Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6748/2022/1
Works approval holder	Veolia Recycling & Recovery (Perth) Pty Ltd
ACN	118 828 872
Registered business address	Level 4, 65 Pirrama Road PYRMONT NSW 2009
DWER file number	DER2022/000533
Duration	28/03/2023 to 27/03/2028
Date of issue	28/03/2023
Premises details	North Bannister Resource Recovery Park Lot 2 on Plan 2767 Albany Highway North Bannister WA 6390

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed production / design capacity**
Category 64: Class II or III putrescible landfill site	400,000 tonnes per annual period
Category 67A: Compost manufacturing and soil blending	100,000 tonnes per annual period

This works approval is granted to the works approval holder, subject to the attached conditions, on 28 March 2023, by:

Abbie Crawford

Digitally signed by Abbie Crawford
Date: 2023.03.28 09:19:42 +08'00'

Abbie Crawford
A/MANAGER, WASTE INDUSTRIES

Officer delegated under section 20 of the Environmental Protection Act 1986

Works approval history

Date	Reference number	Summary of changes
28/03/2023	W6748/2022/1	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 and/or install the infrastructure and/or equipment;

(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: Design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Specifications reference
1.	Leachate Pond 5 site preparation	The following site preparation works must be undertaken: • Clearing and grubbing of entire pond footprint including embankments, bunds and pond base. • Removal of topsoil to nominal depth of 300mm from the entire pond footprint including embankments, bunds and pond base. • Excavation of all unsuitable materials to a minimum depth of -500mm from final surface level (FSL) to form a suitable subgrade and replace with engineered fill material; moisture condition and compact to Standard Maximum Dry Density (SMDD) of 95% and Optimum Moisture Content (OMC) of -2% to +2% in two 250mm layers to FSL. • If suitable material (meeting requirements for engineered fill material) exists in the cell footprint, the material shall be excavated to -250mm of FSL, in situ subsoil ripped and treated as per engineered fill material for moisture conditions and compaction requirements; followed by replacement of removed material, moisture conditioned and compacted to Standard Maximum Dry Density (SMDD) of 95% and Optimum Moisture Content (OMC) of -2% to +2% in a 250mm layer.	Schedule 1, Figure 1

	Infrastructure	Design and construction / installation requirements	Specifications reference
		• Internal batters cut to 1:3 (V:H) • Proof roll entire footprint including pond floor and embankments.	
2.	Subgrade construction	The engineered fill subgrade shall be formed in accordance with the following specifications: • Shall be cut and filled to achieve a grade of 1% to the southeastern corner of the pond. • Shall be moisture conditioned prior to GCL placement near or wet of OMC sufficient to keep the GCL hydrated under the expected loading conditions. • Constructed to the levels and dimensions in Schedule 4, within tolerances in Schedule 4.1.	Schedule 4
3.	Geomembrane	The liner system is to be placed over the entire leachate pond base and extended up side embankments. Installation of the liner shall be in accordance with the following specifications: • HDPE geomembrane 2mm thick single sided textured overlying the geocomposite strip drains and installed textured side down. • Must be uniform and free of pin holes, blisters, blemishes, striations, bubbles, roughness, contaminants and permanently attached raw materials; • Completely sealed and waterproof along all joins and seams with heat welded joints tested in accordance with Schedule 2; • The HDPE geomembrane shall be supplied, tested and inspected in accordance with Schedule 2. • Permanent internal ballast shall be installed at the toe of the internal embankment and across the centre of each pond floor.	Schedules 2 Schedule 4
4.	Depressurisation system	The installed depressurisation system is to be placed over the entire leachate pond base and extended up the side embankments. Installation of the system shall be undertaken in accordance with the following specifications: • Coated GCL with additional bentonite applied to the overlaps; supplied, tested and	Schedule 3 Schedule 4, Figure 6

	Infrastructure	Design and construction / installation requirements	Specifications reference
		inspected following delivery to site in accordance with Schedule 3 and comprising: - non-woven geotextile layer in direct contact with subgrade - needle punched bentonite impregnated centre layer - woven geotextile containment layer - polyethylene coating layer fused to the woven geotextile layer in direct contact with strip drains and overlying GCL. • Geocomposite strip drains installed above the GCL and beneath the HDPE geomembrane across the floor of the ponds: - minimum 8mm x 60mm thick (bi-planar or tri-planar) geonet - non-woven filter geotextile wrapped around and entirely covering the geonet - herringbone arrangement directing down gradient towards the sump • Depressurisation outlet pipe capable of reporting leachate from the pond sump to the concrete pit (Schedule 4, Figure 6).	
5.	Sump	• The separation distance between the bottom of the sump and maximum groundwater table elevation shall be greater than 2m. • Geocomposite sump liner configuration in accordance with Schedule 4, Figures 5 and 7.	Schedule 4
6.	Anchor trenches	• The anchor trenches shall be set back 1.0m from the crest of the perimeter embankment, edge bunds and interim edge bunds. • The trenches shall be backfilled with engineered fill while liner materials are in the relaxed state, in full contact with subgrade and without wrinkles or folds.	Schedule 4, Figure 5
7.	Safety Ropes	Safety egress ropes shall be installed on each embankment slope, including one located adjacent to the inlet and outlets points of each pond. The rope ladders will be anchored at the embankment crest and weighted at the base.	Schedule 4, Figure 3

	Infrastructure	Design and construction / installation requirements	Specifications reference
8.	Stormwater management	Stormwater management infrastructure shall be constructed to divert uncontaminated stormwater around Leachate Pond 5 and shall be constructed to the following specifications: • All stormwater drainage measures shall be designed to convey peak flow rate corresponding to a 1 in 20 year storm event, with available freeboard to convey discharge corresponding to a 1 in 100 year storm event.	N/A
9.	Fencing	• Fencing to be installed around the perimeter of Leachate Pond 5 Fencing and gate shall be chain wire mesh and at least 1.8m high	Schedule 4, Figure 3

Compliance reporting

2. Within 30 days of completion of the works described in Condition 1, the works approval holder must provide to the CEO a construction compliance report confirming that the infrastructure specified in Condition 1 has been constructed with no material defects and in accordance with the corresponding specifications reference listed in Table 1. The works approval holder must ensure that the report:

(a) is certified by the Geotechnical Inspection and Testing Authority (GITA);
(b) that each item of infrastructure in Table 1 has been constructed in accordance with the design specification and requirements provided in the corresponding specifications reference listed in Table 1;
(c) contains a detailed site plan showing the location and dimensions of the infrastructure corresponding to the design and construction requirements provided in Table 1;
(d) contains as-constructed drawings and photographs;
(e) contains details of any infrastructure (including groundwater monitoring wells) decommissioned as part of the works; and
(f) is signed by a person authorised to represent the works approval holder and contains the printed name and position of that person within the company.

3. For each item of infrastructure specified in Condition 1, the construction compliance report required by Condition 2 must be accompanied by a Construction Quality Assurance Validation Report that:

(a) is written and certified by the GITA that completed the construction quality assurance required by the corresponding specifications reference in Condition 1, Table 1;
(b) assesses test results against the relevant minimum values;
(c) documents all repairs to subgrade and liner materials, including those resulting from non-destructive weld testing;
(d) certifies that the constructed infrastructure is free of fault or defect, built to the design specification and fit for the intended purpose; and
(e) includes copies of drawings, inspections, monitoring, and testing results required by the corresponding specifications reference in Condition 1,Table 1.

Records and reporting (general)

4. 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.

5. 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) complaints received under Condition 4.

6. The books specified under Condition 5 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 have the meanings defined.

Table 2: Definitions

Term	Definition
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
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).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
GITA	Geotechnical Inspection and Testing Authority
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.
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 the map below (Figure 1).

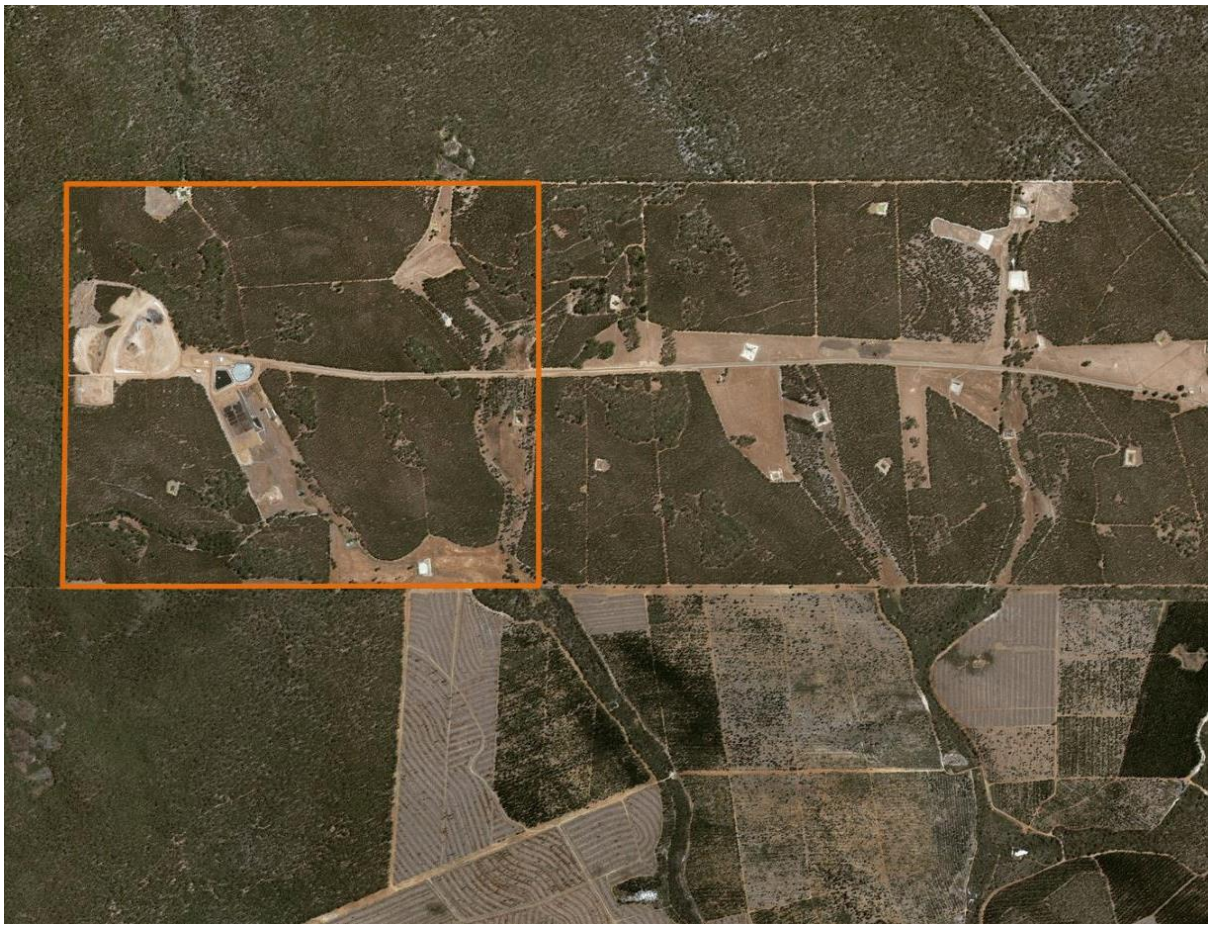

Figure 1: Map of the boundary of the prescribed premises

Schedule 2 : HDPE CQA Material and Weld Conformance

Table 3: HDPE Material Properties (as delivered)

Property	Units	Value (Textured) HDPE 1	Value (Smooth) HDPE 2	Test Standard	Independent CQA Testing Frequency
Thickness (average)	mm	2.0	2.0	ASTM D 5199 (smooth) ASTM D 5994 (textured)	One test per
Minimum Thickness	mm	>1.80	>1.90	ASTM D 5199 ASTM D 5994	
Density (min)	g/cm^3	≥0.94	≥0.94	ASTM D 1505 or ASTM D 792	One test per 5000 m^2
Asperity Height	mm	>0.40	N/A	ASTM D 7466	Two samples from textured HDPE
Melt Flow Index	g/10 min	<1.0	<1.0	ASTM D 1238	Review MQC data
Tensile properties (each direction) Strength at break Elongation at break Strength at yield Elongation at yield	 N/mm % N/mm %	 ≥21 >100 >29 >12	 ≥53 >700 >29 >12	 ASTM D 6693 ASTM D 6693 ASTM D 6693 ASTM D 6693	One test per 5000 m^2
Tear Resistance	N	>249	>249	ASTM D 1004	
Puncture Resistance	N	≥534	≥534640	ASTM D 4833	
Carbon Black Content	%	2 to 3	2 to 3	ASTM D 4218	
Carbon Black Dispersion	Rating	100% Cat 1	100% Cat 1	ASTM D 5596	
Oxidative Induction Time (OIT) (1) Standard OIT AND High Pressure OIT	 Min Min	 ≥100 ≥400	 ≥100 ≥400	 ASTM D 8117 ASTM D 5885	One test per resin type or per 10 000 m^2, or manufacturing run per geomembrane type
Oven Aging at 85°C High Pressure OIT	% retained after 90 days	≥80	≥80	ASTM D 5721 ASTM D 5885	Per each fomulation
Oven Aging at 85°C Standard OIT	% retained after 90 days	≥55	≥55	ASTM D 5721 ASTM D 8117	
Stress Crack Resistance (2)	hr	>500	>500	ASTM D 5397	One test per resin type or per 10 000 m^2, or manufacturing run per geomembrane type
Longitudinal edge		Smooth both sides	Smooth both sides		

Notes: [1] Depending on results the QAI may require OIT testing on both core and surface samples of the geomembrane.

[2] Tensile Load Crack Resistance to be undertaken on Textured HDPE geomembrane.

Table 4: Weld Testing

Property		Units	Value	Test	Testing Frequency
Destructive fusion weld testing on-site tests undertaken by Contractor, witnessed by CQA Consultant	Fusion/Wedge Weld - Shear strength	N/25 mm	700	ASTM D6392	Every 150m along weld
	Fusion/Wedge Weld - Peel strength		530		
	Extrusion Weld – Shear Strength		700		Every 150m along weld
	Extrusion Weld – Peel Strength		455		
Non - destructive weld testing – tests undertaken by Contractor, witnessed by the GITA	Air pressure test	-	pass/fail	ASTM D5820	All seams over full length
	Vacuum box test			ASTM D5641	

Schedule 3 : Coated GCL CQA Material Conformance

Table 5: GCL Material Properties (as delivered)

Property	Units	Value MARV[1] GCL	Test Standard	Independent CQA Testing Frequency
Mass per unit area of GCL	g/m^2	≥4 000	ASTM D5993	1 test per 500 m^2
Bentonite Mass (measure at 0% moisture content)	g/m^2	≥3 700	ASTM D5993	1 test per 2 500 m^2
Mass per unit area of bentonite in overlaps (measure at 0% moisture content) (2)	g/m^2	≥ 300 extra compared to the rest of the panel	ASTM D5993	1 test per 40 m overlap
Cation exchange capacity of Bentonite	Meq/100 g (or cmol/kg)	≥70	Methylene Blue Method	1 test per 500 m^2
Montmorillonite Content	% by weight	>70	X-ray diffraction	1 test per 10 000 m^2
Carbonate Content	% by weight	≤2	X-ray diffraction or ASTM D4373	1 test per 10 000 m^2
Mass per unit area of carrier geotextile	g/m^2	≥100	AS 2001.2.13	1 test per 20 000m^2
Mass per unit area of cover geotextile	g/m^2	≥200	AS 2001.2.13	1 test per 20 000m^2
Tensile Strength	kN/m	≥6	ASTM D6768	1 test per 10 000 m^2
Tensile Elongation	%	≥4	Modified ASTM D6768	Review MQC data
CBR Strength of GCL	N	≥1 500	AS 3706.4	1 test per 5 000 m^2
Peel Strength (min avg.)	N/m	≥360	ASTM D6496	1 test per 500 m^2
Fluid Loss	mL	≤18	ASTM D5891	1 test per 300 m^2
Permeability	m/s	≤5 x 10^{-11}	ASTM D5887	1 test per 10 000 m^2
Polyethylene Coating (mass)	g/m^2	200 (nominal)	EN ISO 9864	1 test per 20 000m^2
Polyethylene Geofilm (thickness)	mm	0.1	ASTM D5199	1 test per 20 000m^2

Notes: [1] MARV = Minimum average roll value representing a confidence level of 97.5% of the test results meet the required value.

[2] The overlap treatment of the GCL rolls may be varied by the QAI in consultation with the Superintendent depending on the type of GCL, the composition of the geotextile type and edge treatment of the GCL supplied. Alternatives could include taping of overlaps.

Schedule 4: Leachate Pond 5 Layout and Dimensions

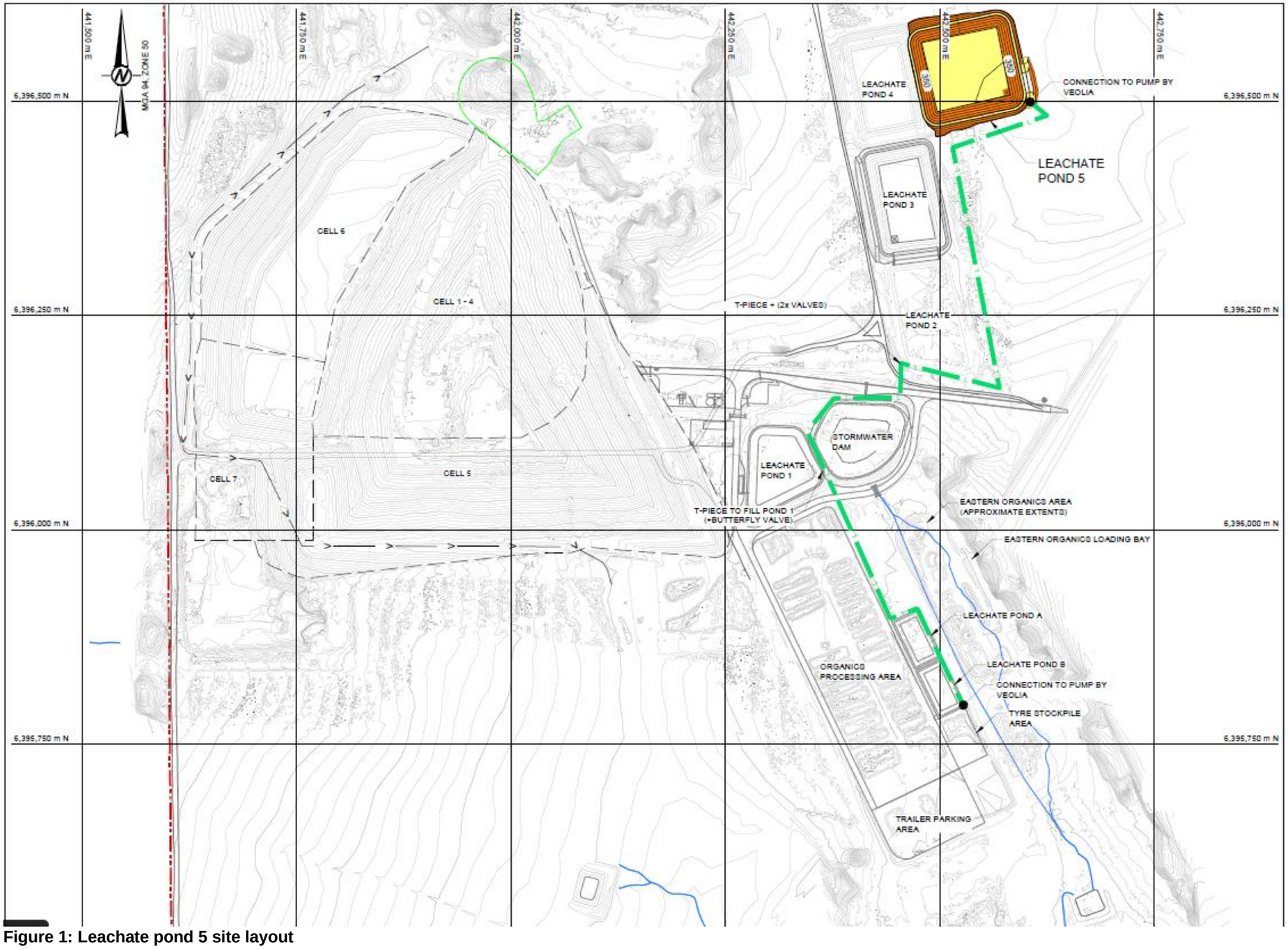

Figure 1: Leachate pond 5 site layout

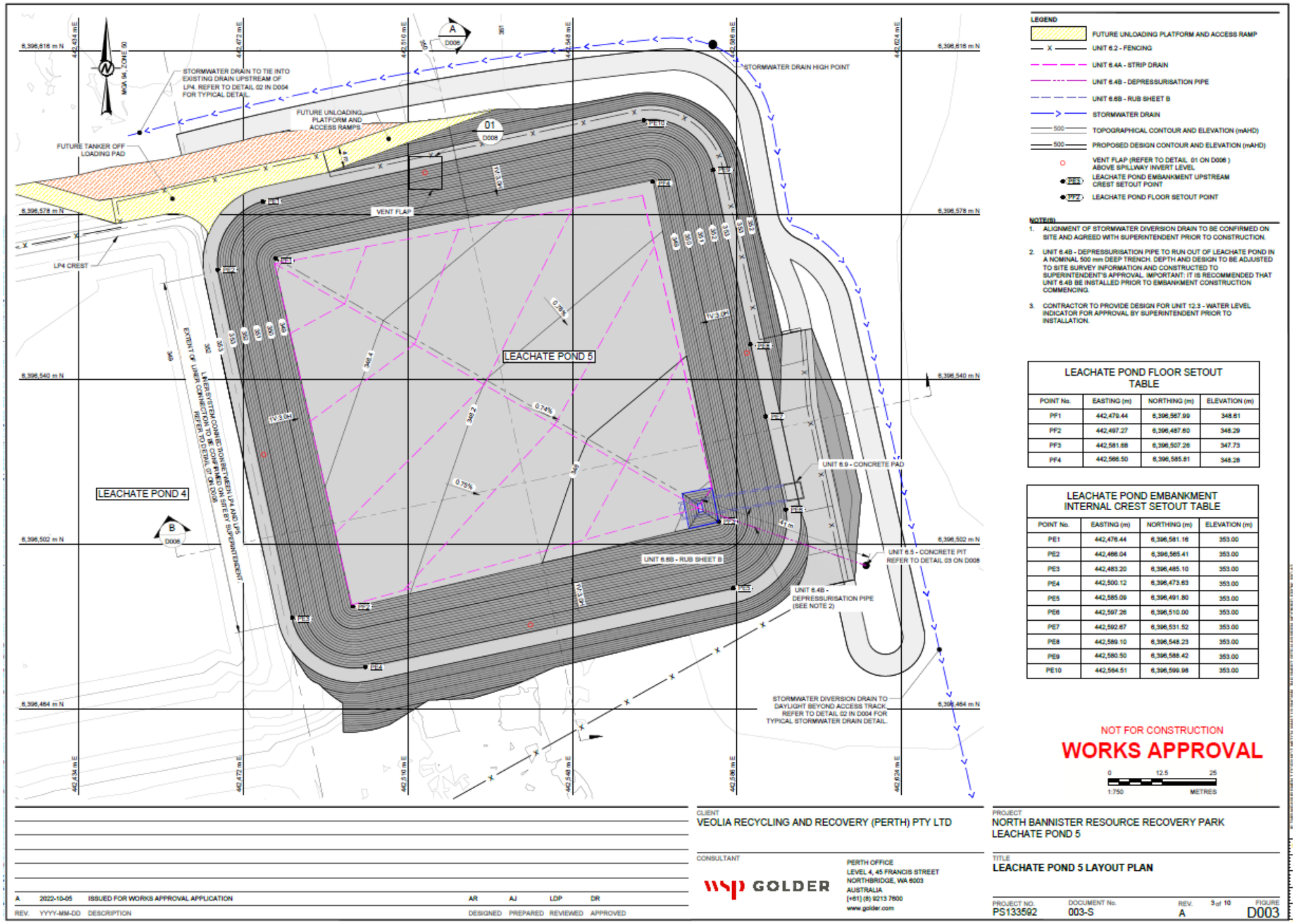

Figure 2: Leachate pond 5 dimensions and features

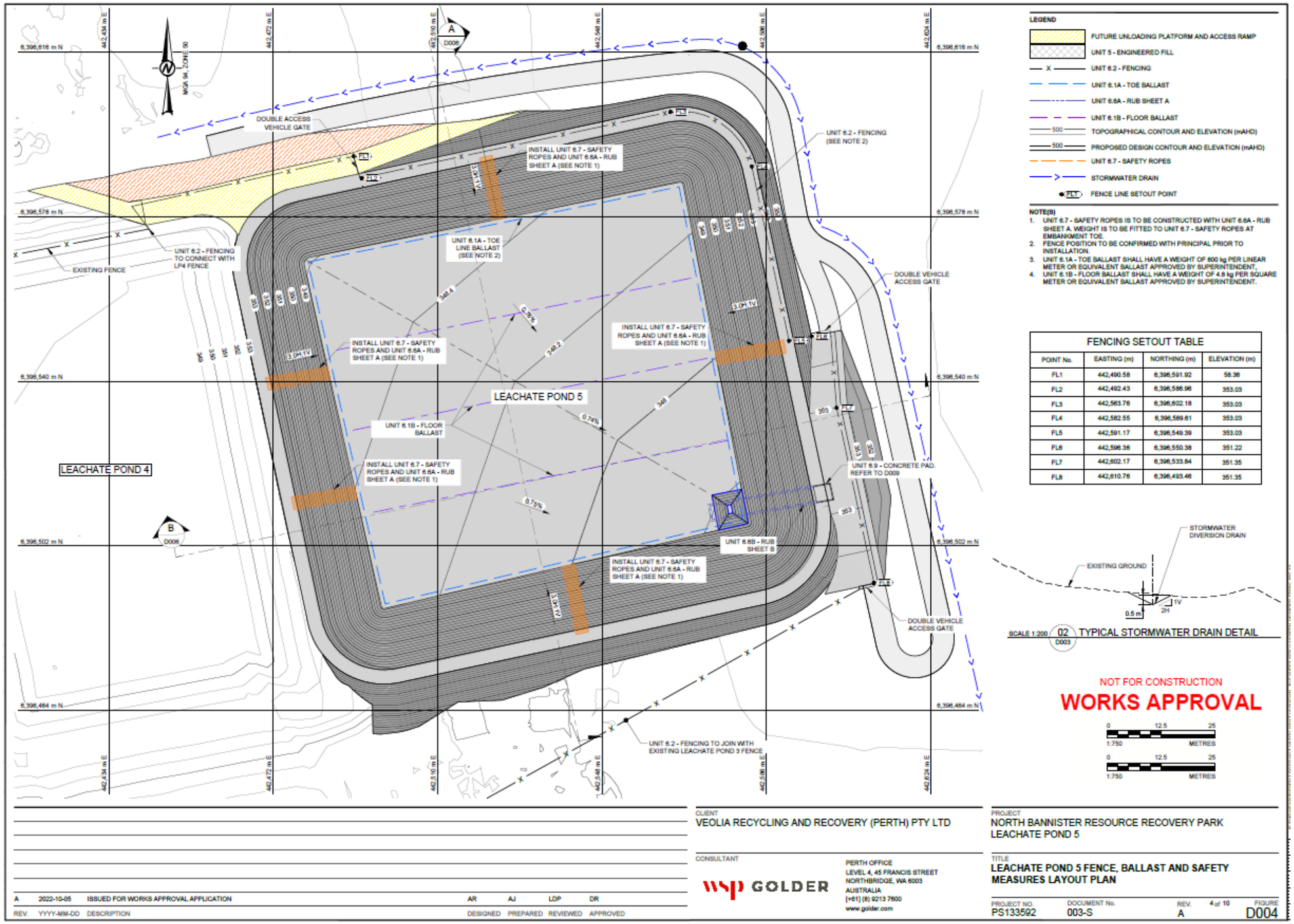

Figure 3: Leachate pond 5 ballast, safety ropes and fencing

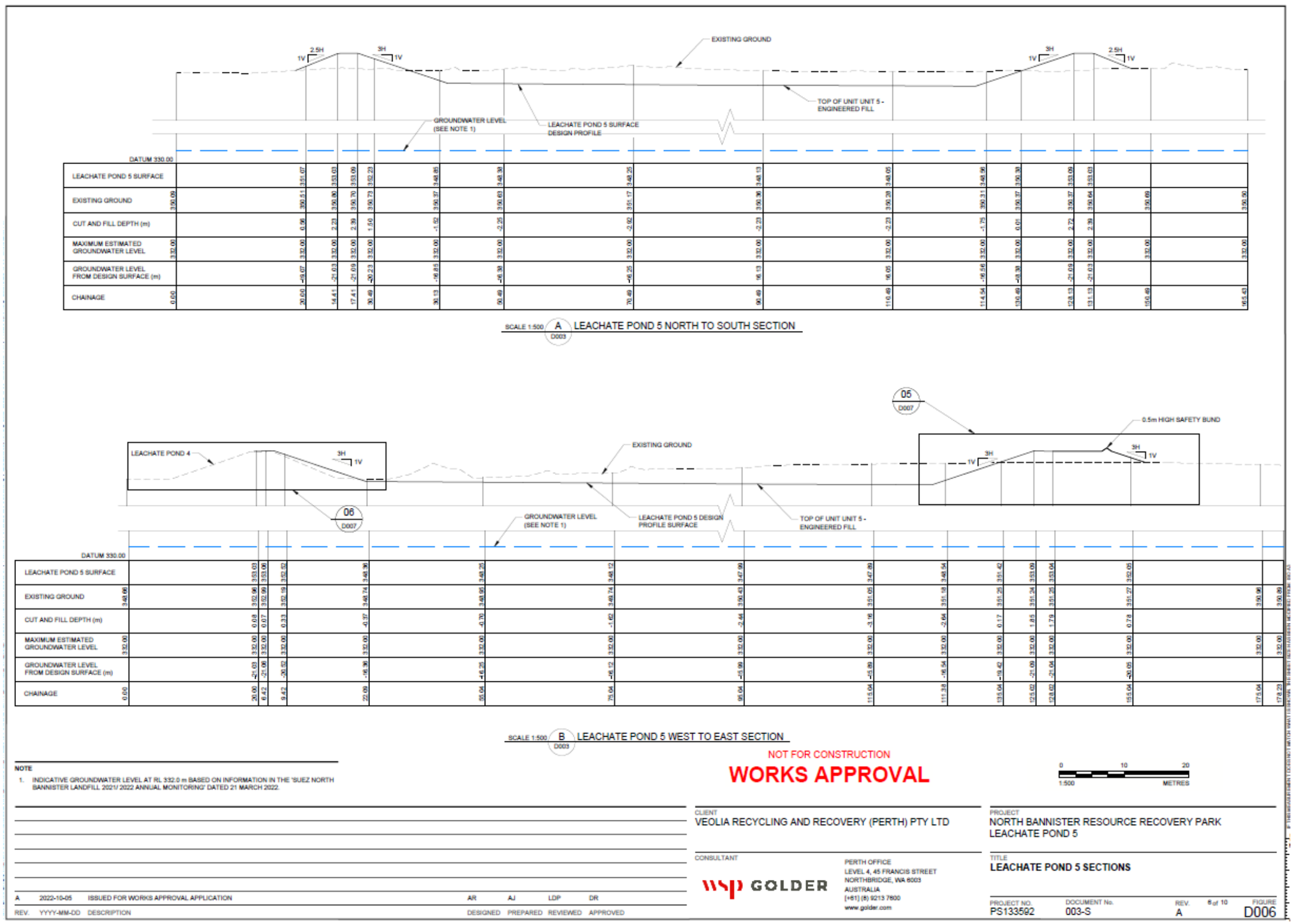

Figure 4: Leachate pond 5 levels and grade

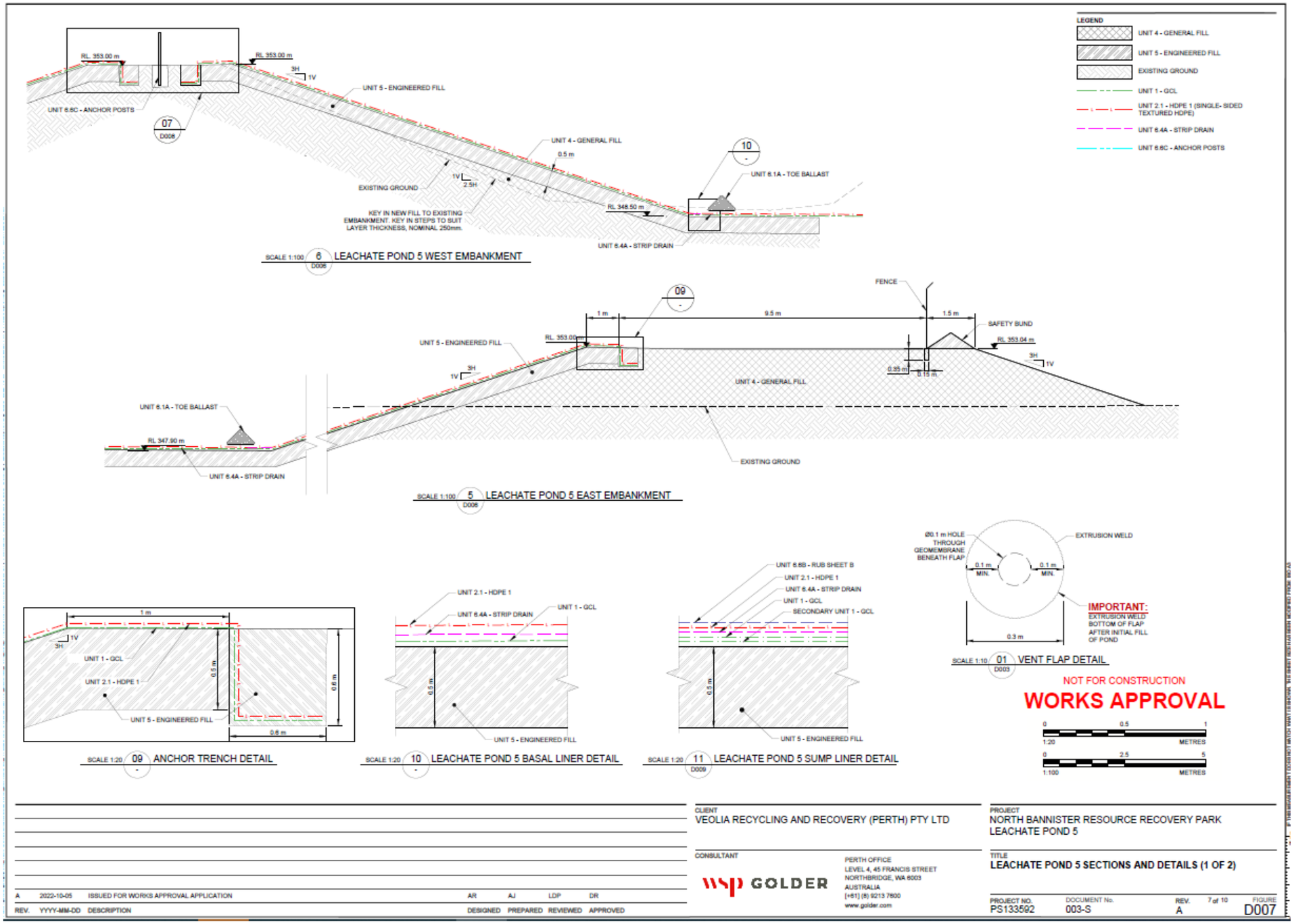

Figure 5: Leachate pond 5 anchor and sump detail

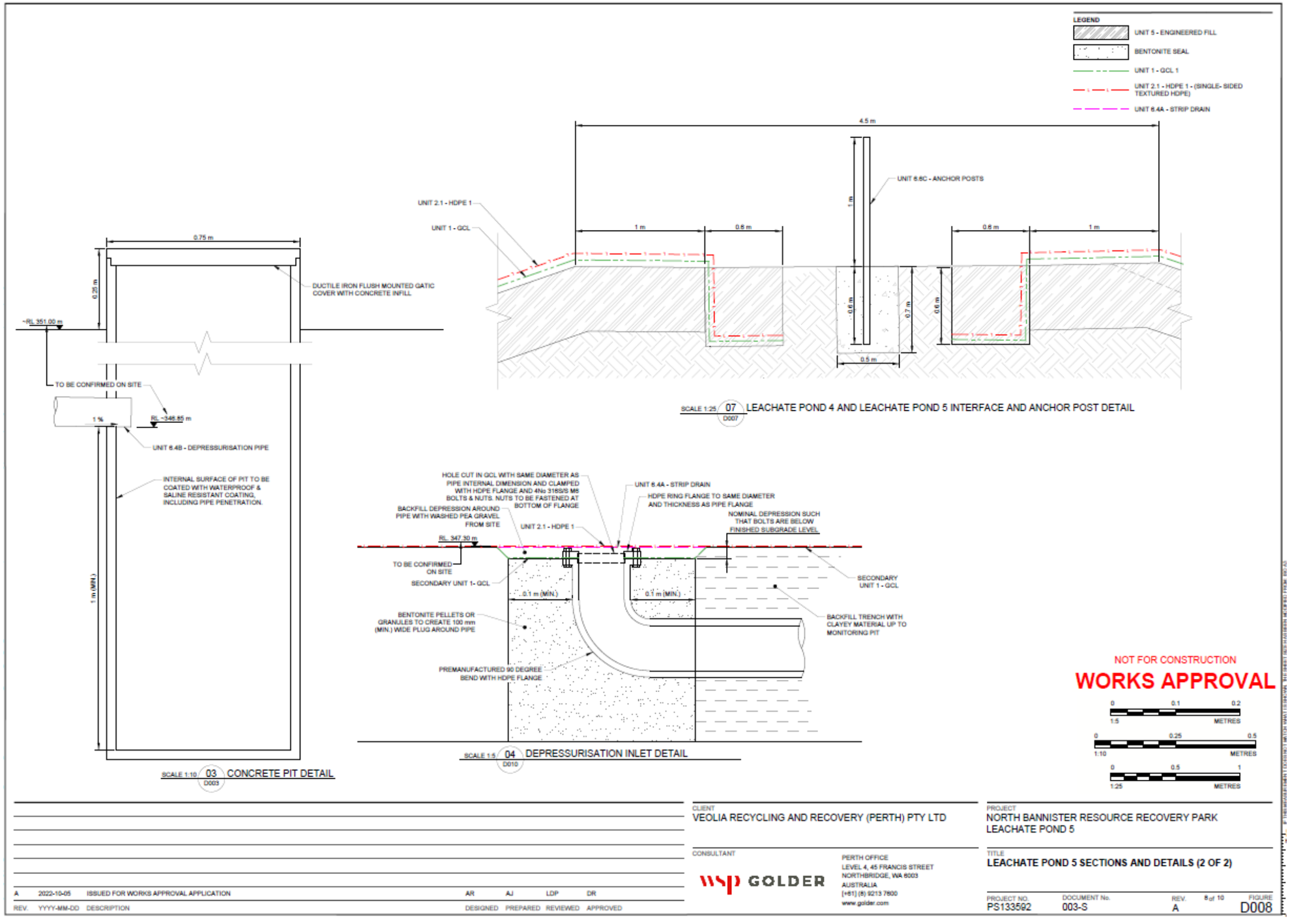

Figure 6: Leachate pond 5 depressurisation detail

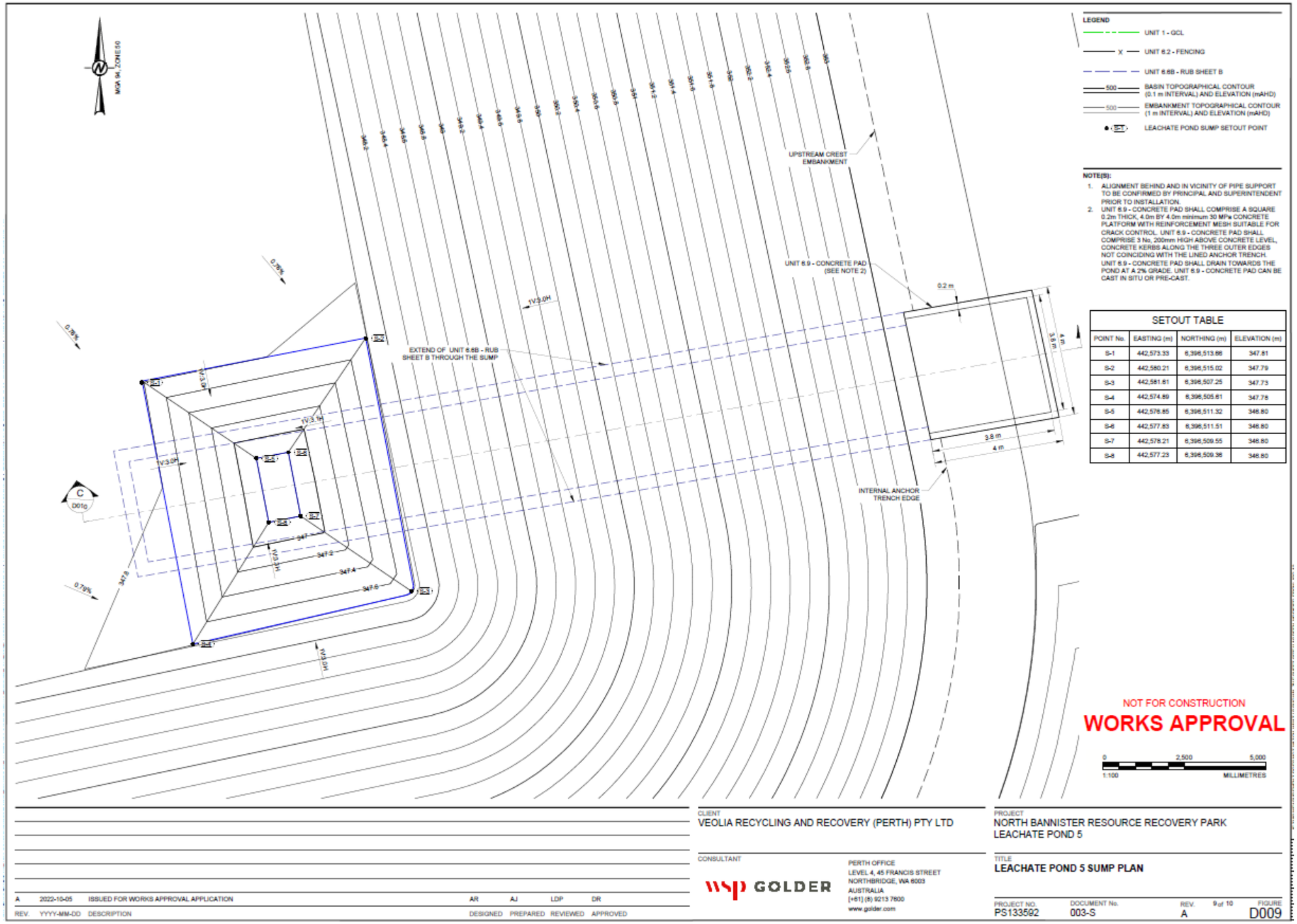

Figure 7: Leachate pond 5 sump and depressurisation outlet detail

Schedule 4.1 : Leachate pond 5 earthworks tolerance

The final surface finish of all earthworks shall be within the following tolerances:

- Subgrade elevations (i.e., prior to placement of fill material) shall have a maximum deviation of -100 mm to +0 mm relative to the design.
- The final subgrade surface must be free draining to the direction shown on the Drawings.
- The elevation of the Unit 5 – Engineered Fill shall have a maximum deviation of 20 mm.
- The as-built thickness of Unit 5 – Engineered Fill shall have a tolerance of 0 mm to +100 mm.
- The internal LP5 batters shall have an average batter slope of 1:3 (V:H) and at no point shall the batter be steeper than 1:2.9 (V:H) over any length more than 2 m, unless approved by the Superintendent.
- The external LP5 batters shall have an average batter slope of 1:2.5 (V:H) and at no point shall the batter be steeper than 1:2.3 (V:H) over any length more than 2 m
- The surface shall be shaped to result in a uniform grade across the floor of LP5 and Leachate sump, with no significant depressions holding runoff after rainfall events.
- Thicknesses shall have a tolerance of 0 mm and +100 mm.