Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 3

Licence Number	L4612/1989/11
Licence Holder	BHP Billiton Nickel West Pty Ltd
ACN	004 184 598
File Number:	2012/006877
Premises	Leinster Nickel Operation LEINSTER, WA
Date of Amendment	20 March 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.

Date signed: 20 March 2018

Tim Gentle

Manager Licensing (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
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
AHD	Australian Height Datum
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-der@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.
DER	The former Department of Environment Regulation
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Licence Holder (also referred to as the Licensee)	BHP Billiton Nickel West Pty Ltd
m^3	cubic metres

mtpa	million tonnes per annum
NiW	Nickel West
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Occupier	has the same meaning given to that term under the EP Act.
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*
RL	Reduced Level: being the relative height of a point in relation to a known datum.
tpa	Tonnes per annum
TSF	Tailings Storage Facility
UDR	*Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA)

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 other Categories 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: Land Use Planning (February 2017)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guidance Statement: Decision Making (November 2016)*
- *Guidance Statement: Risk Assessment (November 2016)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

This Amendment is to authorise the construction of a further embankment raise to the perimeter walls of TSF3 Cell AB at Nickel West Leinster (also known as Leinster Nickel Operation). The raise increases the height of the cell by approximately 2.5m to RL 10,556.5m to provide further tailings storage capacity. A standard scope of works prepared by geotechnical engineering consultants, consistent with previous embankment raises for the active tailings storage facilities TSF2 and TSF3 will be utilised (Coffey 2018). The active TSFs are as shown in Figure 1. The TSFs have a mature groundwater monitoring program and

seepage recovery systems in place. The application was received 5 February 2018.

No changes are proposed to the current authorised category 5 throughput of 3,600,000 tpa.

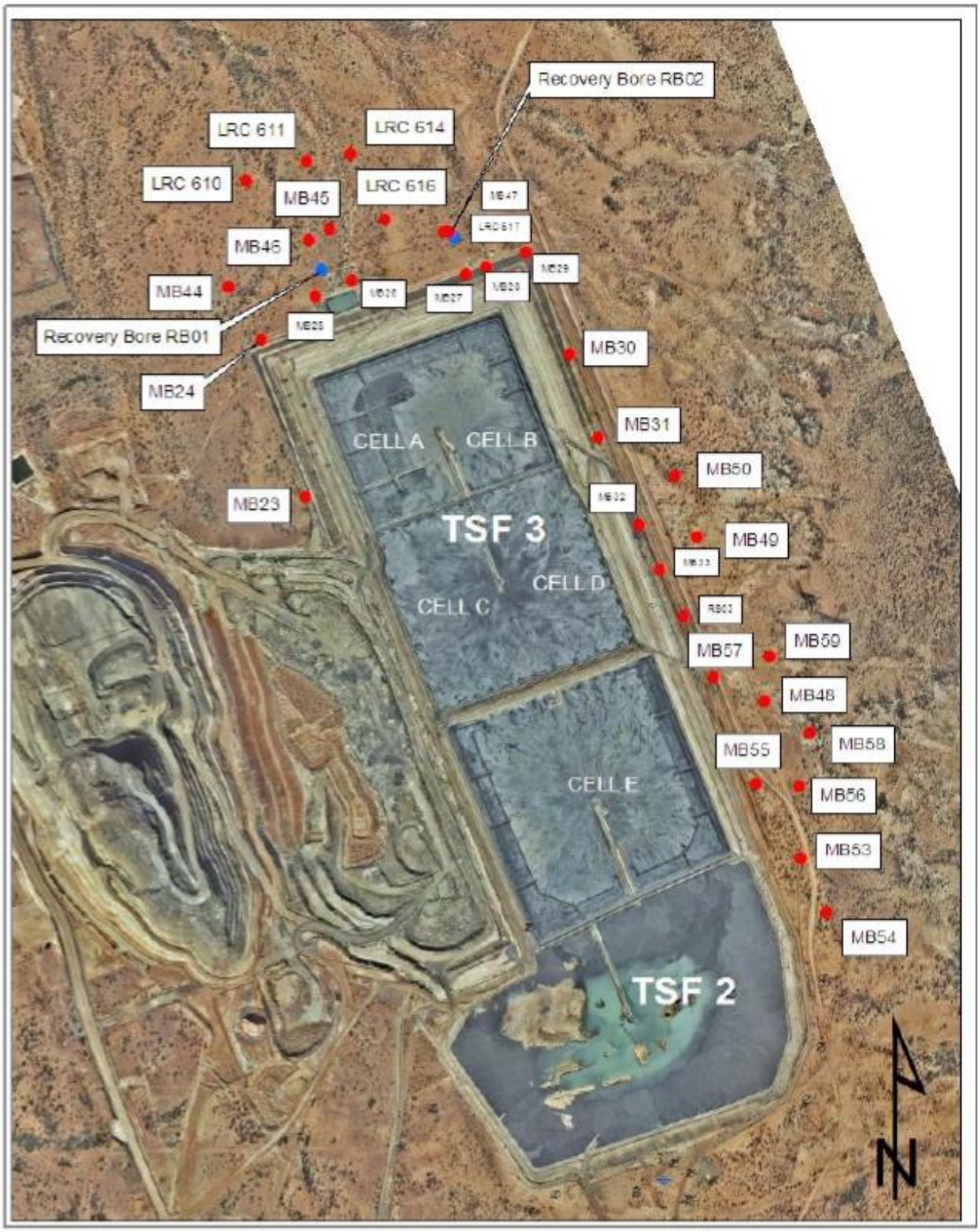


Figure 1: Nickel West Leinster Active TSFs (TSF2 and TSF3). Cell AB is shown with adjacent groundwater bores. Recovery bores RB01 and RB02 are shown to the north of TSF Cell AB. Recovery bore RB03 is also shown adjacent to Cell CD. This was installed in the 2001 but has not been operated due to low yields (Berry 2017).

Amendment history

Table 2 provides the amendment history for L4612/1989/11.

Table 2: Licence amendments

Instrument	Issued	Amendment
L4612/1989/11	12/12/2013	Amendment to authorise dewatering from Rocky's Reward Open Pit to Harmony Open Pit and a Turkey's Nest
L4612/1989/11	21/05/2015	Amendment to authorise operation of a pipeline to discharge tailings supernatant from the TSF to Harmony Open Pit.
L4612/1989/11	17/12/2015	Amendment to authorise operation of a new dewatering bore at Rocky's Reward Open Pit and construction and operation of a new pipeline from the dewatering bore to Harmony Open Pit.
L4612/1989/11	29/04/2016	The Licence duration extended from 18 October 2018 to 18 October 2030 by Amendment Notice.
L4612/1989/11	15/12/2016	Amendment Notice 1 to authorise construction and operation of a replacement waste water treatment plant.
L4612/1989/11	22/08/2017	Amendment Notice 2 to authorise embankment raise to TSF3 Cell CD to RL 10,556.5m
L4612/1989/11	20/03/2018	Amendment Notice 3 to authorise embankment raise to TSF3 Cell AB to RL 10,556.5m

Location and receptors

Table 3 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 3: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Town of Leinster	9 km (to the south–west) as shown in Figure 2 following.

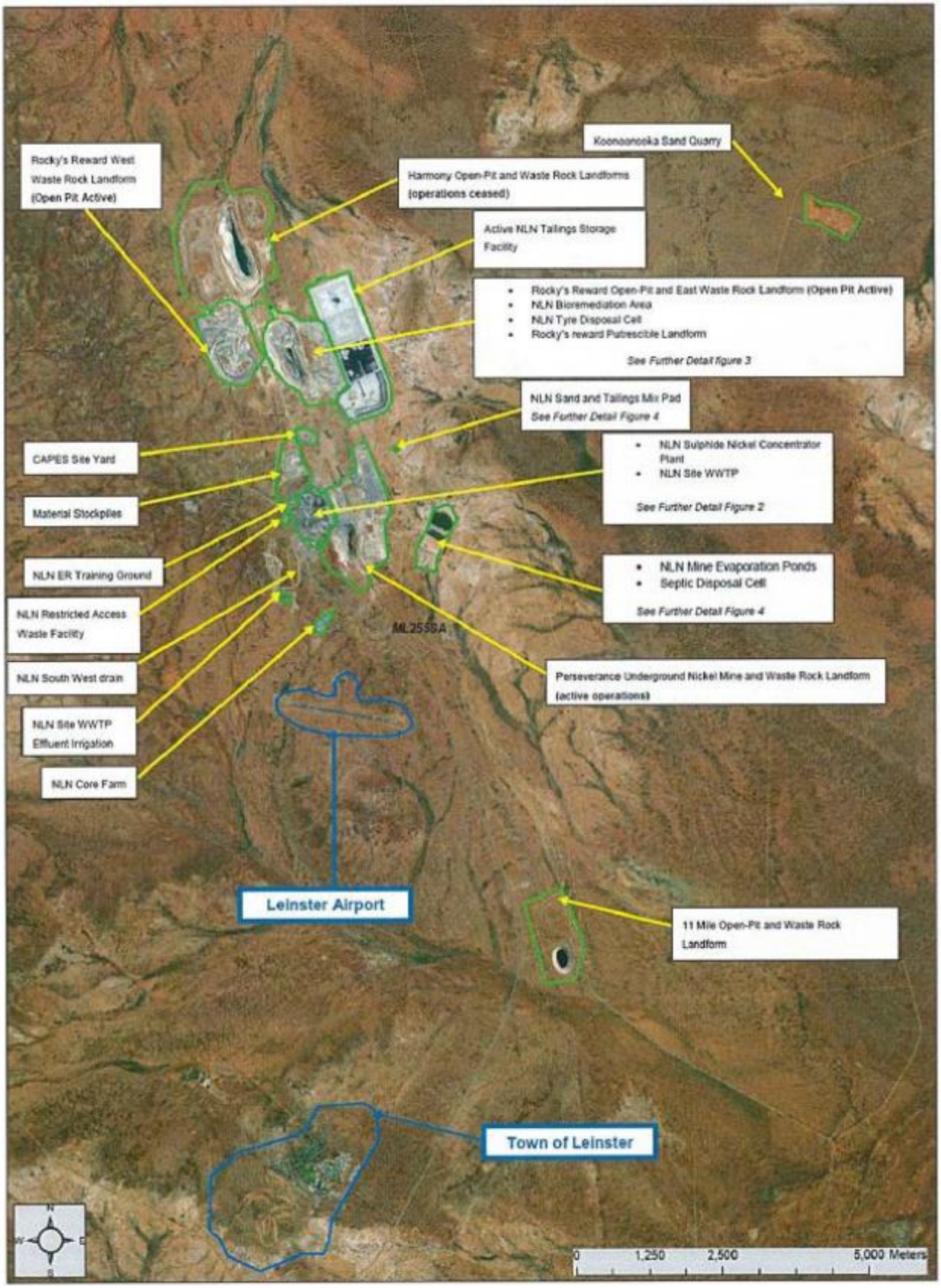


Figure 2: Location of Town of Leinster with respect to the Leinster TSF

Table 4 below lists the nearest environmental receptors to the TSF.

Table 4: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
11 mile (potable) borefield	5 km (11 km south of the TSF)
McArthurs (historical pastoral) Bore	5 km to the north
Priority flora	Located to the south and east of TSF as shown in Figure 3 below.

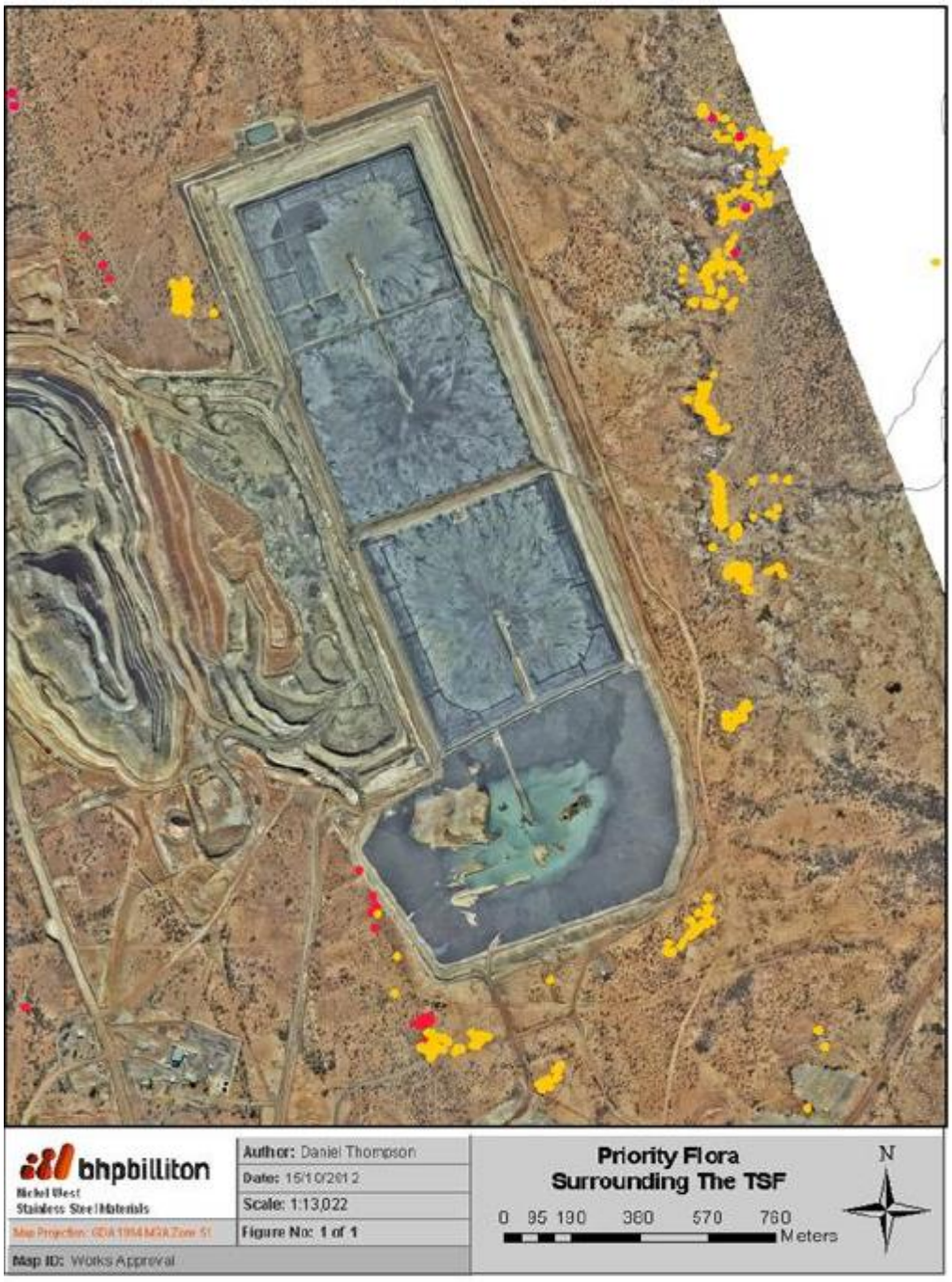


Figure 3: Location of priority flora (shown in red and yellow) adjacent to the TSF

Local Hydrogeology

The TSFs are located on a regional catchment divide at a ground elevation of 520m AHD, more than 10km from significant aquifers (valley fill alluvial groundwater systems including 11 Mile Potable borefield). Drilling programs in 1991 – 1992, prior to construction of TSF3, encountered no underlying groundwater systems. In 1996 three years post operation of TSF3, a section of deep weathered fractured bedrock running north – south under TSF2 was detected, with seepage consequently expected to run north-south with spread to east and west less (Berry 2017).

Immediately underlying the TSFs is alluvial soil, of moderate permeability to a depth of less than 5m, overlying low permeability saprolitic clay. Highly weathered granite extends to 20-30m deep and pre-development static water levels were at this level (~490 m AHD). The only natural groundwater occurrences were minor and discontinuous zones associated with bedrock fractures (Berry 2017).

The tailings seepage salinity of 15,000 mg/L is distinct from the salinity of local groundwater. The seepage is also chemically distinct with elevated arsenic, magnesium, nickel and sulfate concentrations (Berry 2017). Vertical seepage from the TSF has mounded in the previously unsaturated materials and this water has a slight tendency to migrate laterally through low permeability geology which were previously unsaturated.

A ground conductivity survey in 2007 provided evidence of the extent of impact from seepage over the 15 year operating period 1993 – 2007. Warm colours in Figure 4 following show areas of elevated conductivity, with the area most affected being to the north and south of the TSFs (Berry 2017). This is consistent with the predictions made in 1996. Limited lateral seepage to the east is shown. Cell AB is to the north of Cell CD, as shown in Figure 4.

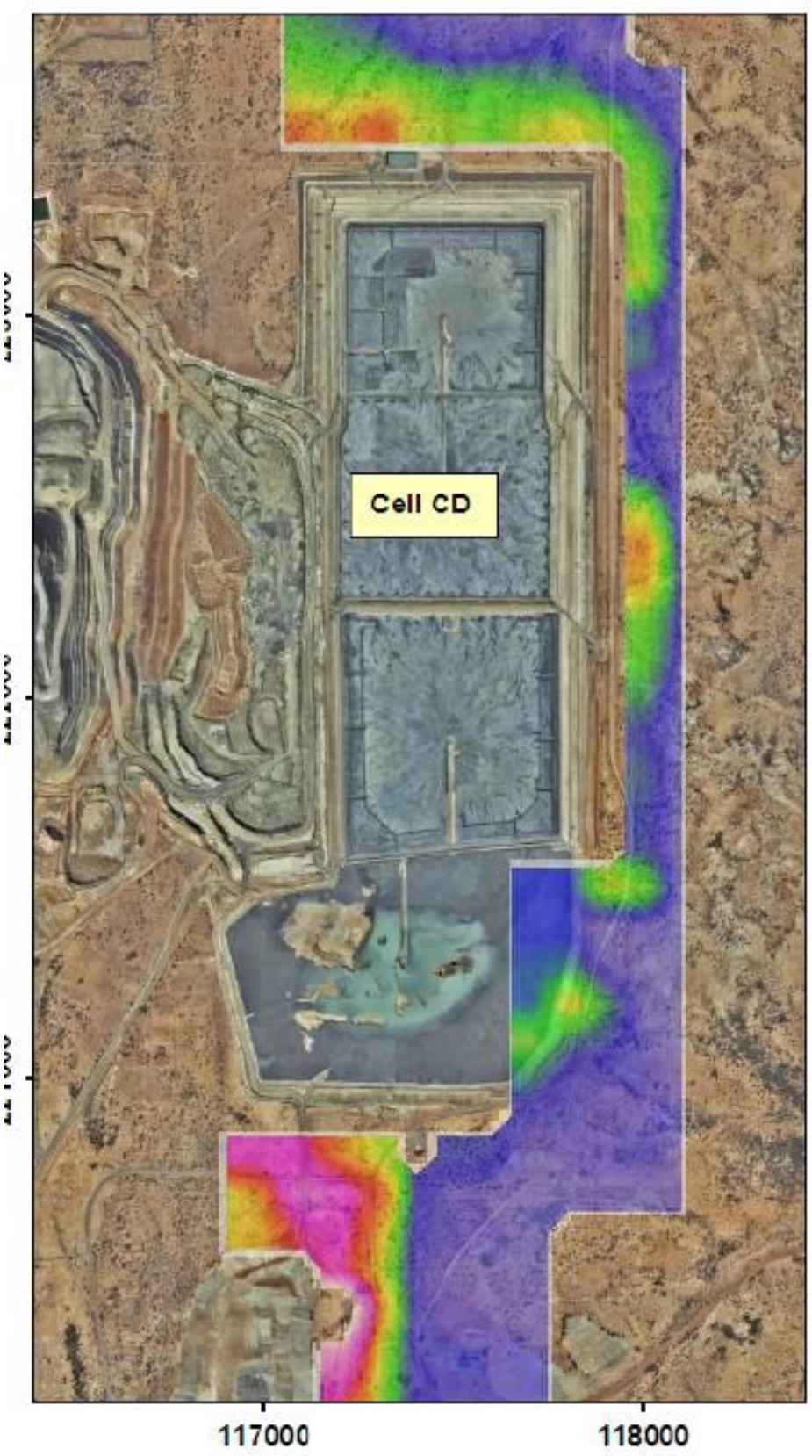


Figure 4: 2007 Ground conductivity survey using surface Electro Magnetic soundings. Areas affected by shallow saline groundwater from 15 years of TSF3 operation (1993 - 2007) shown as warm colours (high conductivity) and unaffected areas shown in blue.

Risk assessment

Table 7 and Table 8 following describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Those tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls. The risk rating is determined for risk events in accordance with the matrix set out in Table 5 below.

Table 5: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER assesses the consequence and likelihood of the Risk Event in accordance with Table 6 below.

Table 6: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity

Likelihood	
The following criteria has been used to determine the likelihood of the Risk Event occurring.	
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

Consequence		
The following criteria has been used to determine the consequences of a Risk Event occurring:		
	Environment	**Public health* and amenity (such as air and water quality, noise, and odour)**
Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*
* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*
"onsite**"** means within the Prescribed Premises boundary.

Note that the geotechnical stability and engineering of the TSF structure is not assessed by DWER under the EP Act. Instead this is regulated by the Department of Mines, Industry Regulation and Safety under the *Mines Safety and Inspection Act 1994.*

Table 7: Risk assessment for proposed amendments during construction

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 5 Processing or beneficiation of metallic or non-metallic ore	Construction of embankment raises	Dust: associated with construction activities	Adjacent native vegetation, including priority flora species.	Air	Poor vegetation health	Slight	Possible	Low	The Licence Holder controls are deemed adequate to control dust. The Scope of Work for the embankment raises requires regular wetting down of work areas to control dust (Coffey 2018). The embankment materials require a level of moisture to meet quality controls and this will also ensure that dust is minimised. Controls on dust will be conditioned in the Amendment.
		Noise	None	Air	N/A	N/A	N/A	N/A	No receptors present.

Table 8: Risk assessment for proposed amendments during operation

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Category 5 Processing or beneficiation of metallic or non-metallic ore	Tailings deposition to TSF3 Cell AB	Tailings Seepage	Adjacent native vegetation, including priority flora species.	Groundwater	Inundation of vegetation rootzones from rising groundwater levels	Moderate	Rare	Medium	Hydrogeology is well understood in the vicinity of the TSFs. Groundwater levels are stable (Berry 2017). Any increases to levels would be detected through the monitoring of local groundwater bores. An active seepage recovery program is in place using recovery bores RB01, RB02 and a seepage recovery trench at the external perimeter toe of the TSF.

									Average return of 5,900 kL/month of seepage from RB01 and RB02 (NiW 2018). There is a surface gradient increase to the east of the TSF3, also limiting lateral seepage movement to the east. Conditions W4, W5, and W6 ensure that the recovery and monitoring programs are completed.
		Tailings		Overtopping of the Cell AB release to ground	Poor vegetation health or death from tailings inundation.	Moderate	Rare	Medium	The embankment raises' design and construction uses a known scope, by geotechnical engineers (Coffey 2018). The scope is consistent with ANCOLD, internal BHP Billiton and DMIRS guidelines. Freeboard pegs indicating a depth of 300mm will be installed around the raised TSF embankment to ensure that regular monitoring of the freeboard levels. Current condition W15 on L4612 prescribes a minimum 300mm freeboard for containment infrastructure including TSF cells. Condition W16 prescribes 12 hourly inspections of the TSF infrastructure, including freeboard levels. Additionally annual and quarterly geotechnical reviews of the TSFs, including the operating manual, are completed.

Decision

TSF3 Cell AB Works

Licence Holder controls for the embankment raise will be conditioned on the Licence to ensure that these controls are met. Condition W6 currently on the Licence captures the monitoring of groundwater levels and quality in the vicinity of the TSF3 and is adequate to assess any potential impacts arising from increased tailings deposition to Cell AB. Maintenance of perimeter toe drains and recovery and groundwater monitoring bores is required by existing Conditions W4 and W5.

The risk of overtopping is managed through Conditions W15 and W16 which prescribe a minimum freeboard to be maintained on the TSF cells and 12 hourly inspections of the freeboard and TSF infrastructure.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 19 March 2018. The Licence holder responded on 19 March 2018. No comments were received and the Licence Holder waived the remaining consultation period.

Amendment

1. Condition W9(a) of the Licence is amended by the insertion of red text in underline as shown below:

CONSTRUCTION OF TSF EMBANKMENT RAISES

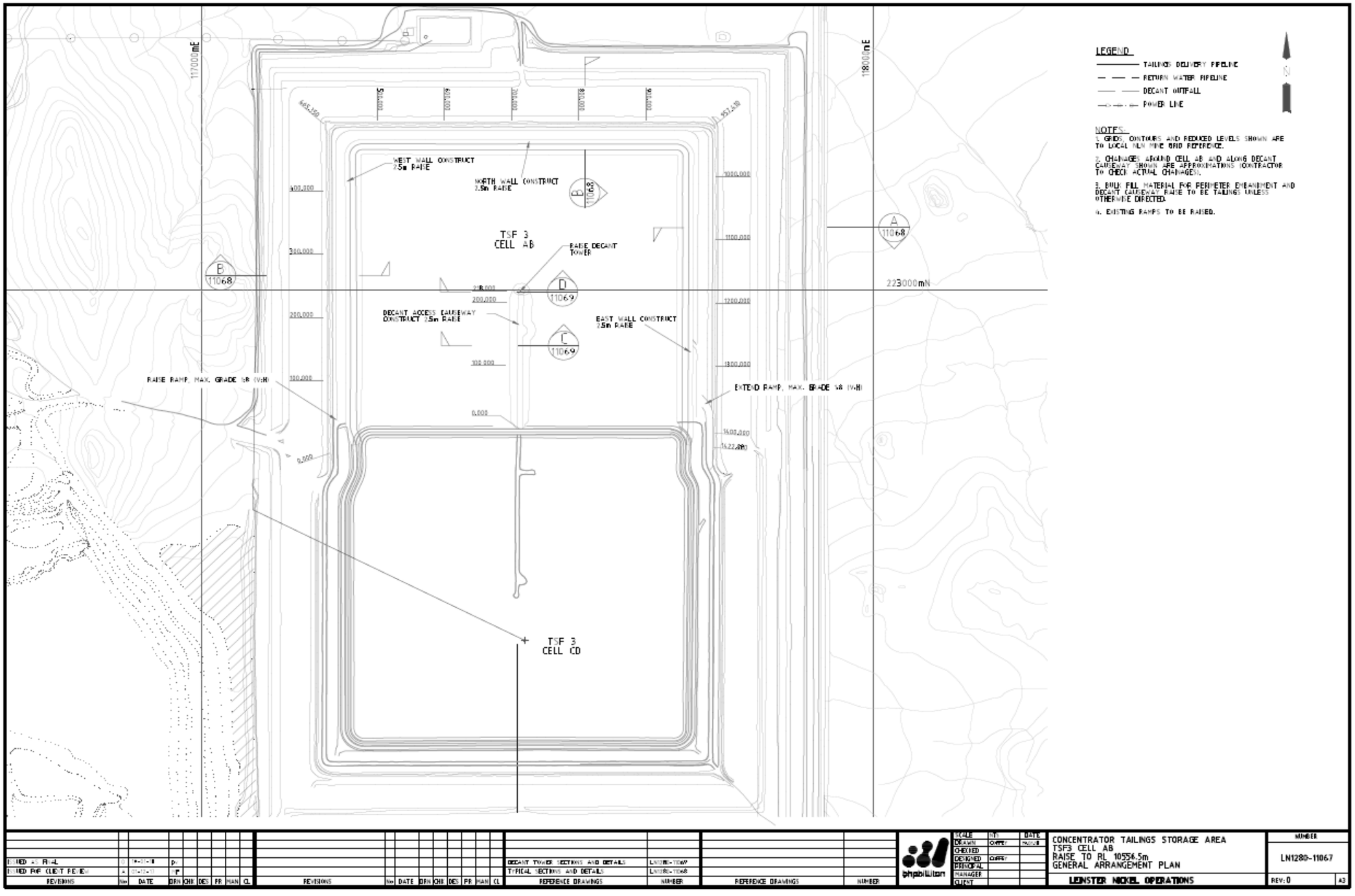
W9 (a) The Licensee shall ensure that each item of infrastructure or equipment specified in column 1 of Table 6 is designed and constructed in accordance with the requirements specified in column 2 of Table 6.

Table 6: Infrastructure or equipment requirements (construction)

Column 1	***Column 2***
Infrastructure	***Requirements***
Perimeter tailings pipeline	*Removal and reinstatement; located as shown in Attachment 10.*
Upstream raises of TSF3 Cell CD embankments	*To a maximum height of RL 10,556.5m*
Areas subject to construction activities for Cell CD Raise	*Minimise dust by using water carts to wet down work areas.*
Upstream raises of TSF3 Cell AB embankments (west wall, north wall and east wall)	*To a maximum height of RL 10,556.5m; construction works as shown in Attachment 10.*
Areas subject to construction activities for Cell AB Raise	*Minimise dust by using water carts to wet down work areas.*

2. The Licence is amended by the insertion of Attachment 10 as shown below:

TSF3 Cell AB Embankment Raise to RL 10.556.5m - General Arrangement Drawing



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Application to amend Licence L4612/1989/11 signed 5 February 2018	NiW 2018	DWER internal document A1607127
2	Berry K (2017) *Nickel West Leinster Assessment of Groundwater Characteristics*, April 2017	Berry 2017	Appendix 2 to the Application Supporting Document (DWER internal document A1607127)
3	Coffey Services Australia Pty Ltd (2018) *Leinster Nickel TSF3 Cell AB Raise to RL 10,556.5m (FY18) Scope of Work & Earthworks Specification*, 19 January 2018.	Coffey 2018	Appendix 1 to the Application Supporting Document (DWER internal document A1607127)
4	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
5	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	
6	DER, August 2016. *Guidance Statement: Licence duration.* Department of Environment Regulation, Perth.	DER 2016a	
7	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2016b	
8	DER, November 2016. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2016c	