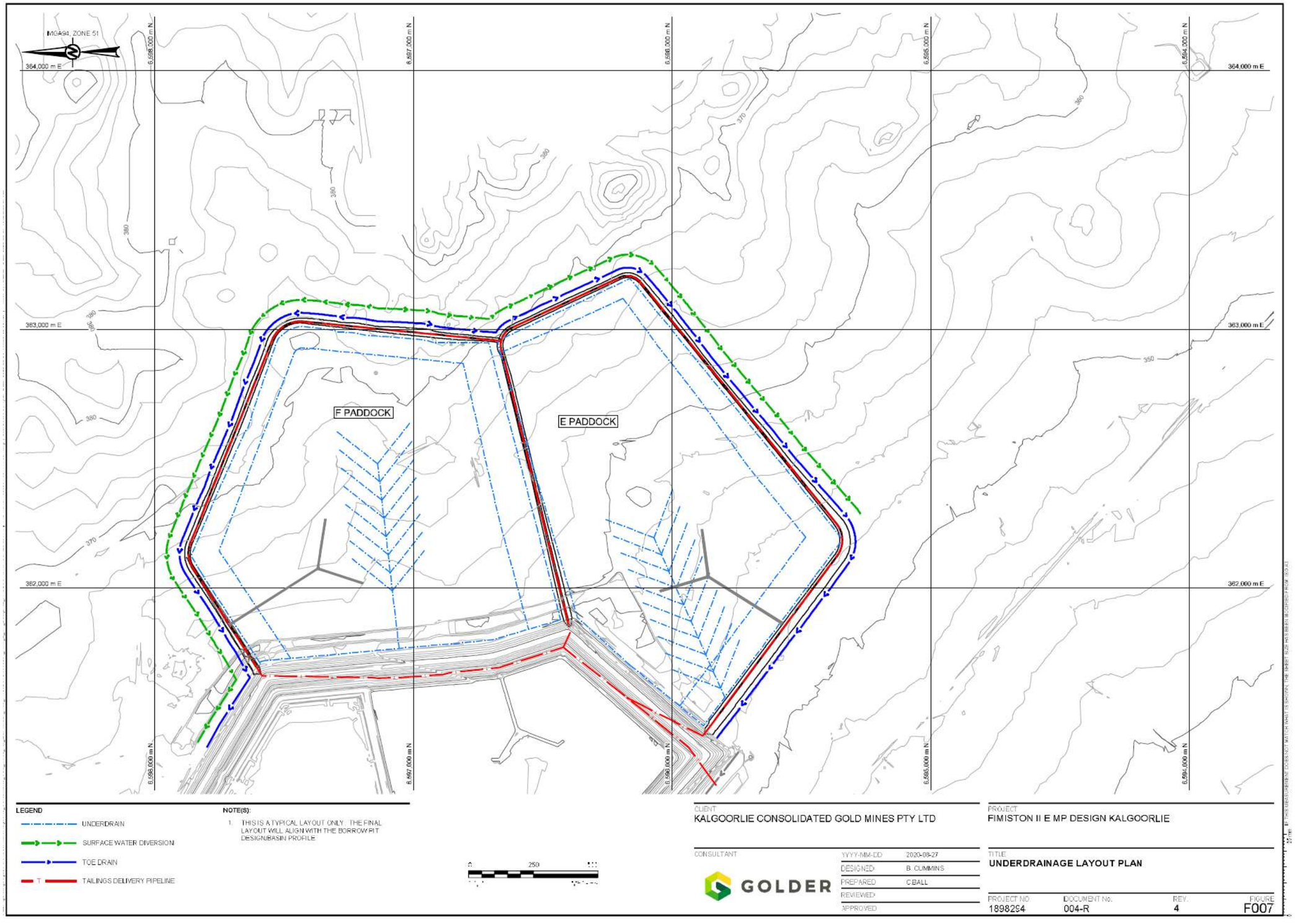

Figure 4: Proposed underdrainage system

Tailings characteristics

The tailings to be deposited in the Fimiston II TSF Extension are from the Fimiston Processing Plant. These tailings have the same characteristics as have been discharged to the current TSFs connected to the Fimiston Operations; Fimiston I, Fimiston II and Kaltails. The design of the new Fimiston II TSF paddocks uses the results of tailings management within the current TSFs to model the expected outcomes from deposition within the new structures.

Seepage analysis

When modelling the seepage expected from the proposed TSF paddocks the following parameters are assumed, based on current tailings disposal within TSFs.

- An average seepage rate of 7 L/s
- A liquor density of 1.1 t/m3 for the water, to account for its salinity
- An estimated decant pond size of 15% of the tailings beach area, in line with existing operations
- Evaporation coefficients of 0.6, 0.3 and 0.1 for the wet, drying and dry beach factors, respectively, and 0.7 for the pond.

The above parameters were used to produce a water balance for the new TSF cells as below.

2025						2028-2034					
Total Inflows			Total Outflows			Total Inflows			Total Outflows		
	Mm^3	%		Mm^3	%		Mm^3	%		Mm^3	%
Process Water	5.8	89	Evaporation	2.2	34	Process Water	7.6	91	Evaporation	2.2	27
Precipitation	0.7	11	Interstitial Water	2.2	34	Precipitation	0.7	9	Interstitial Water	2.9	34
Total	6.5	100	Seepage	0.5	7	Total	8.3	100	Seepage	0.5	6
			Return Water	1.6	25				Return Water	2.7	33
			Total	6.5	100				Total	8.3	100

The water balance indicates that an annualised average of 25% of the process water should be available for recycling via the decant return system to the process plant under normal operating conditions during the first few years of operation, increasing to approximately 33% from 2028 onwards.

3.1.2 Fimiston Seepage and Groundwater Management Plan

The position of the Fimiston II TSF Extension is located in a catchment of Hannan Lake to the east of the central drainage identified from previous hydrogeological investigation. The groundwater aquifer that is the predominant concern in regard to seepage transport is the ferricrete and alluvial sediment groundwater system. This is the aquifer that the Eastern Borefield predominantly extracts water from. The Eastern Borefield is the area surrounding the Fimiston II TSF where a number of monitoring and production bores are located to monitor and recover seepage to prevent the mounding of groundwater impacting vegetation. Groundwater surrounding the TSF is hypersaline and the only identified beneficial use is for mining and mineral processing. The water abstracted from the Eastern Borefield is used in the Fimiston Processing Plant for processing of gold ore.

Seepage from the Fimiston TSFs and surrounding groundwater have been managed by the Works Approval Holder around the Fimiston II TSF through the Fimiston Seepage and Groundwater Management Plan (FSGMP) developed in 2005. This plan has been updated regularly with the latest revision being in June 2020. The primary objective of the FSGMP is to prevent impact to vegetation as a consequence of rising groundwater levels due to seepage

from the Fimiston I and Fimiston II TSFs. The FSGMP documents processes to ensure the groundwater limits stipulated in the Licence are achieved and maintained.

Annual audits of the FSGMP are carried out and included in the Annual Environmental Report for the Fimiston Operations (licence L6420/1988/14). Quarterly groundwater monitoring reports are submitted in accordance with condition 24 of licence L6420/1988/14. A groundwater standing water level limit of >4m below ground level is set by condition 24 of the licence for the compliance monitoring bores of the Eastern Borefield. Measurements based on depth below ground level are used as an indication of the groundwaters proximity to potential root zones of vegetation.

The Operational Area of the Fimiston TSFs includes the footprint of the facilities plus a halo around the perimeter, where infrastructure associated with the operation of the facilities is located. The halo is a maximum of 100 m wide. Monitoring bores located outside the TSF Operational Area are referred to as compliance monitoring bores, as it may not be practical to manage groundwater levels within the Operational Area whilst the TSFs are operational. Figure 5 shows the eastern borefield monitoring locations and operational areas around the Fimiston TSFs.

Figure 5: Eastern borefield monitoring locations and operational areas around the Fimiston TSFs

3.1.3 Seepage and groundwater mounding current levels

As reported in the last quarterly report (Q4 2020) the depth to groundwater and salinity of water quality has been overall steady. The groundwater and salinity levels are presented as diagrams showing both the levels at the current time and the changes over one year. (Figures 6 to 9). The diagrams show the areas of groundwater mounding around the TSF but also demonstrate that the mounding is below the 4 m below ground level limit set by the licence for the compliance bores listed in the licence. Long term groundwater depths records have shown that the groundwater mounding has been successfully managed for several years across the three TSFs in use by KCGM; Fimiston I, Fimiston II and Kaltails.

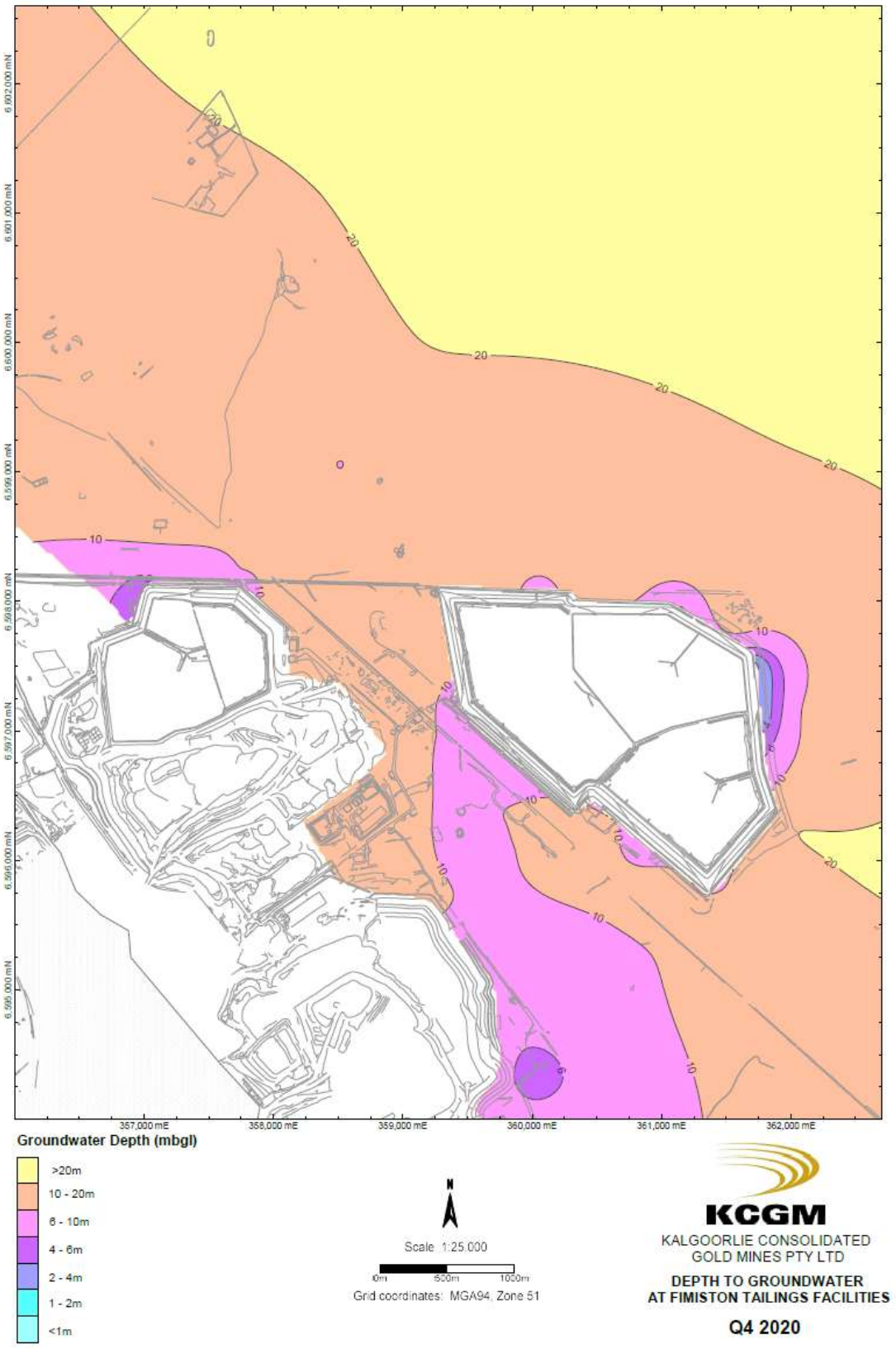

Figure 6: Depth to groundwater at Fimiston Tailings facilities as of December 2020

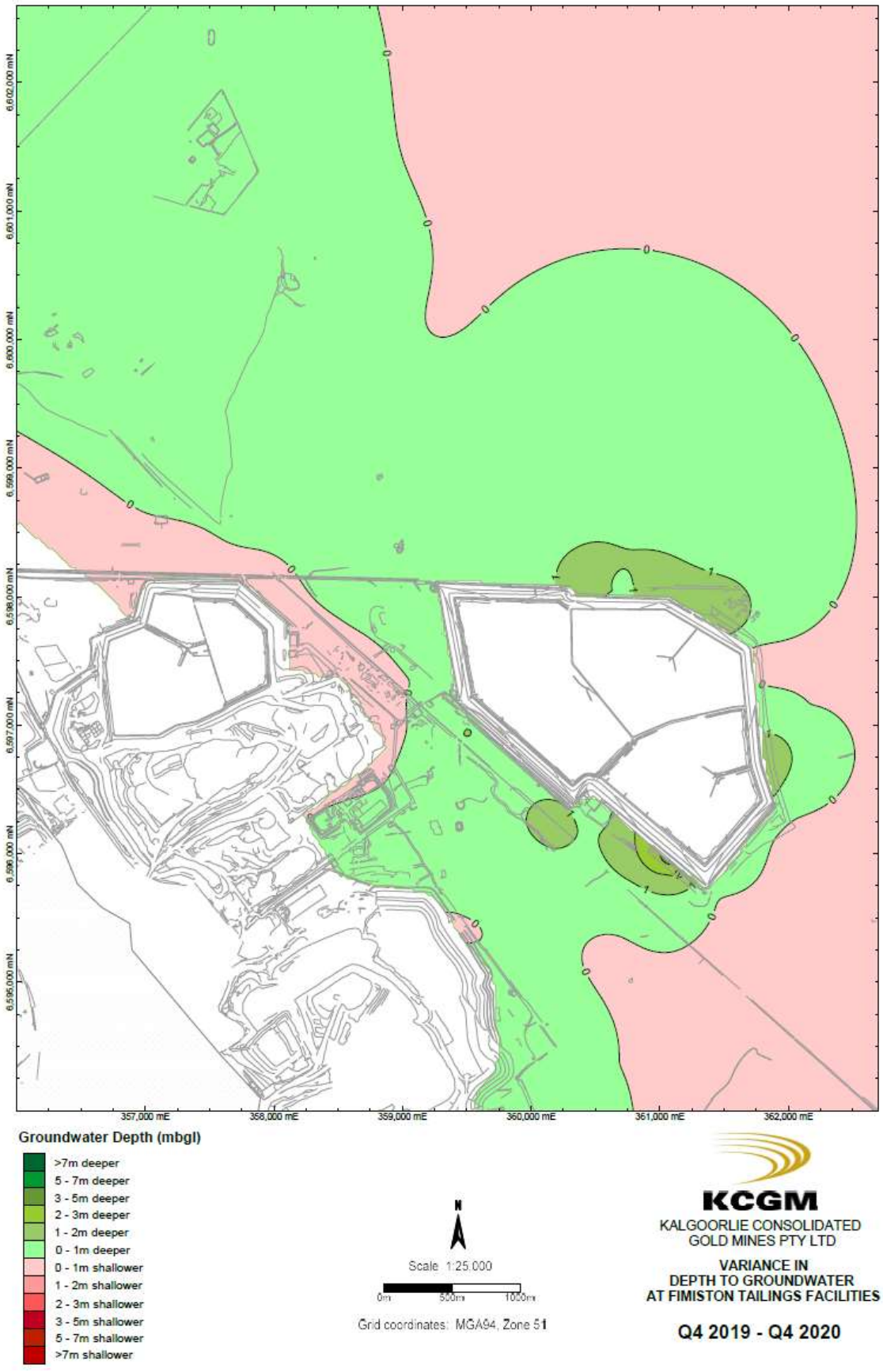

Figure 7: Variation of the groundwater levels over 2020

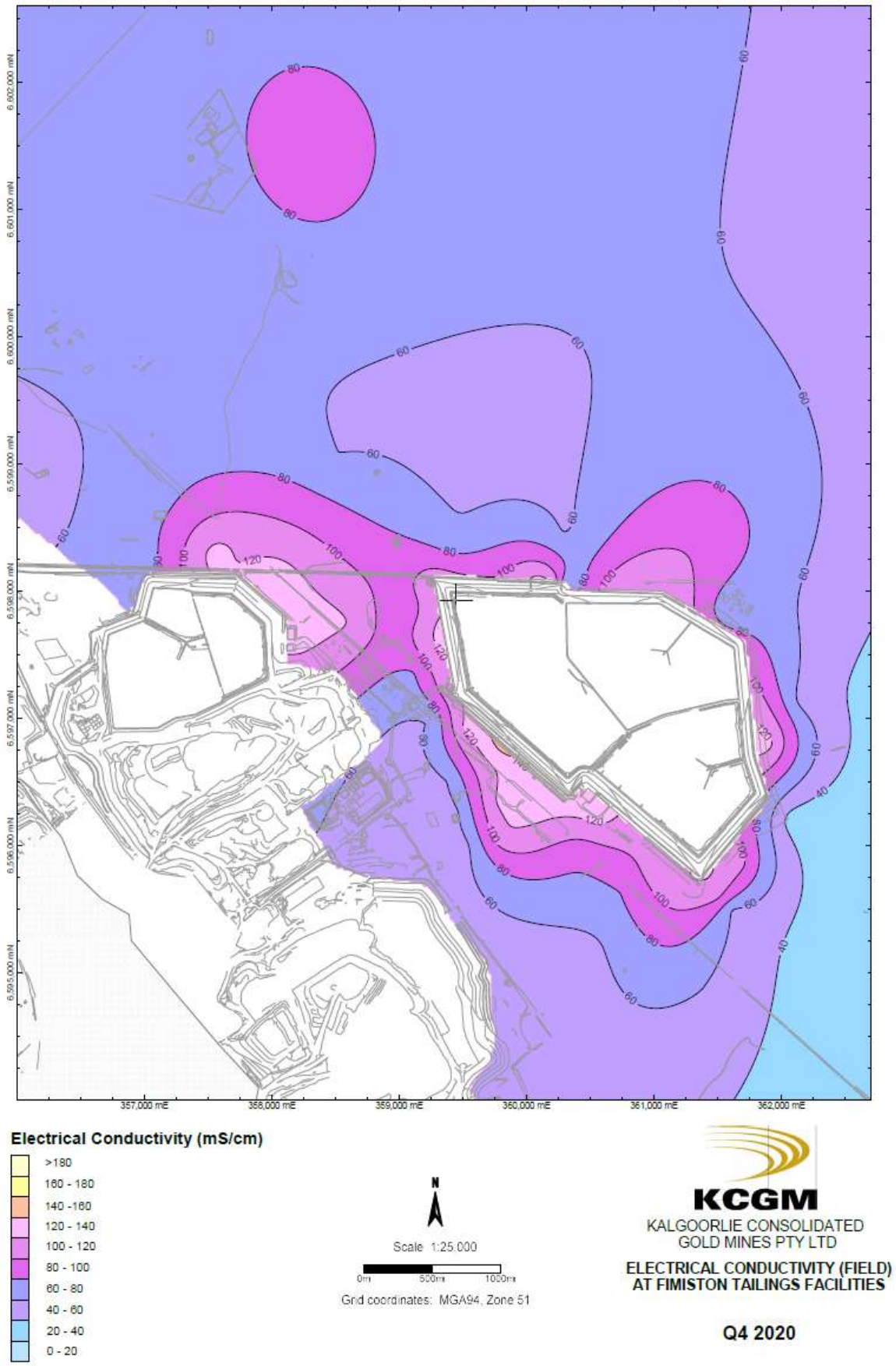

Figure 8: Field electrical conductivity levels as of December 2020

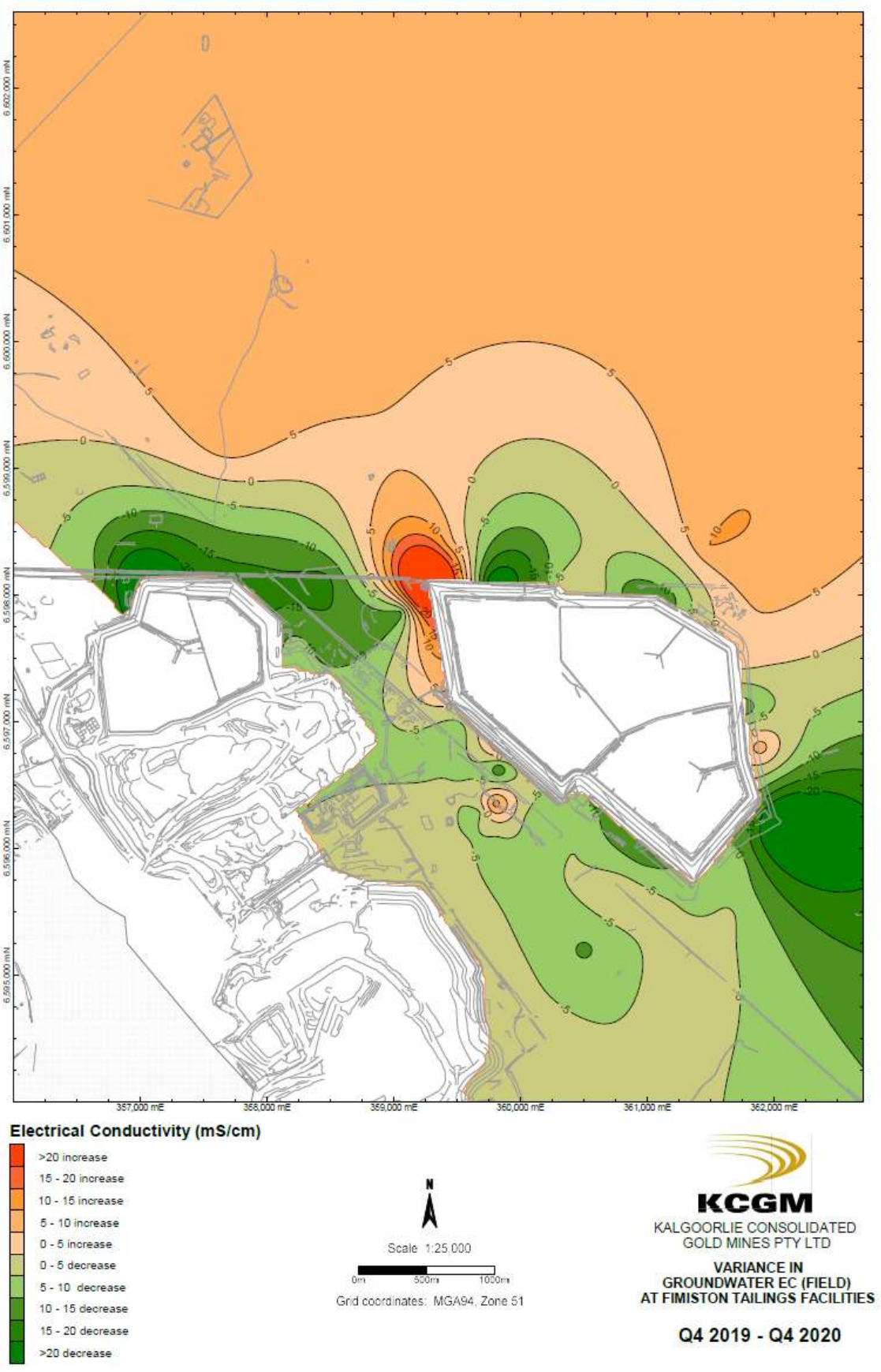

Figure 9: Variation of the field electrical conductivity levels over 2020

3.1.4 Summary of detailed risk assessment

The management of seepage from the current tailings storage facilities taking tailings from the Fimiston Processing Plant has been shown to be effective in maintaining the groundwater mounding around the facilities to below the limit set in licence L6420/1988/14. The proposed infrastructure constructed under this works approval is an extension one of the current facilities within the same landforms and groundwater aquifer. The environmental risks from the proposed facility are marginally less than the older sections of the TSF given the reduction in seepage entering the ground expected from the planned underdrainage and the already operational and effective management plans for controlling seepage.

4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website (04/02/2021)	None received	N/A
Local Government Authority advised of proposal (04/02/2021)	None received	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal (04/02/2021)	None received	N/A
Applicant was provided with draft documents on (26/5/2021)	21/06/2021 and 29/06/2021 Refer to Appendix 1	Refer to Appendix 1

5. Conclusion

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

References

1. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
2. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
3. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Environmental Protection Authority (EPA) 2018, *Ministerial Statement 782 (Fimiston Gold Mine Operations extension (Stage 3) and mine closure Planning), Attahcment 7, Environmental Protection Authority, Perth, WA.*

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

Condition	Summary of applicant's comment	Department's response
	Change of registered address from the one provided with application form	Registered address on Works Approval corrected.
Condition 1, Table 1	Confirmed heights of cells as highest starter embankment height: E Paddock – RL359.5m F Paddock – RL367m	Condition amended.
	Location of proposed bores is approximate and final positions may differ.	The Delegated Officer understands that the locations as indicated on the premises map are not precise. The coordinates of the precise location are to be provided as part of the submitted bore logs and compliance reports post construction. It is understood however that the locations indicated on Schedule 1 Figure 3 are the areas targeted for the bores and the reason for any major deviation from these areas should be explained in the reports required by Conditions 3, 5 and 6.
	KCGM assumes the definition of "freeboard" is as defined in the Fimiston Processing Plant Licence L6420/1988/14	Definition of freeboard has been added to Table 12 of the Works Approval
Condition 2, Table 2	Up to 12 monitoring bores are proposed, 5 new monitoring bores are proposed by Big Dog Hydrogeology and 7 bores are established.	Noted. Table 2 updated.
Condition 4: Table 3:	As there may be local or regional variations in groundwater system properties from those assumed during modelling, the recovery yield of 4L/s should be considered an indicative estimate, and the actual pumping rates will be determined from detailed monitoring of groundwater elevation responses in monitoring bores during operation of the new facility.	'with demonstrated recovery yields of up to 4 l/s' has been removed from condition.

Condition	Summary of applicant's comment	Department's response
Condition 9, Table 6	'*18,000m3 per day in the pattern of 8 weeks discharge followed by 8 weeks without discharge followed by 6 weeks of discharge. Discharge to commence into E Paddock prior to F Paddock.'* This was a concept deposition plan – figures provided were approximate. Expected discharge of up to 1250m/3 per hour or 30,000m3 per day (total volume) with commissioning fill on each cell consisting of 1.5Mt of dry tailings. KCGM suggest removing the pattern of discharge. This will enable the cells to be constructed at different times and provide operational flexibility to ensure initial filling can be conducted in a controlled manner. The revised Environmental Commissioning Plan has been rewarded to state: *The concept deposition plan for commissioning will consist of a single tailings line depositing up to 30,000m3 of tailing slurry each day. The commissioning fill will be limited to 2,000,000m3 per cell which will equate to approximately 10 to 20 weeks of deposition, subject to plant throughput. Deposition and lifts will be conducted in consultation with the Design Engineer.*	Condition 9, Table 6 updated.
Condition 10, Table 7	Plant-end flowmeter (Flowmeter is situated at the tailings hopper prior to exiting the processing plant)	Flowmeter details added to Table 7
Conditions 16 and 22	It is KCGMs understanding that approval of items of critical containment infrastructure can be staged in order to avoid a situation where we cannot deposit to either facility.	Condition 16 states: "*The works approval holder may only commence time limited operations **for an item** of critical containment infrastructure identified in condition 18"* As Condition 18, Table 9 separates out each cell of the TSF and the pipeline as separate items then each may be completed and commissioned at separate times as necessary under Conditions 8 - 15. Once the Critical Containment Infrastructure Report and/or the Environmental Commissioning Report for an item of infrastructure has been received then the time limited operations may commence for that item.

Condition	Summary of applicant's comment	Department's response
		The amendment of the operating licence can be applied for once the Critical Containment Infrastructure reports for all items have been completed. This will allow for the new infrastructure to be commissioned and then operate for up to 180 days whilst the amendment to add them to the licence is processed.
Condition 18, Table 9	Decant ponds are currently managed in accordance with KCGM's Fimiston Seepage and Groundwater Management Plan and 15% represents an operating target under normal operating conditions. An exception needs to be made for events such a high intensity rainfall and plant shutdowns.	Table 9 amended to include the rephrasing of the decant pond management to: • Decant pond of no more than 15% of surface area of paddock during normal operating conditions. • In the event that the size of the supernatant pool becomes greater than the target size (e.g. due to a high rainfall event), decant water from the TSFs will be used as a priority for mineral processing in preference to groundwater derived from remote saline water borefields
Condition 19	Use of the term "only" - KCGM assumes it is understood that tailings will also continue to be deposited to Fimiston I TSF, Kaltails TSF and Fimiston II TSF (AB, C & D Paddocks) as per normal operations.	The Works Approval Premises does not extend to cover Fimiston 1 TSF, Kaltails TSF or Fimiston II Paddock AB so there is no restriction on disposal to these facilities. As there could be some overlap with Fimiston II Paddocks C and D the word "only" has been removed from this condition.

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:			
		Relevant works approval number:		N/A	☐
Registration	☐	Current works approval number:		None	☐
Date application received		16/12/2020			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Kalgoorlie Consolidated Gold Mines Pty Ltd			
Premises name		Fimiston Processing Plant			
Premises location		Current on licence L6420/1988/14, only highlighted tenements included in this works approval: Tenements G26/15, G26/44-68, G26/70-71, G26/73–78, G26/82-86, G26/99-107, G26/138-145, G26/149, G26/159, G26/160, G26/165, G26/166, L26/267, M26/39, M26/46, M26/78, M26/86, M26/95, M26/267-268, M26/294, M26/308, M26/326, M26/359, M26/377, M26/383, M26/405, M26/448, M26/451 and M26/715			
Local Government Authority		Additional tenements, not on the licence, to be included in this works approval: M26/503 and M26/778.			
Application documents					
HPCM file reference number:		DER2018/001042-4~60			
Key application documents (additional to application form):		• *Maps and plans of TSF and extension* • *Environmental commissioning plan for Fimiston II TSF extension – updated 21 April 2021* • *Mining proposal 90108 (approved 15 December 2020)* • *Proposed clearing plan*			

	• *Ministerial statement 782 Attachment 7* • *Emissions and discharges – summary* • *Fimiston seepage and groundwater management plan* • *Fimiston air quality management plan (Nov 2019)* • *Noise and vibration monitoring and management programme (Aug 2018)* • *Eastern borefield operating strategy 2020* • *Fimiston processing plant TSF's operating manual*
Scope of application/assessment	
Summary of proposed activities or changes to existing operations.	Construction of 2 tailings storage paddocks as extension to the Fimiston II TSF.

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

Table 1: Prescribed premises categories

Prescribed premises category and description	**Proposed 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	14 500 000 tonnes per annual period (throughput of Fimiston Plant)	N/A

Legislative context and other approvals

Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☒ No ☐	Ministerial statement No: 782 EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Mining lease / tenement ☒ Expiry: M26/308 – 23/04/2031 M26/451 – 19/01/2037 M26/503 – 15/10/2030 M26/778 – 28/08/2033
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why? Mining tenements

Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☒ No ☐	Application reference No: Licence/permit No: GWL66252/8 Groundwater licence GWL66252/8 covers the Eastern borefield. A construct and alter well licence will be required for the new production bores.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☒ No ☐	Name: Goldfields Type: Proclaimed Groundwater Area Has Regulatory Services (Water) been consulted? Yes ☐ No ☒ N/A ☐ Regional office: Goldfields (Ellam St)
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 ☐	Mining Act 1978 Rights in Water and Irrigation Act 1914
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	

Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☒ No ☐	Classification: possibly contaminated – investigation required (PC–IR) Date of classification: 13/09/2010