



Licence Number L7815/2001/11

Licence Holder Saracen Metals Pty Ltd

ACN 107 154 727

File Number: 2012/006911

Premises North Eastern Goldfields Operations

Mining tenements L36/155, L36/157, L36/158, L36/181, L36/193, L36/199, L36/202, L37/61, L37/73, L37/142, L37/166, L37/181, L37/199, L37/215, L37/216, M36/35, M36/421, M36/428, M36/462, M36/473, M36/494, M36/503, M36/504, M36/512, M36/525, M36/527, M36/541, M36/542, M36/582, M37/339, M37/340, M37/356, M37/357, M37/358, M37/359, M37/360, M37/361, M37/465, M37/367, M37/368, M37/437 and M36/599

Date of Amendment 11 April 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: 11 April 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
Amendment Notice	refers to this document
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 <i>Environmental Protection Act 1986</i> Locked Bag 33 Cloisters Square PERTH WA 6850 info-der@dwer.wa.gov.au
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Licence Holder	Saracen Metals Pty Ltd
m ³	cubic metres

mbgl	metres below ground level
mtpa	million tonnes per annum
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Occupier	has the same meaning given to that term under the EP Act.
PMP	Probable Maximum Precipitation
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Notice applies, as specified at the front of this Amendment Notice.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
RL	Reduced level – survey datum point
TSF	Tailings 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 works to be constructed under category 5. No other changes to the existing Licence 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 (November 2016)*
- *Guidance Statement: Risk Assessment (November 2016)*
- *Guidance Statement: Environmental Siting (November 2016)*

Amendment description

DWER received an application to amend Licence L7815/2001/11 to construct a modified design for the tailings storage facility (TSF) Cells A and B in order to utilise additional surface area between the existing Cells A and B and the adjacent Eastern Waste Dump.

The TSF at Thunderbox Gold Mine (part of Saracen's North Eastern Goldfields Operations) consists of two above ground paddock facilities, Cells A and B, designed with basin underdrainage and a central pump out decant system. The TSF was constructed in 2002 and operated until 2007, with the facility entering an extended period of care and maintenance (non operation). The TSF was recommissioned in 2016, with stage 5 lifts for Cell A and B constructed in 2015 and 2017 respectively. In 2017 a stage 6 lift to Cell A was approved and is currently in progress. The previous construction works for each cell are summarised in Table 2 below.

Table 2: TSF Construction Summary

Stage	Cell A		Cell B	
	Crest RL	Construction completed	Crest RL	Construction completed
1	RL497.0m	October 2002	RL493.5m	October 2002
2	RL499.5m	July 2003	RL496.0m	September 2003
3	RL502.0m	October 2004	RL498.5m	October 2005
4	RL504.5m	November 2006	RL501.0m	March 2007
5	RL507.0m	December 2015	503.5m	April 2017
6	RL509.7m	In progress		

The Stage 5 embankment lift was authorised under Works Approval W5794/2015/1. The Stage 6 embankment raise was approved via Amendment Notice 1 issued on 31 October 2017.

Additionally Saracen notified DWER that groundwater monitoring bore MB2 will be destroyed by these proposed works. As MB1, MB2 and MB3 have all been destroyed by the incremental

changes to the Eastern Waste Rock Dump and the TSF since recommissioning of the TSF in 2015, this amendment requires that 6 additional groundwater bores be installed at 3 sites: to the west and north of TSF Cell A and one to the east of TSF Cell A. These bores shall comprise a series of shallow and deep bores slotted to intercept potential groundwater mounding and also to intercept the groundwater aquifer at 15 – 20 metres below ground level.

The application has also requested an increase in the category 85 threshold from 40m³/day to 70m³/day. This increase necessitates no change to the existing approved sewage facility and discharge location at the Eastern Waste Dump.

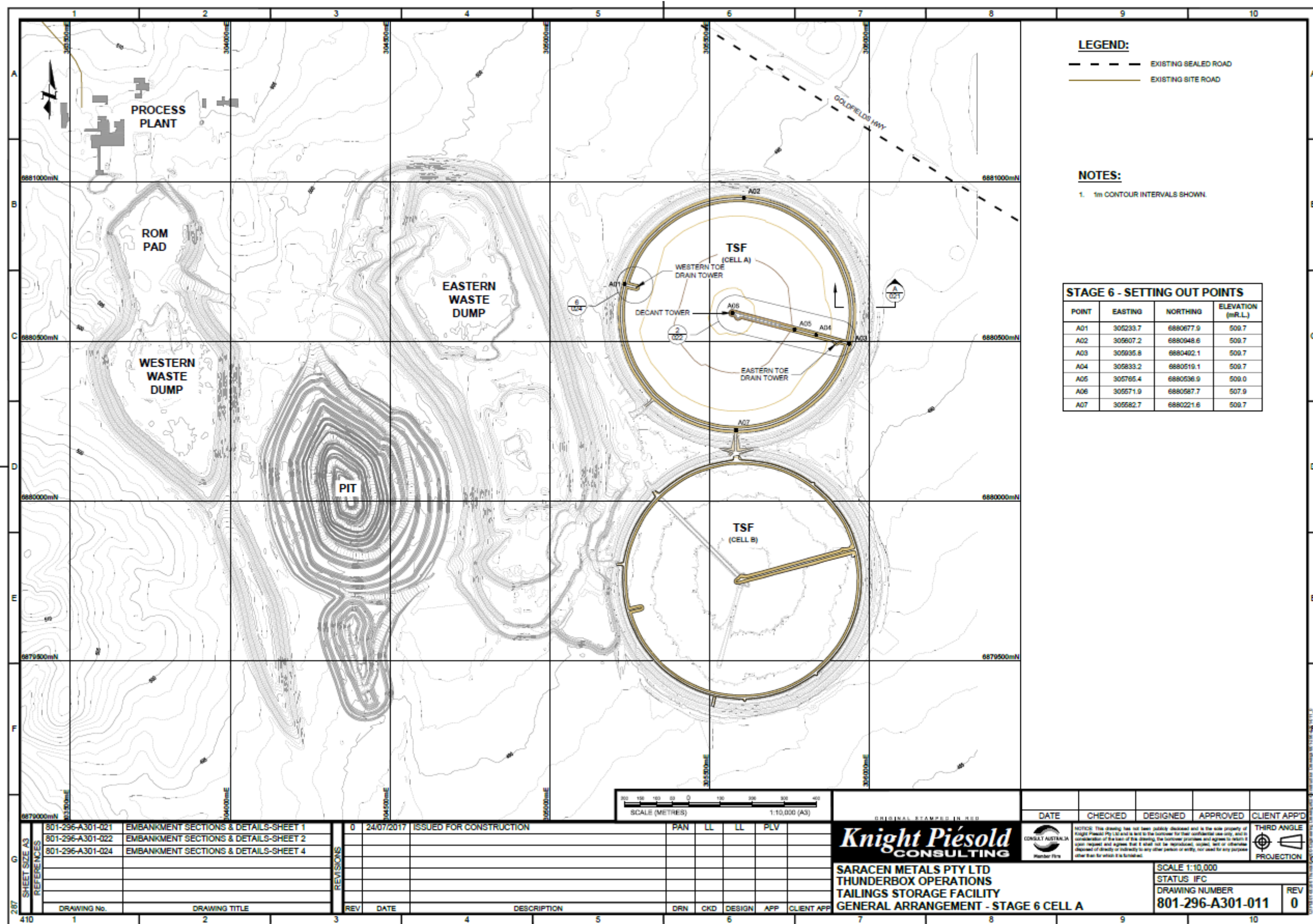


Figure 1: Existing general arrangement drawing for Stage 6 embankment raise works for TSF Cell A (works highlighted in yellow currently in progress) (Knight Piesold 2017a)

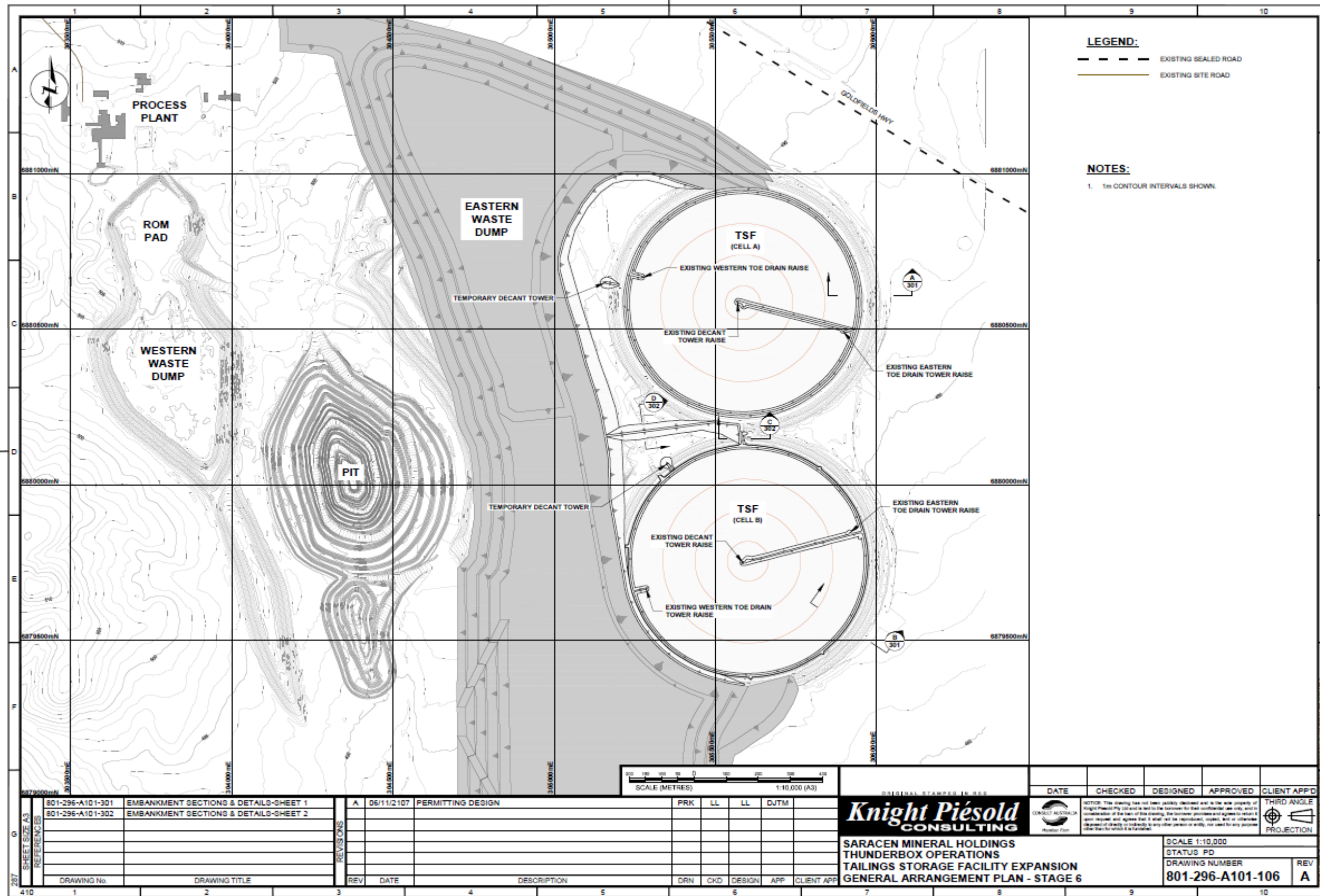


Figure 2: Proposed modified Stage 6 General Arrangement Plan for TSF Expansion to the west to meet the Eastern Waste Dump (Knight Piesold 2017c).

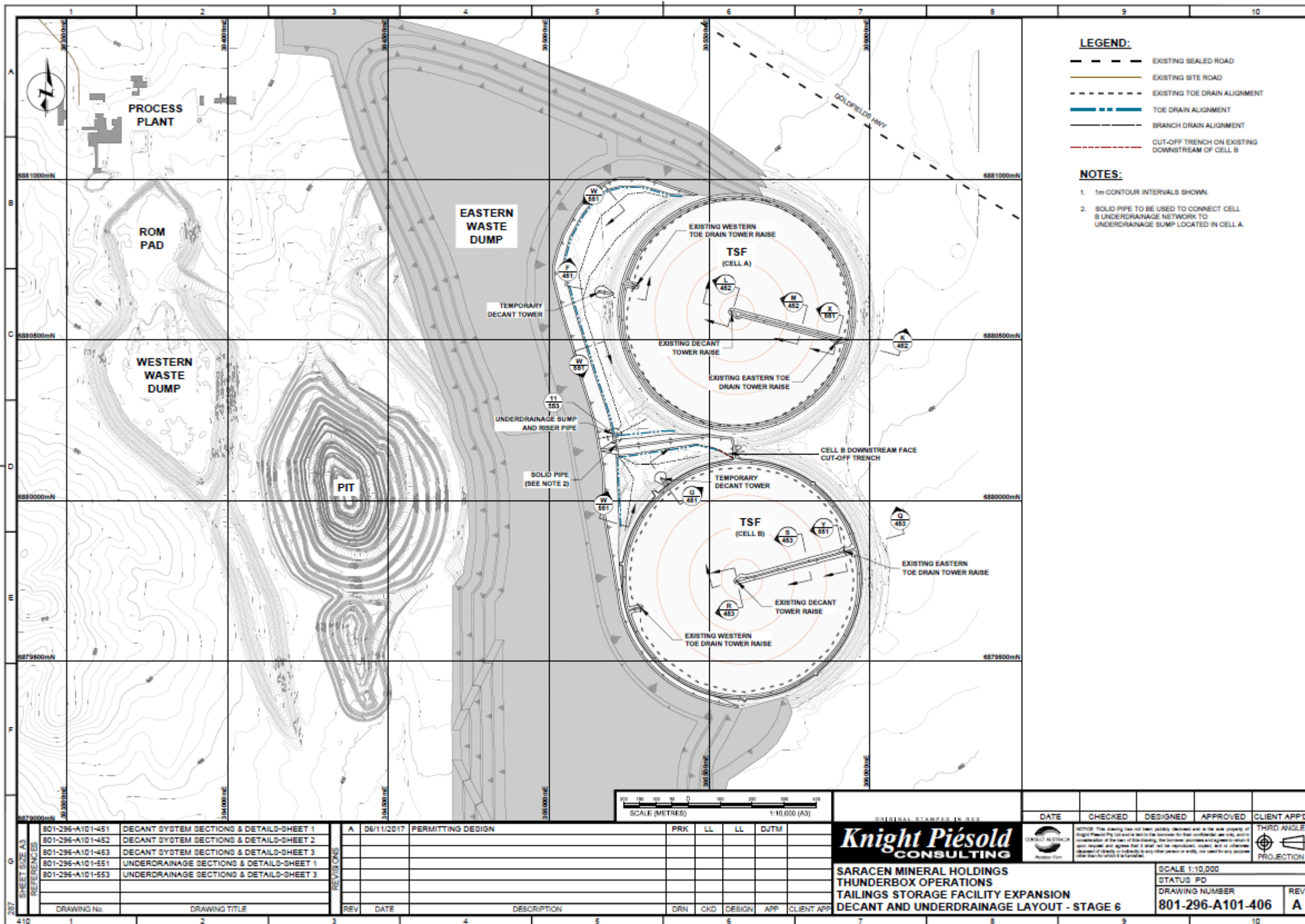


Figure 3: Proposed Stage 6 TSF expansion decant and underdrainage layout (Knight Piesold 2017c)

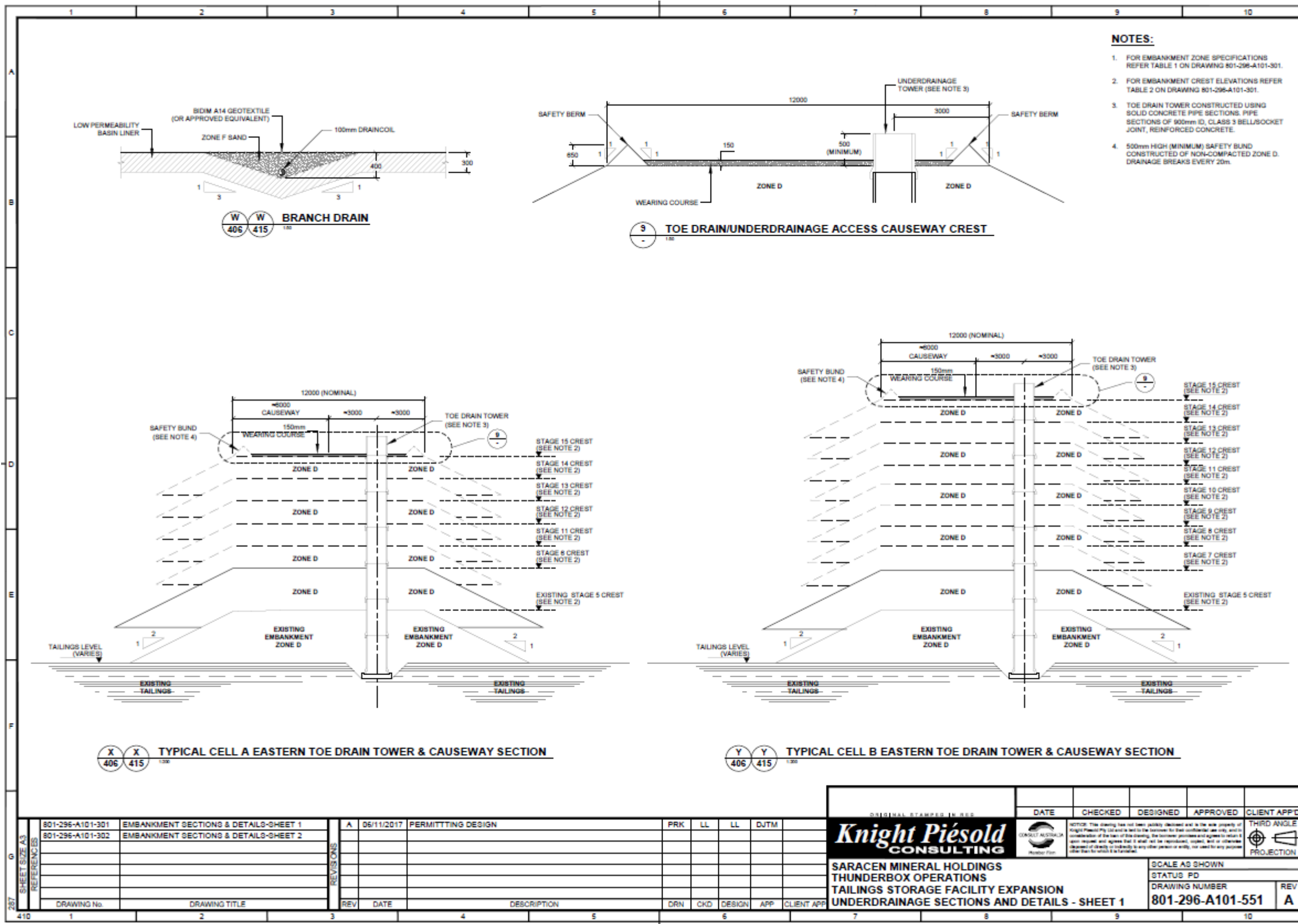


Figure 4: Underdrainage detail for TSF expansion construction (Drawing 1 of 2) (Knight Piesold 2017c)

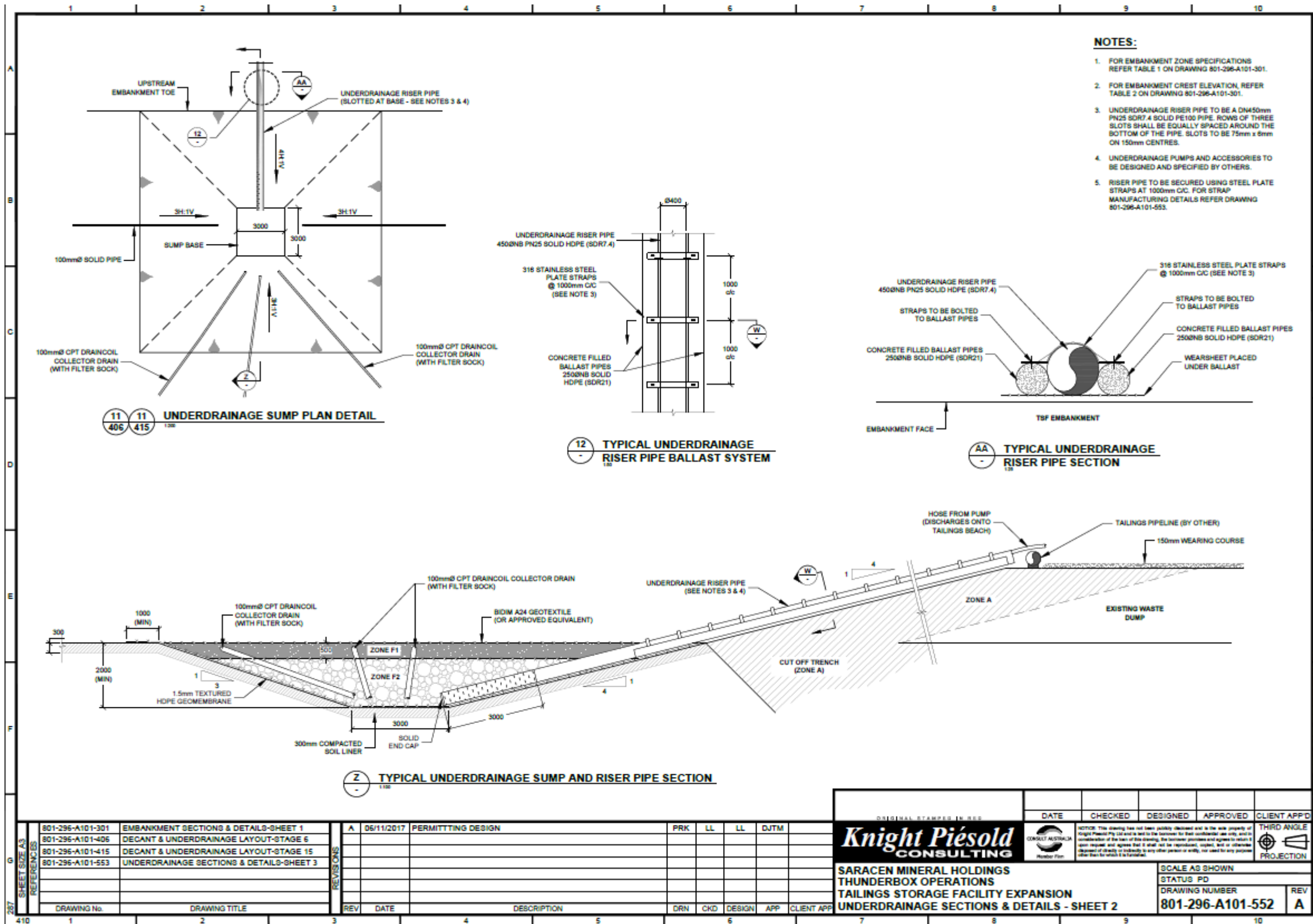


Figure 5: Underdrainage details for TSF expansion construction (Drawing 2 of 2) (Knight Piesold 2017c)

Amendment history

Table 3 provides the amendment history for L7815/2001/11.

Table 3: Licence amendments

Instrument	Issued	Amendment
L7815/2001/11	29 January 2015	Licence amendment
L7815/2001/11	29 October 2015	Licence amendment to move out of care and maintenance, increasing throughput for category 5 to 2.6 Mtpa.
L7815/2001/11	4 April 2016	Licence amendment to add categories 64 and 85.
L7815/2001/11	11 November 2016	Licence amendment to add Bannockburn tenements and tenements for the connecting haul road and pipeline to Thunderbox as part of the North Eastern Goldfield Operations' Premises. Removal of monitoring bore MB3. Correction to the power plant generators description.
L7815/2001/11	31 October 2017	Licence amendment to authorise construction of stage 6 embankment lift to TSF Cell A.
L7815/2001/11	11 April 2018	Licence amendment to authorise expansion of TSF Cell A and Cell B to abut the Eastern Waste Dump.

Location and receptors

Table 4 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 4: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Goldfields Hwy	At premises boundary

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
Groundwater (fresh, TDS 370 – 740 mg/L; pH neutral to slightly alkaline (7.1 – 8.0))	Underlying the TSF at depths of between 19 mgl to 28 mgl.

Risk Assessment Methodology

The risk assessment following utilises the risk rating matrix as shown in Table 6, recently updated in accord with DWER's *Guidance Statement: Risk Assessments (November 2016)* (DER 2016a). The risk criteria used in the matrix below is further defined in Table 7.

Table 6: 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

Table 7: Risk criteria definitions (taken from DWER's *Guidance Statement: Risk Assessments*)

Consequence			Likelihood	
The following criteria will be used to determine the consequences of a risk event occurring:			The following criteria will be used to determine the likelihood of the risk event occurring.	
	Environment	Public Health* and Amenity (such as air and water quality, noise, and odour)		
Severe	<ul style="list-style-type: none"> on-site impacts: catastrophic off-site impacts local scale: high level or above off-site 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 	<ul style="list-style-type: none"> 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 	Almost Certain	The risk event is expected to occur in most circumstances
Major	<ul style="list-style-type: none"> on-site impacts: high level off-site impacts local scale: mid level off-site 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 	<ul style="list-style-type: none"> 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 	Likely	The risk event will probably occur in most circumstances
Moderate	<ul style="list-style-type: none"> on-site impacts: mid level off-site impacts local scale: low level off-site impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> 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 	Possible	The risk event could occur at some time
Minor	<ul style="list-style-type: none"> on-site impacts: low level off-site impacts local scale: minimal off-site impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity 	Unlikely	The risk event will probably not occur in most circumstances.
Slight	<ul style="list-style-type: none"> on-site impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal impacts to amenity Specific Consequence Criteria (for public health) criteria met 	Rare	The risk event may only occur in exceptional circumstances

[^] Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*

* In applying public health criteria, DER may have regard to the Department of Health's, *Health Risk Assessment (Scoping) Guidelines*

“on-site” means within the prescribed premises boundary

Risk assessment

Tables 8 and 9 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments* (DER 2016a). Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 8: 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 TSF modified design	Dust: associated with construction activities	Passing traffic on Goldfields Hwy	Air	Health and amenity impacts	Minor (tailings solids have elevated arsenic concentration)	Unlikely	Medium	TSF scope of works requires the contractor to manage dust and regularly wet down roads and work areas (Knight Piesold 2017c).
		Noise: associated with construction activities		Air	Amenity impacts	N/A	N/A	N/A	TSF scope of works requires the earthmoving equipment to be fitted with smart alarm reversing systems maintained in good working order. Muffler systems on all equipment to be maintained in good working order (Knight Piesold 2017b). Delegated Officer deems this amenity impact to be negligible.

Table 9: 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 Cell A and Cell B	Tailings seepage	Groundwater with beneficial use (fresh water quality)	Through underlying soil to groundwater	Increasing pH, metals /metalloids in groundwater that was suitable for livestock/ potable use	Minor	Possible	Medium	Refer to 'Reasoning –risk event: Seepage impacts on groundwater quality', section below this table.
			Native vegetation	Groundwater mounding at base of the TSF	Rising standing water levels result in inundation of rootzones of adjacent vegetation	Minor (land area to the west and south is disturbed with waste rock landform and Cell B of TSF. To the north Goldfields Hwy cuts through native vegetation)	Rare (groundwater levels over the previous 15 years have demonstrated)	Low	The TSF design has a basin underdrainage system with upstream toe drains to capture seepage. Piezometers placed within the embankments during Stage 5 (previous embankment raise) have not detected any phreatic surface (wetting front/seepage) through the embankment to date. A minimum sized of supernatant pond of 5000m ³ will be maintained and there is a central decant design to keep supernatant away from the embankments (Knight Piesold 2017a).
		Tailings supernatant	Birds and other wildlife ingesting tailings liquor/ supernatant	Direct consumption	Poor wildlife health or death where WAD–CN (weak acid dissociable cyanide) concentrations are above 50 mg/L.	Moderate (salinity of supernatant is fresh so palatable to birds and other wildlife)	Unlikely (WAD-CN concentrations of supernatant typically between 10-20 mg/L with tailings slurry discharged at 3 – 33mg/L; Saracen 2014)	Medium	Research has indicated that gold processing tailings with residual WAD-CN in solution above 50 mg/L, with a salinity of less than 50 000 mg/L present a risk to wildlife health (Adams <i>et al</i> 2008). Table 3.3.1 of the Licence requires WAD–CN in tailings supernatant in the TSF to remain below a limit of 50 mg/L.

					Poor wildlife or death due to ingestion of tailings liquor with high soluble arsenic concentrations	Major (salinity of supernatant is fresh so palatable to birds and other wildlife- may result in an offsite mid level local impact refer Table 7)	Possible (soluble arsenic concentration in supernatant estimated at 23.8mg/L (Appendix C of Knight Piesold 2017c))	High	Soluble concentrations of arsenic are elevated with respect to ANZECC (2000) livestock drinking water values, and two orders of magnitude above the ANZECC (2000) guideline values for protection of freshwater species. It is unknown at this stage the extent the TSF cells may be utilised by birds and bats. Condition 1.3.16 has been added to the Licence to require the Licensee to develop and submit a plan to reduce the soluble arsenic concentrations in the supernatant. The TSF will be operated to minimize the size of the supernatant pond to a volume of 5000m ³ (Knight Piesold 2017c).
		Tailings (including supernatant)	Native vegetation	Supernatant release/ tailings overflow during extreme rainfall event	Inundation of vegetation causing poor health; vegetation death possible if covered by tailings sediment.	Moderate (tailings water quality is alkaline (8.1-9.4) and fresh (Saracen 2014). Native vegetation to the north and east may be impacted; however the Goldfields Hwy lies to the north east and bisects this vegetation.	Rare (supernatant pond size will be kept to a minimum of 5000m ³ ; and the Stage 6 design has capacity to retain rainfall runoff up to a PMP (probable maximum precipitation) 72 hour event (pond depth of 920 mm) (Knight Piesold 2017a))	Medium	The consequence of a tailings discharge is mitigated due to the disturbed land surrounding the facility (Eastern waste rock dump to the west and TSF Cell B to the south) and that the salinity of the tailings is fresh. The Licence will be amended to require the embankment raise works to be completed to ensure that the capacity of Cell A is sufficient to provide storage capacity for a PMP event of 72 hours duration, in accord with the design.

<p>Category 85: Sewage facility</p>	<p>Increase in rate of effluent discharge to Eastern Waste Dump from 40m³/day to 70m³/day</p>	<p>Treated effluent</p>	<p>Native vegetation</p>	<p>Overflow from Eastern Waste Dump</p>	<p>Inundation of vegetation with nutrients causing excessive growth, growth of weed species.</p>	<p>Slight (Discharge point on the Eastern Waste Dump is surrounded by the TSF to the east and the pit to the west, so minimal amount of vegetation that could be impacted)</p>	<p>Unlikely (Excess sprinklers - not in use currently - are available to discharge the effluent).</p>	<p>Low</p>	<p>Water quality of the effluent will remain unchanged as the existing wastewater treatment plant has capacity to operate at the increased rate of 70m³/day.</p>
--	---	-------------------------	--------------------------	---	--	---	--	-------------------	---

Reasoning – risk event: seepage impacts on groundwater quality

Groundwater monitoring over the past 15 years from the bores surrounding the TSF has shown very few records of water quality concentrations for metals/metalloids and major ions above the livestock drinking water guidelines (Appendix E of Saracen 2014; Saracen 2016). Totals dissolved solids concentrations have remained relatively steady (from between 400 – 800 mg/L in 2002 to 370 – 740 mg/l in 2016). pH has remained relatively steady (between 7.1 – 8.0 in 2016; Saracen 2016).

The works approval application supporting document for W5794/2015/1 noted that the processed ore comprises two types: oxide and primary; of which the oxide ore tailings were slightly enriched in antimony, whilst the tailings from primary ore were enriched in chromium, nickel, selenium, molybdenum and antimony. Both tailings samples were enriched in arsenic (arsenopyrites and arsenical ferrihydrates in the primary ore and non sulphide forms in the oxide tailings). It is also noted that these results are based on testwork conducted on a single oxide tailings sample and a single primary ore tailing sample (Saracen 2014).

The new expansion area to the west of the existing cells introduces the potential of increased seepage through the soil layer of the expansion area. To mitigate this risk, the TSF design has incorporated a 300mm compacted soil liner over the entire basin area, with a 200mm protection layer over the compacted soil liner to prevent erosion prior to tailings deposition. Whilst not proposed in the TSF design, the Licensee shall be required to test the hydraulic conductivity of the soil liner and ensure that it meets 1×10^{-8} m/s. An underdrainage collection system with temporary decants will also be required to be installed within the expansion area to manage seepage within the expansion area.

Cutoff trenches will also be installed through base of the embankments to reduce the likelihood of a phreatic surface developing through the embankment.

Existing Licence Condition 1.3.4 requires that a seepage collection and recovery system is provided and used to capture TSF seepage and that it is either returned to the TSF or re-used in the process. Cell A has two seepage toe drains on the western and eastern sides of the Cell, in addition to a basin underdrainage system to capture seepage and return it to the Processing Plant. Condition 1.3.6 requires an annual water balance to be conducted over the TSF in which seepage recovery volumes and volumes of tailings discharged are required to be accounted for.

Decision

Given the application of Licence Holder controls (expansion area soil liner and underdrainage collection, quality assurance and monitoring controls), the amendment application is granted for the initial expanded stage 6. Pending the submission of construction compliance documents, further amendments to the Licence to install and operate the additional stages may be granted. It is acknowledged that a potential high risk may be associated with the TSF operation due to the soluble arsenic concentration in the tailings liquor (supernatant), however new condition 1.3.16 requires a plan to be developed to undertake measures to reduce this concentration.

Licence Holder controls for the construction of the works are conditioned on the Licence in condition 1.3.11 to ensure that the work is constructed in accord with the scope of work assessed and that the Licence Holder's environmental controls are met. Conditions 1.3.3, 1.3.4, 1.3.5, 1.3.6 prescribe controls for minimum freeboard depths on the TSF, operating a seepage collection and recovery system, inspections of embankment freeboard and completing an annual water balance. Currently Licence Condition 3.3.2 capture controls in the event that groundwater levels rise above 6 mbgl. Table 3.3.1 of Condition 3.3.1 has been updated to include the requirement to monitor from the new groundwater monitoring bores at MB7S, MB7D, MB8S and MB8D. These bores are installed to replace the bores that are

destroyed by the expansion of the Eastern Waste Dump and the TSF Cell A and B.

The expansion in the capacity of the sewage treatment plant and increase in discharge of treated effluent has been approved.

Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 5 April 2018. One comment was received from the Licence Holder in regard to the proposed condition 1.3.16 (refer to Appendix 2). The remaining consultation period was waived as of 9 April 2018.

Amendment

1. The Prescribed premises categories of the Licence are amended by the deletion of text in strikethrough and the insertion of red text in underline as shown below:

Category number	Category description	Category production or design capacity	Approved Premises production or design capacity
5	Processing or beneficiation of metallic or non-metallic ore.	50 000 tonnes or more per year	2 600 000 tonnes per annual period
6	Mine dewatering-	50 000 tonnes or more per year	450 000 tonnes per annual period
52	Electric power generation	10 megawatts or more in aggregate (using a fuel other than natural gas)	14.8 MW in aggregate
64	Class II putrescible landfill	20 tonnes or more per year	5000 tonnes per annual period
73	Bulk chemical storage	1 000 cubic metres in aggregate	105 000 cubic metres in aggregate
85	Sewage facility: premises (a) On which sewage is treated (excluding septic tanks);or (b) From which treated sewage is discharged onto land or into waters	More than 20 but less than 100 m ³ per day	40 <u>70</u> m ³ per day

2. Table 1.3.5 of condition 1.3.11 of the Licence is amended as shown below:

1.3.11 The Licensee must construct the infrastructure in Column 1 of Table 1.3.5 in accord with the requirements specified in Column 2 and to plans and locations referenced in Column 3.

Table 1.3.5: Infrastructure and equipment requirements		
Column 1	Column 2	Column 3
Infrastructure/ Equipment	Requirements (design and construction)	Site plan reference
Stage 6 embankment raise to TSF Cell A	<ul style="list-style-type: none"> Construct an upstream embankment raise to the perimeter embankment of TSF Cell A from a starting embankment crest height of RL 507.0 m to completion at RL 509.7 m, in accord with Knight Piesold (2017a) General Arrangement drawing 801-296-A301-011 (Figure 1 of this Amendment Notice); Raise the eastern and western toe drain towers as per Knight Piesold (2017b) drawings 801-296-A301-023 and 024 (Figures 2 and 3 of this Amendment Notice); Complete decant return system raise works comprising an access causeway, decant tower with 1,800mm diameter slotted concrete pipe surrounded by clean waste rock, submersible pump and pipework and hoist and pulley to raise and lower the pump; and Install four piezometers within the completed Stage 6 embankments 	TSF Cell A location shown in Figure 4 of Schedule 1.
<u>Stage 6 TSF modified Cell A and Cell B design</u>	<ul style="list-style-type: none"> <u>Install a 300mm compacted soil liner over the expansion area as shown in Knight Piesold (2017c) drawing 801-296-A101-106 with a hydraulic conductivity of at least 1×10^{-8} m/s.</u> <u>Install underdrainage collection system within the expansion area as per Knight Piesold (2017c) drawings 801-296-A101-406, 801-296-A101-551 and 801-296-A101-552.</u> 	<p><u>Expansion area as shown in Figure 2 of this Amendment Notice 2.</u></p> <p><u>TSF expansion underdrainage details and location as shown in Figure 3 – 5 of this Amendment Notice 2.</u></p>
<u>Groundwater monitoring bores</u>	<ul style="list-style-type: none"> <u>Installation of nested bores at MB7S (slotted at shallow depth 1mbgl – 5mbgl) MB7D (slotted to encounter groundwater) and MB8S (slotted at shallow depth 1mbgl – 5mbgl) and MB8D (slotted to encounter groundwater) at locations as shown in Knight Piesold (2017c) drawing 801-296-A101-900 (also referred to as Figure 4b in this amendment).</u> 	<u>Monitoring Bores Location as per Figure 4b of Schedule 1.</u>

3. Condition 1.3.14 of the Licence is amended by the deletion of text in strikethrough and the insertion of red text in underline as shown below:

1.3.14 The Licensee must ensure the construction compliance document:

- (a) Is certified by a qualified engineer stating that each item of infrastructure specified in Table 1.3.5 has been constructed in accordance with the conditions of the Licence; ~~and~~
- (b) ~~Be~~ signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company; and

- (c) Includes the groundwater bore logs for newly installed nested groundwater bores.

4. Condition 1.3.16 to be added to the Licence as shown below:

1.3.16 Within 3 months of the issue of this amendment, the Licensee must submit a plan to the CEO to reduce the soluble arsenic concentrations in the tailings supernatant to 0.1 mg/L, the ANZECC (2000) livestock drinking water trigger value; or propose an alternative trigger value, with justification as to the alternative value's acceptability.

5. Table 3.3.1 of Condition 3.3.1 of the Licence is amended by the deletion of text in shown in strikethrough and the insertion of the red text shown in underline below:

Table 3.3.1: Monitoring of ambient groundwater quality and WAD-cyanide ~~tailings decant~~ concentrations

Monitoring point reference and location	Parameter	Limit	Units	Averaging period	Frequency	
Monitoring bores MB2, MB4, MB5 and MB6 <u>MB7S, MB7D</u> <u>MB8S, MB8D</u> <u>(Location of new bores as shown in Figure 4b following.)²</u>	pH ¹	6.0 to 9.0	-	Spot sample	Quarterly	
	Standing water level (SWL)	>4	mbgl			
	Total dissolved solids (TDS)	<1500	mg/L			
	Weak acid dissociable cyanide (WAD CN)	<0.5				
	Arsenic (As)	<0.5		mg/L	Spot sample	Six monthly
	Antimony (Sb)	-				
	Bicarbonate (HCO ₃)	-				
	Calcium (Ca)	-				
	Carbonate (CO ₃)	-				
	Cadmium (Cd)	-				
	Chloride (Cl)	-				
	Chromium (Cr)	-				
	Cobalt (Co)	-				
	Copper (Cu)	-				
	Total cyanide (CN)	-				
	Iron (Fe)	-				
	Lead (Pb)	-				
	Magnesium (Mg)	-				
	Manganese (Mn)	-				
	Mercury (Hg)	-				
Molybdenum (Mo)	-					
Nickel (Ni)	-					
Nitrate (NO ₃)	-					
Potassium (K)	-					
Selenium (Se)	-					
Sodium (Na)	-					
Sulphate (SO ₄)	-					
Thallium (Tl)	-					
Zinc (Zn)	-					
Decant (supernatant) pond of each operating Cell of the Tailings Storage Facility	Weak acid dissociable cyanide	50	mg/L	Spot sample	Quarterly	
	<u>Arsenic¹</u>	-			<u>Weekly</u>	

Note 1: In-field non NATA accredited analysis permitted

Note 2: Monitoring to commence following bore installation.

6. Schedule 1 of the Licence is amended by the addition of Figure 4b below:

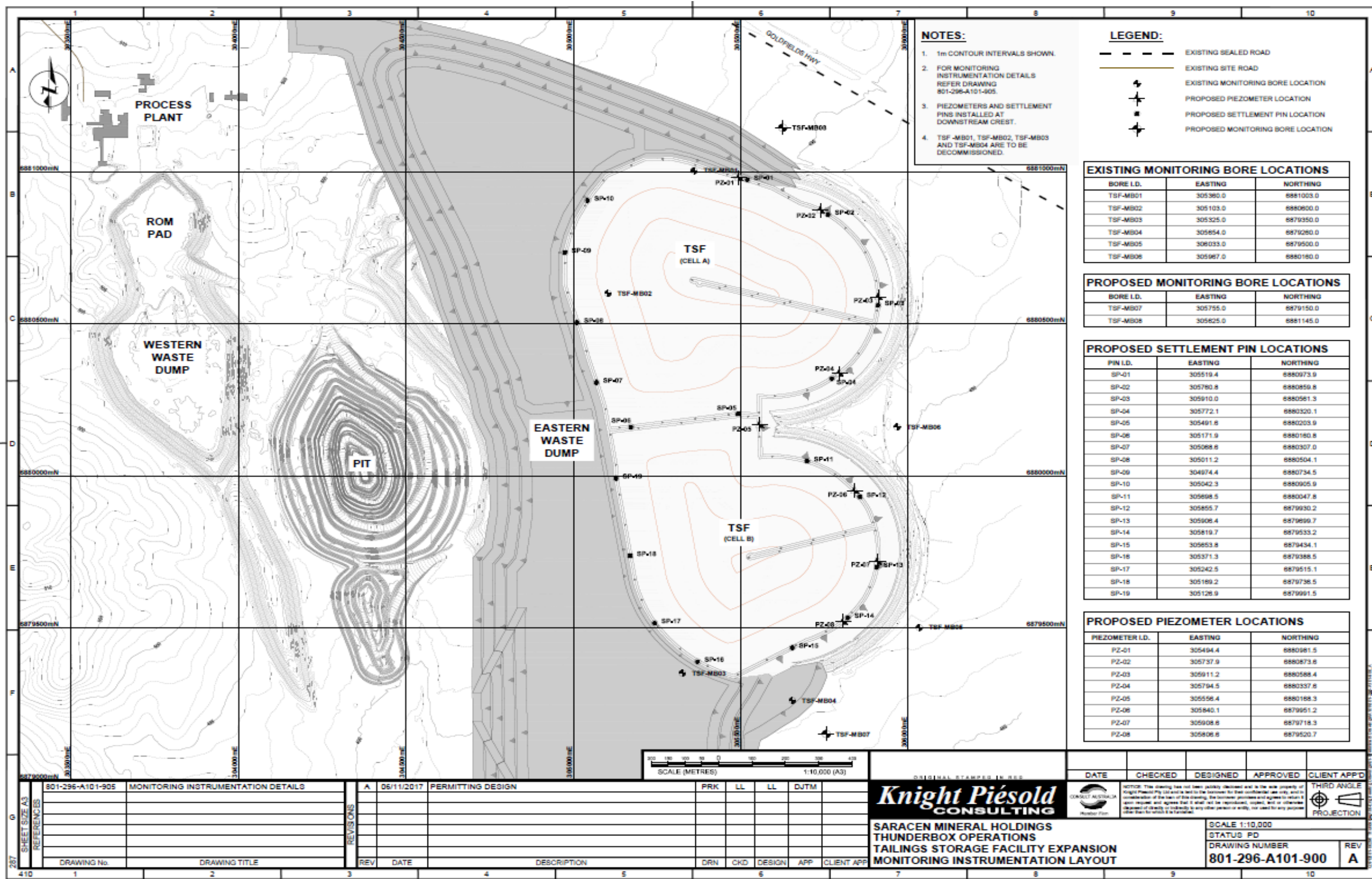


Figure 4b: Location of TSF groundwater monitoring bores, including new bores at MB7 and MB8.

Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L7815/2001/11	L7815/2001/11	accessed at www.dwer.wa.gov.au
2	Works Approval W5794/2015/1	W5794/2015/1	
3	Adams, M.D., Donato, D.B., Schulz, R.S. and Smith, G.B., (2008) <i>Influences of Hypersaline Tailings on Wildlife Cyanide Toxicosis</i> ; MERIWA Project M398 (II) 'Cyanide Ecotoxicity at Hypersaline Gold Operations' Final Report Volume 2 – Definitive Investigation, 26 August 2008.	Adams <i>et al</i> 2008	Accessed at: https://www.mriwa.wa.gov.au/publications/previous-project-reports/
4	ANZECC & ARMCANZ (2000) <i>Australian and New Zealand guidelines for fresh and marine water quality</i> :	ANZECC 2000	Accessed at http://www.agriculture.gov.au/water/quality/guidelines/volume-1
5	DER (2015) <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth, July 2015.	DER 2015a	accessed at: www.dwer.wa.gov.au
6	DER (2015) <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth, October 2015.	DER 2015b	
7	DER (2016) <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth November 2016.	DER 2016a	
8	DER (2016) <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth November 2016.	DER 2016b	
9	Knight Piesold (2017a) Memorandum from Dave Morgan to Saracen Metals Pty Ltd Re: Thunderbox Operations – TSF Cell A Stage 6 Design, 31 August 2017	Knight Piesold 2017a	DWER records (A1516427)
10	Knight Piesold (2017b) TSF Stage 6 (Cell A) Tender Documentation, August 2017.	Knight Piesold 2017b	DWER records (A1516427)
11	Knight Piesold (2017c) <i>Saracen Mineral Holdings, Thunderbox Project, Tailings Storage Facility Expansion Permitting Design</i> , 1 November 2017.	Knight Piesold 2017c	DWER records (A1577367)
12	MEND (2004) Review of Water	MEND 2004	Accessed at: http://mend-

	Quality Issues in Neutral pH Drainage: Examples and Emerging Priorities for the Mining Industry in Canada. MEND Report 10.1		nedem.org/wp-content/uploads/2013/01/10.1.pdf
13	Ministry of Environment & Climate Change Strategy (2018) <i>British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture, Summary Report</i> , March 2018	Ministry of Environment & Climate Change Strategy 2018	-
14	Saracen Metals Pty Ltd (2014) <i>North Eastern Goldfields Operations Works Approval</i> (supporting document), November 2014.	Saracen 2014	DWER records (A836815)
15	Saracen Metals Pty Ltd (2016) <i>Annual Environmental Report 2016</i> , November 2016.	Saracen 2016	DWER records (A1335109)

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on [insert date] for review and comment. The Licence Holder responded on 9 April 2018 waiving the remaining comment period and making one comment on the draft Amendment Notice.

Condition	Summary of Licence Holder comment	DWER response
1.3.16	Saracen will conduct monitoring to determine the soluble arsenic concentrations in the tailings supernatant and assess relevance of 0.1 mg/L, the ANZECC (2000) livestock drinking water trigger value.	DWER has amended the proposed condition 1.3.16 to permit Saracen to propose an alternative trigger value to the ANZECC arsenic value for livestock drinking water, however a plan to reduce arsenic concentrations in tailings supernatant/decant is required to be submitted given the high arsenic soluble concentrations in tailings supernatant. It should be noted that the ANZECC livestock drinking water guideline value may not be a low enough concentration to protect wildlife. Interim water quality values for arsenic from British Columbia, a province of Canada, recommend 0.025mg/L as a trigger value for arsenic concentration to protect wildlife (Ministry of Environment & Climate Change Strategy, 2018).