Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 4

Licence Number	L8721/2013/1
Licence Holder	Karara Mining Limited
ACN	070 871 831
File Number:	2012/008499
Premises	Karara Minesite Beneficiation Plant M59/644, M59/645, G59/38 and L59/99 PERENJORI WA 6620
Date of Amendment	**18/12/2018**

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Alana Kidd

Digitally signed by Alana Kidd
Date: 2018.12.18 12:16:14 +08'00'

Alana Kidd

Manager, Resource Industries

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

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
Amendment Notice	refers to this document
BIF	Banded Iron Formation
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info@dwer.wa.gov.au
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Amendment
Licence Holder/ Licensee	Karara Mining Limited
mbgl	metres below ground level
MS	Ministerial Statement
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)

Occupier	has the same meaning given to that term under the EP Act
PEC	Priority Ecological Community
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report.
Risk Event	as described in *Guidance Statement: Risk Assessment*
TDS	Total Dissolved Solids
WCSF	Wet Concentrate Storage Facility

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

This notice is limited only to an amendment for Category 5. No changes to the aspects of the Licence relating to Categories 54 or 64 have been requested by the Licence Holder.

The following guidance statements have informed the decision made on this amendment*:*

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessment (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

On 25 September 2018, the Licence Holder submitted an Application to DWER to amend the Karara Minesite Beneficiation Plant (Premises) Licence L8721/2013/1 to include a Wet Concentrate Storage Facility (WCSF) and its proposed expansion on the licence. The WCSF is considered to be containment infrastructure directly relating to Category 5: Processing or beneficiation of metallic or non-metallic ore. The existing WCSF was constructed in 2017, but has not previously been assessed or included in the licence.

Background

The Karara Iron Ore Project is a magnetite mining and processing operation currently consisting of an open cut pit, a beneficiation plant, tailings storage facility and accommodation facilities. The ore processing plant produces approximately 8 million tonnes of magnetite concentrate per year, and up to 18 million tonnes of per year of both dry and wet tails.

In 2007, Graham Campbell and Associates undertook a geochemical characterisation (static and kinetic testing) of mine waste and process tailings solids samples, and concluded that mine waste is benign (GCA, 2007), though concentrate slurry per se was not characterised in the study.

The WCSF is a permanent structure used to store wet magnetite concentrate discharged from the thickeners in circumstances when the filtration circuit is unable to meet throughput requirements.

Unfiltered magnetite concentrate slurry is thickened at the process plant to between 70% and 75% (w/w) solids and is pumped as required to the WCSF from a pump located at the underflow discharge of the thickener tank.

Proposed infrastructure and operation

The existing WCSF will be expanded to increase the storage capacity from 20,000 tonnes to 50,000 tonnes of wet concentrate slurry. The WCSF is located adjacent to the processing area as shown in Figure 1 below.

The expanded WCSF will consist of an extension of each of the current Cells 1 and 2, with a low dividing wall between to allow for operational flexibility. The existing infrastructure and planned expansion is shown in Figures 2 and 3 below.

The WCSF will be constructed of naturally occurring colluvium material and material sourced from the nearby dry tailings storage facility. The maximum height of the containment earth

embankment will be 3 metres (m) with the crest profile to follow the gentle topography of the site. Concentrate storage depth will not exceed 2.5 m deep.

Delivery of wet concentrate will be by 200 mm diameter steel pipe. Subaerial slurry deposition will be by open end pipes acting as spigots, on the perimeter embankments.

The WCSF has been designed to store 50,000 tonnes of concentrate plus an allowance for a 1:100 year ARI 72 hour storm event and a 300 mm freeboard.

The facility has been designed to recover rainfall and concentrate water from the storage cells as quickly as possible to facilitate drying of the concentrate. Two gravity decants will connect to underdrainage pipe works installed in the entire base of the cells. Underdrainage water will be collected in a sump then pumped to the process plant.

V-drains will be constructed at the toe of the perimeter embankment to collect water from the outer faces of the embankments. Water will be directed to the main surface water diversion channel.

Once the product has dried sufficiently, it is placed on an adjacent drying bed for reclaim to the rail load out facility.

Other approval

The Licence Holder has provided the following information relating to other approvals as outlined in Table 2.

Table 2: Relevant approvals

Legislation	Number	Approval summary relevant to this assessment
EP Act	MS 805	Approved 8 September 2009. Clearing approved. Condition 6-5 requires the proponent to monitor impacts from mining and mining related activities due to: 1. dust; 2. saline water application for dust; 3. fire; and 4. feral species on the Blue Hills vegetation complex Priority Ecological Community (PEC). Condition 6-6 requires proponent to immediately provide and implement proposed management measures when monitoring impacts indicates, for outcome of minimizing disturbance or loss of the PEC.
Environmental Protection and Biodiversity Conservation Act 1999	Reference Number 2006/3017	Approved 29 October 2009
Mining Act 1978	Reg. Id 75877	*Karara Mining Limited Wet Concentrate Storage Facility Expansion G59/38 CORP-EN-REP-1131 15 November 2018* approved 17/12/2018.

Amendment history

Table 3 provides the history of the licences and works approvals related to L8721/2013/1 that have been issued since 10/12/2009.

Table 3: Instrument log

Instrument	Issued	Amendment
W4596/2009/1	10/12/2009	Works Approval - Karara Landfill Facility
W4615/2009/1	12/02/2010	Works Approval - Karara Minesite Beneficiation Plant
W4620/2009/1	05/03/2010	Works Approval – Waste Water Treatment Plant
L8486/2010/1	09/12/2010	Licence – Waste Water Treatment Plant
L8721/2013/1	16/05/2013	Licence - Karara Minesite Beneficiation Plant
L8721/2013/1	26/09/2013	Amendment Licence - Karara Minesite Beneficiation Plant
W5545/2013/1	20/01/2014	Works Approval – wet tailings TSF1
W5664/2014/1	11/07/2014	Works Approval – wet tailings TSF2 (Stage 1 and Stage 2) Note: Karara has advised this TSF infrastructure will not be constructed.
L8721/2013/1	11/11/2015	Amendment to include wet TSF1 and amalgamate L8486/2010/1 (WWTP) and include the Landfill.
W5545/2013/1	17/12/2015	Amendment for raise and extension of wet TSF1.
L8721/2013/1	29/04/2017	Notice of Amendment to extend licence expiry date to 19 May 2021
L8721/2013/1	30/06/2017	Amendment Notice #1 to include Phase 1 (raise) of TSF1, change the premises boundary and increase category 5 production capacity.
L8721/2013/1	08/01/2018	Amendment Notice # 2 for the construction of TSF 2A
L8721/2013/1	03/08/2018	Amendment Notice # 3 for the construction of a dividing wall within TSF 2A to create Cell 1 and Cell 2.
L8721/2013/1	18/12/2018	Amendment Notice # 4 to include the wet concentrate facility and its expansion.

Location and receptors

The Karara Minesite is located about 230 kilometres (km) east of Geraldton.

Table 4 below lists the closest sensitive land uses to the proposed infrastructure.

Table 4: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Activity
Karara Homestead	About 7 km southwest

Table 5 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Priority Ecological Community - Blue Hills vegetation complex (banded ironstone formation.	Occurs on ridges. Located on the premises.
One DRF, 20 Priority Flora and four other taxa of conservation significance.	Occurs on the premises. Mapping provided by KML indicates the closest priority fauna is located approximately 500 m north of the Concentrate Storage Facility
Three invertebrate and 15 vertebrate species of conservation significance.	Recorded during a fauna survey of the mine site, or are very likely to be present.
Department of Biodiversity, Conservation and Attractions (DBCA) managed land	The Premises is located entirely within the DBCA managed land.
RIWI Act proclaimed Area - Gascoyne Groundwater Area – Mullewa/Byro Sub Area.	The Premises is located within the Gascoyne Groundwater Area.
Mongers Lake (non perennial)	Approximately 6 km northeast.
Yarramonger River	Closest mainstream is 18 km south west of the premises
Minor unconnected non-perennial watercourses	Located on the premises.

Hydrogeology

The site generally consists of colluvium overlaying ferricrete or colluvium overlaying granite bedrock. The colluvium soil, typically red clayey Sand/clayey Gravel/Sandy Silt, is characterised by increasing gravel content with depth.

Aquifers in and around the mine site are mainly in fractured Banded Iron Formation (BIF), particularly where the BIF is intersected by cross-cutting features such as faults and dykes. Salinity is variable across the mine site, and ranges from 600 to 81,000 mg/L Total Dissolved Solids (TDS).

The depth of the water table at the mine site area is generally related to ground elevation and is considered to range from 2.7 to 24.4 metres below ground level (mbgl). Recent excavations as part of geotechnical investigations indicate the groundwater table is more than 5 metres below ground level (mbgl) (Design Report). KML states that groundwater recorded at a monitoring bore within the rail loop which is nearby the CSF, is approximately 50 mbgl (Application).

Meteorology

The premises is located in the mid-west region of Western Australia and climate is characterised by hot summers and cold winters.

Pan evaporation is almost an order of magnitude greater than average rainfall and exceeds rainfall in every year.

Figure 1: Location of the Wet Concentrate Storage Facility (CSF)

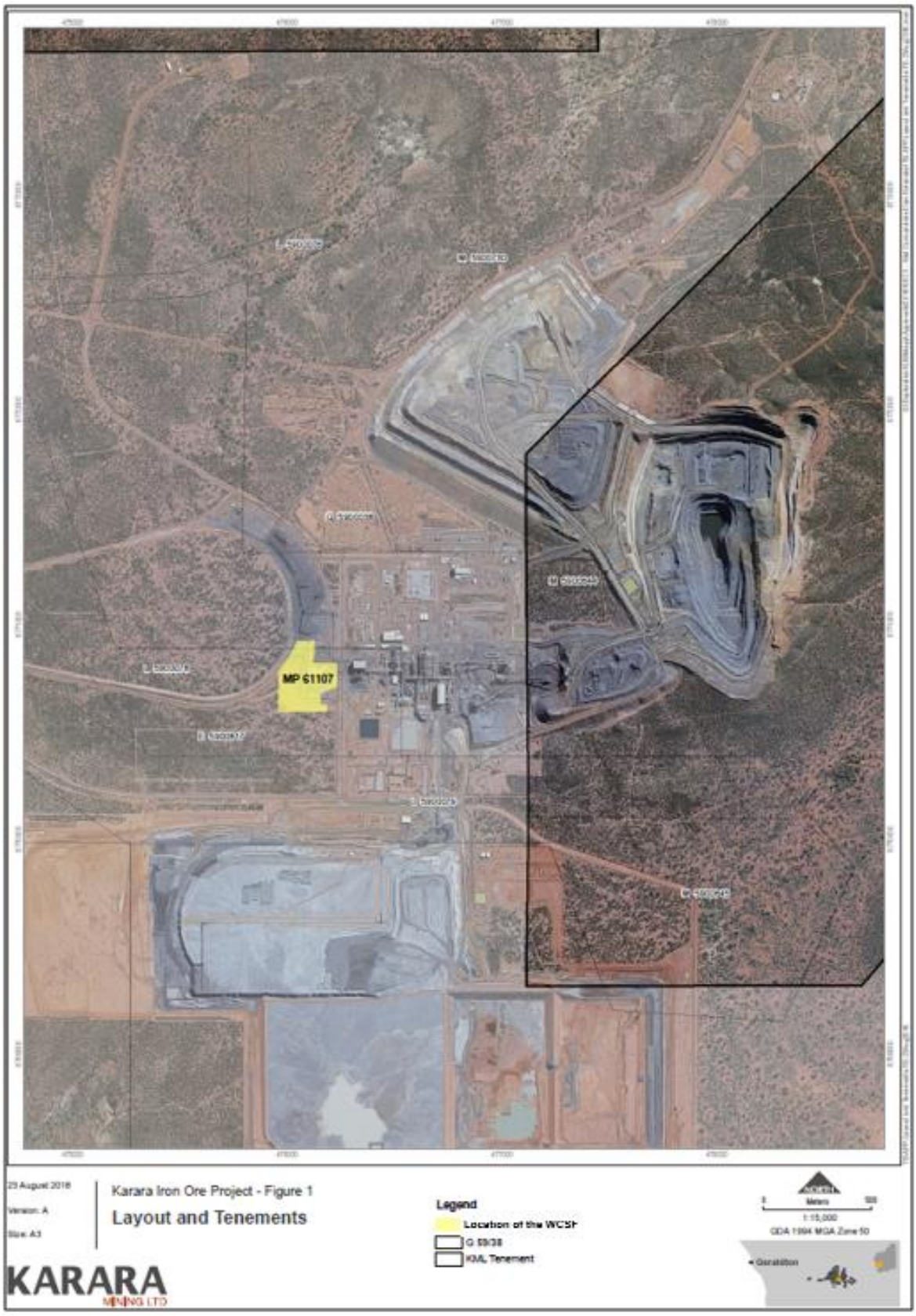


Figure 2: Existing Wet Concentrate Storage Facility

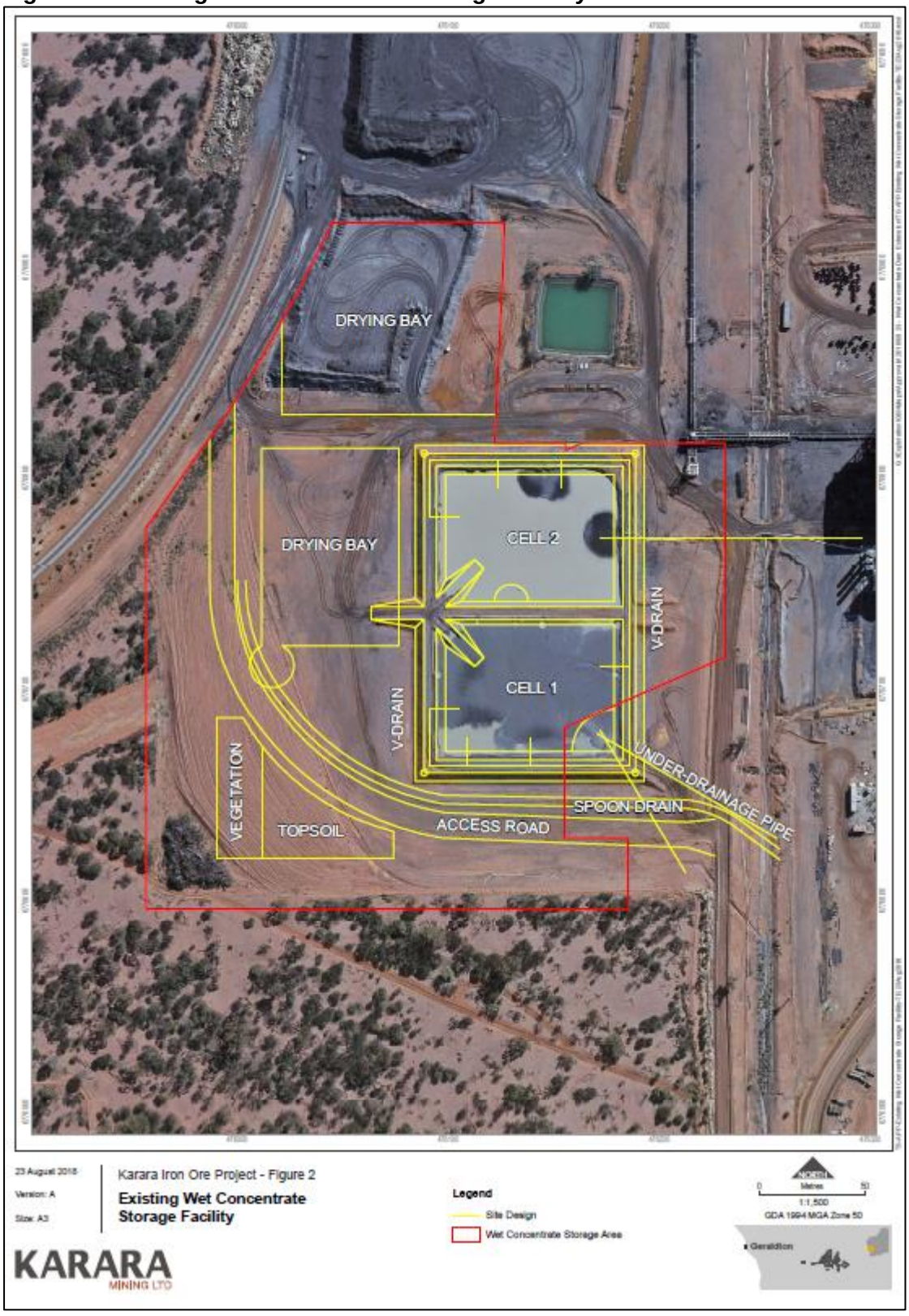
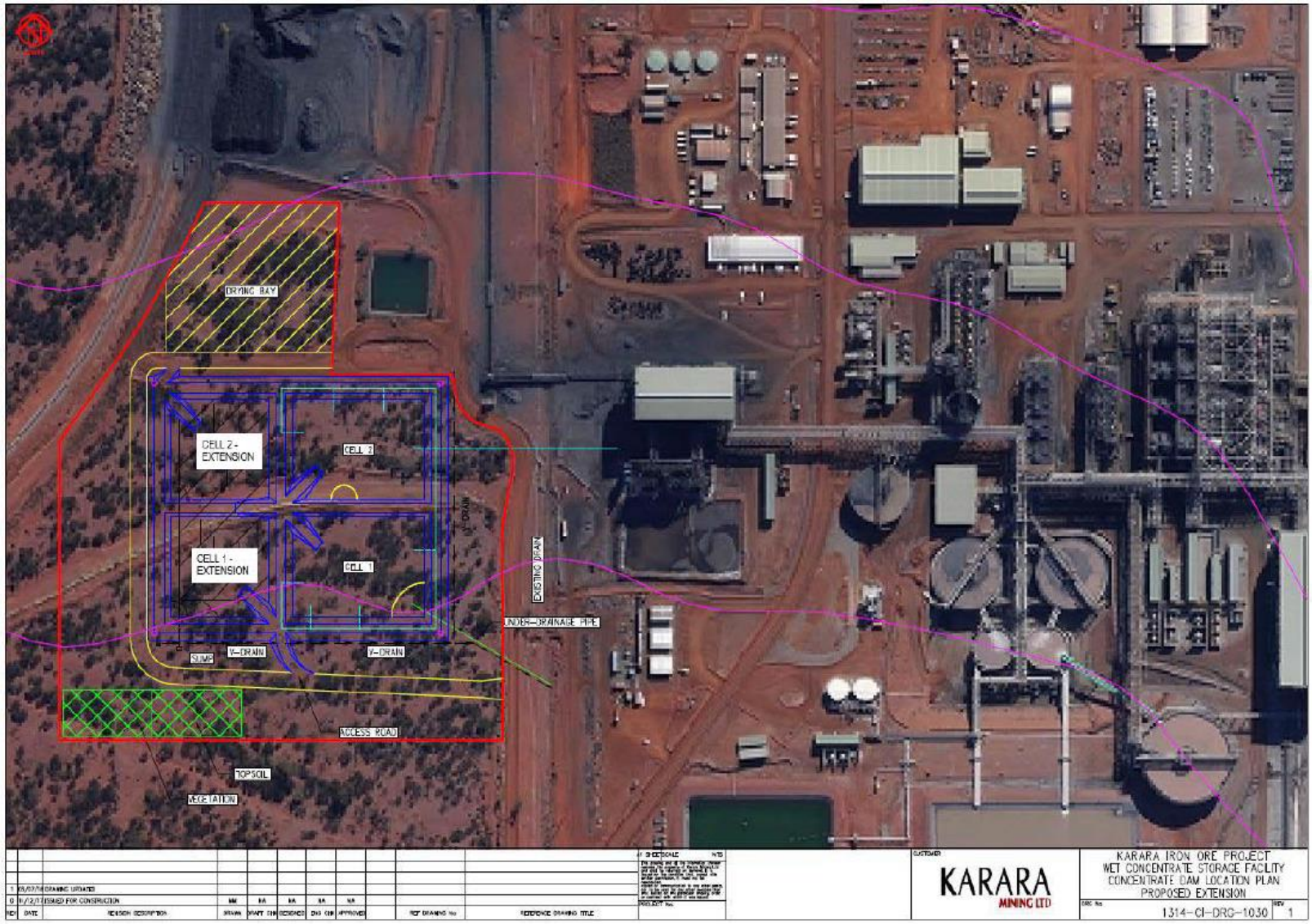


Figure 3: Wet Concentrate Storage Facility with proposed extension



Risk assessment

Tables 6 and 7 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls

Table 6: Risk assessment during construction

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Construction of the CSF expansion.	Dust associated with movement of vehicles during construction activities	The Blue Hills PEC located on the premises	Air	Dust deposition on vegetation which may prevent photosynthesis and plant respiration	N/A	N/A	N/A	Not within scope – impacts to the PEC from dust are regulated by Part IV of the EP Act under MS 805.
	Dust associated with movement of vehicles during construction activities	Flora of conservation significance, and native vegetation	Air	Dust deposition on vegetation which may prevent photosynthesis and plant respiration	Slight	Rare	Low	Dust is managed to reduce impact to the PEC, and in accordance with the KML Environmental Plan – *Dust Management CORP-EN-PLN-1010* which includes site dust monitoring. Construction activities will be of relatively short duration. No Licence controls required for construction activities
	Dust associated with movement of vehicles during construction activities	Karara Homestead about 7 km southwest	Air	Health and amenity impacts	Slight	Rare	Low	Distance to closest sensitive receptor is sufficient to inform the risk of dust and noise emissions as not foreseeable. No Licence controls required for construction activities.
	Noise associated with movement of vehicles during construction activities	Karara Homestead about 7 km southwest	Air	Amenity impacts	Slight	Rare	Low	

Table 7: Risk assessment during operation

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Storage of magnetite concentrate (product) at the WCSF	Dust from drying beds and dry concentrate in the WCSF	The Blue Hills PEC located on the premises.	Air	Dust deposition on vegetation which may prevent photosynthesis and plant respiration	N/A	N/A	N/A	Not within scope - impacts to the PEC are regulated by Part IV of the EP Act, MS 805.
	Dust from drying beds and dry concentrate in the WCSF	Flora of conservation significance, and native vegetation	Air	Dust deposition on vegetation may reduce photosynthesis and plant respiration	Minor Low level on site impacts	Rare The risk event may only occur in exceptional circumstances	Low	Contribution of dust from the WCSF is expected to be low in relation to dust from the whole site. <u>Applicant controls</u> Dust is managed to reduce impact to the PEC, and in accordance with the KML Environmental Plan – *Dust Management CORP-EN-PLN-1010* which includes site dust monitoring. <u>Decision - Licence conditions</u> Licence conditions are not required to be amended to manage dust from the WCSF.
	Failure of the concentrate WCSF cell walls	Soils Native vegetation in the locality of the cells failure	Path of concentrate slurry at wall failure.	Contamination of soils with impacts to terrestrial ecosystems. Inundation and smothering of vegetation.	N/A	N/A	N/A	Not within the scope - Embankment failure is assessed and managed under the Mining Act 1978 by Department of Mines, Industry Regulation and Safety (DMIRS) through Mining Proposal and long term closure planning.
	Magnetite concentrate leachate	Groundwater	Vertical infiltration through ground	Contamination of groundwater	Minor Low level on site impacts	Unlikely The risk event will probably	Medium	Mine waste and process tailings solids sample testing concluded the geochemistry was benign (GCA, 2007). However, concentrate slurry per se was

		Soils	Horizontal infiltration through ground	Inundation of the root zone of soils.		not occur in most circumstances		not characterised in the study. The facility is un-lined. Ground at the site consists of colluvium overlaying ferricrete or colluvium overlaying granite bedrock. Aquifers at the site are mainly in fractured Banded Iron Formation. Groundwater at the premises is more than 5 mbgl (recorded as 50 mbgl in the near vicinity) and salinity has been recorded at 600 to 81,000 mg/L TDS. <u>Applicant controls</u> A maximum of 50,000 tonnes slurry will be stored. To promote drying of concentrate slurry, gravity decant structures and underdrainage piping network will drain seepage to a sump. Water from the sump will be directed by an under drainage pipe to the process plant for reuse. <u>Decision - Licence controls</u> Applicant's controls have lowered the risk and hence will be conditioned in the licence.
	Overflow of the WCSF cells	Soils Native vegetation in the vicinity of the WCSF.	Path of overflow	Contamination of soils with impacts to terrestrial ecosystems. Inundation of vegetation.	Minor Low level on site impacts	Unlikely The risk event will probably not occur in most circumstances	Medium	Water courses on the premises are minor unconnected non-perennial watercourses only. Topography is flat to low gradient. Surface water flow is generally low velocity. <u>Applicant controls</u> The WCSF is designed to

								accommodate 50,000 tonnes concentrate slurry and with a 300 mm freeboard above a 1:100 ARI, 72 storm event. The Design Report recommends inspection of the location and size of the water pond daily. <u>Decision - Licence controls</u> Applicant's controls have lowered the risk and hence will be conditioned in the licence.

Decision

The Delegated Officer has determined to grant the amendment to include the containment infrastructure for wet concentrate storage on the Licence.

The main risk events associated with operation of the WCSF were determined to be vertical and lateral seepage, and overflow of the facility embankments.

Licence Holder controls that were considered to lower the risk of seepage and overtopping of the facility are conditioned by the addition of construction condition 1.3.8 and addition of a freeboard requirement in condition 1.3.2. Construction compliance documents are required to be submitted by the addition of condition 4.3.8.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 7 December 2018. The Licence Holder responded on 7 December 2018 that there were no comments and requested the amendment be issued as soon as possible, waiving the remaining comment period.

Amendment

1. Condition 1.3.2 of the Licence is amended by the insertion of the text in Table 1.3.2 shown in bold underline below:

1.3.2 The Licensee shall:

(a) undertake inspections as detailed in Table 1.3.2;
(b) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and
(c) maintain a record of all inspections undertaken.

Table 1.3.2: Inspection of infrastructure		
Scope of inspection	**Type of inspection**	**Frequency of inspection**
Tailings pipelines	Visual integrity	Daily
Return water lines	Visual integrity	Daily
Wet TSF1 embankments	Visual to confirm no unusual changes and at least 500mm freeboard capacity	Daily
Retention pond	Visual to confirm able to accommodate stormwater flows from a 1 in 100 year, 72 hour ARI rainfall event.	Daily
Wet Concentrate Storage Facility	**Visual to confirm at least 300mm freeboard capacity**	**Daily**

2. The Licence is amended by the addition of the following condition 1.3.8 as shown in bold underline below:

1.3.8 The Licensee shall ensure that the requirements as detailed in Table 1.3.7 are met for the Concentrate Storage Facility.

Table 1.3.7: Construction requirements		
Infrastructure	**Requirements**	**Location and references**
Wet Concentrate Storage Facility	**Designed and constructed to accommodate 50,000 tonnes of concentrate slurry with a 300 mm freeboard above a 1:100 ARI, 72 storm event.**	**Schedule 1: Map 10: Wet Concentrate Storage Facility**
	Under-drainage piping network constructed under the base of the wet concentrate storage facility connected to gravity decant structures, to enable draining of seepage to a sump. **Constructed so that seepage collected by the underdrainage piping network and sump is directed to the process plant by underdrainage pipe.**	**Karara Mining Limited, 23 October 2018. *Wet Concentrate Storage Facility Extension, Design Report, L128-CI-REP-0001-Rev1 - Figures 6.1B and 6.1.C***

3. The Licence is amended by the addition of the following conditions as shown in bold underline below:

4.3.8 The Licensee shall submit compliance documents to the CEO within one month of the completion of construction of the Wet Concentrate Storage Facility.

4.3.9 The Licensee must ensure that construction compliance documents required by Condition 4.3.8:

(i) is certified by a suitably qualified professional engineer stating infrastructure specified in Table 1.3.7 has been constructed or completed in accordance with each line of Table 1.3.7 of the Licence;

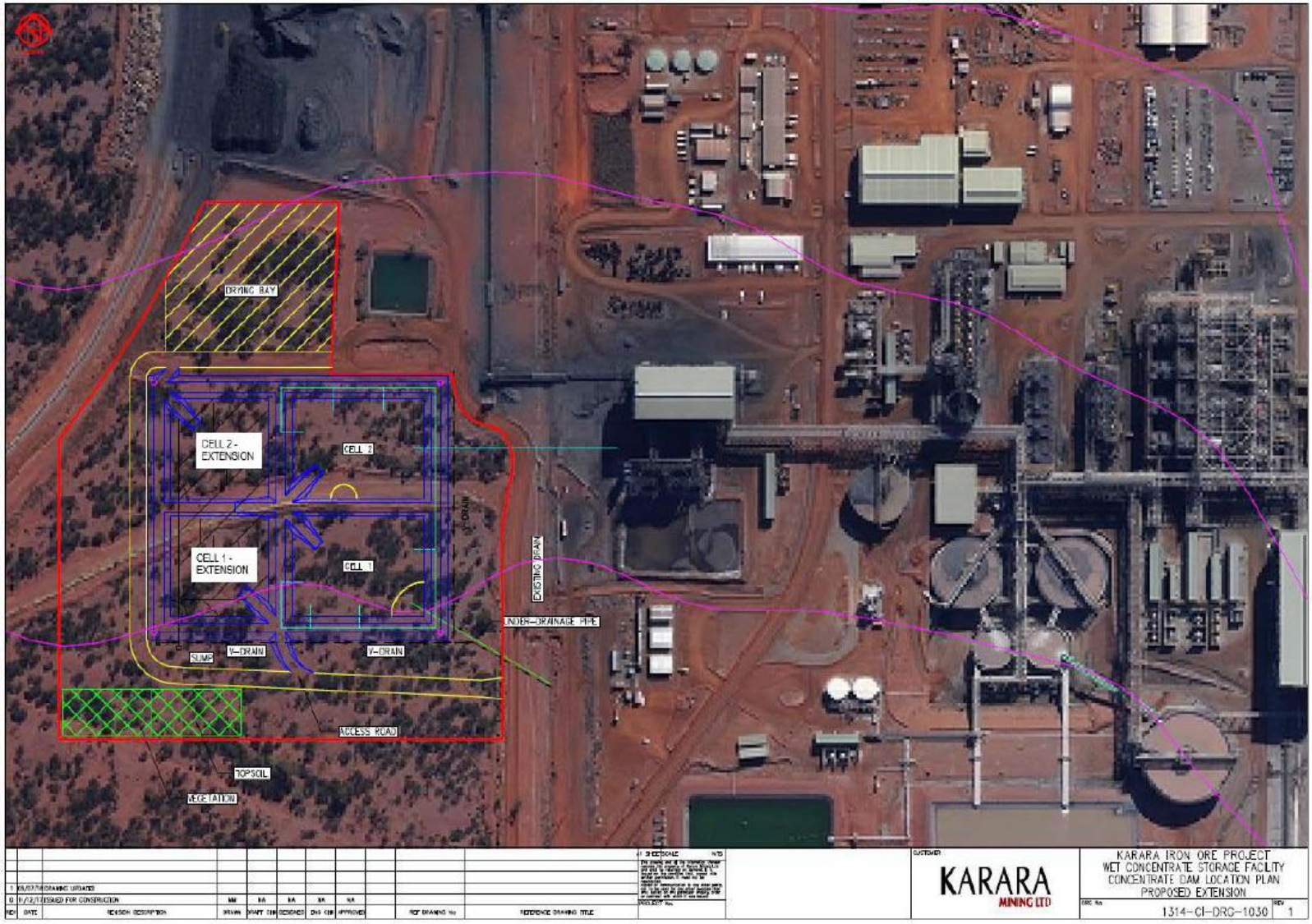
(ii) be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company.

4.3.10 The Licensee may deposit wet concentrate into the expanded Wet Concentrate Storage Facility following submission of the construction compliance documents required by Condition 4.3.8.

4. The Licence is amended by the addition of Map 10 in Schedule 1 as shown in bold underline below:

Map 10: Wet Concentrate Storage Facility

The wet concentrate storage facility embankments are drawn in dark blue in the map below.



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Application Form and supporting documentation: Karara Mining Limited, *Karara Minesite Beneficiation Plant Licence L8721/2013/, Supporting Document to Licence Amendment Application, Concentrate Storage Facility CORP-EN-REP-1133*	Application	DWER records (A1723020)
2	Karara Mining Limited, 23 October 2018. *Wet Concentrate Storage Facility Extension, Design Report*, *L128-CI-REP-0001-Rev1.*	Design Report	DWER records (A1740365)
3	DWER, July 2015. *Guidance Statement: Regulatory principles.* Department of Water and Environmental Regulation, Perth.	-	accessed at www.dwer.wa.gov.au
4	DWER, October 2015. *Guidance Statement: Setting conditions.* Department of Water and Environmental Regulation, Perth.	-	
5	DWER, November 2016. *Guidance Statement: Environmental Siting*. Department of Water and Environmental Regulation, Perth.	-	
6	DWER, February 2017. *Guidance Statement: Decision Making.* Department of Water and Environmental Regulation, Perth.	-	
7	DWER, February 2017. *Guidance Statement: Risk Assessments*. Department of Water and Environmental Regulation, Perth.		
8	Graeme Campbell and Associates Pty ltd, May 2008. *Karara Iron Ore Project, Geochemical Characterisation Of Mine-Waste and Process-Tailings-Solids Samples* *(Static- and Kinetic-Testing),* *Implications for Mine-Waste Management.*	GCA, 2008	DWER records (A1740941)
9	Ministerial Statement 805	MS 805	accessed at www.dwer.wa.gov.au
10	Phone call record: Lindy Twycross (DWER) and Parveen Bauer (Karara Mining Limited), 20 November 2018	-	DWER records (A1746846)