



Works approval number	W6509/2021/1
Works approval holder	Northern Star (Carosue Dam) Pty Ltd
ACN	116 649 122
Registered business address	Level 1, 388 Hay Street SUBIACO, WA 6008
DWER file number	DER2020/000690
Duration	30/03/2021 to 29/03/2024
Date of issue	30/03/2021
Premises details	Carosue Dam Mine Site TSF Cell 3 Stage 3 embankment raise M31/295, M31/220 and M28/269 MENZIES WA 6436

Prescribed premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>)	Assessed design capacity
Category 5: Processing or beneficiation of metallic or non-metallic ore: premises on which (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam	4,000,000 tonnes per annual period.

This works approval is granted to the works approval holder, subject to the attached conditions, on 30 March 2021, by:

Terrel MacGregor

A/Manager – Resource Industries

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

Works approval history

Date	Reference number	Summary of changes
30/03/2021	W6509/2021/1	Works approval granted for the construction and time limited operations of TSF Cell 3 Stage 3 embankment raise.

Interpretation

In this works approval:

- (a) the words 'including', 'includes' and 'include' in conditions mean "including but not limited to", and similar, as appropriate;
- (b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
- (c) where tables are used in a condition, each row in a table constitutes a separate condition;
- (d) any reference to an Australian or other standard, guideline, or code of practice in this works approval:
 - (i) if dated, refers to that particular version; and
 - (ii) if not dated, refers to the latest version and therefore may be subject to change over time;
- (e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and
- (f) unless specified otherwise, all definitions are in accordance with the EP Act.

NOTE: This works approval requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this works approval.

Works approval conditions

The works approval holder must ensure that the following conditions are complied with:

Construction phase

Infrastructure and equipment

1. The works approval holder must:
 - (a) construct the infrastructure;
 - (b) in accordance with the corresponding design and construction requirements;
 - (c) at the corresponding infrastructure location, as set out in Table 1.

Table 1: Design and construction requirements

	Infrastructure	Design and construction requirements	Drawing reference
1.	Tailing storage facility Cell 3 (stage 3) embankment raise	<ul style="list-style-type: none"> • Embankments raised from 375.5 m RL to a maximum height of 377.5 m RL in accordance with drawings 801-002-C3003-150, 801-002-C3003-201 and 801-002-C3003-202 • Embankments are to be constructed using downstream construction method • Embankments are to be constructed with an upstream low permeability zone (zone A) using material with a compacted hydraulic conductivity not greater than 1×10^{-8} m/s • Embankment material compaction, layer thickness and moisture content specifications to be in accordance with Table 3 in Schedule 3 • Constructed to provide a minimum 0.5 m total freeboard (including an allowance for a 1% AEP 72-hour rain event) above the normal operating pond. 	Drawings 801-002-C3003-150, 801-002-C3003-201 and 801-002-C3003-202 as shown in Schedule 2
2.	Tailing delivery and return water pipelines	<ul style="list-style-type: none"> • Pipelines to be contained within bunded open trenches to contain leaks and spillages from pipe burst events • Pipelines to be fitted with automatic leak detection and shut off systems to minimise discharge and allow for maintenance and recovery of materials 	Not applicable
3.	Monitoring equipment	Survey settlement pins and piezometers installed in accordance with drawings 801-002-C3003-250 and 801-002-C3003-251	Drawing 801-002-C3003-250 and 801-002-C3003-251 shown in Schedule 2

Compliance reporting

2. The works approval holder must within 30 calendar days of an item of infrastructure or equipment required by condition 1 being constructed and/or installed:
 - (a) undertake an audit of their compliance with the requirements of condition 1; and
 - (b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.
3. The Environmental Compliance Report required by condition 2, must include as a minimum the following:
 - (a) certification by a suitably qualified geotechnical or civil engineer that the items of infrastructure or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;
 - (b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 1; and
 - (c) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Time limited operations phase

Commencement and duration

4. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 1 where the Environmental Compliance Report as required by condition 2 has been submitted by the works approval holder for that item of infrastructure
5. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 1 (as applicable):
 - (a) for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 4 for that item of infrastructure; or
 - (b) until such time as a licence for that item of infrastructure is granted in accordance with Part V of the *Environmental Protection Act 1986*.

Records and reporting (general)

6. The works approval holder must record the following information in relation to complaints received by the works approval holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:
 - (a) the name and contact details of the complainant, (if provided);
 - (b) the time and date of the complaint;
 - (c) the complete details of the complaint and any other concerns or other issues raised; and
 - (d) the complete details and dates of any action taken by the works approval holder to investigate or respond to any complaint.
7. The works approval holder must maintain accurate and auditable books including the following records, information, reports, and data required by this works approval:
 - (a) the works conducted in accordance with condition 1;

- (b) any maintenance of infrastructure that is performed in the course of complying with condition 5;
- (c) complaints received under condition 6.

8. The books specified under condition 7 must:

- (a) be legible;
- (b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;
- (c) be retained by the works approval holder for the duration of the works approval; and
- (d) be available to be produced to an inspector or the CEO as required.

END OF CONDITIONS

Definitions

In this works approval, the terms in Table have the meanings defined.

Table 2: Definitions

Term	Definition
AEP	Annual exceedance probability
annual period	a 12-month period commencing from 1 July until 30 June of the immediately following year.
books	has the same meaning given to that term under the EP Act.
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 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
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.
discharge	has the same meaning given to that term under the EP Act.
emission	has the same meaning given to that term under the EP Act.
EP Act	<i>Environmental Protection Act 1986</i> (WA).
EP Regulations	<i>Environmental Protection Regulations 1987</i> (WA).
premises	the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map (Figure 1 in Schedule 1 to this works approval).
prescribed premises	has the same meaning given to that term under the EP Act.
time limited operations	refers to the operation of the infrastructure and equipment identified under this works approval that is authorised for that purpose, subject to the relevant conditions.
works approval	refers to this document, which evidences the grant of the works approval by the CEO under section 54 of the EP Act, subject to the conditions.
works approval holder	refers to the occupier of the premises being the person to whom this works approval has been granted, as specified at the front of this works approval.

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in the map below (Figure 1).

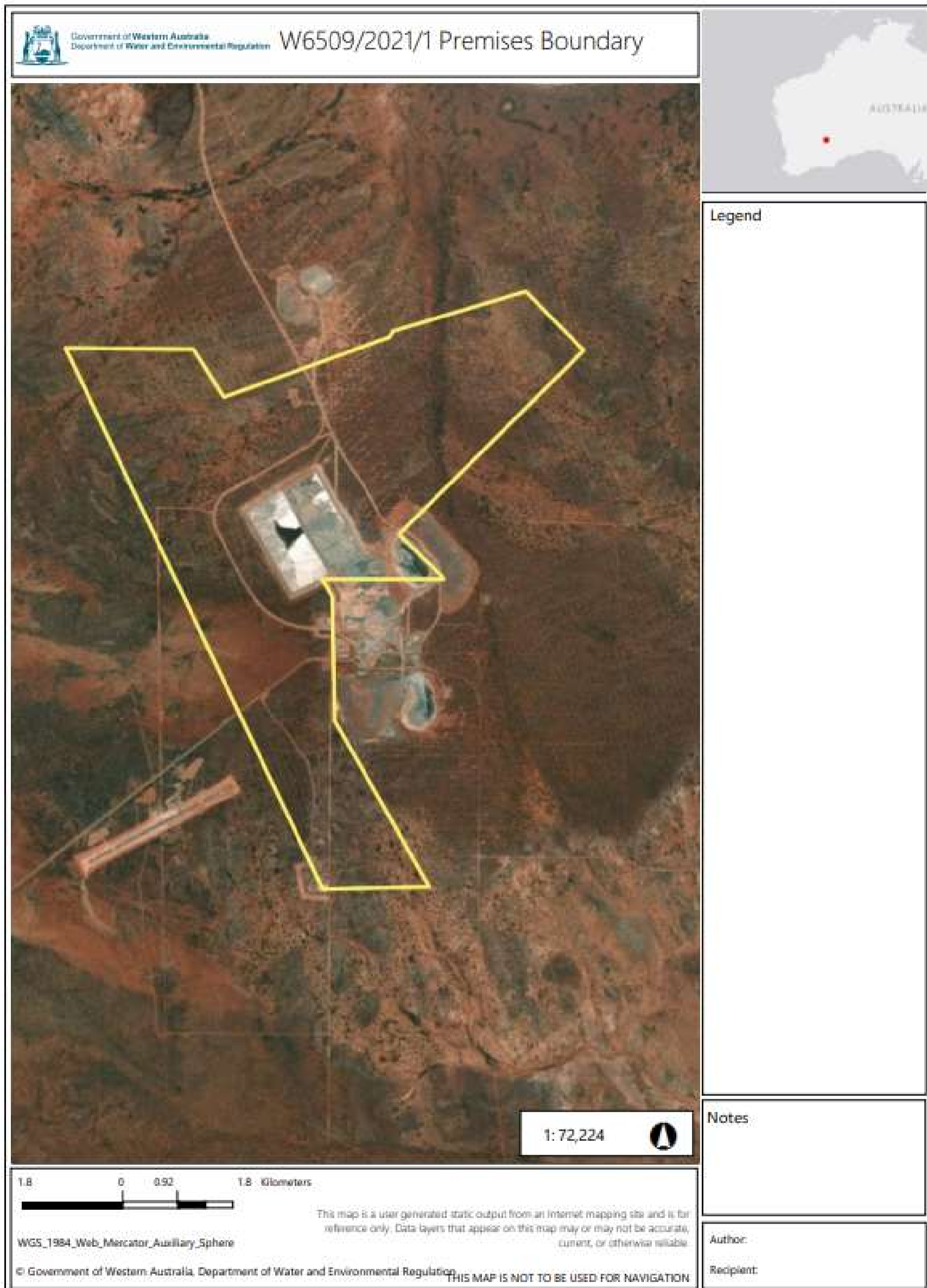
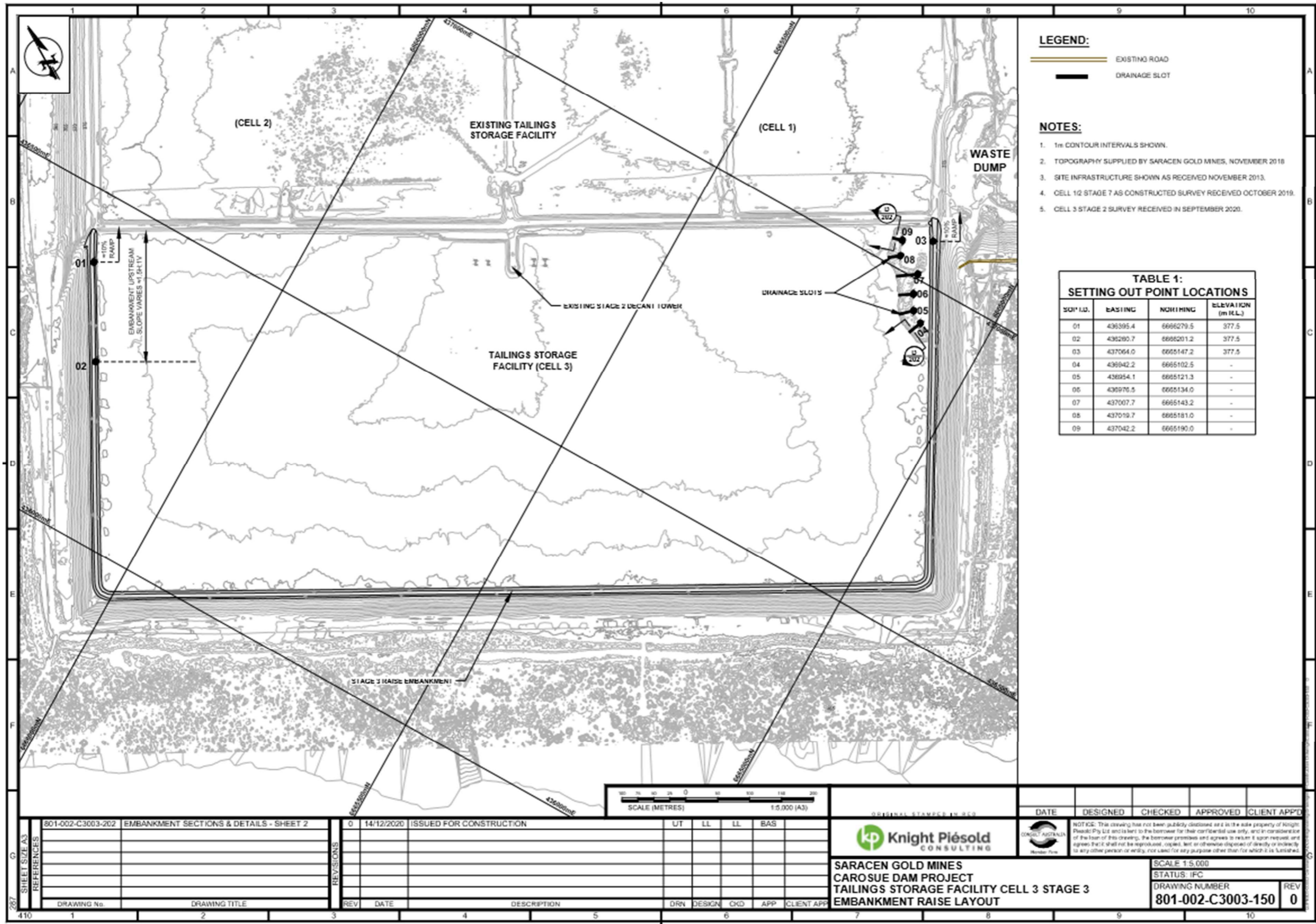
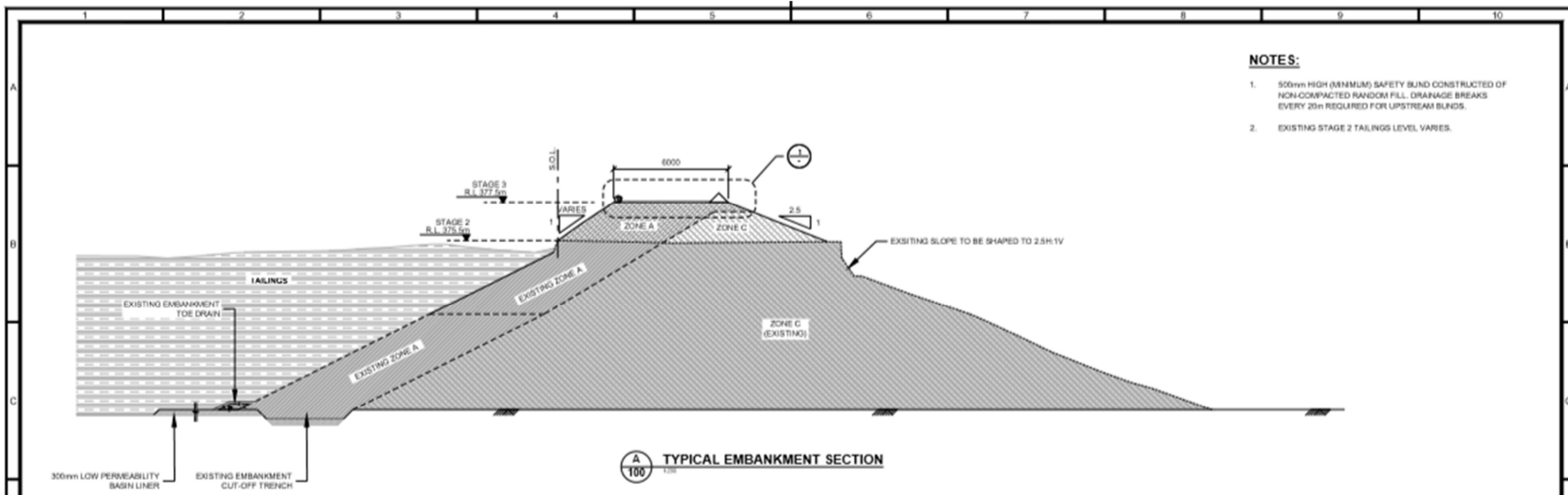


Figure 1: Map of the boundary of the prescribed premise

Schedule 2: Design Drawings





- NOTES:**
- 500mm HIGH (MINIMUM) SAFETY BUND CONSTRUCTED OF NON-COMPACTED RANDOM FILL. DRAINAGE BREAKS EVERY 20m REQUIRED FOR UPSTREAM BUNDS.
 - EXISTING STAGE 2 TAILINGS LEVEL VARIES.

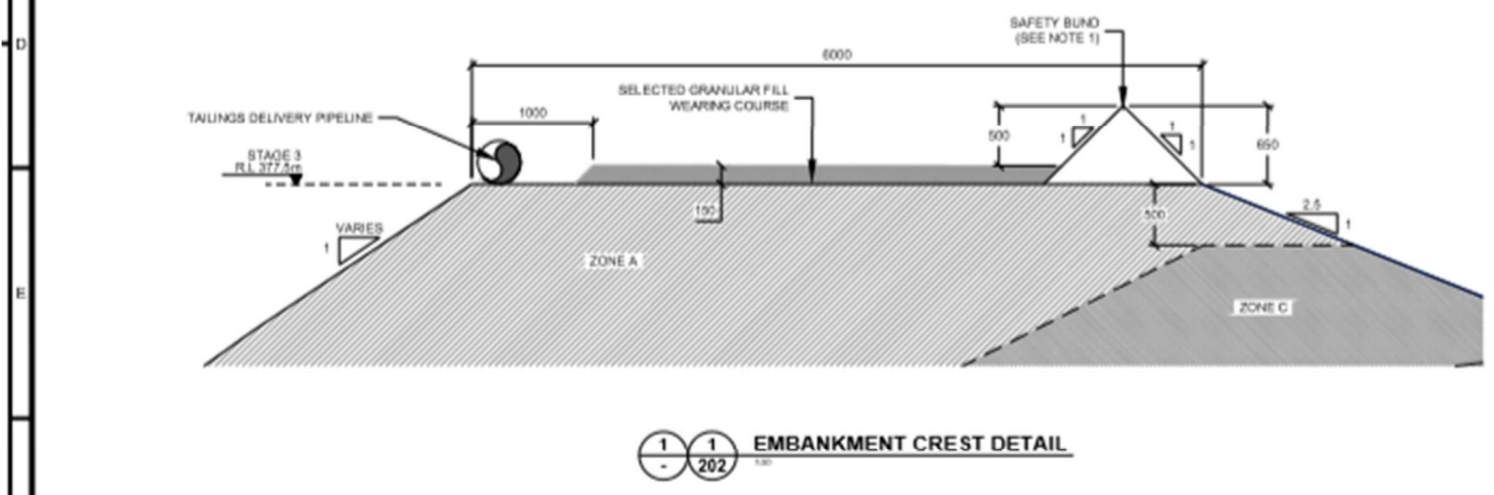


TABLE 2: ZONE SPECIFICATIONS SUMMARY

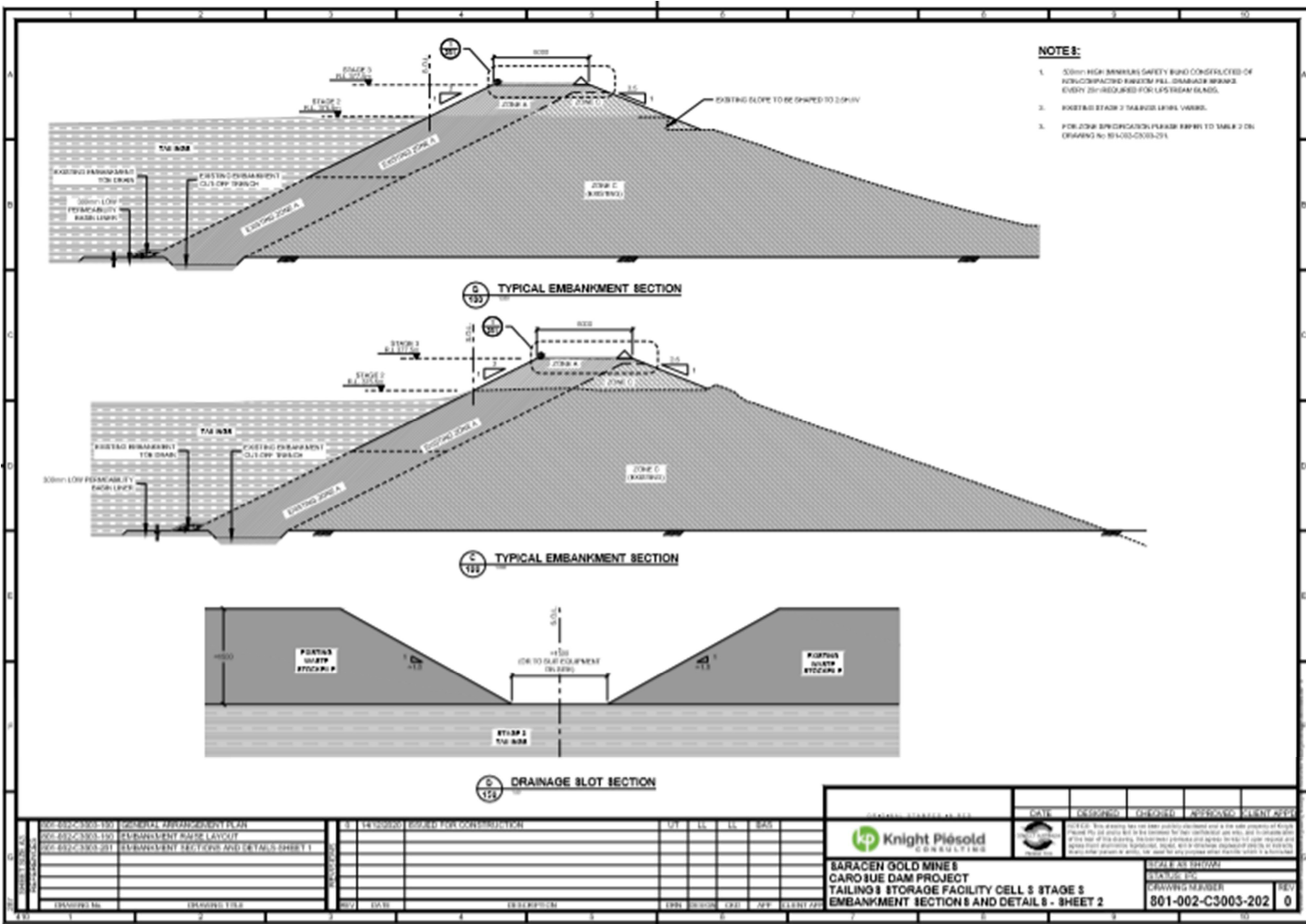
ZONE KEY	ZONE 1 (%)	DESCRIPTION	MAXIMUM LAYER THICKNESS	COMPACTION SPECIFICATION	GRAINING
Zone A		LOW PERMEABILITY FILL	300mm	95% OF STANDARD MAXIMUM DRY DENSITY OMC -2% < MC < OMC +3%	$D_{50} = 19mm$ % FINES > 40 $P_{150} > 10$
Zone C		STRUCTURAL FILL	500mm	95% OF STANDARD MAXIMUM DRY DENSITY	$D_{50} = 150mm$ % FINES > 15
Wearing Course		LATERITE GRAVEL	150mm	95% OF STANDARD MAXIMUM DRY DENSITY	$D_{50} = 37.5mm$ % FINES < 5-15 LL < 35 $P_{150} < 12$
EMBANKMENT FOUNDATION		IN-SITU MATERIAL (AS APPROVED BY THE ENGINEER)	300mm	95% OF STANDARD MAXIMUM DRY DENSITY OMC -3% < MC < OMC +3%	N/A

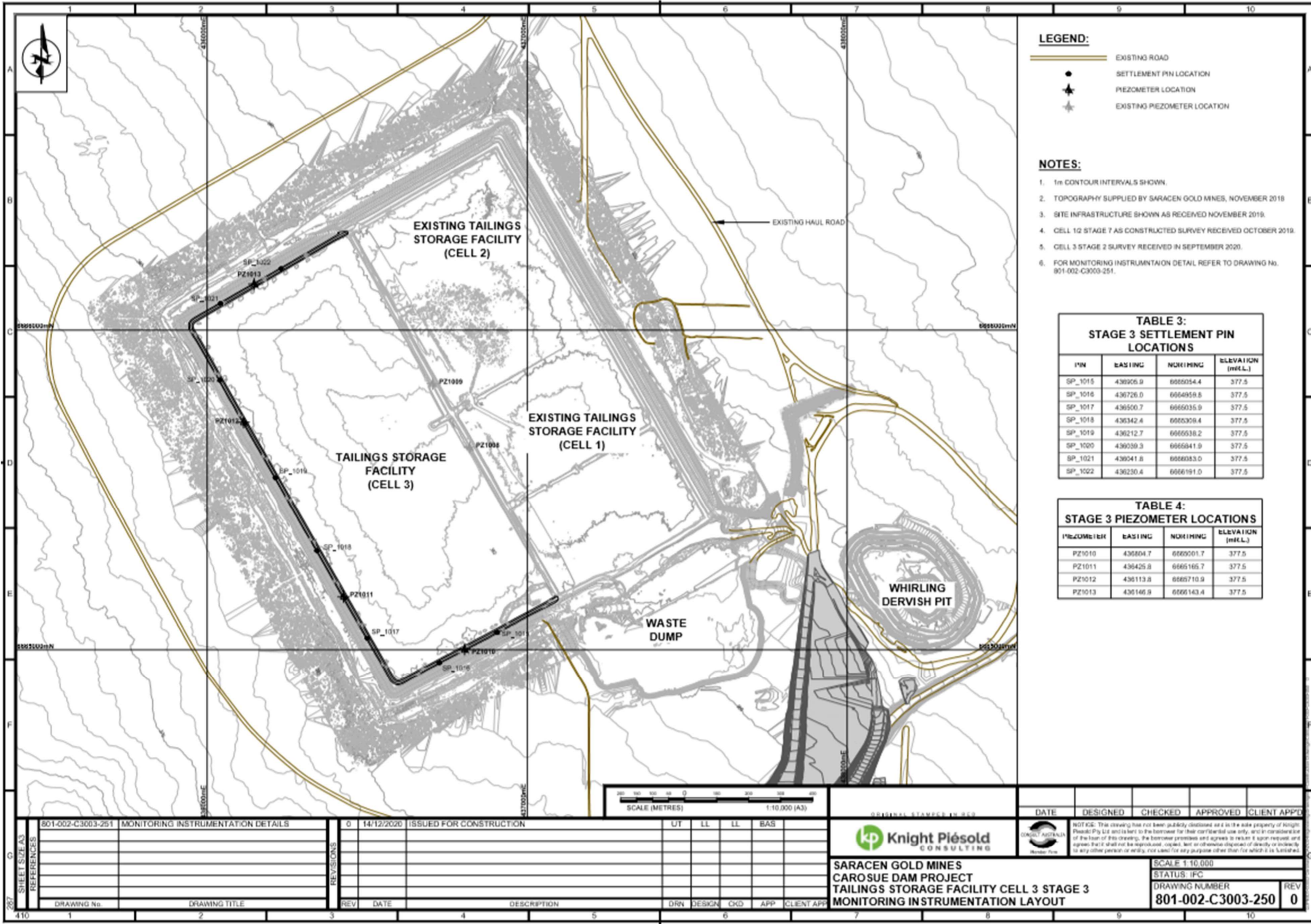
SHEET SIZE (A3) REFERENCES	801-002-C3003-100	EMBANKMENT RAISE LAYOUT	0	14/12/2020	ISSUED FOR CONSTRUCTION	UT	LL	LL	BAS						
	801-002-C3003-202	EMBANKMENT SECTIONS AND DETAILS-SHEET 2													
DRAWING No.	DRAWING TITLE		REV	DATE	DESCRIPTION	DRN	DESIGN	CHK	APP	CLIENT APP	SCALE AS SHOWN		STATUS: IFC		
410	1	2	3	4	5	6	7	8	9	10	801-002-C3003-201	REV	0		

SARACEN GOLD MINES
CAROSUE DAM PROJECT
TAILINGS STORAGE FACILITY CELL 3 STAGE 3
EMBANKMENT SECTIONS AND DETAILS - SHEET 1

DATE: _____ DESIGNED: _____ CHECKED: _____ APPROVED: _____ CLIENT APP: _____

NOTICE: This drawing has not been publicly disclosed and is the sole property of Knight Piésold Pty Ltd and is lent to the borrower for their confidential use only, and in consideration of the loan of this drawing, the borrower promises and agrees to return upon request and agrees that it shall not be reproduced, copied, lent or otherwise disposed of directly or indirectly to any other person or entity, nor used for any purpose other than for which it is furnished.





- LEGEND:**
- EXISTING ROAD
 - SETTLEMENT PIN LOCATION
 - PIEZOMETER LOCATION
 - EXISTING PIEZOMETER LOCATION

- NOTES:**
1. 1m CONTOUR INTERVALS SHOWN.
 2. TOPOGRAPHY SUPPLIED BY SARACEN GOLD MINES, NOVEMBER 2018.
 3. SITE INFRASTRUCTURE SHOWN AS RECEIVED NOVEMBER 2019.
 4. CELL 1Q STAGE 7 AS CONSTRUCTED SURVEY RECEIVED OCTOBER 2019.
 5. CELL 3 STAGE 2 SURVEY RECEIVED 31 SEPTEMBER 2020.
 6. FOR MONITORING INSTRUMENTATION DETAIL REFER TO DRAWING No. 801-002-C3003-251.

**TABLE 3:
STAGE 3 SETTLEMENT PIN
LOCATIONS**

PIN	EASTING	NORTHING	ELEVATION (mELL)
SP_1015	436926.9	6666054.4	377.5
SP_1016	436726.0	6664959.8	377.5
SP_1017	436500.7	6666035.9	377.5
SP_1018	436342.4	6665309.4	377.5
SP_1019	436212.7	6666038.2	377.5
SP_1020	436039.3	6666941.9	377.5
SP_1021	436041.8	6666033.0	377.5
SP_1022	436230.4	6666191.0	377.5

**TABLE 4:
STAGE 3 PIEZOMETER LOCATIONS**

PIEZOMETER	EASTING	NORTHING	ELEVATION (mELL)
PZ1010	436804.7	6666001.7	377.5
PZ1011	436425.8	6665165.7	377.5
PZ1012	436113.8	6665710.9	377.5
PZ1013	436146.9	6666143.4	377.5



801-002-C3003-251	MONITORING INSTRUMENTATION DETAILS	0	14/12/2020	ISSUED FOR CONSTRUCTION	UT	LL	LL	BAS
REFERENCES		REVISIONS						
DRAWING No.	DRAWING TITLE	REV	DATE	DESCRIPTION	DRN	DESIGN	CHKD	APP

ORIGINAL STAMPEL IN RED

DATE	DESIGNED	CHECKED	APPROVED	CLIENT APP'D

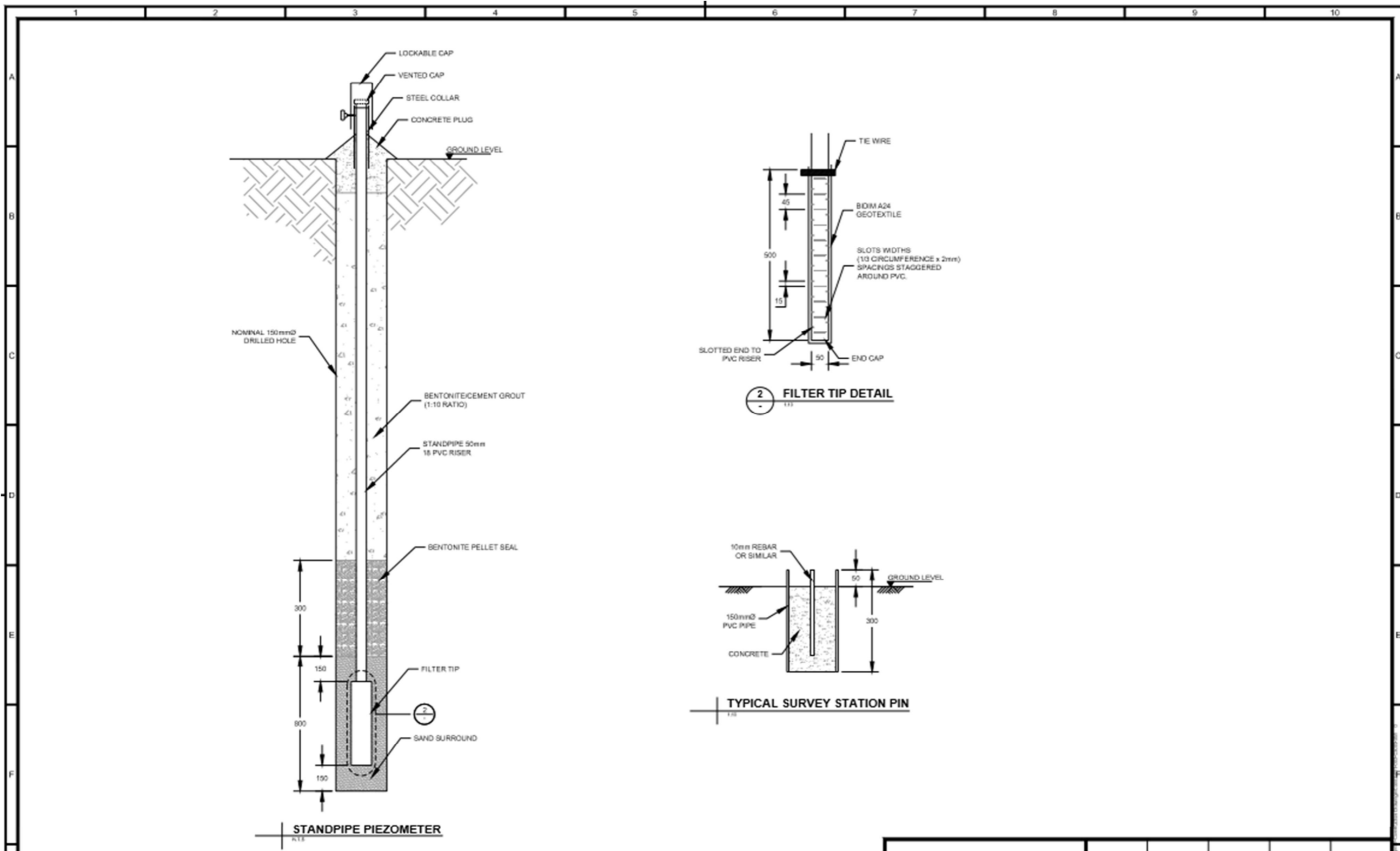
kp Knight Piesold CONSULTING

SARACEN GOLD MINES
CAROSUE DAM PROJECT
TAILINGS STORAGE FACILITY CELL 3 STAGE 3
MONITORING INSTRUMENTATION LAYOUT

SCALE 1:10,000
STATUS: IFC
DRAWING NUMBER
801-002-C3003-250

REV **0**

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REV	DATE	DESCRIPTION	DRN	DESIGN	CHKD	APP	CLIENT APP
0	14/12/2020	ISSUED FOR CONSTRUCTION	UT	LL	LL	BAS	

ORIGINAL STAMPED IN RED					DATE	DESIGNED	CHECKED	APPROVED	CLIENT APP'D
					<small>NOTICE: This drawing has not been publicly disclosed and is the sole property of Knight Piésold Pty Ltd and is lent to the borrower for their confidential use only, and in consideration of the loan of this drawing, the borrower promises and agrees to return it upon request and agrees that it shall not be reproduced, copied, lent or otherwise disposed of directly or indirectly to any other person or entity, nor used for any purpose other than for which it is furnished.</small>				
SARACEN GOLD MINES CAROSUE DAM PROJECT TAILINGS STORAGE FACILITY CELL 3 STAGE 3 MONITORING INSTRUMENTATION DETAIL								SCALE AS SHOWN	
								STATUS: IFC	
								DRAWING NUMBER	REV
								801-002-C3003-251	0

Schedule 3: Embankment raise material specifications

Compaction, layer thickness and moisture content specifications detailed for the Cell 3 stage 3 embankment raise are provided in Table 3.

Table 3: Compaction, layer and moisture content specifications

Fill description	Material type	Maximum Permissible Layer Thickness (mm)	Compaction Specification	Moisture Content
Embankment A Zone	Low Permeability Fill	300	98% of Standard Max Dry Density	Optimum +3% Optimum - 2%
Embankment Tailings	Low Permeability Fill	300	98% of Standard Max Dry Density	Optimum +3% Optimum - 2%
Embankment C Zone	Structural Fill	500	98% of Standard Max Dry Density	Not Required
Decant Access Causeway Zone D	General Fill	500	98% of Standard Max Dry Density	Not Required
Zone E	Erosion Protection	300	Uniform Density Free From Cavities	Not Required
Decant Surrounds Zone G	Rock Fill	500	Uniform Density Free From Cavities	Not Required
Embankment Foundation (Scarify and Re-Compact)	In-Situ Fill	200	98% of Standard Max Dry Density	Optimum +3% Optimum - 2%