Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6659/2022/1
Works approval holder	BHP Nickel West Pty Ltd
ACN	004 184 598
Registered business address	171 Collins Street MELBOURNE VIC 3000
DWER file number	DER2022/000104
Duration	05/12/2022 to 04/12/2025
Date of issue	5/12/2022
Premises details	Kalgoorlie Nickel Smelter Celebration Road KALGOORLIE WA 6430 Legal description - Lot 100 on Deposited Plan 212288 Certificate of Title Volume 1670 Folio 313 As shown in Schedule 1: Maps

Prescribed premises category description (Schedule 1, Environmental Protection Regulations 1987)	**Assessed design capacity**
Category 44: Metal smelting or refining	12,000 m^3 of residue solids deposited to the Stabilised Residue Dam 3 per annual period Total storage capacity of Stabilised Residue Dam 3 is 60,000m^3

*The works in isolation do not meet the description of a prescribed category under Schedule 1 of the Environmental Protection Regulations 1987 but relate to the alteration of a prescribed premises under s53 of the EP Act.

This works approval is granted to the works approval holder, subject to the attached conditions, on 5 December 2022, by:

Caron Goodbourn
Digitally signed by Caron Goodbourn
Date: 2022.12.05 13:34:18 +08'00'

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

Works approval history

Date	Reference number	Summary of changes
05/12/2022	W6659/2022/1	Works Approval granted

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 critical containment infrastructure;

(b) in accordance with the corresponding design and construction / installation requirements; and

(c) at the corresponding infrastructure location,

as set out in Table 1.

Table 1: Critical containment infrastructure design and construction requirements

	Infrastructure	Design and construction requirements	Infrastructure location
1.	SRD3	SRD3 must be constructed as follows and in accordance with the plans in Schedule 2: • SRD3 must be constructed with an emergency overflow spillway 1.2 m x 0.9 m and comprising of precast concrete box culverts or similar. • The inlet of the spillway must be at least 0.3 m above the maximum operating level of the pond. • The overflow spillway shall have a base fall of 0.5%. • A geotextile liner shall be placed at all interfaces between the SRD3 HDPE liner and the box culvert to mitigate liner damager before installation of the box culverts. • SRD3 must be constructed with a minimum storage capacity of 60,000m^3, excluding freeboard. • Constructed to contain stormwater from a 1 in 100-year AEP, 72-hour storm event plus a minimum total freeboard of 500 mm • Embankments must be constructed to a maximum embankment height of 4.5 m (RL 351 m) with embankment slopes as follows: – Upstream embankment batter 1(V):2.75(H); and – Downstream embankment batter 1(V):2(H). • Embankment crests must be a minimum of 8 m width. • SRD3 foundations must be constructed with a minimum 300 mm base compacted to achieve an average compaction of at least 95% SMDD	Schedule 2: Figure 2: Proposed location of SRD3 Schedule 2: Figure 3: Layout diagram of SRD3 Schedule 2: Figure 4: SRD3 design details

	Infrastructure	Design and construction requirements	Infrastructure location
		at a moisture content of ±2% to OMC as determined by AS 1289.5.1.1 (or equivalent). • SRD3 embankments must be constructed with a minimum 300 mm base compacted to achieve an average compaction of at least 95% SMDD at a moisture content of +2% to OMC as determined by AS 1289.5.1.1 (or equivalent). • SRD3 embankments and foundations which will be lined must be graded smooth, free from sharp objects or other materials which may damage the liner and drum rolled prior to HDPE geomembrane liner installation. • The SRD3 embankments and foundations must be double lined with HDPE geomembrane liners comprising of the following: – a top HDPE liner with a thickness of at least 2.5mm; – a geocomposite drainage layer (Geonet Interdrain M 22 or equivalent) of at least 5mm thickness between two HDPE liners that drains to a HDPE lined leak detection sump; and – a bottom HDPE liner with a thickness of at least 2mm. • All HDPE liners must comply with the requirements specified in condition 2. • HDPE liners and the geocomposite drainage layer must be anchored into anchor trenches and extend into the recovery sumps. • The basin of SRD3 will slope southward at a nominal grade of 0.5%, and the base area at the southern side (southern 10 m) shall be graded to a nominal fall of 0.5% from both the eastern and western sides towards the leak detection sump. • Anchor trenches must be offset from the embankment crest by 1 m, and be 1 m wide and 1 m deep. • Anchor trenches must be backfilled with material compacted to achieve an average compaction of at least 95% SMDD at a moisture content of ±2% of OMC as determined by AS 1289.5.1.1 (or equivalent. • A toe drain must be constructed on the eastern side connecting to the existing toe drain to divert stormwater away from SRD3.	
2.	Leak detection sump	• A leak detection sump must be installed in accordance with Schedule 2: Figure 5: Underdrainage system and leak detection	Schedule 2: Figure 5: Underdrainage

	Infrastructure	Design and construction requirements	Infrastructure location
		sump. • The recovery sump must have a DN300 PE 100 PN 12.5 incliner riser pipe wrapped in a filter sock at the pipe end.	system and leak detection sump
3.	Underdrainage system	• An underdrainage system must be installed in accordance with Schedule 2: Figure 5: Underdrainage system and leak detection sump. • The underdrainage system shall consist of slotted composite panel pipes (Megaflo '150' or equivalent) surrounded by 300 mm of fine aggregate/filter course sand wrapped in geotextile and stabilised with 150 mm of course aggregate. • The underdrainage system shall be connected to a DN300 PE 100 PN 12.5 inclined riser pipe housing a submersible pump for water recovery. • The underdrainage system shall be installed in such a way that the SRD3 dual liner system is not damaged.	Schedule 2: Figure 5: Underdrainage system and leak detection sump
4.	Decant recovery system	• A decant recovery system shall be constructed for removing supernatant water from SRD3 in accordance with Schedule 2: Figure 6: Decant system. • The decant recovery system shall comprise of pre-cast, slotted concrete rings, surrounded by rockfill of nominal 10 m radius.	Schedule 2: Figure 3: Layout diagram of SRD3
5.	Residue delivery pipeline	• A leak detection alarm and flow meter must be installed on the residue delivery pipeline to assist in identifying leaks or issues with the pipeline integrity.	N/A

2. The works approval holder must ensure all HDPE liners comply with the properties listed in Table 2 and are constructed in accordance with the requirements specified in that table.

	Item	Property/construction requirement
1.	Liner properties	HDPE liners must have the following properties: • Specific gravity of 0.94 or more; • Melt index of 0.05 g to 0.30 g in 10 minutes; • Carbon black content of 2-3%; • Minimum tensile strength at yield of 16,000 kN/m^2; • Minimum tensile strength at break of 550 kN/m^2; • Minimum elongation at yield of 10%, and at break 300%
2.	Liner fabrication	• Liners must be fabricated to form the shape of the pond embankments;

	Item	Property/construction requirement
		• All seams and joins made on the premises must be continuous; • Panels of the liner must be overlapped by a minimum of 100 mm, prior to heat welding or mechanical joining
3.	Welding materials	• Membrane welding materials must be supplied by the liner manufacturer, and be identical with the liner membrane
4.	Seams and joins	• All seams and joins must be constructed and tested as watertight over their full length using a vacuum box test and air pressure test
5.	Shear resistance	• Shear resistance must be tested in accordance with ASTM D5321

3. The works approval holder must ensure that construction of the critical containment infrastructure specified in condition 1 shall be supervised by a suitably qualified engineer.

Compliance reporting

4. The works approval holder must within 30 calendar days of the Critical Containment Infrastructure identified by condition 1 being constructed:

(a) undertake an audit of their compliance with the requirements of condition 1; and

(b) prepare and submit to the CEO a Critical Containment Infrastructure Report on that compliance.

5. The Critical Containment Infrastructure Report required by condition 4, must include as a minimum the following:

(a) certification by a suitably qualified engineer that each item of critical containment infrastructure or component(s) thereof, as specified in condition 1, has been built and installed in accordance with the requirements specified in condition 1;

(b) as constructed plans and a detailed site plan showing the location and dimensions for each item of critical containment infrastructure or component thereof, as specified in condition 1;

(c) records of any quality assurance/control testing undertaken to demonstrate the requirements of conditions 1 and 2, including the basis of any method specification adopted;

(d) a summary of HDPE geomembrane liner defects and repairs recorded during installation of the liner in accordance with conditions 1 and 2;

(e) photographic evidence of the installation of the infrastructure;

(f) details of any significant modifications made to the original design together with reasons why the modifications were necessary; and

(g) 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

6. The works approval holder may only commence time limited operations for an item of critical containment infrastructure identified in condition 1:

(a) where the CEO has notified the works approval holder that the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 4 meets the requirements of that condition; or

(b) where at least 10 business days have passed after the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 4 has been submitted to the CEO.

7. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 1:

(a) for a period not exceeding 90 calendar days from the day the works approval holder meets the requirements of condition 6 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*, if one is granted before the end of the period specified in condition 7(a).

Infrastructure and equipment

8. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 2 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 2.

Table 2: Infrastructure and equipment requirements during time limited operations

	Site infrastructure and equipment	**Operational requirement**	**Infrastructure location**
1.	Stabilised Residue Dame 3 (SRD3)	Supernatant water must be recovered and pumped back to the Process Water Pond for reuse at the premises. Deposition of slurry into SRD3 will occur from a single spigot situated along the northern embankment. An operational freeboard of at least 500mm must be maintained at all times. The volume of slurry deposited into SRD3 must be recorded during time limited operation. The volume of supernatant water recovered from SRD3 must be recorded during time limited operation.	Schedule 1: Figure 1: Map of prescribed premises

Monitoring during time limited operations

9. During time limited operations, the works approval holder must undertake inspections of the scope and type and at the corresponding frequency specified in Table 3.

Table 3: Inspection of infrastructure requirements

Type of inspection	**Scope of inspection**	**Frequency of inspection**
Visual inspection of SRD3	To confirm integrity (including signs of seepage) of SRD3	Daily whilst operating

Type of inspection	Scope of inspection	Frequency of inspection
	Assessment of freeboard capacity.	
Visual inspection of slurry delivery pipeline	To confirm integrity	Twice daily whilst operating (minimum of 8 hours apart)
Visual inspection of water return pipeline	To confirm integrity	
Dipping of seepage collection sump via dip meter	To confirm if seepage is present	Quarterly

10. The works approval holder must maintain a written log of all inspections undertaken, with each inspection signed off by the person who conducted the inspection.

Reporting (time limited operations)

11. The works approval holder must submit to the CEO a report on the time limited operations within 30 calendar days of the completion date of time limited operations or 90 calendar days before the expiration date of the works approval, whichever is the sooner.

12. The works approval holder must ensure the report required by condition 11 includes the following:

(a) a summary of the time limited operations, including timeframes;

(b) the volume of waste disposed of to SRD3 and the volume of supernatant water recovered;

(c) confirmation of visual inspections performed during time limited operations under condition 9.

(d) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable);

(e) a review of performance and compliance against the conditions of the works approval; and

(f) where the manufacturer's design specifications and the conditions of this works approval have not been met, what measures will the works approval holder take to meet them, and what timeframes will be required to implement those measures.

Records and reporting (general)

13. 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.

14. 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 8;

(c) monitoring programmes undertaken in accordance with condition9; and

(d) complaints received under condition 13.

15. The books specified under condition 14 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.

Definitions

In this works approval, the terms in Table 4 have the meanings defined.

Table 4: 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.
AS 1289.5.1.1	means the Australia Standards .1289.5.1.1 *Methods of testing soils for engineering purposes Method 5.1.1: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using standard compactive effort*
ASTM D5321	means the Active Standard ASTM D5321 / D5321M *Standard test method for determining the shear strength of soil-geosynthetic and geosynthetic-geosynthetic interfaces by direct shear*
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 *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
condition	means a condition to which this works approval is subject under s.62 of the EP Act
critical containment infrastructure	means the items of infrastructure listed in condition 1.
Critical Containment Infrastructure Report	means a report to satisfy the CEO that works of critical containment infrastructure have been constructed in accordance with the works approval.
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.
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	*Environmental Protection Act 1986* (WA).

Term	Definition
EP Regulations	*Environmental Protection Regulations 1987* (WA).
freeboard	means the distance between the maximum surface water elevations and the top of retaining banks or structures at their lowest point.
HDPE	High density polyethelene
monthly	means a one-month period commencing from first day of a month until last day of the immediately following month.
OMC	means optimal moisture content
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.
SMDD	means standard maximum dry density
suitable qualified engineer	means a person who: (a) holds a tertiary academic qualification in civil or geotechnical engineering; and (b) has a minimum of five years' experience working in the area / field of design engineering and certification of dams and/or tailings storage facilities.
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.
waste	has the same meaning given to that term under the EP Act.
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.

END OF CONDITIONS

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in green on the map below (Figure 1). Note: Mining Tenement G26/163 (shown below) is excluded from the premises boundary.

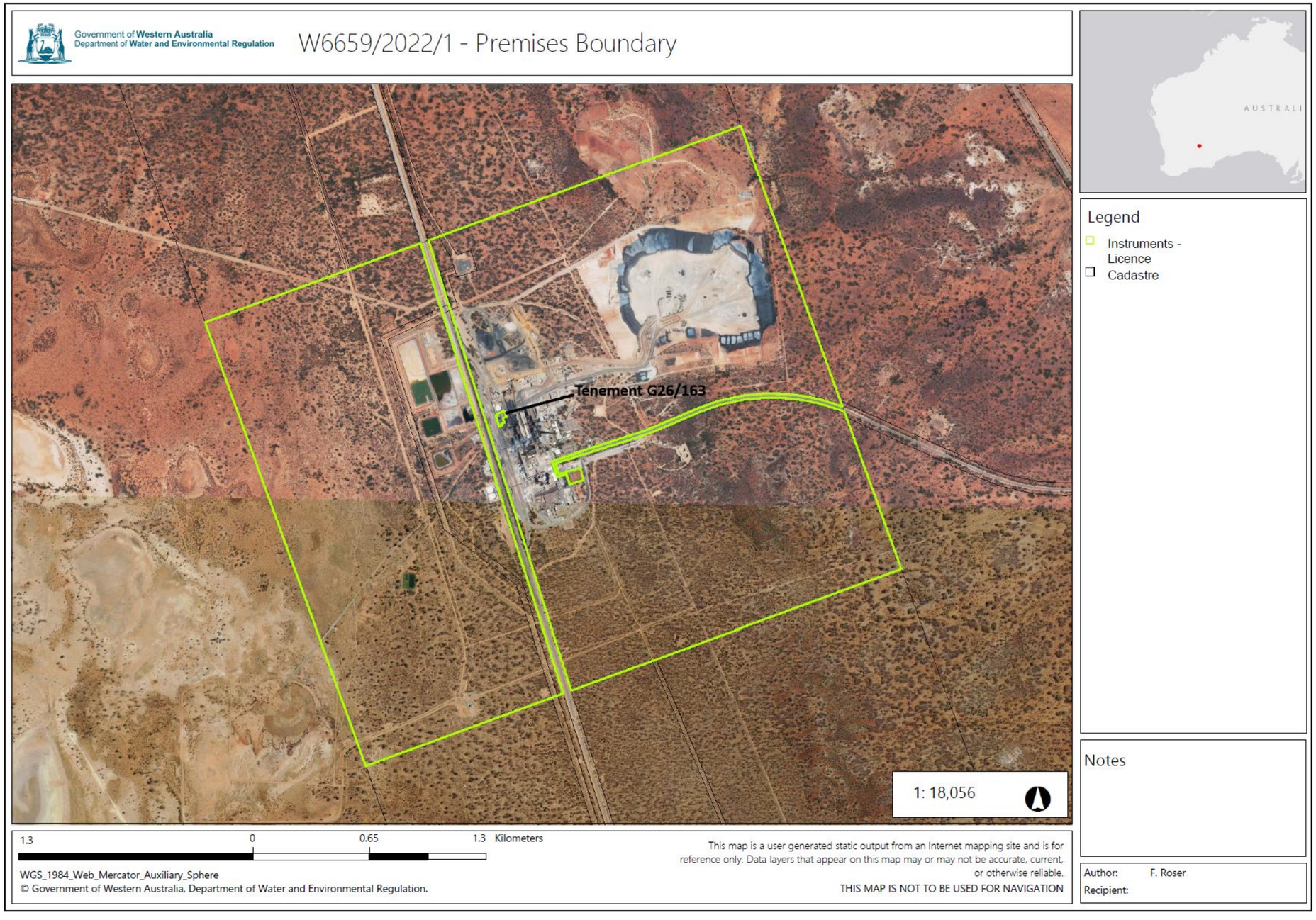


Figure 1: Map of prescribed premises boundary

Figure 2: Proposed location of SRD3

Schedule 2: Drawings

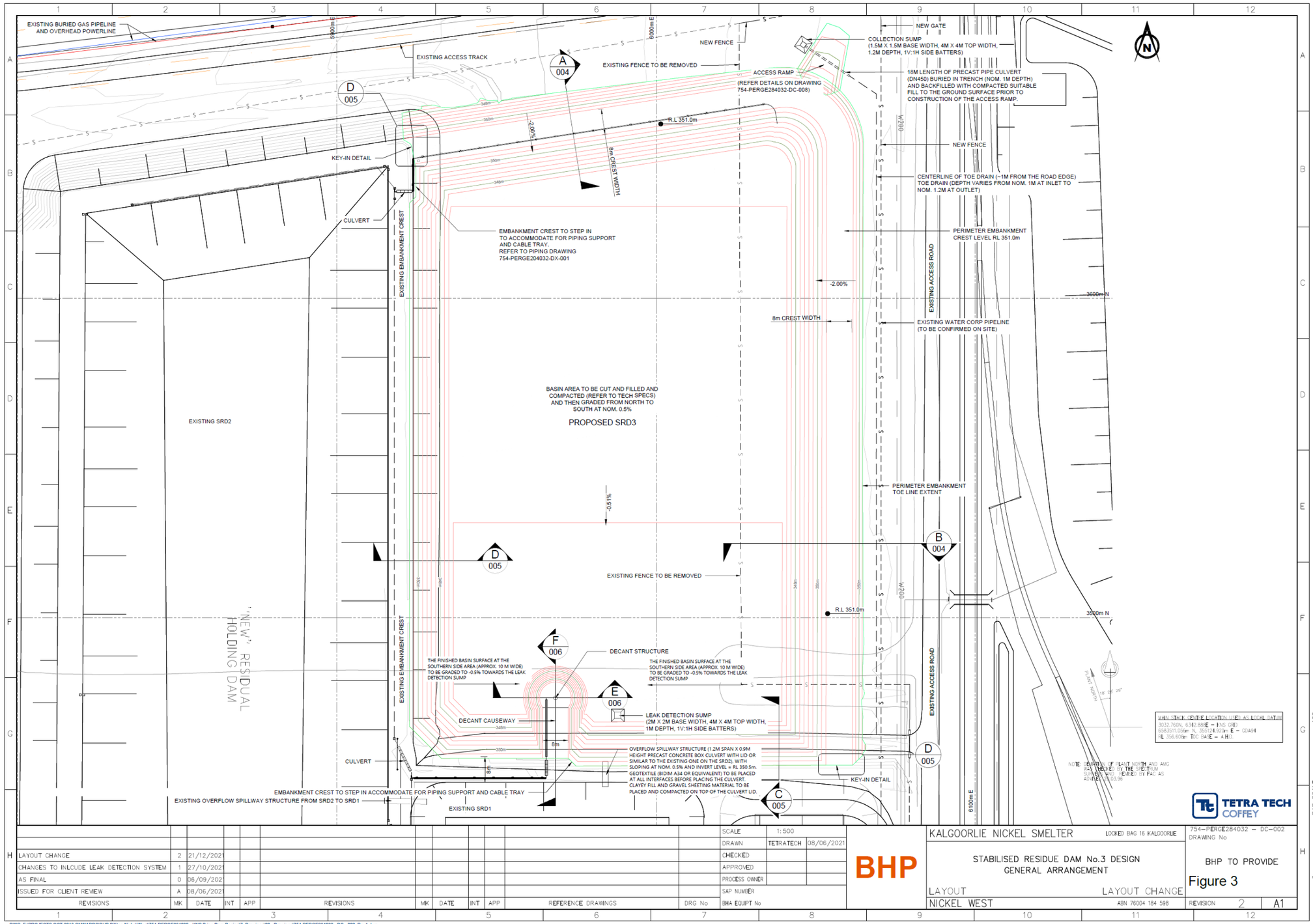
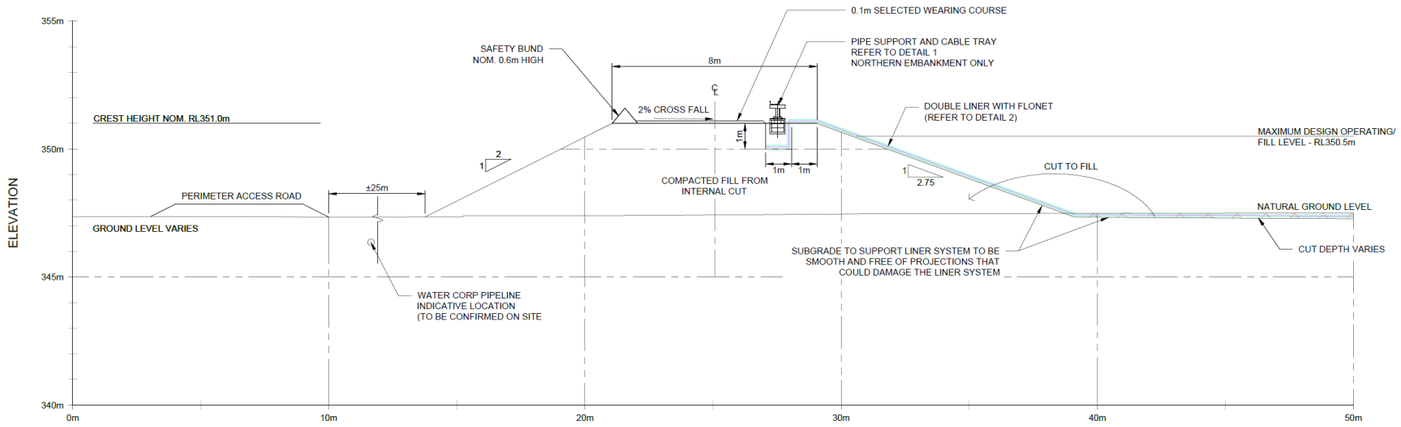
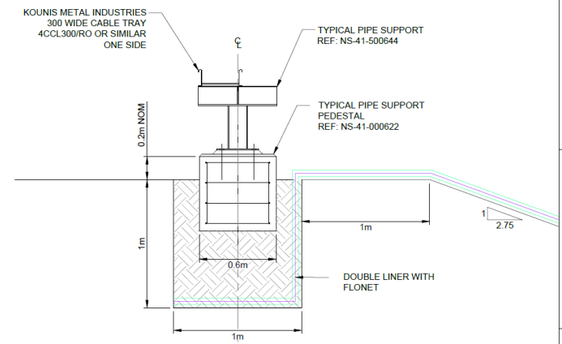


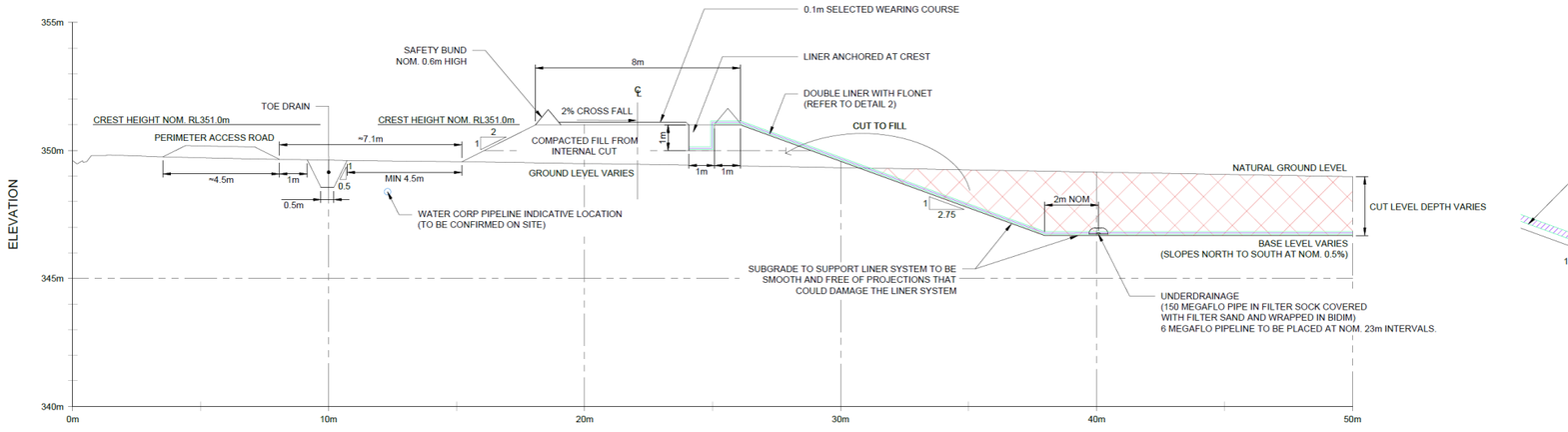
Figure 3: Layout diagram of SRD3



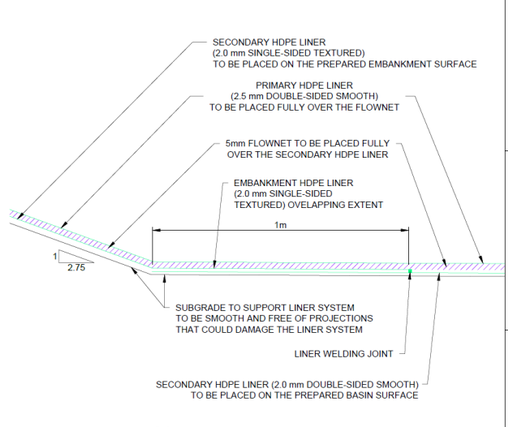
A NORTHERN PERIMETER EMBANKMENT SECTION (CHAINAGE 0m-130m)
002 SCALE 1:100



1 ANCHOR TRENCH DETAIL
- SCALE 1:20



B EASTERN PERIMETER EMBANKMENT SECTION (CHAINAGE 130m-350m)
002 SCALE 1:100



2 DOUBLE LINER DETAIL
- SCALE 1:10

TETRA TECH COFFEY

REVISIONS	MK	DATE	INT	APP
LAYOUT CHANGE	2	21/12/2021		
CHANGES TO INCLUDE LEAK DETECTION SYSTEM	1	27/10/2021		
AS FINAL	0	06/09/2021		
ISSUED FOR CLIENT REVIEW	A	08/06/2021		

SCALE	AS SHOWN
DRAWN	TETRATECH 08/06/2021
CHECKED	
APPROVED	
PROCESS OWNER	
SAP NUMBER	
BHA EQUIPT No	
DRG No	

BHP

KALGOORLIE NICKEL SMELTER — LOCKED BAG 16 KALGOORLIE

STABILISED RESIDUE DAM No.3 DESIGN
EARTHWORKS: TYPICAL SECTIONS AND DETAILS (1 OF 2)
DETAILS — LAYOUT CHANGE

NICKEL WEST — ABN 76004 184 598

754-PERGE284032 - DC-004
DRAWING No

BHP TO PROVIDE
Figure 4

REVISION 2 A1

Figure 4: SRD3 design details

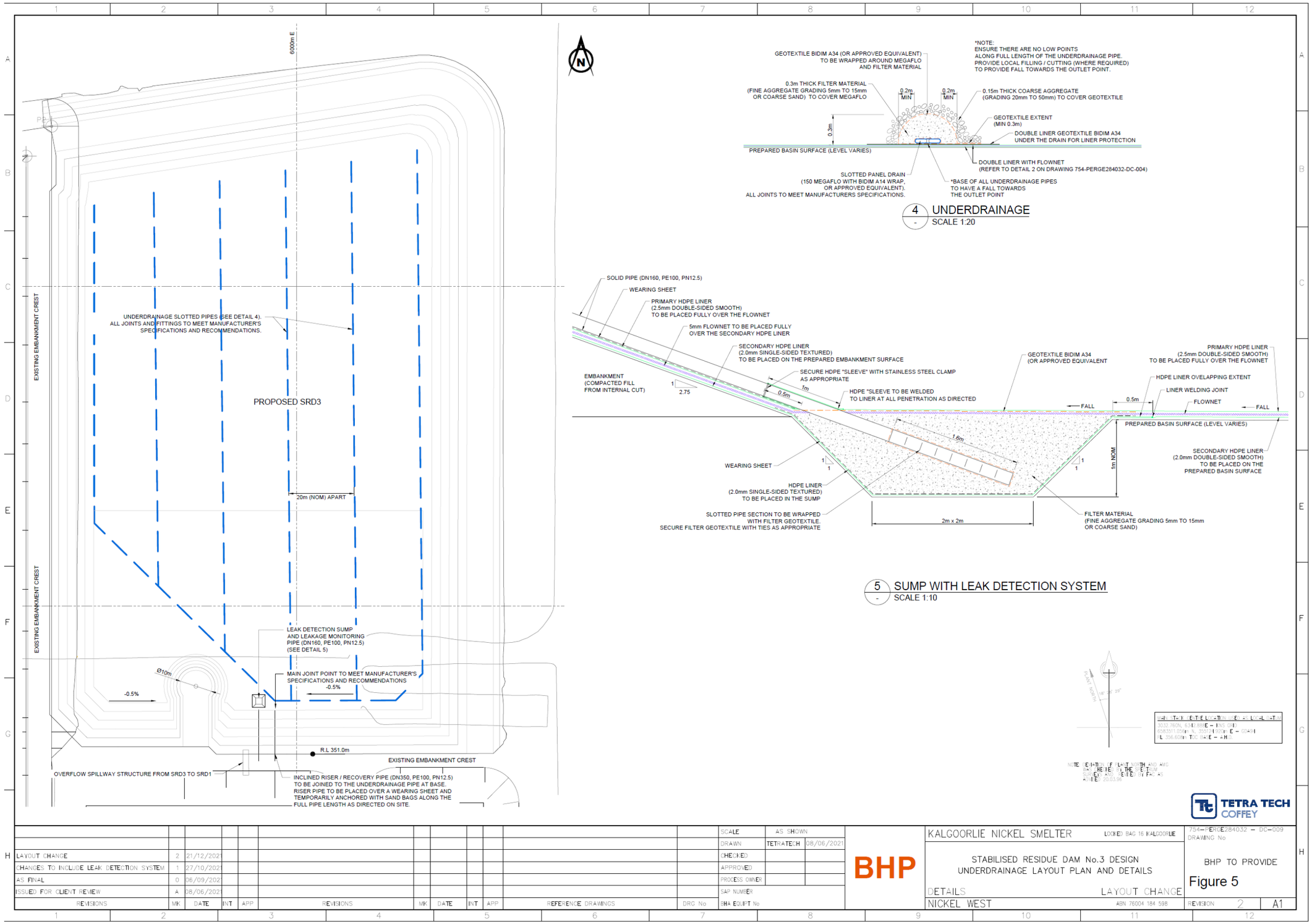


Figure 5: Underdrainage system and leak detection sump

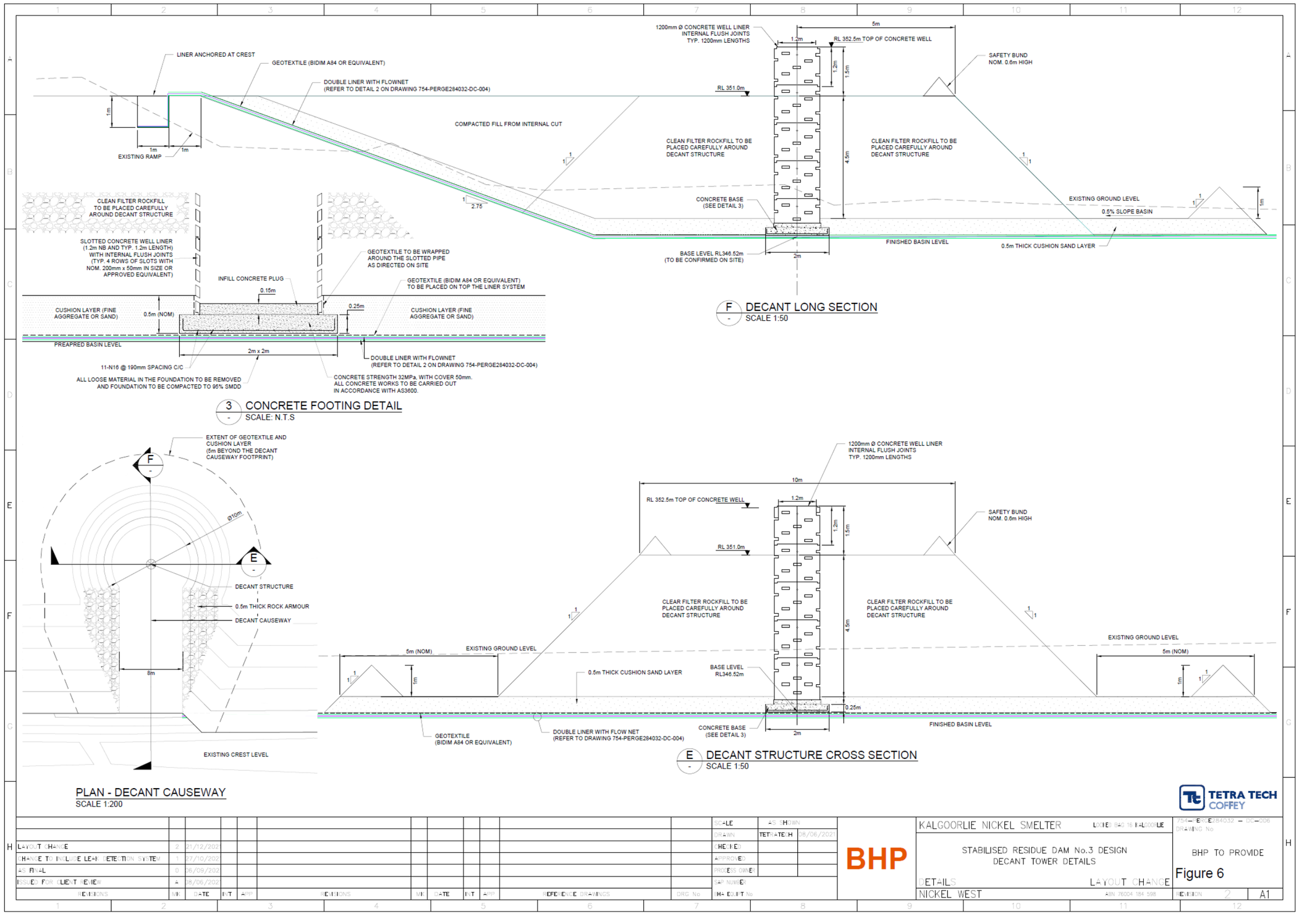


Figure 6: Decant system