Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6855/2023/1
Works approval holder	Cleanaway Solid Waste Pty Ltd
ACN	120 175 635
Registered business address	Level 4, 441 St Kilda Road MELBOURNE VIC 3004
DWER file number	DER2021/000183~4
Application number	APP-0029506
Duration	23/02/2024 to 22/02/2034
Date of issue	23/02/2024
Date of amendment	24/06/2025
Premises details	Banksia Road Putrescible Landfill Banksia Road CROOKED BROOK WA 6236 Legal description - Part of Lot 2 on Deposited Plan 65861 As defined by the coordinates in Schedule 2

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed design capacity**
Category 64: Class II or III putrescible landfill site: premises on which waste (as determined by reference to the waste type set out in the document entitled "Landfill Waste Classification and Waste Definitions 1996" published by the Chief Executive Officer and as amended from time to time) is accepted for burial.	350,000 tonnes per annual period

This works approval is granted to the works approval holder, subject to the attached conditions, on 24 June 2025 by:

Grace Heydon

Digitally signed by Grace Heydon
Date: 2025.06.24 14:33:44 +08'00'

MANAGER, WASTE INDUSTRIES

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

Works approval history

Date	Reference number	Summary of changes
23/02/2024	W6855/2024/1	Works approval granted.
16/10/2024	W6855/2024/1	Works approval amended to; • include time limited operations into the Works Approval • extend the works approval duration by four years and • amend the wording in condition 1 and 2.
24/06//2025	W6855/2024/1	APP-0029506. CEO initiated works approval amendment to extend approved period for time limited operation of landfill cell 12A.

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

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	Infrastructure location
1.	Cell 9 stormwater retention pond and pipework	• Constructed to the specifications depicted in Figure 3 of Schedule 1 • Must be sized to be able to contain water from a 1 in 100-year AEP stormwater event of 4 hrs duration without overtopping • Must maintain a pumped connection to the existing stormwater management infrastructure. • Must be located a minimum of 10 metres from the eastern batter of cell 8 • Internal batters must be constructed at a minimum to 1V:2H • Must be a minimum of 3 metres deep • A minimum 2 m separation distance to groundwater must be maintained from the base of the pond • Pipework must be constructed so as to be free of leaks • All pipework and drainage channels must be constructed so as to direct stormwater to the stormwater retention pond	Located within the cell 10 footprint as depicted by Figure 3 of Schedule 1.
2.	Cell 10 stormwater retention pond and pipework	• Constructed to the specifications depicted in Figure 9 of Schedule 1 • Must be sized to be able to contain water from a 1 in 100-year AEP stormwater event of 4 hrs duration without overtopping • Must maintain a pumped connection to the existing stormwater management infrastructure. • Must be located a minimum of 10 metres from the eastern batter of cell 9 • Internal batters must be constructed at a minimum to 1V:2H • Must be a minimum of 3 metres deep	Located immediately to the east of the cell 10 footprint as depicted by Figure 9 of Schedule 1.

	Infrastructure	Design and construction / installation requirements	Infrastructure location
		• A minimum 2 m separation distance to groundwater must be maintained from the base of the pond • Pipework must be constructed so as to be free of leaks • All pipework and drainage channels must be constructed so as to direct stormwater to the stormwater retention pond	

2. The works approval holder must:

(a) construct the critical containment infrastructure;

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

(c) at the corresponding infrastructure location;

as set out in Table 2.

Table 2: Critical containment infrastructure design and construction requirements

Infrastructure	Design and construction requirements	Infrastructure location
Cell 9	• Constructed to the specifications depicted in Figure 3, Figure 4, Figure 5, Figure 6, Figure 7 and Figure 8 of Schedule 1	As depicted by Figure 2 of Schedule 1
Cell 10	• Constructed to the specifications depicted in Figure 9, Figure 10, Figure 11, Figure 12, Figure 13 and Figure 14 of Schedule 1	As depicted by Figure 2 of Schedule 1
Cell 12A	• Constructed to the specifications depicted in Figure 15, Figure 16, Figure 17, Figure 18, Figure 19, Figure 20 and Figure 21 of Schedule 1 • Piggyback liner must extend horizontally over Cells 1 and 2 by a minimum of 15 m. • Anchor trenches constructed over Cells 1 and 2 for the Cell 12A piggyback liner must be a minimum of 0.5 m deep and must not intercept the underlying waste mass • Piggyback liner must extend horizontally over Cell 4B by a minimum of 5 m. • Liner tie in to existing liners for Cells 12 and 4B must terminate in an independent anchor trench of a minimum of 1 m deep • A Geosyntheic Clay Liner must be placed in the gap between existing Cell 12 and Cell 4B anchor trenches and the new Cell 12A anchor trench with a minimum overlap of 500 mm onto each of the adjoining cell liners • A 2mm thick High Density Polyethylene capping strip must be placed over the Geosyntheic Clay Liner between anchor trenches	As depicted by Figure 2 of Schedule 1

Infrastructure	Design and construction requirements	Infrastructure location
Cell 9 and Cell 10		
Layer 1 – subsoil	• All excavation around existing liner material must be conducted in a manner that does not damage the existing liner • All excavation areas must be managed to direct stormwater to the stormwater retention ponds • A minimum 2 m separation distance to groundwater must be maintained from the base of the cell • Fill material used to create the subsoil layer must be free of debris and deleterious material with a maximum particle size of 40mm • Fill material must be placed, levelled and compacted to not less than 95% of the Standard Maximum Dry Density determined in accordance with AS 1289.5.1.1 • Fill material must be moisture condition to +/- 2% of optimum in accordance with AS 1289.5.1.1 • All areas of fill must be a minimum of 100 mm thick • The subsoil layer must be steel drum rolled to provide a smooth surface and have no irregularities in excess of 10 mm deep over a straightedge length of 20 mm • The subsoil layer must attain a minimum gradient of 1% along the valley drain and 3% into the valley drain	Cells 9 and 10 to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cells 9 and 10 depicted by Figure 5, Figure 6, Figure 11, and Figure 12 of Schedule 1

Layer 2 – Geosynthetic clay liner (GCL)	• Must not be installed in the presence of water
	• Must be installed in a manner to prevent damage to the GCL and prevent wrinkles in the liner layer
	• The minimum overlaps for joins must be as follows:
	  ○ Longitudinal ends – 300 mm
	  ○ Roll end joins on the landfill base – 500 mm
	  ○ Roll end joins on the landfill side slope – 1.5 m (with anchor trench)
	• The overlap zone must be kept clear of debris
	• The leachate sump must contain a double GCL layer
	• GCL installed on landfill side slopes must be fixed in anchor trenches, with the trench backfilled and compacted with suitable fill after GCL placement
	• Must be covered by the geomembrane layer to prevent water damage within 12 hrs of placement
		Cells 9 and 10 to be located as depicted by Figure 2 of Schedule 1
		Liner configuration within Cells 9 and 10 depicted by Figure 5, Figure 6, Figure 11, and Figure 12 of Schedule 1

Infrastructure	Design and construction requirements	Infrastructure location
Layer 3 – Geomembrane	• Must consist of 2mm thick High-Density Polyethylene (HDPE) • Must not be installed in the presence of water • Must be installed in a manner to prevent damage to the HDPE and prevent wrinkles in the liner layer • The minimum overlap for welds must be 75 mm	Cells 9 and 10 to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cells 9 and 10 depicted by Figure 5, Figure 6, Figure 11, and Figure 12 of Schedule 1
Layer 4 – protection geotextile	• Must consist of 100 % polyester or polypropylene material • Must not be installed during heavy rain or winds • Must be installed in a manner to prevent damage to the geotextile and prevent wrinkles in the liner layer • The minimum overlap for all longitudinal joins and roll end joins on the floor of the cell must be 150 mm • A minimum of 1 m roll end overlap must be present on the landfill side slopes • Geotextiles installed on the landfill side slopes must be fixed in anchor trenches, where the trench is backfilled and compacted with low hydraulic conductivity soils after geotextile placement • A leak detection survey must be undertaken after placement of the leachate aggregate layer and before the placement of the separation geotextile	Cells 9 and 10 to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cells 9 and 10 depicted by Figure 5, Figure 6, Figure 11, and Figure 12 of Schedule 1
Layer 5 – Leachate collection	Leachate Collection Pipework: • Polyethylene pipes must be welded so no leaks are present • No drilling of pipework is to be undertaken within lined areas of the landfill cell • Must be installed in a manner to prevent damage to the geotextile liner	Cells 9 and 10 to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cells 9 and 10 depicted by Figure 5, Figure 6,

Infrastructure	Design and construction requirements	Infrastructure location
	Leachate Drainage Aggregate: • Material must consist of blue metal aggregate free of organic manner, fine grained material and deleterious material • Maximum particle size must be no more than 37.5 mm • Installation must be completed within 2 weeks of the installation of any GCL • Layer must be a minimum of 300 mm thick • Layer must be placed up the landfill side slopes to a maximum vertical height of 4.5 m above the toe of the side slope	Figure 11, and Figure 12 of Schedule 1 Leachate collection infrastructure configuration within Cells 9 and 10 depicted by Figure 7, Figure 8, Figure 13 and Figure 14 of Schedule 1
	Leachate Collection Sump: • Installation must include a double GCL lined base and a HDPE rub sheet down the side wall batter and into the sump • All pipework leading to the sump must be secured by a concrete headwall at the leachate extraction point	
Layer 6 – separation geotextile	• Must consist of 100 % polyester or polypropylene material • Must not be installed during heavy rain or winds • Must be installed in a manner to prevent damage to the geotextile and prevent wrinkles in the liner layer • The minimum overlap for all longitudinal joins and roll end joins on the floor of the cell must be 150 mm • A minimum of 1 m roll end overlap must be present on the landfill side slopes • Geotextiles installed on the landfill side slopes must be heat bonded to the cushion geotextile beyond the aggregate layer • No vehicles are to be driven over this layer	Cells 9 and 10 to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cells 9 and 10 depicted by Figure 5, Figure 6, Figure 11, and Figure 12 of Schedule 1

Infrastructure	Design and construction requirements	Infrastructure location
Cell 12A		
Layer 1 – subsoil	• No excavation of waste from Cells 1 and 2 is to occur to facilitate reprofiling • All excavation around existing liner material must be conducted in a manner that does not damage the existing liner • All excavation areas must be managed to direct stormwater into the stormwater retention network at the premises • Fill material used to create the subsoil layer must be free of debris and deleterious material with a maximum particle size of 40mm • Fill material must be placed, levelled and compacted to not less than 95% of the Standard Maximum Dry Density determined in accordance with AS 1289.5.1.1 • Fill material must be moisture condition to +/- 2% of optimum in accordance with AS 1289.5.1.1 • All areas of fill must be a minimum of 100mm thick • The subsoil layer must be steel drum rolled to provide a smooth surface and have no irregularities in excess of 10 mm deep over a straightedge length of 20 mm • The subsoil layer must attain a minimum gradient of 1% along the valley drain and 3% into the valley drain	Cell 12A to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cell 12A depicted by Figure 11 and Figure 12 of Schedule 1 Piggyback liner configuration within Cell 12A depicted by Figure 17 of Schedule 1

Layer 2 – Geosynthetic clay liner (GCL)	• Must not be installed in the presence of water
	• Must be installed in a manner to prevent damage to the GCL and prevent wrinkles in the liner layer
	• The minimum overlaps for joins must be as follows:
	  ○ Longitudinal ends – 300mm
	  ○ Roll end joins on the landfill base – 500mm
	  ○ Roll end joins on the landfill side slope – 1.5 m (with anchor trench)
	• The overlap zone must be kept clear of debris
	• The leachate sump must contain a double GCL layer
	• GCL installed on landfill side slopes must be fixed in anchor trenches, with the trench backfilled and compacted with suitable fill after GCL placement
	• Must be covered by the geomembrane layer to prevent water damage within 12hrs of placement
		Cell 12A to be located as depicted by Figure 2 of Schedule 1
		Liner configuration within Cell 12A depicted by Figure 11 and Figure 12 of Schedule 1
		Piggyback liner configuration within Cell 12A depicted by Figure 17 of Schedule 1

Infrastructure	Design and construction requirements	Infrastructure location
Layer 3 – Geomembrane	• Must consist of 2mm thick High Density Polyethylene (HDPE) • Must not be installed in the presence of water • Must be installed in a manner to prevent damage to the HDPE and prevent wrinkles in the liner layer • The minimum overlap for welds must be 75 mm	Cell 12A to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cell 12A depicted by Figure 11 and Figure 12 of Schedule 1 Piggyback liner configuration within Cell 12A depicted by Figure 17 of Schedule 1
Layer 4 – protection geotextile	• Must consist of 100 % polyester or polypropylene material • Must not be installed during heavy rain or winds • Must be installed in a manner to prevent damage to the geotextile and prevent wrinkles in the liner layer • The minimum overlap for all longitudinal joins and roll end joins on the floor of the cell must be 150 mm • A minimum of 1 m roll end overlap must be present on the landfill side slopes • Geotextiles installed on the landfill side slopes must be fixed in anchor trenches, where the trench is backfilled and compacted with low hydraulic conductivity soils after geotextile placement • A leak detection survey must be undertaken after placement of the leachate aggregate layer and before the placement of the separation geotextile	Cell 12A to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cell 12A depicted by Figure 11 and Figure 12 of Schedule 1 Piggyback liner configuration within Cell 12A depicted by Figure 17 of Schedule 1
Layer 5 – Leachate collection	Leachate Collection Pipework: • Polyethylene pipes must be welded so no leaks are present • No drilling of pipework is to be undertaken within lined areas of the landfill cell • Must be installed in a manner to prevent damage to the geotextile liner	Cell 12A to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cell 12A depicted by Figure 11 and Figure 12

Infrastructure	Design and construction requirements	Infrastructure location
	Leachate Drainage Aggregate: • Material must consist of blue metal aggregate free of organic manner, fine grained material and deleterious material • Maximum particle size must be no more than 37.5 mm • Installation must be completed within 2 weeks of the installation of any GCL • Layer must be a minimum of 300 mm thick • Layer must be placed up the landfill side slopes to a maximum vertical height of 4.5 m above the toe of the side slope	of Schedule 1 Piggyback liner configuration within Cell 12A depicted by Figure 17 of Schedule 1 Leachate collection infrastructure configuration within Cell 12A depicted by Figure 13 and Figure 14 of Schedule 1
	Leachate Collection Sump: • Installation must include a double GCL lined base and a HDPE rub sheet down the side wall batter and into the sump • All pipework leading to the sump must be secured by a concrete headwall at the leachate extraction point	
Layer 6 – separation geotextile	• Must consist of 100 % polyester or polypropylene material • Must not be installed during heavy rain or winds • Must be installed in a manner to prevent damage to the geotextile and prevent wrinkles in the liner layer • The minimum overlap for all longitudinal joins and roll end joins on the floor of the cell must be 150 mm • A minimum of 1 m roll end overlap must be present on the landfill side slopes • Geotextiles installed on the landfill side slopes must be heat bonded to the cushion geotextile beyond the aggregate layer • No vehicles are to be driven over this layer	Cell 12A to be located as depicted by Figure 2 of Schedule 1 Liner configuration within Cell 12A depicted by Figure 11 and Figure 12 of Schedule 1 Piggyback liner configuration within Cell 12A depicted by Figure 17 of Schedule 1

3. The works approval holder must ensure that no visible dust generated from the primary activities crosses the boundary of the premises.

Construction quality assurance requirements

4. The works approval holder must undertake construction quality assurance (CQA) testing for the geosynthetic clay liner installed within cells 12A, 9 and 10 in accordance with the specifications outlined in Table 3.

Table 3: Geocomposite clay liner (GCL) CQA requirements

Item	Property	Standards	Frequency
Conformance Quality Control testing (sampled at the point of manufacture or on site, as determined by the Superintendent)	Composite layer Thickness (dry)	ASTM D1777	1 sample every 3rd roll
	Mass per unit area of GCL	ASTM D5993	1 sample per 1,000 m^2
	Mass per unit area of Bentonite	ASTM D5993	1 sample per 2,500 m^2
	Mass per unit area of Bentonite in overlaps	ASTM D5993	1 sample every 3rd roll
	Montmorillonite content	XRD (X-ray diffraction) Quantitative Mineralogy Analysis	sample per 10,000 m^2
	Cation exchange capacity of bentonite	Methylene blue method	sample per 1,500 m^2
	Moisture content of bentonite	ASTM D5993 AS 1289.2.1.1	sample per 2,500 m^2
	Swell index/free swell of clay	ASTM D5890	1 sample per 1,500 m^2
	Water absorption	ASTM D5891	1 sample per 1,500 m^2
	Peel strength (for needle-punched products only)	ASTM D6496	1 sample every 3rd roll
	Tensile strength	ASTM D6768	1 sample per 10,000 m^2
	Index flux	ASTM 5887	1 sample per 10,000 m^2
	Permeability	ASTM 5887	1 sample per 10,000 m^2

Visual inspection of GCL	Colour, thickness, needle punching, presence of needles or broken needles, and sewing density or other faults in the material.	N/A	Every roll
Thickness of GCL and overlap (i.e. uniformity of bentonite distribution) and apparent variations in the as placed moisture distribution.	On-site	N/A	Each roll during placement. If thickness appears to be variable a check of the variability of the mass per unit area shall be conducted

5. The works approval holder must undertake CQA testing for the geomembrane layer installed within cells 12A, 9 and 10 in accordance with the specifications outlined in Table 4.

Table 4: Geomembrane CQA requirements

Item	Property	Standards	Frequency
Conformance Quality Control testing (sampled at the point of manufacture or on site, as determined by the Superintendent)	Thickness	ASTM D5994	Every roll
	Asperity height	ASTM D7466	One sample per 5,000 m^2, or every five rolls delivered to Site whichever is the greatest number of tests
	Density	ASTM D1505 D792	
	Tensile properties (yield and break stress, yield and break elongation)	ASTM D6693 type IV	
	Puncture resistance	ASTM D4833	
	Tear resistance	ASTM D1004	
	Carbon black content	ASTM D4218	
	Carbon black dispersion	ASTM D5596	
	Stress crack resistance	ASTM D5397	One sample every 10,000 m^2, or resin type or manufacturing run
	Geomembrane Oxidative induction time	ASTM D8117 ASTM D5885	
Start-up test weld	Welding equipment	N/A	Checked daily at start of Works, and whenever the welding

Item	Property	Standards	Frequency
			equipment is shut-off for more than one hour. Also after significant changes in weather conditions
	Weld conditions	N/A	Test weld strips will be required whenever personnel or equipment are changed and/or wide temperature fluctuations are experienced. Minimum 1.5 m continuous seam
Destructive weld testing	On-Site, hand tensiometer in peel and shear	ASTM D6392	Every 150 m (if fusion weld) Every 120 m (if extrusion weld)
	Off-Site — weld seam strength in peel and shear	ASTM D6392	Every 150 m (if fusion weld) every 120 m (if extrusion weld)
Non-destructive weld testing	N/A	Air pressure test ASTM D5820 Vacuum box test ASTM D5641	All seams over full length
Visual inspection of geomembrane	Smooth edges on both sides, tears, punctures, abrasions, cracks, indentations, thin spots, or other faults in the material.	N/A	Every roll
Thickness of geomembrane	On-Site	N/A	Five per 100 m, 20 m apart, taken at the edge of the sheet

6. The works approval holder must undertake CQA testing for the geotextiles (layer 4 and layer 6) installed within cells 12A, 9 and 10 in accordance with the specifications outlined in Table 5.

Table 5: Geotextile CQA requirements

Item	Property	Standards	Frequency
Conformance Quality Control testing (sampled at the point of manufacture or on site, as determined by	Wide Strip Tensile Strength	AS 3706–2	1 sample per 5,000 m^2
	Grab Tensile Strength	AS 3706–2	1 sample per 5,000 m^2
	Trapezoidal Tear Strength	AS 3706–3	1 sample per 5,000 m^2
	CBR Burst Strength	AS 3706–4	1 sample per 5,000 m^2

the Superintendent)	UV Stability	ASTM D7238	Review of MQC data
Destructive tests	Tensile tests for joints.	AS 3706–6	As required
Visual inspection of geotextile	Colour, thickness, tears, holes, punctures, needle-punching, presence of needles or broken needles, and other faults in the material.	N/A	Each roll during placement.

Compliance reporting

7. The works approval holder must within 60 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.

8. The Environmental Compliance Report required by condition 7, must include as a minimum the following:

(a) certification by a suitably qualified civil or structural 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.

9. The works approval holder must within 60 calendar days of the Critical Containment Infrastructure identified by condition 2 being constructed:

(a) undertake an audit of their compliance with the requirements of condition 2; and

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

10. The Critical Containment Infrastructure Report required by condition 9 must include as a minimum the following:

(a) a CQA Validation Report certified and written by the independent third party civil or structural engineer professional engineer that completed the CQA that includes, but is not limited to;

(i) certification that each item of critical containment infrastructure or component thereof, as specified in condition 2, has been built and installed in accordance with the requirements specified in condition 2;
(ii) documentation of the quality of the completed works;
(iii) certification that each item of critical containment infrastructure or component thereof, has complied with the relevant construction quality assurance requirements detailed in conditions 4, 5 and 6;
(iv) an assessment of test results against minimum values in conditions 4,5 and 6 as relevant; and

(v) documentation of all repairs to subgrade and resulting from non-destructive weld testing;

(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 2;

(c) photographic evidence of the installation of the infrastructure; and

(d) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Groundwater monitoring network expansion

11. The works approval holder must design, construct, and install groundwater monitoring wells in accordance with the requirements specified in Table 6.

Table 6: Infrastructure requirements – groundwater monitoring wells

Infrastructure	Design, construction, and installation requirements	Monitoring well location(s)	Timeframe
Groundwater monitoring wells GW12S GW14S/D GW15S/D GW16S/D GW17S/D	<u>Well design and construction:</u> Designed and constructed in accordance with *ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores*. Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination[1]. Where temporary/seasonal perched features are present, wells must be nested, and the perched features individually screened.	As depicted in Figure 22 of Schedule 1	Must be constructed, developed (purged), and determined to be operational no later than 60 calendar days after the submission of the Critical Containment Infrastructure report required by condition 9.
	<u>Logging of borehole:</u> Soil samples must be collected and logged during the installation of the monitoring wells. A record of the geology encountered during drilling must be described and classified in accordance with the Australian Standard Geotechnical Site Investigations AS1726. Any observations of staining / odours or other indications of contamination must be included in the bore log.		
	<u>Well construction log:</u> Well construction details must be documented within a well construction log to demonstrate compliance with *ASTM D5092/D5092M-16*. The construction logs shall include elevations of the top of casing position to be used as the reference point for water-level measurements, and the elevations of the ground surface protective installations.		

Infrastructure	Design, construction, and installation requirements	Monitoring well location(s)	Timeframe
	Well development: All installed monitoring wells must be developed after drilling to remove fine sand, silt, clay and any drilling mud residues from around the well screen to ensure the hydraulic functioning of the well. A detailed record should be kept of well development activities and included in the well construction log.		
	Installation survey: the vertical (top of casing) and horizontal position of each monitoring well must be surveyed and subsequently mapped by a suitably qualified surveyor.		
	Well network map: a well location map (using aerial image overlay) must be prepared and include the location of all monitoring wells in the monitoring network and their respective identification numbers.		

Note 1: refer to Section 8 of Schedule B2 of the *Assessment of Site Contamination NEPM* for guidance on well screen depth and length.

12. The works approval holder must, within 60 calendar days of the monitoring wells being constructed, submit to the CEO a well construction report evidencing compliance with the requirements of condition 11.

13. The works approval holder must undertake one groundwater monitoring event to determine baseline ambient environmental conditions at the premises immediately following construction of the groundwater monitoring wells specified in condition 11.

14. The monitoring of the baseline ambient environmental conditions required under condition 13 must be undertaken in accordance with Table 7.

Table 7: Determination of baseline ambient environmental conditions in groundwater

Monitoring well location	Parameter	Unit	Frequency	Averaging period
Groundwater monitoring wells GW12S GW14S/D GW15S/D GW16S/D GW17S/D As depicted in Figure 22 of Schedule 1	Standing water level[1]	m(AHD)	One off sample	Spot sample, in accordance with AS/NZS 5667.11
	pH[1]	pH unit		
	Electrical conductivity[1]	µS/cm		
	Redox potential[1]	Eh		
	Chemical oxygen demand	mg/L		
	Nitrate-nitrogen			
	Ammonia-nitrogen			
	Total nitrogen			
	Total phosphorus			
	Total dissolved solids			
	Total organic carbon			
	Dissolved oxygen[1]			

	Major cations and anions: calcium, magnesium, potassium, sodium, chloride, bicarbonate, and sulphate			
	Heavy Metals: Aluminium, Arsenic, Cadmium, Chromium, Copper, Iron (total) Lead, Manganese, Mercury, Nickel, Selenium and Zinc			
	Organics: Phenols, Polyaromatic hydrocarbons (PAH), Organochlorine pesticides, Organophosphate pesticides (Demeton-S-Methyl, Diazinon, Dimethoate, Fenamiphos, Fenthion, Malathion and Parathion), Polychlorinated biphenyls (PCB), Atrazine, BTEX (benzene, toluene, ethylbenzene, xylens), Total Petroleum Hydrocarbons and Trichloroethylene/ Perchloroethylene			
	PFAS: • Perfluorooctane sulfonate; • Perfluorooctanoic acid; • 6:2 Fluorotelomer sulfonate; • 8:2 Fluorotelomer sulfonate, • Perfluoroheptanoic acid; • Perfluorobutane sulfonate; • Perfluorobutanoic acid; • Perfluorohexanoic acid; • Perfluorohexane sulfonate; • Perfluoropentanoic acid; • Perfluorooctane sulfanomide; • Perfluorodecane sulfonate; • Perfluorononanoic acid; • Perfluorodecanoic acid; • Perfluoroundecanoic acid; • Perfluorododecanoic acid; • Perfluorotridecanoic acid; • Perfluorotetradecanoic acid; • N-Methyl-heptadecafluorooctane sulfanomide; • N-Eethyl-heptadecafluorooctane sulfanomide; • N-Methyl-heptadecafluorooctane sulfanomidoethanol; and • N-Ethyl-heptadecafluorooctane sulfanomidoethanol.	µg/L		

Note 1: In-field non-NATA accredited analysis permitted.

15. The works approval holder must within 60 calendar days of conducting the groundwater monitoring event required by condition 13, submit to the CEO a groundwater monitoring report, which must include:

(a) a clear statement of the scope of work carried out;

(b) a description of the field methodologies employed;

(c) a summary of the field and laboratory quality assurance / quality control (QA/QC) program;

(d) copies of the field monitoring records and field QA/QC documentation;

(e) an assessment of reliability of field procedures and laboratory results;

(f) a tabulated summary of results, as well as all raw data provided in an accompanying Microsoft Excel spreadsheet digital document/file (or a compatible equivalent digital document/file), with all results being clearly referenced to laboratory certificates of analysis;

(g) a diagram with aerial image overlay showing all monitoring locations and depicting groundwater level contours, flow direction and hydraulic gradient (relevant site features including discharge points and other potential sources of contamination must also be shown); and

(h) an interpretive summary and assessment of the results against relevant assessment levels for water, as published in the Guideline Assessment and management of contaminated sites.

Note 1: General guidance on report presentation can be found in the Department's *Guideline: Assessment and management of contaminated sites*.

Water balance assessment

16. The works approval holder must within 60 calendar days of the submission of the Critical Containment Infrastructure Report required by condition 9, submit to the CEO a water balance for the primary leachate pond and leachate evaporation ponds 1, 2 and 3 (leachate evaporation ponds) as depicted in Figure 1 of Schedule 1.

17. The water balance required by condition 16 must consider at a minimum the input and output parameters outlined in Table 8.

Table 8: Water balance considerations

Infrastructure	Inputs	Outputs
Primary leachate pond and leachate ponds 1, 2 and 3 (leachate evaporation ponds) as depicted in Figure 1of Schedule 1.	Rainfall directly into the ponds	Pan evaporation from the ponds
	Run-off from operational areas of the premises to the ponds	Accelerated evaporation from the ponds through sprinkler use
	Leachate generated from all landfill cells at the premises directed to the ponds	Leachate extraction from the ponds for use as dust suppression / for leachate circulation within operational landfill cells at the premises
		Seepage of leachate through the landfill liners

Time limited operational phase

Commencement of Critical Containment Infrastructure

18. The works approval holder may conduct the time limited operation of Cell 12A as specified in Table 9 of condition 20:

(a) Until 1 October 2025, 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 18(a).

19. The works approval holder may conduct the time limited operation of Cell 9 and 10 stormwater retention ponds and pipework as specified in Table 9 of condition 20:

(a) for a period not exceeding 180 calendar days, 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 18(a).

Time limited operations requirement

20. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 9 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 9.

Table 9: Infrastructure and equipment requirements during time limited

	Site infrastructure and equipment	Operational requirement	Infrastructure location
1	Cell 12A	Lining system in the cell 12A to be maintained to achieve a permeability of at least < 1x 10^{-9} m/s or equivalent	As depicted by Figure 2 of Schedule 1
2	Cell 9 and 10 stormwater retention ponds and pipework	Maintain the pond and associated pipework to be free of leaks and defects The stormwater pumping to existing stormwater management infrastructure must be started within 4 hours of the storm event's commencement.	As depicted by 3 and 9 of Schedule 1

Waste acceptance during time limited operations

21. The works approval holder must only accept onto the premises solid waste of a waste type, which does not exceed the corresponding rate at which waste is received, and which meets the corresponding acceptance specification set out in Table 10.

Table 10: Types of solid waste authorised to be accepted onto the premises

Waste type	Rate at which waste is received	Acceptance specification
All waste types	350,000 tonnes per annual period with no more than 20,000 tonnes of Special Waste Type 1 received in any annual period.	(a) All waste accepted at the Premises must be completely covered; (b) All waste loads accepted at the Premises must be visually inspected to confirm waste type/s; (c) Should a hot load be identified, the waste must not be disposed of at the tipping face; and (d) All waste suspected of containing ACM or asbestos must be treated as being Special Waste Type 1.
Contaminated Solid Waste Inert Waste Type		(a) Contaminated Solid Waste must be supported by documentation that demonstrates compliance with the Acceptance Criteria for Class III landfills; and

1 Inert Waste Type 2 Putrescible Waste Special Waste Type 2 Processed septage waste		(b) No tyres are to be accepted.
Special Waste Type 1		(a) All Special Waste Type 1 accepted at the Premises must be completely contained; and (b) Acceptance of any waste must not result in the discharge of ACM or asbestos fibres.
Clean Fill		None specified

Waste processing during time limited operations

22. The works approval holder must ensure that the waste types specified in Table 11 are only subjected to the corresponding processes, subject to the corresponding process limits and/or specifications.

Table 11: Solid waste processing

Waste type	Process(es)	Process limits/specification
Clean fill	Receipt, handling, and disposal by landfilling.	None specified
Contaminated Solid Waste		(a). Only Contaminated solid waste that demonstrates compliance with the Acceptance Criteria for Class II landfills must be disposed of in the area of Cell 12A that overlaps Cell 1 or Cell 2. (b). Waste will only be disposed of by burial into the Active Landfill Area and must not be used for any other purpose. (c). All waste will be levelled in layers no greater than 0.5 m thick and compacted; and (d). Highly Odorous Waste will be disposed of by burial immediately following acceptance
Drill muds (processed in accordance with Condition 8 in L8904/2015/1) Inert Waste Type 1 Inert Waste Type 2 Putrescible Waste Processed septage		(a) Waste must only be disposed of by burial into the Active Landfill Area and must not be used for any other purpose; (b) All waste, except Special Waste Type 1, must be levelled in layers no greater than 0.5 m thick and compacted; and (c) Highly Odorous Waste must be disposed of by burial immediately following acceptance.
Special Waste Type 1		(d) Waste must only be disposed of by burial to the active Special Waste Disposal Area. (e) Disposal must not result in the discharge of ACM or asbestos fibres; (f) Bulk loads of soil containing ACM or asbestos must be wet down during disposal, levelling and immediate burial; and (g) Waste must not be compacted until covered in

		accordance with Condition 19.
Special Waste Type 2		(h) Waste must only be disposed of by burial to the active Special Waste Disposal Area. (i) Waste must be levelled in layers no greater than 0.5 m thick and compacted; and (j) Highly Odorous Waste must be disposed of by burial immediately following acceptance.

Waste cover requirement during time limited operations

Daily and Interim cover

22. The licence holder shall ensure that daily and interim cover is applied and maintained on landfilled waste types in accordance with the corresponding cover requirements in Table 12 and Table 13 that sufficient stockpiles of cover are maintained on the premises at all times to meet the requirements of this condition.

Table 12: Daily cover requirements

Waste type	Material	Depth	Timescales
Clean Fill	No cover requirement		
Special Waste Type 1 Special Waste Type 2	Either: (a). 300 mm of Inert Waste Type 1 or Clean fill; or (b). 1,000 mm of Solid waste		As soon as practicable after acceptance and no later than the end of the working day that the waste was accepted, and before being compacted to prevent the release of asbestos fibres and further disturbance as a result of compaction and other landfilling activities.
Contaminated Solid Waste Drill muds Inert Waste Type 1 Inert Waste Type 2 Putrescible Waste	Inert Waste Type I or Clean Fill	150 mm	As soon as practicable and not later than the end of the working day that the waste was deposited.
Processed Septage waste	Inert Waste Type 1 or Clean Fill	300 mm	As soon as practicable and not later than the end of the working day that the waste was deposited.
All waste types	Inert Waste Type 1 or Clean Fill	300 mm	Immediately following disposal for any wastes meeting the definition of Highly Odorous Wastes[1] or Dusty Wastes[1].
	Putrescible Waste	1000 mm	Immediately following disposal for any wastes meeting the definition of Highly Odorous Wastes[1] or Dusty Wastes[1].

Note 1: Where waste meets the definition of Highly Odorous Wastes and/or Dusty Wastes, the cover requirements for Highly Odorous Wastes and Dusty Wastes take precedence over any other cover requirements.

Table 13: Interim cover requirements

Waste type	Material	Depth	Timescales
All waste types	Clean Fill	1000 mm	Progressively applied and within 3 months of achieving Interim Waste Contours

Monitoring during time limited operations

23. The works approval holder must record the total amount of waste accepted onto and removed from the premises in accordance with the specifications listed in Table 14.

Table 14: Monitoring of inputs and outputs

Input/Output	Unit	Time period	Frequency
Waste Inputs	Tonnes	Annual period	Each load arriving at the Premises
Waste Outputs			Each load leaving or rejected from the premises

Groundwater monitoring during time limited operations

24. The works approval holder must monitor groundwater for concentrations of the identified parameter(s) in accordance with Table 15.

Table 15: Groundwater monitoring of ambient concentrations

Monitoring well location	Parameter	Unit	Frequency	Averaging period
Monitoring wells as shown in Figure 2, Schedule 1 of the Licence L8904/2015/1 and newly constructed wells GW12S, GW16S/D and GW17S/D	Standing water level[1]	m(AHD)	Quarterly	Spot sample, in accordance with AS/NZS 5667.11
	pH[1]	pH unit		
	Electrical conductivity[1]	µS/cm		
	Redox potential[1]	Eh		
	Chemical oxygen demand	mg/L		
	Nitrate-nitrogen			
	Ammonia-nitrogen			
	Total nitrogen			
	Total phosphorus			
	Total dissolved solids			
	Total organic carbon			
	Dissolved oxygen[1]			
	Major cations and anions: calcium, magnesium, potassium, sodium, chloride, bicarbonate and sulphate			
	Heavy Metals: Aluminium, Arsenic, Cadmium, Chromium, Copper, Iron (total) Lead, Manganese, Mercury, Nickel, Selenium and Zinc			

	PFAS: • Perfluorooctane sulfonate; • Perfluorooctanoic acid; • 6:2 Fluorotelomer sulfonate; • 8:2 Fluorotelomer sulfonate, • Perfluoroheptanoic acid; • Perfluorobutane sulfonate; • Perfluorobutanoic acid; • Perfluorohexanoic acid; • Perfluorohexane sulfonate; • Perfluoropentanoic acid; • Perfluorooctane sulfanomide; • Perfluorodecane sulfonate; • Perfluorononanoic acid; • Perfluorodecanoic acid; • Perfluoroundecanoic acid; • Perfluorododecanoic acid; • Perfluorotridecanoic acid; • Perfluorotetradecanoic acid; • N-Methyl-heptadecafluorooctane sulfanomide; • N-Eethyl-heptadecafluorooctane sulfanomide; • N-Methyl-heptadecafluorooctane sulfanomidoethanol; and N-Ethyl-heptadecafluorooctane sulfanomidoethanol.	µg/L	Six monthly	Spot sample, in accordance with AS/NZS 5667.11
	Organics: Phenols, Polyaromatic hydrocarbons (PAH), Organochlorine pesticides, Organophosphate pesticides (Demeton-S-Methyl, Diazinon, Dimethoate, Fenamiphos, Fenthion, Malathion and Parathion), Polychlorinated biphenyls (PCB), Atrazine, BTEX (benzene, toluene, ethylbenzene, xylens), Total Petroleum Hydrocarbons and Trichloroethylene/ Perchloroethylene	mg/L	Six monthly	Spot sample, in accordance with AS/NZS 5667.11

Note 1: In-field non-NATA accredited analysis permitted.

25. 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 30 calendar days before the expiration date of the works approval, whichever is the sooner.

26. The works approval holder must ensure the report required by condition 25 includes the following:

(a). a summary of the time limited operations, including timeframes and amount waste received, disposed of on the premises and the amount of waste taken off the premises;

(b). a summary of the environmental performance of cell 12A and stormwater retention ponds and pipework for cell 9 and 10.

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

(d). 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.

Leachate management during time limited operations

27. The works approval holder must maintain and implement the Leachate Plan Version PS130251-003-R-R-Rev0, dated 31 March 2022, consistent with the conditions of Licence L8904/2015/1.

Records and reporting

28. 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.

29. 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 conditions 1 and 2;

(b) the construction of groundwater monitoring wells in accordance with condition 11;

(c) any maintenance of infrastructure that is performed in the course of complying with conditions 1, 2 and 11;

(d) monitoring programmes undertaken in accordance with condition 13; 23 and 24 and

(e) complaints received under condition 28.

30. The books specified under condition 29 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 16 have the meanings defined.

Table 16: Definitions

Term	Definition
annual period	a 12-month period commencing from 1 January until 31 December of the same 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 *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
critical containment infrastructure	means the items of infrastructure listed in condition 2.
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.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (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.
Suitably qualified civil or structural	means a person who: (a) holds a Bachelor of Engineering recognized by Engineers

Term	Definition
engineer	Australia; and (b) has a minimum or 5 years of experience working in a supervisory area of geotechnical engineering; and (c) is employed by an independent third party external to the Licence Holder's business; or is otherwise approved in writing by the CEO to act in this capacity.
time limited operation	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.

END OF CONDITIONS

Schedule 1: Maps

Premises maps

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

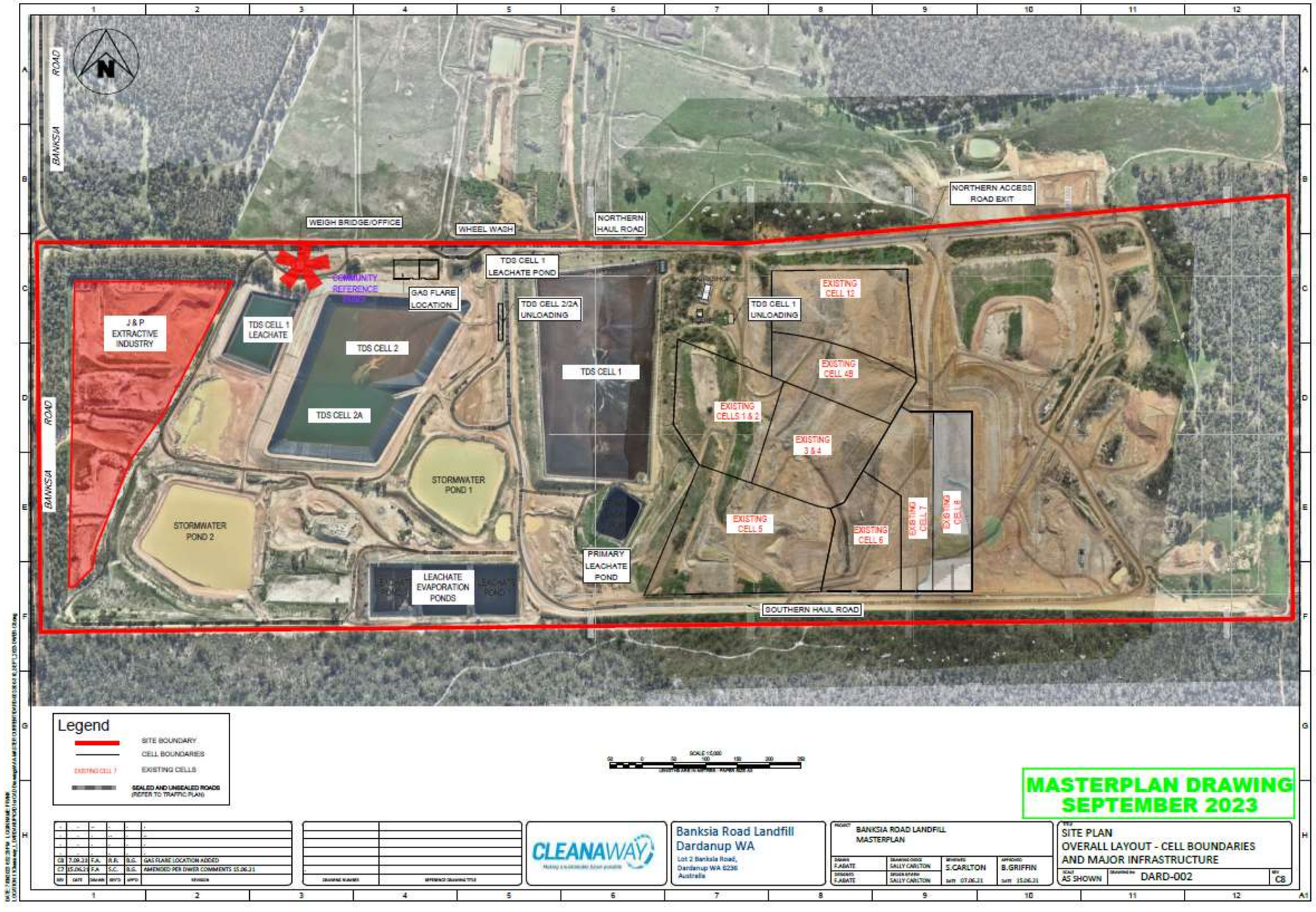


Figure 1: Map of the boundary of the prescribed premises

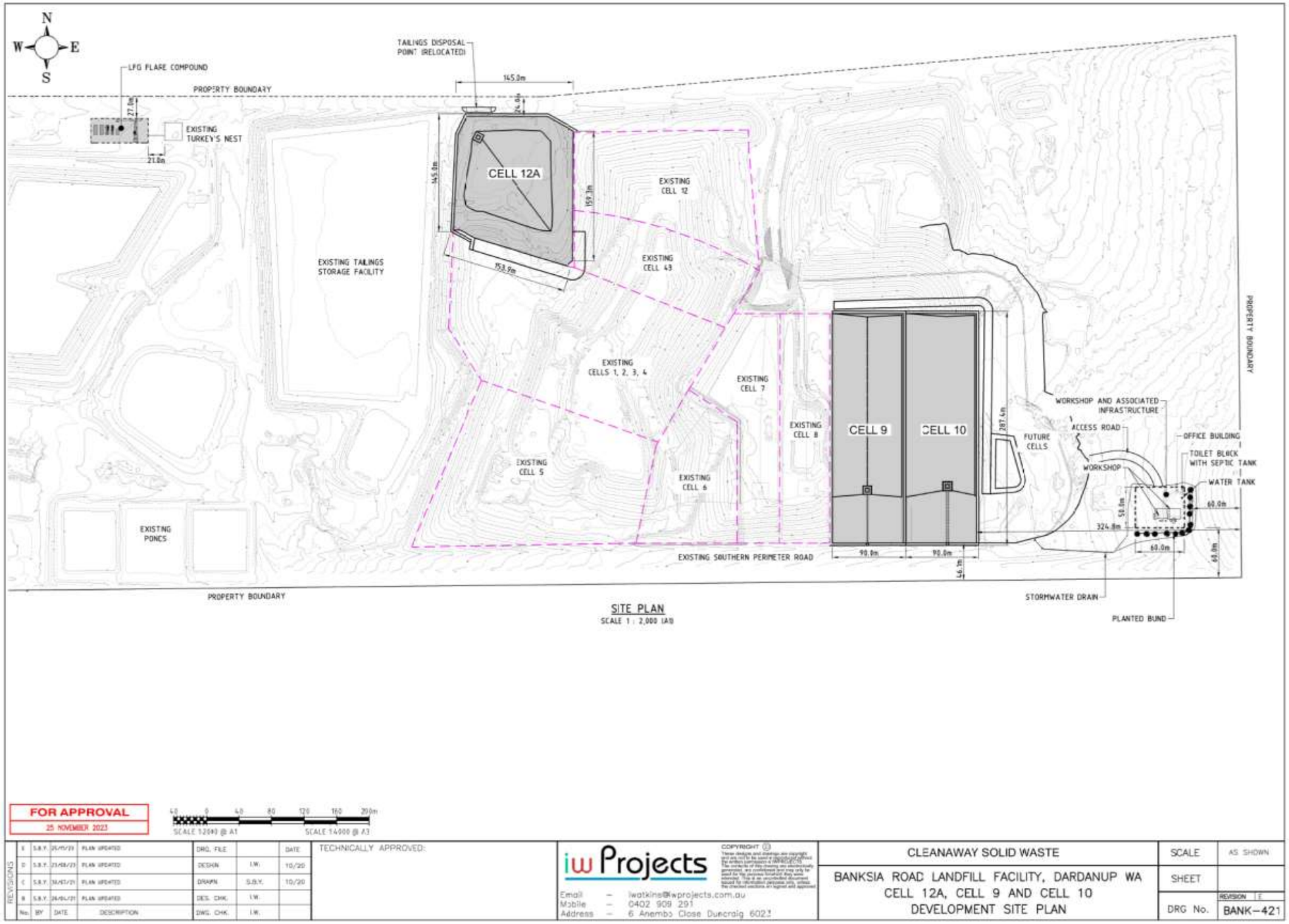


Figure 2: Cells 12A, 9 and 10 overview and locations

Cell 9 Construction specifications

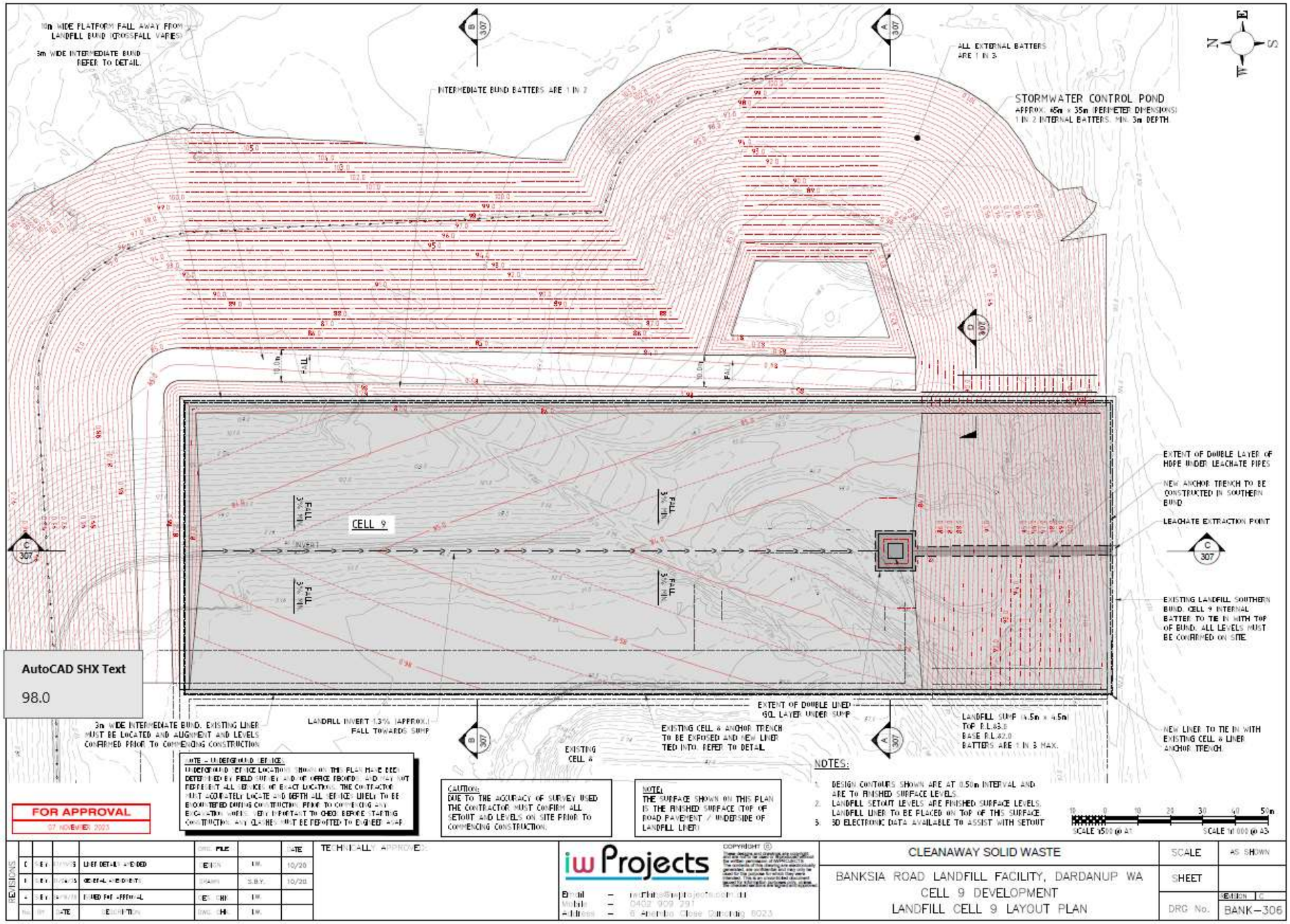


Figure 3: Cell 9 construction overview

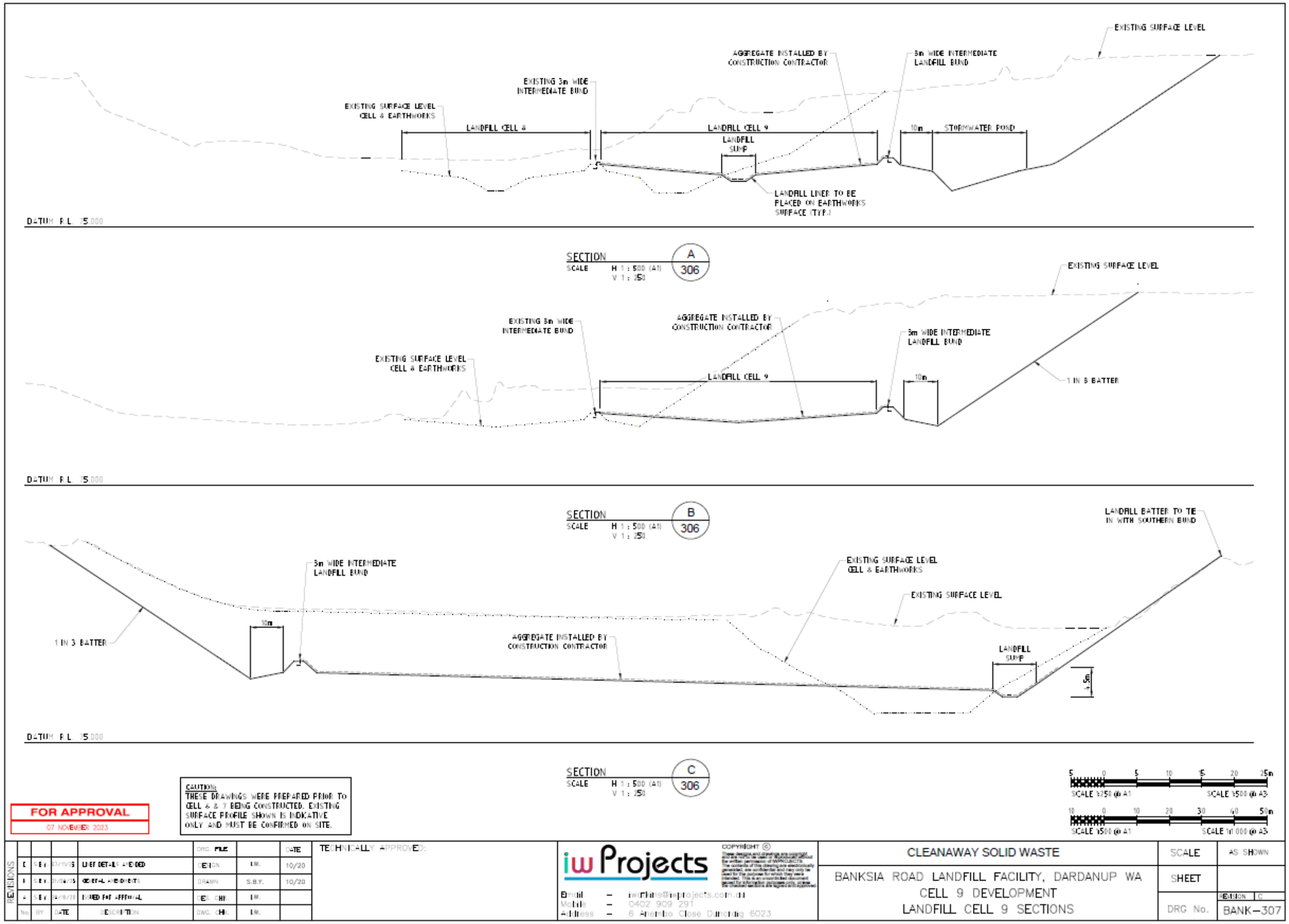


Figure 4: Cell 9 landfill sections

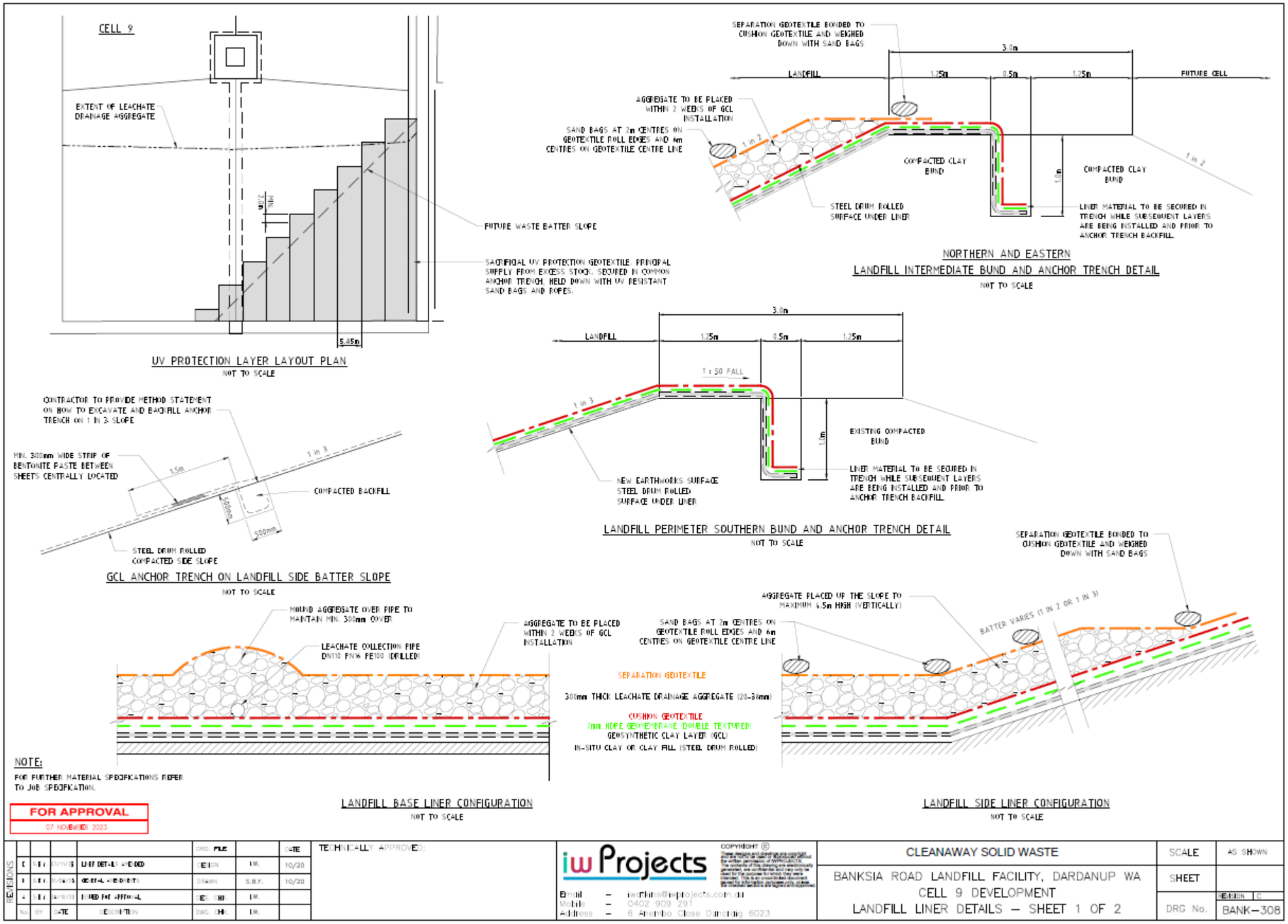


Figure 5: Cell 9 Liner details (1)

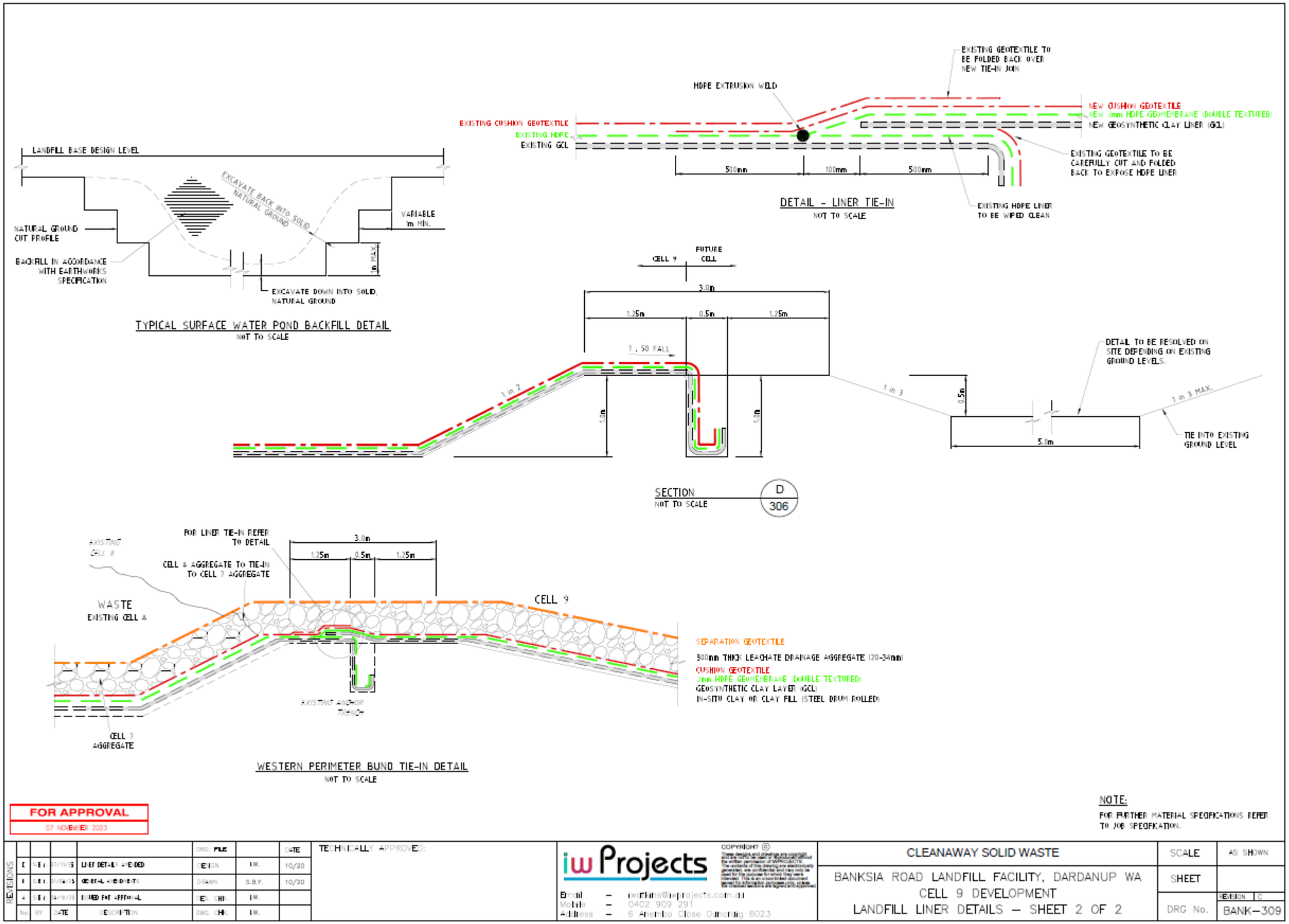


Figure 6: Cell 9 liner details (2)

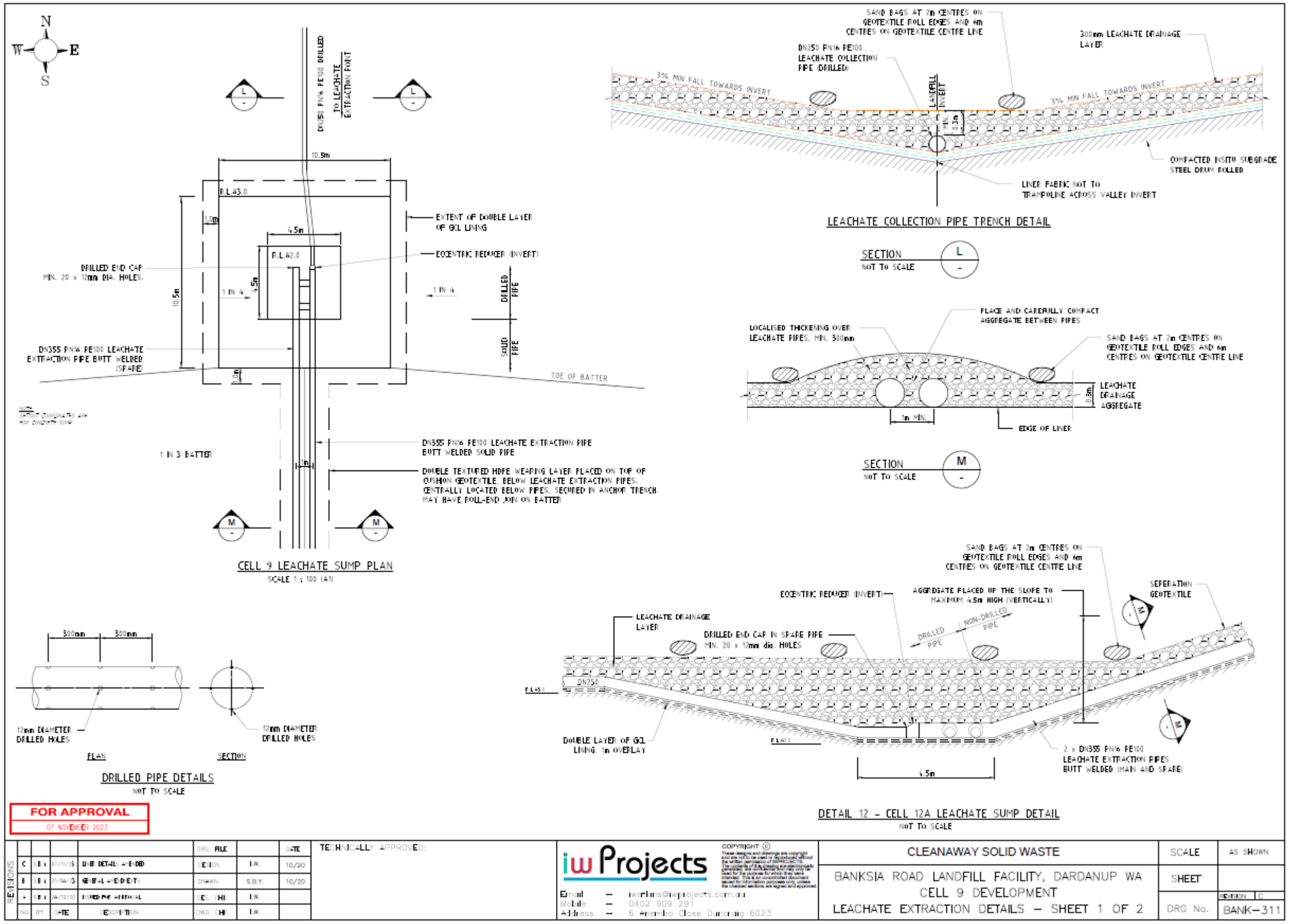


Figure 7: Cell 9 leachate extraction details (1)

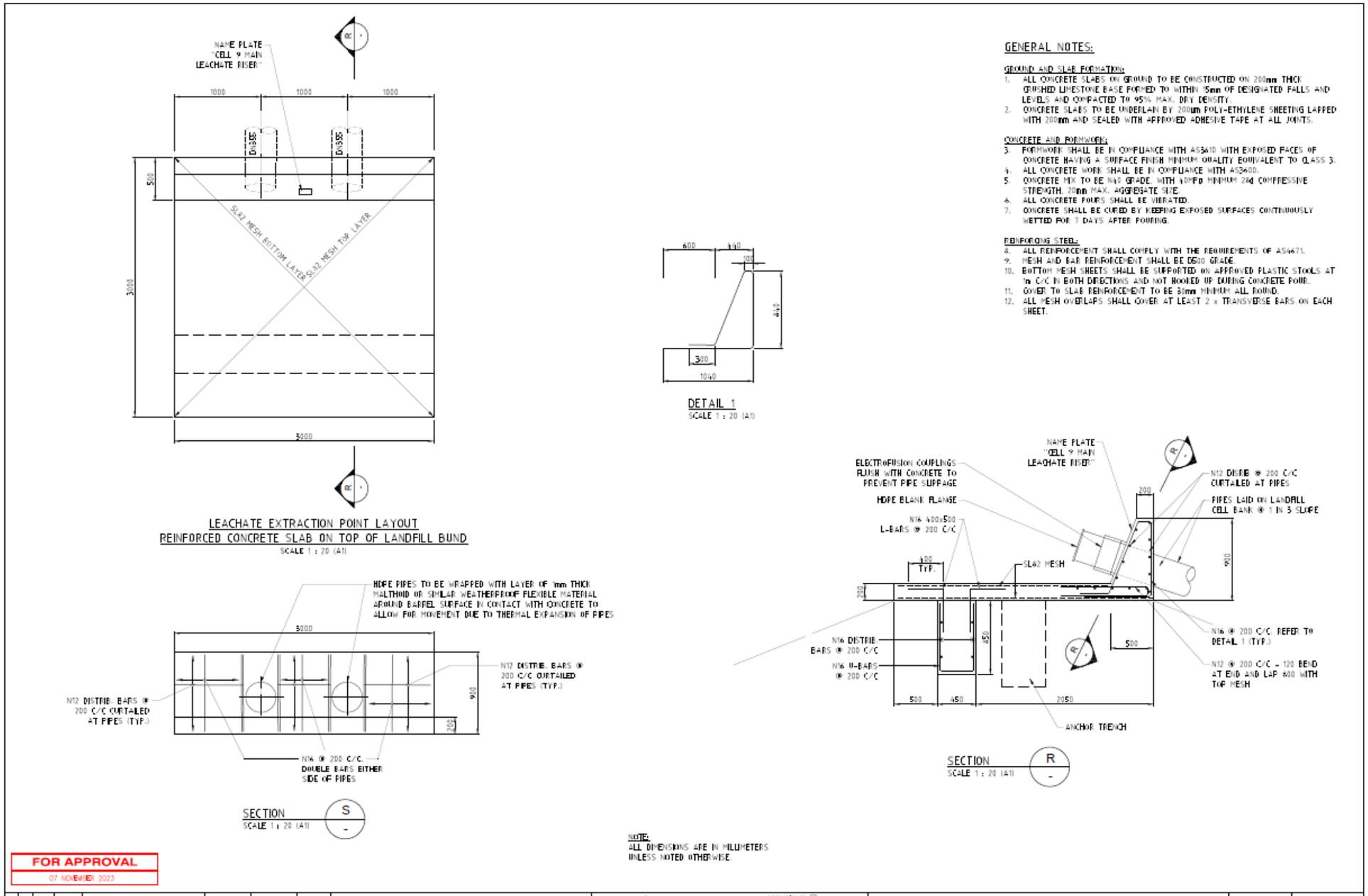


Figure 8: Cell 9 leachate extraction details (2)

Cell 10 Construction specifications

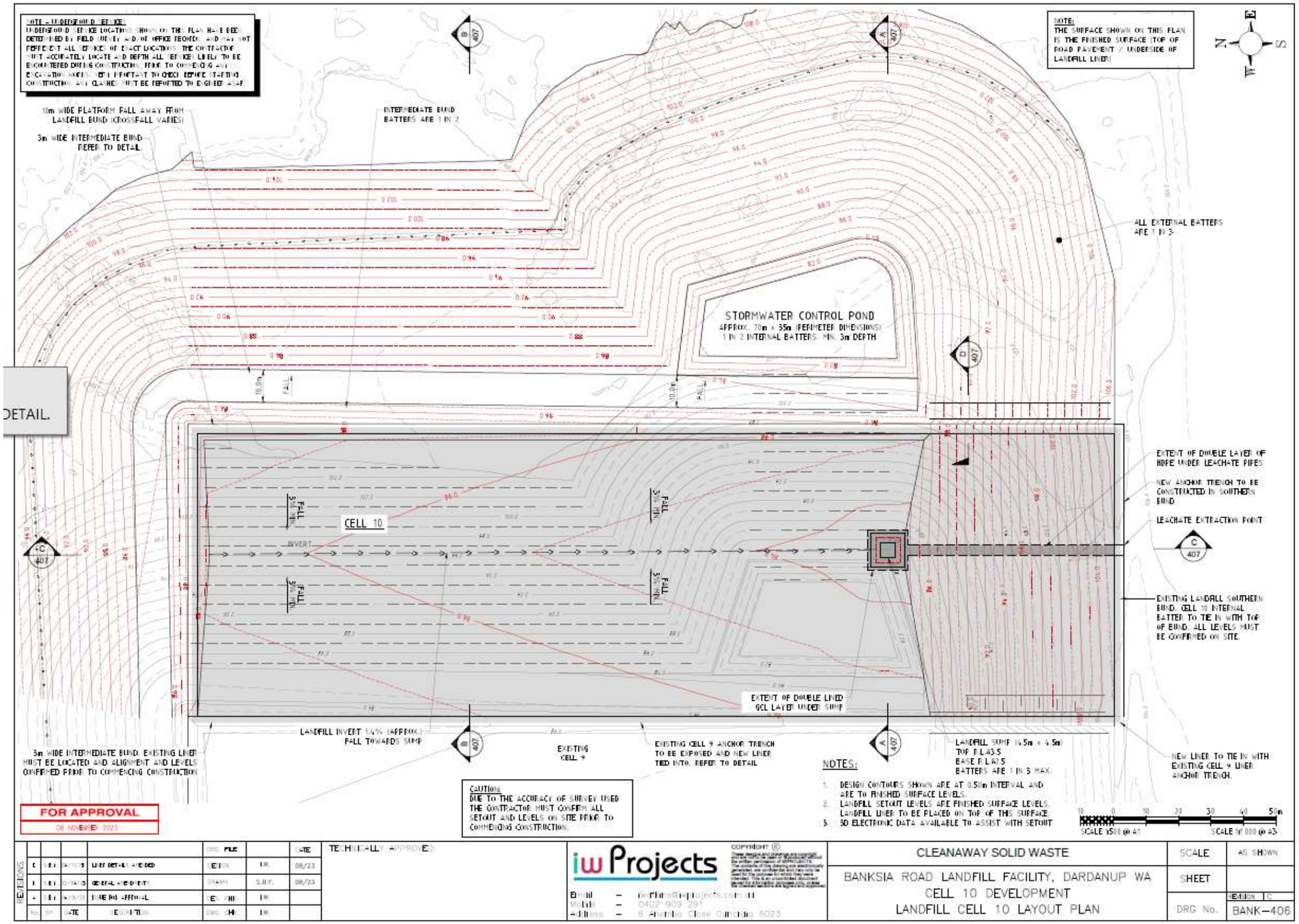


Figure 9: Cell 10 construction overview

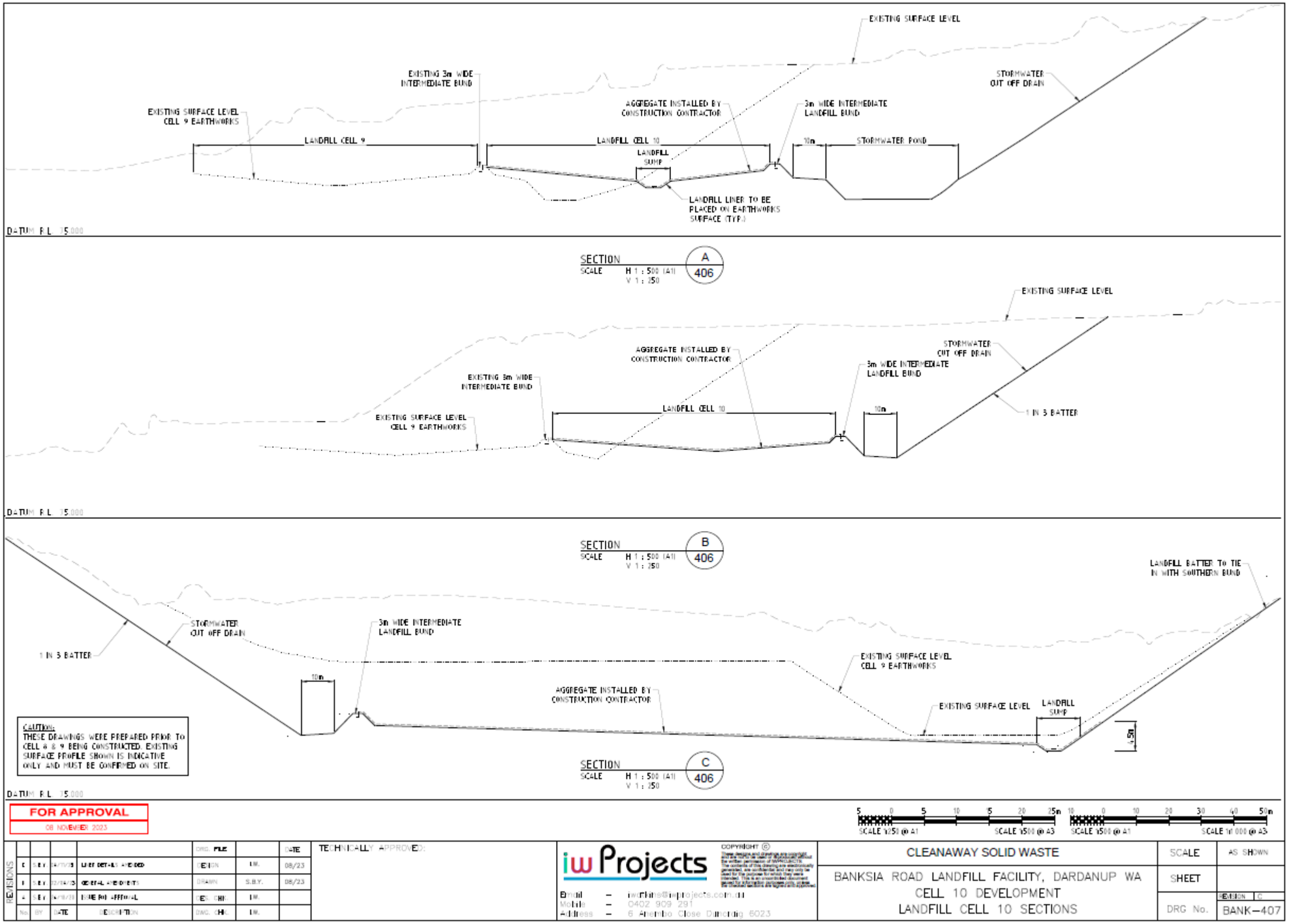


Figure 10: Cell 10 sections

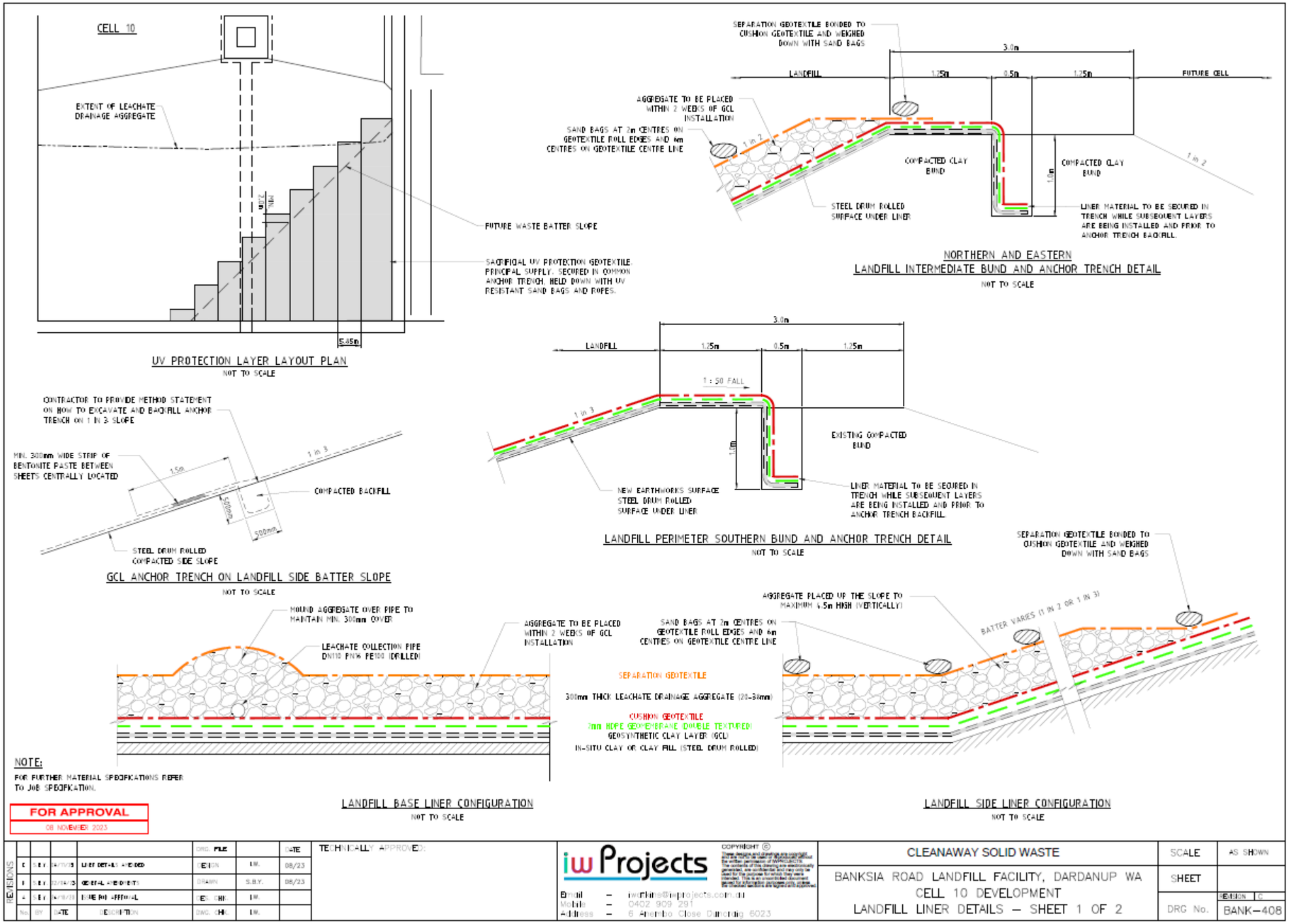


Figure 11: Cell 10 liner details (1)

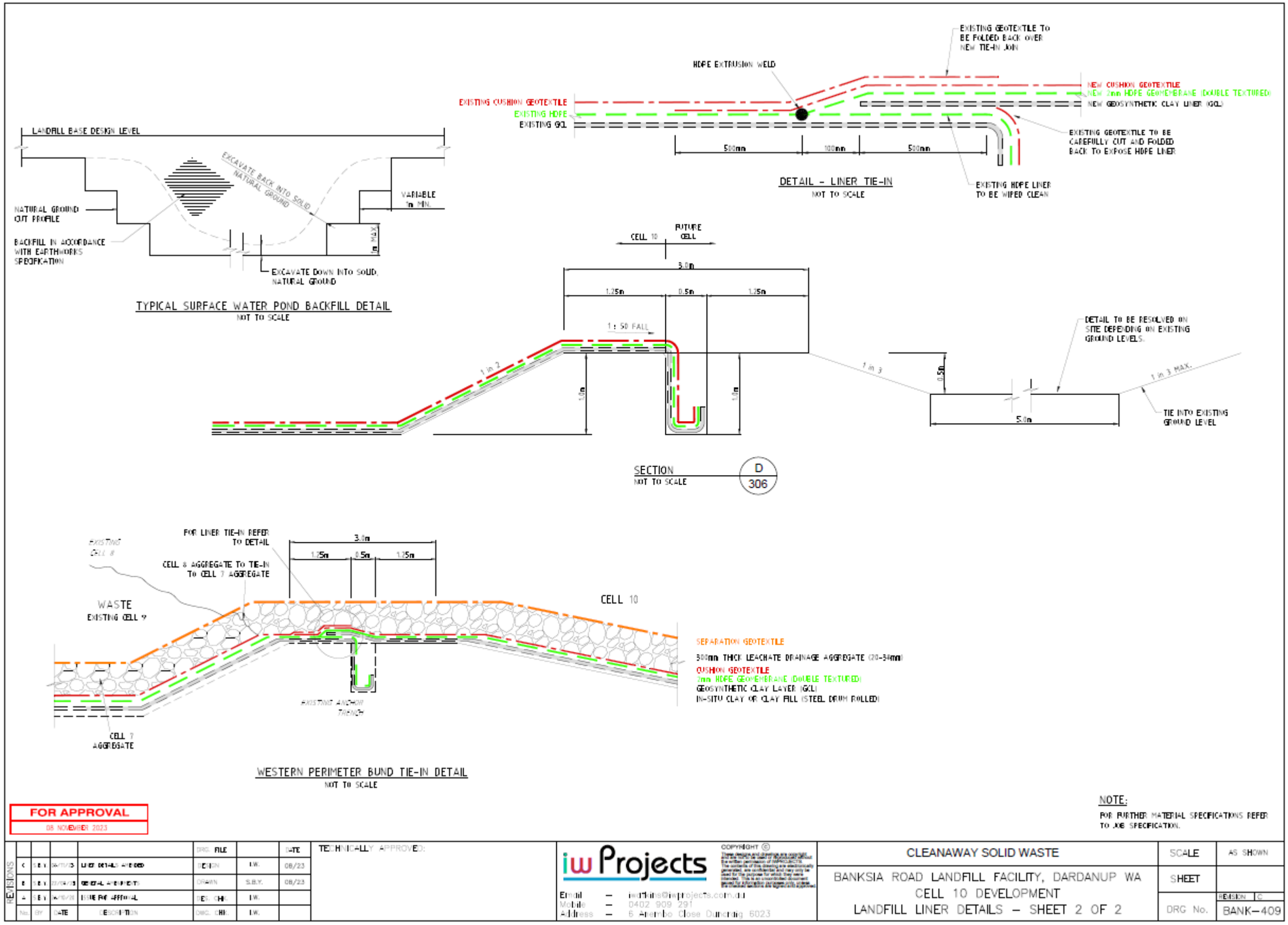


Figure 12: Cell 10 liner details (2)

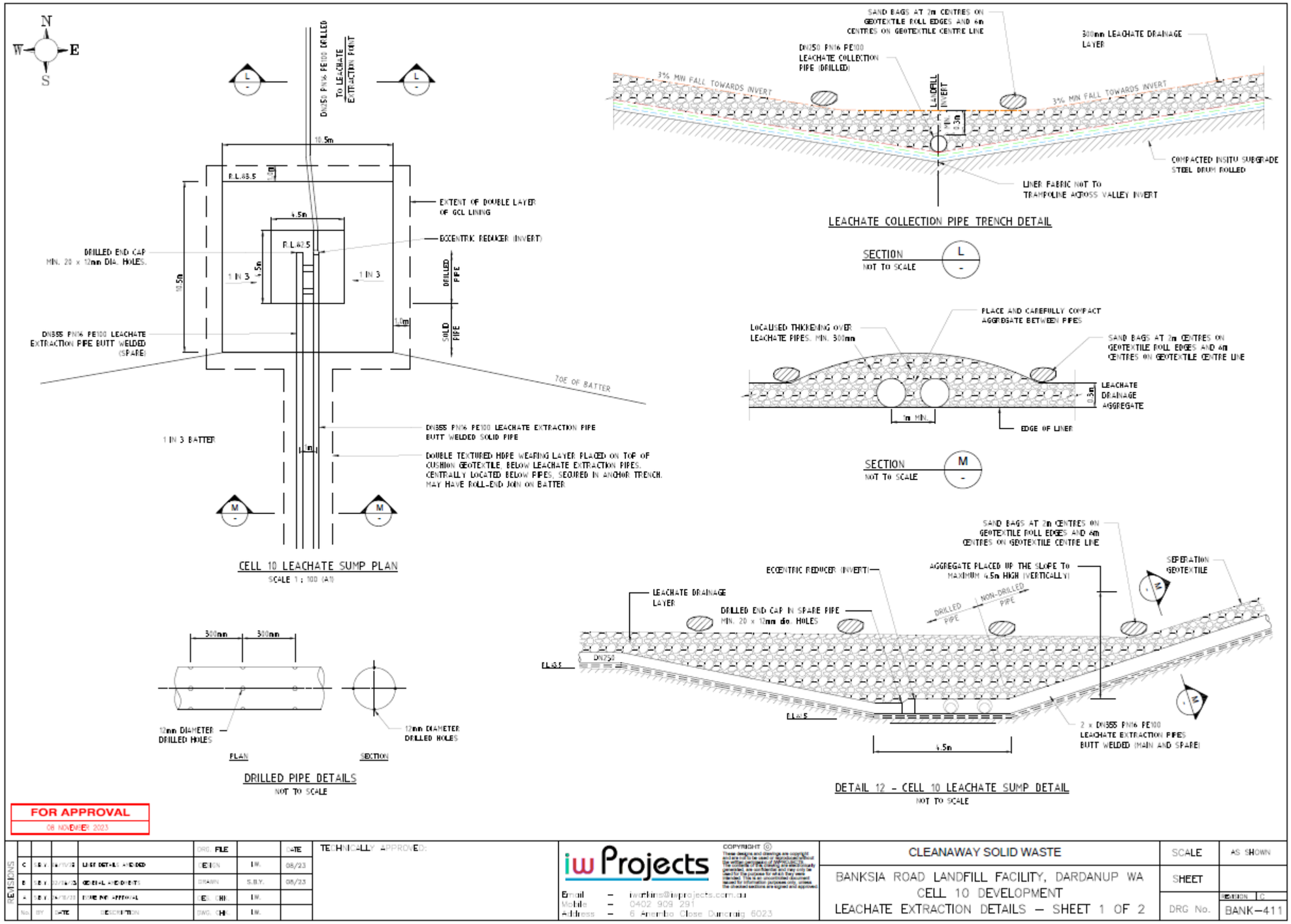
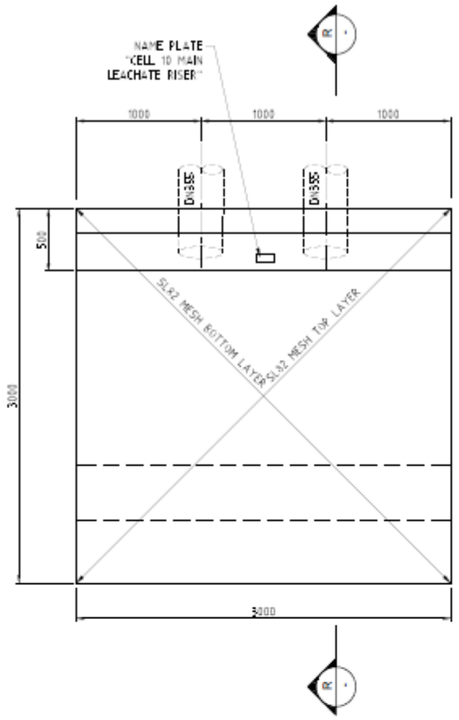
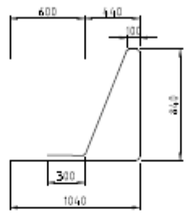


Figure 13: Cell 10 leachate extraction details (1)



LEACHATE EXTRACTION POINT LAYOUT
REINFORCED CONCRETE SLAB ON TOP OF LANDFILL BUND
SCALE 1 : 20 (A1)



DETAIL 1
SCALE 1 : 20 (A1)

GENERAL NOTES:

GROUND AND SLAB FORMATION:

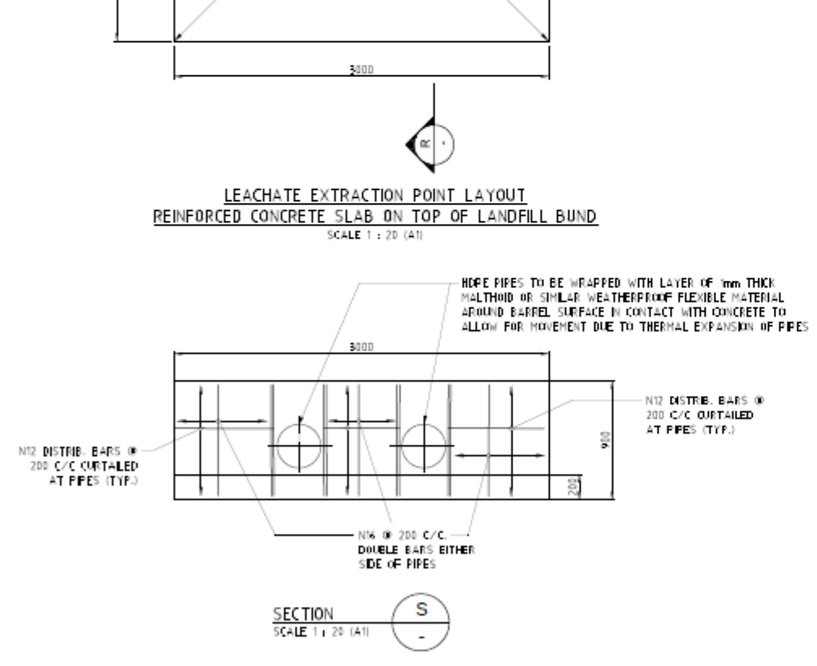
1. ALL CONCRETE SLABS ON GROUND TO BE CONSTRUCTED ON 200mm THICK CRUSHED LIMESTONE BASE FORMED TO WITHIN 15mm OF DESIGNATED FALLS AND LEVELS AND COMPACTED TO 95% MAX. DRY DENSITY.
2. CONCRETE SLABS TO BE UNDERLAIN BY 200µm POLY-ETHYLENE SHEETING LAPPED WITH 200mm AND SEALED WITH APPROVED ADHESIVE TAPE AT ALL JOINTS.

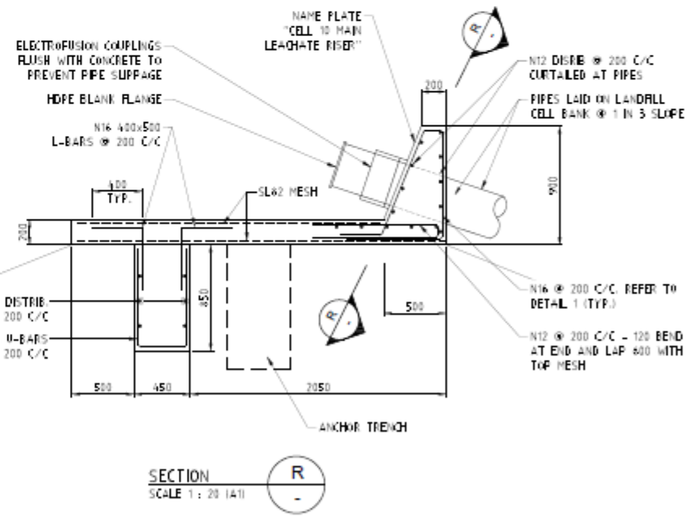
CONCRETE AND FORMWORK:

3. FORMWORK SHALL BE IN COMPLIANCE WITH AS3610 WITH EXPOSED FACES OF CONCRETE HAVING A SURFACE FINISH MINIMUM QUALITY EQUIVALENT TO CLASS 3.
4. ALL CONCRETE WORK SHALL BE IN COMPLIANCE WITH AS3600.
5. CONCRETE MIX TO BE N40 GRADE, WITH 40MPa MINIMUM 28d COMPRESSIVE STRENGTH, 20mm MAX. AGGREGATE SIZE.
6. ALL CONCRETE POURS SHALL BE VIBRATED.
7. CONCRETE SHALL BE CURED BY KEEPING EXPOSED SURFACES CONTINUOUSLY WETTED FOR 7 DAYS AFTER POURING.

REINFORCING STEEL:

8. ALL REINFORCEMENT SHALL COMPLY WITH THE REQUIREMENTS OF AS4671.
9. MESH AND BAR REINFORCEMENT SHALL BE D500 GRADE.
10. BOTTOM MESH SHEETS SHALL BE SUPPORTED ON APPROVED PLASTIC STOOLS AT 1m C/C IN BOTH DIRECTIONS AND NOT HOOKED UP DURING CONCRETE POUR.
11. COVER TO SLAB REINFORCEMENT TO BE 30mm MINIMUM ALL ROUND.
12. ALL MESH OVERLAPS SHALL COVER AT LEAST 2 x TRANSVERSE BARS ON EACH SHEET.





NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

FOR APPROVAL
08 NOVEMBER 2023

REVISIONS					DRG. FILE		DATE
C	S.B.Y.	07/11/23	UNIT DETAILS AMENDED	DESIGN	I.W.	08/23
B	S.B.Y.	02/11/23	GENERAL AMENDMENTS	DRAWN	S.B.Y.	08/23
A	S.B.Y.	24/10/23	ISSUED FOR APPROVAL	DES. CHK.	I.W.	
No.	BY	DATE	DESCRIPTION	DWG. CHK.	I.W.	

TECHNICALLY APPROVED:

iw Projects
Email – iwchris@iwprojects.com.au
Mobile – 0402 909 291
Address – 6 Arendo Close Dunsborough 6281

CLEANAWAY SOLID WASTE
BANKSIA ROAD LANDFILL FACILITY, DARDANUP WA
CELL 10 DEVELOPMENT
LEACHATE EXTRACTION DETAILS – SHEET 2 OF 2

SCALE	AS SHOWN
SHEET	
DRG No.	REVISION C
	BANK–412

Figure 14: Cell 10 leachate extraction details (2)

Cell 12A Construction specifications

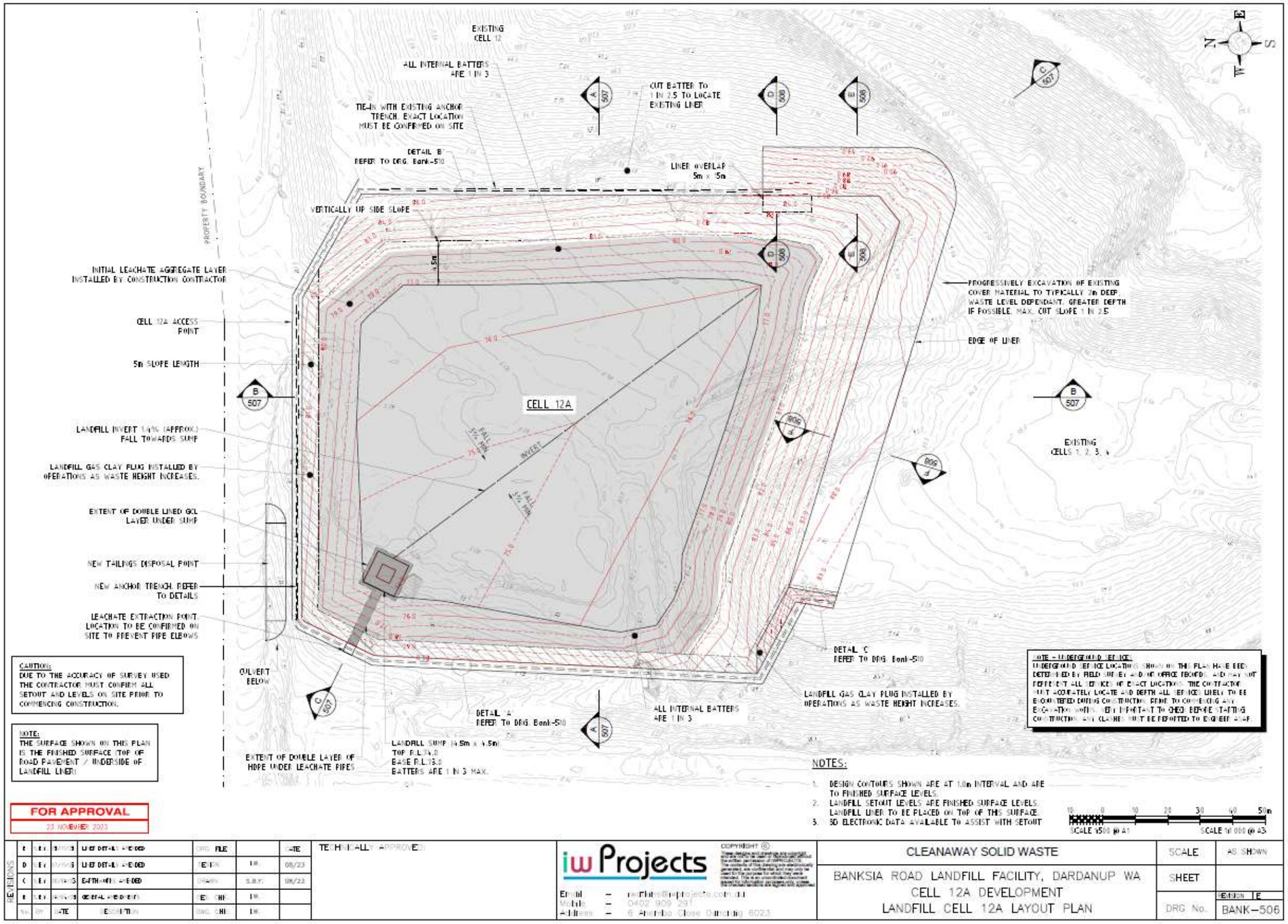


Figure 15: Cell 12A construction overview

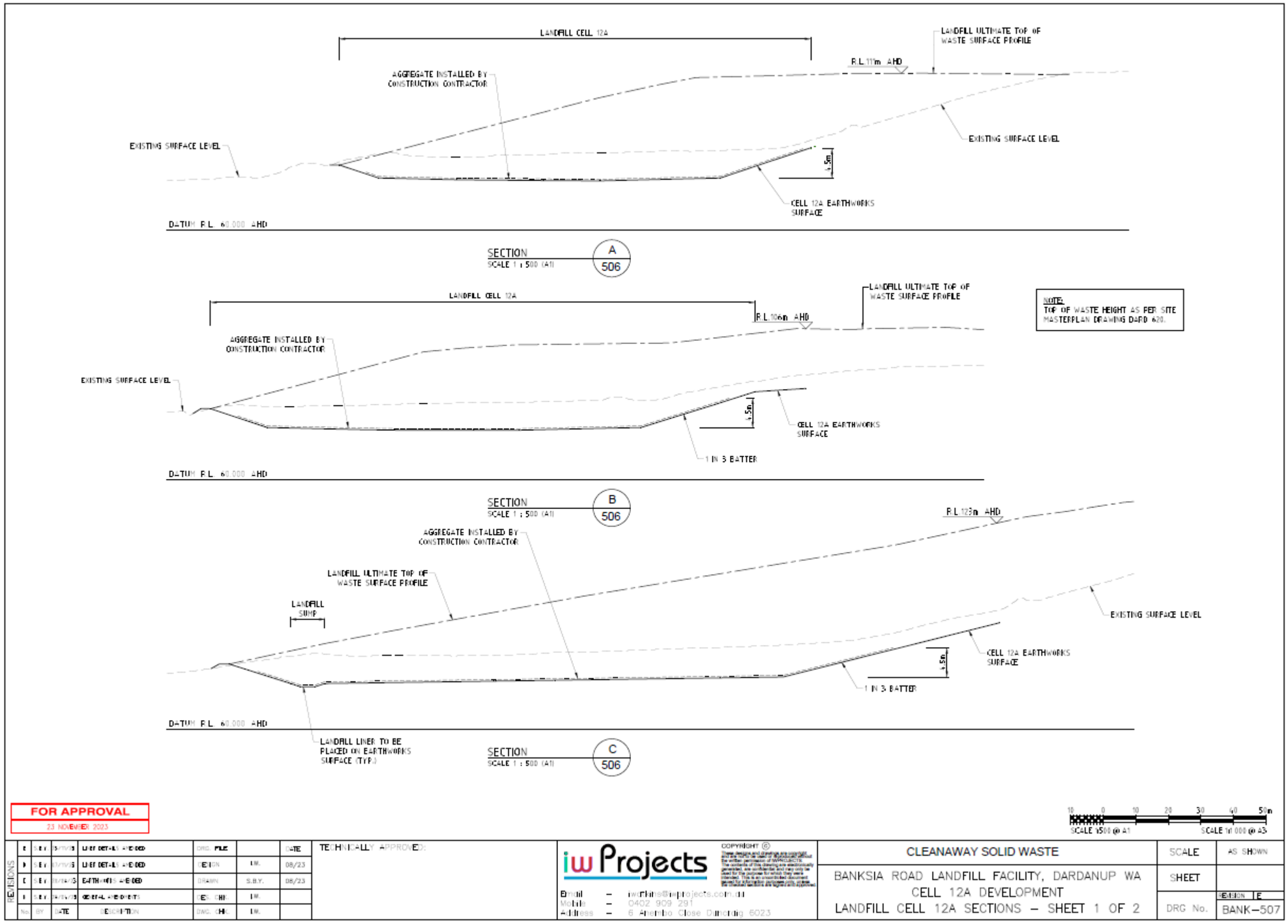


Figure 16: Cell 12A sections

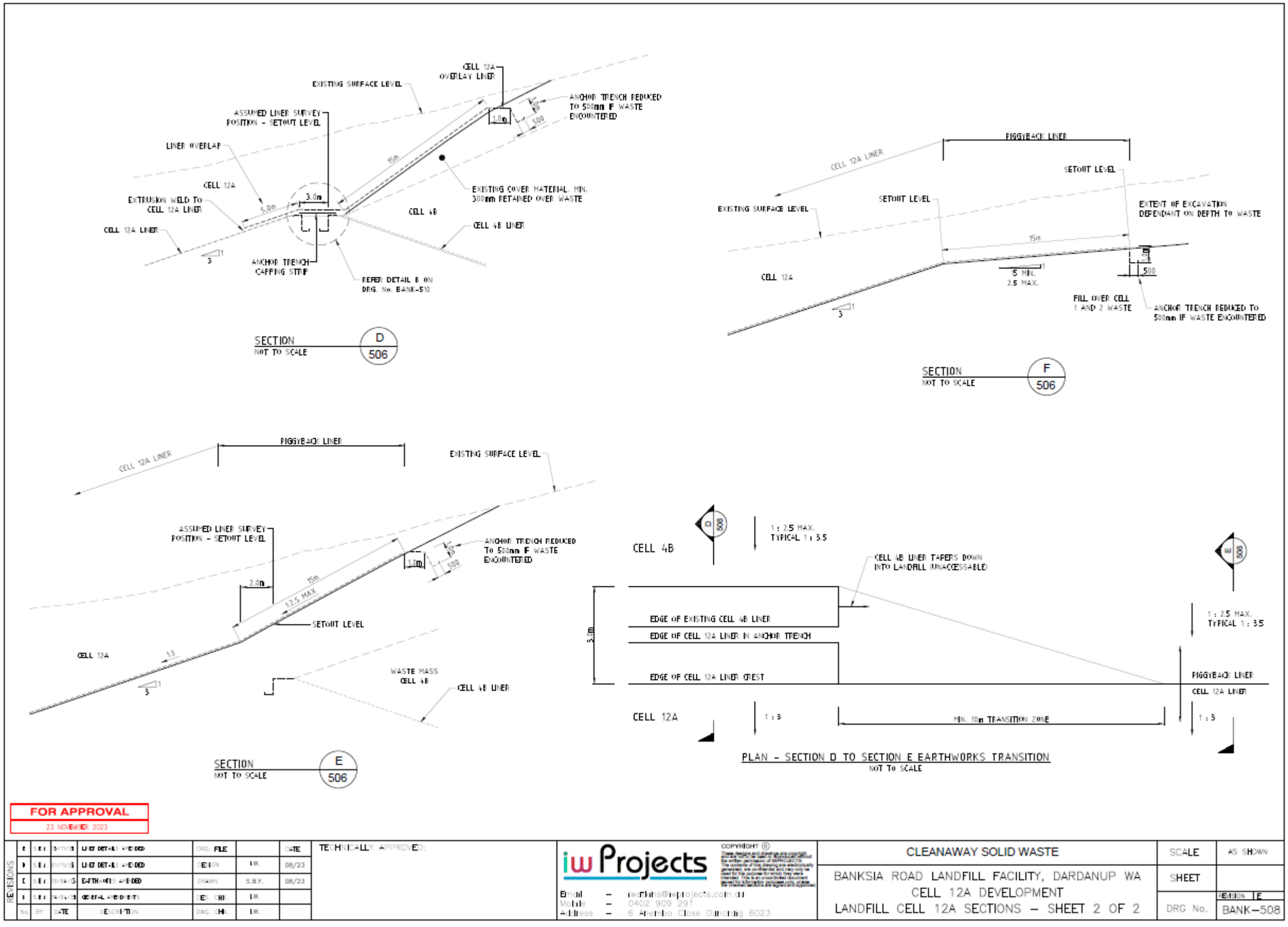


Figure 17: Cell 12A piggyback liner sections

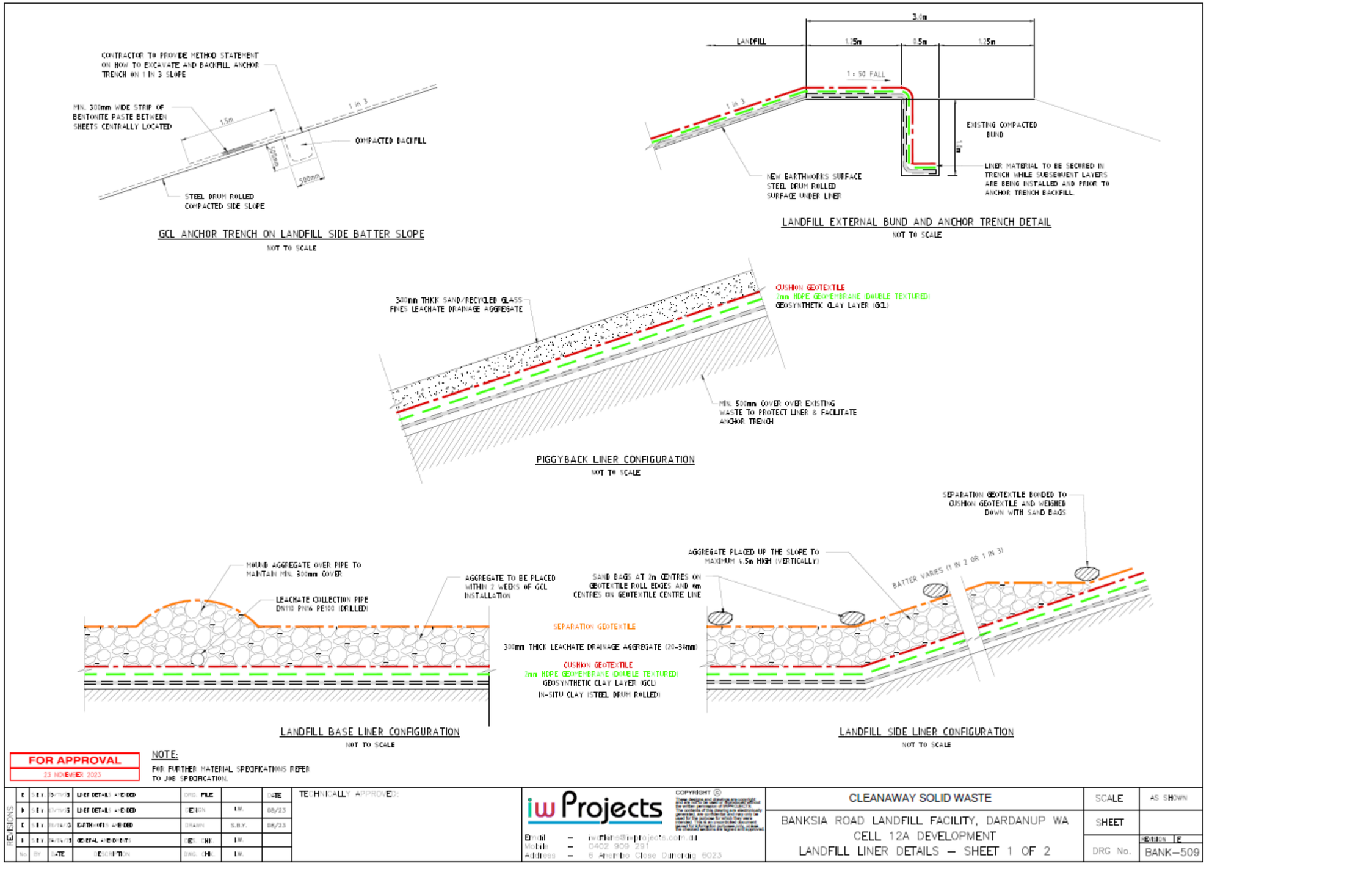


Figure 18: Cell 12A liner details (1)

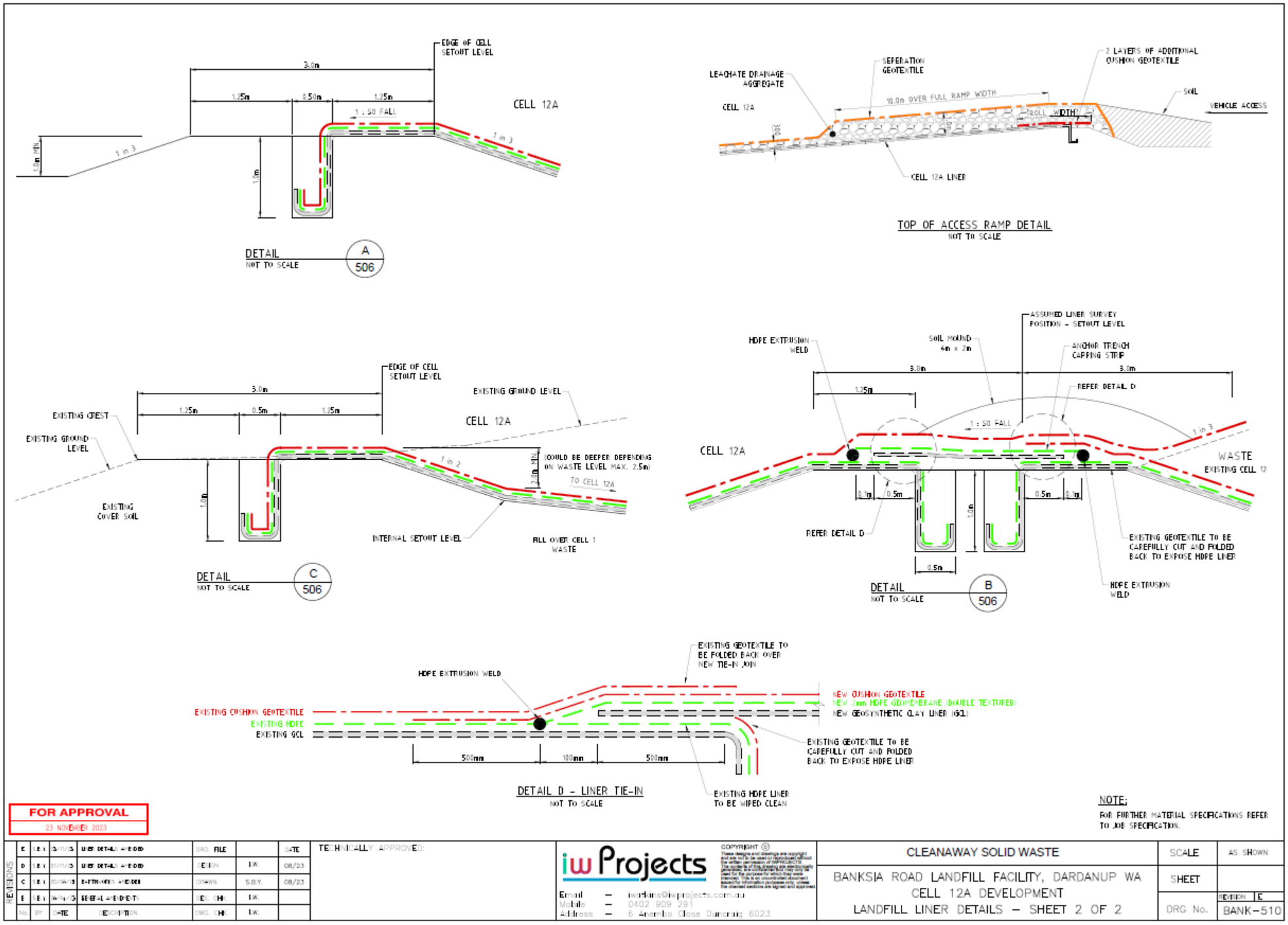


Figure 19: Cell 12A liner details (2)

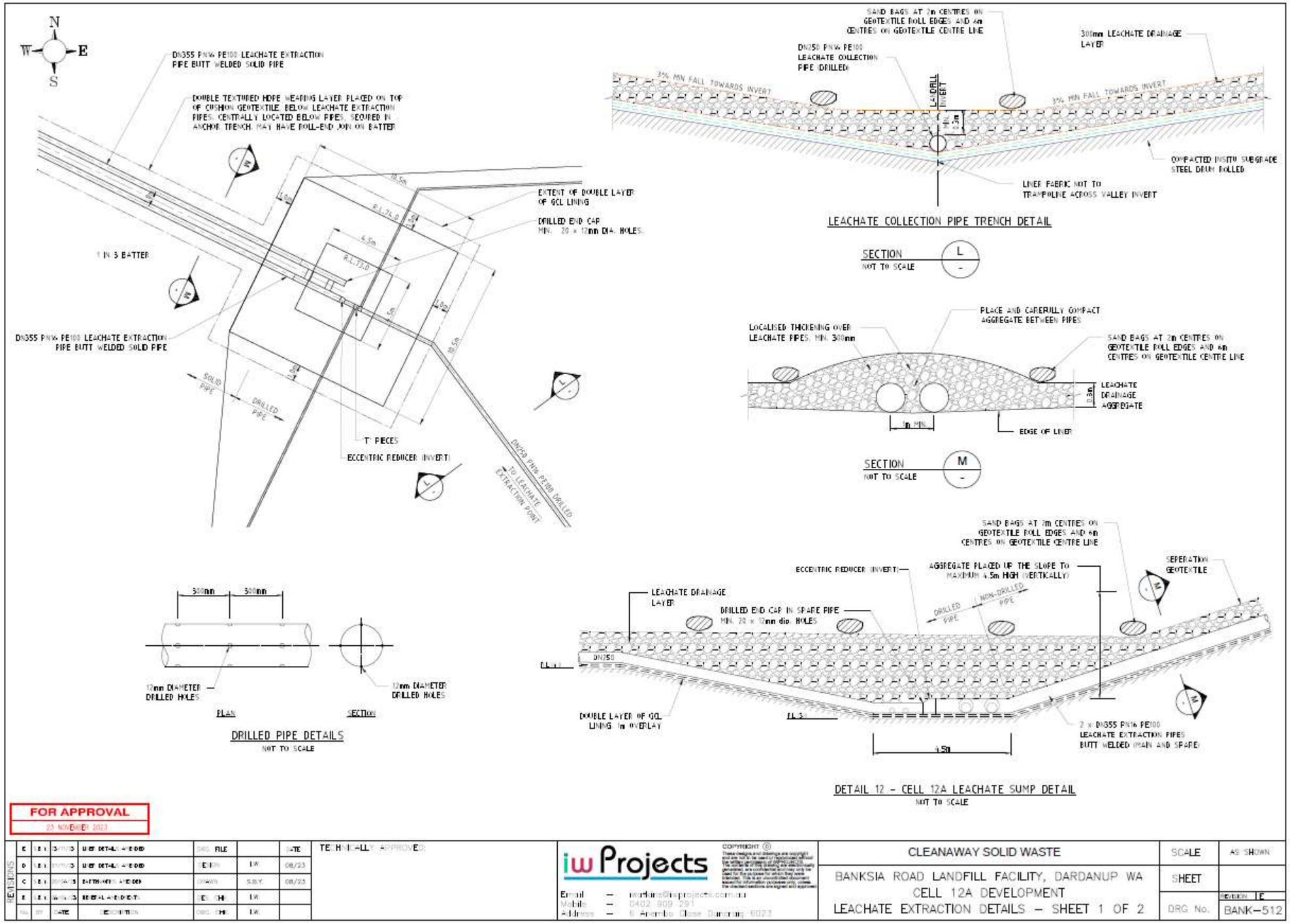
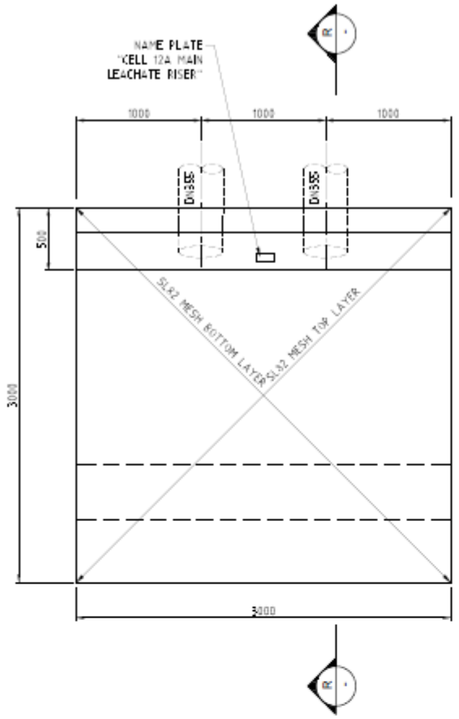
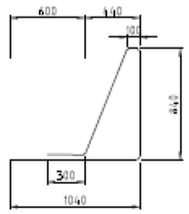


Figure 20: Cell 12A leachate extraction details (1)



LEACHATE EXTRACTION POINT LAYOUT
REINFORCED CONCRETE SLAB ON TOP OF LANDFILL BUND
SCALE 1 : 20 (A1)



DETAIL 1
SCALE 1 : 20 (A1)

GENERAL NOTES:

GROUND AND SLAB FORMATION:

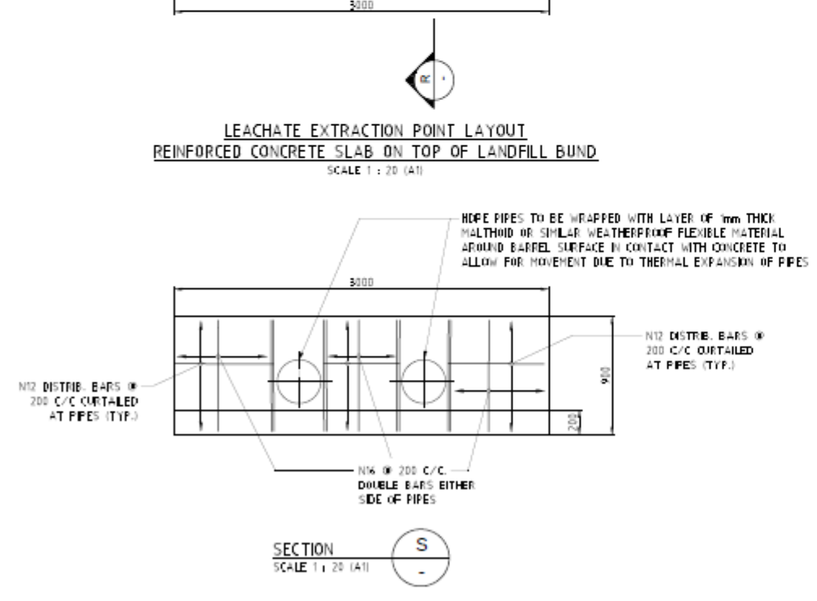
1. ALL CONCRETE SLABS ON GROUND TO BE CONSTRUCTED ON 200mm THICK CRUSHED LIMESTONE BASE FORMED TO WITHIN 15mm OF DESIGNATED FALLS AND LEVELS AND COMPACTED TO 95% MAX. DRY DENSITY.
2. CONCRETE SLABS TO BE UNDERLAIN BY 200µm POLY-ETHYLENE SHEETING LAPPED WITH 200mm AND SEALED WITH APPROVED ADHESIVE TAPE AT ALL JOINTS.

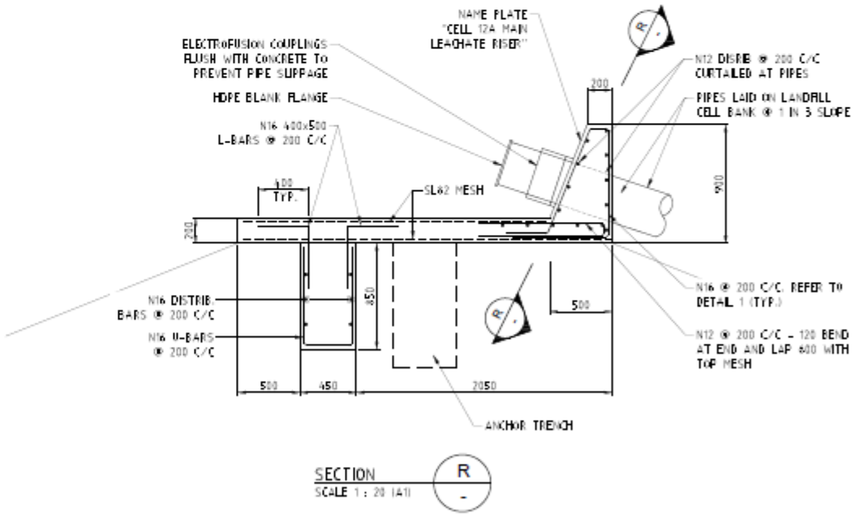
CONCRETE AND FORMWORK:

3. FORMWORK SHALL BE IN COMPLIANCE WITH AS3610 WITH EXPOSED FACES OF CONCRETE HAVING A SURFACE FINISH MINIMUM QUALITY EQUIVALENT TO CLASS 3.
4. ALL CONCRETE WORK SHALL BE IN COMPLIANCE WITH AS3600.
5. CONCRETE MIX TO BE N40 GRADE, WITH 40MPa MINIMUM 28d COMPRESSIVE STRENGTH. 20mm MAX. AGGREGATE SIZE.
6. ALL CONCRETE POURS SHALL BE VIBRATED.
7. CONCRETE SHALL BE CURED BY KEEPING EXPOSED SURFACES CONTINUOUSLY WETTED FOR 7 DAYS AFTER POURING.

REINFORCING STEEL:

8. ALL REINFORCEMENT SHALL COMPLY WITH THE REQUIREMENTS OF AS4671.
9. MESH AND BAR REINFORCEMENT SHALL BE D500 GRADE.
10. BOTTOM MESH SHEETS SHALL BE SUPPORTED ON APPROVED PLASTIC STOOLS AT 1m C/C IN BOTH DIRECTIONS AND NOT HOOKED UP DURING CONCRETE POUR.
11. COVER TO SLAB REINFORCEMENT TO BE 30mm MINIMUM ALL ROUND.
12. ALL MESH OVERLAPS SHALL COVER AT LEAST 2 x TRANSVERSE BARS ON EACH SHEET.





NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

FOR APPROVAL
23 NOVEMBER 2023

REVISIONS							
No.	BY	DATE	DESCRIPTION	DWG. CHK.		DATE
E	S.B.Y.	5/7/23	LINER DETAILS AMENDED	DWG. FILE		DATE
D	S.B.Y.	31/7/23	LINER DETAILS AMENDED	DESIGN	I.W.	08/23
C	S.B.Y.	31/7/23	EARTHWORKS AMENDED	DRAWN	S.B.Y.	08/23
B	S.B.Y.	24/5/23	GENERAL AMENDMENTS	DES. CHK.	I.W.	
No.	BY	DATE	DESCRIPTION	DWG. CHK.	I.W.	

TECHNICALLY APPROVED:

iw Projects
Email – iwchin@iwprojects.com.au
Mobile – 0402 909 291
Address – 6 Arendo Close Dunsborough 6281

CLEANAWAY SOLID WASTE	SCALE: AS SHOWN
BANKSIA ROAD LANDFILL FACILITY, DARDANUP WA CELL 12A DEVELOPMENT LEACHATE EXTRACTION DETAILS – SHEET 2 OF 2	SHEET:
	DRG No.: BANK–513 REVISION: E

Figure 21: Cell 12A leachate extraction details (2)

Groundwater monitoring network

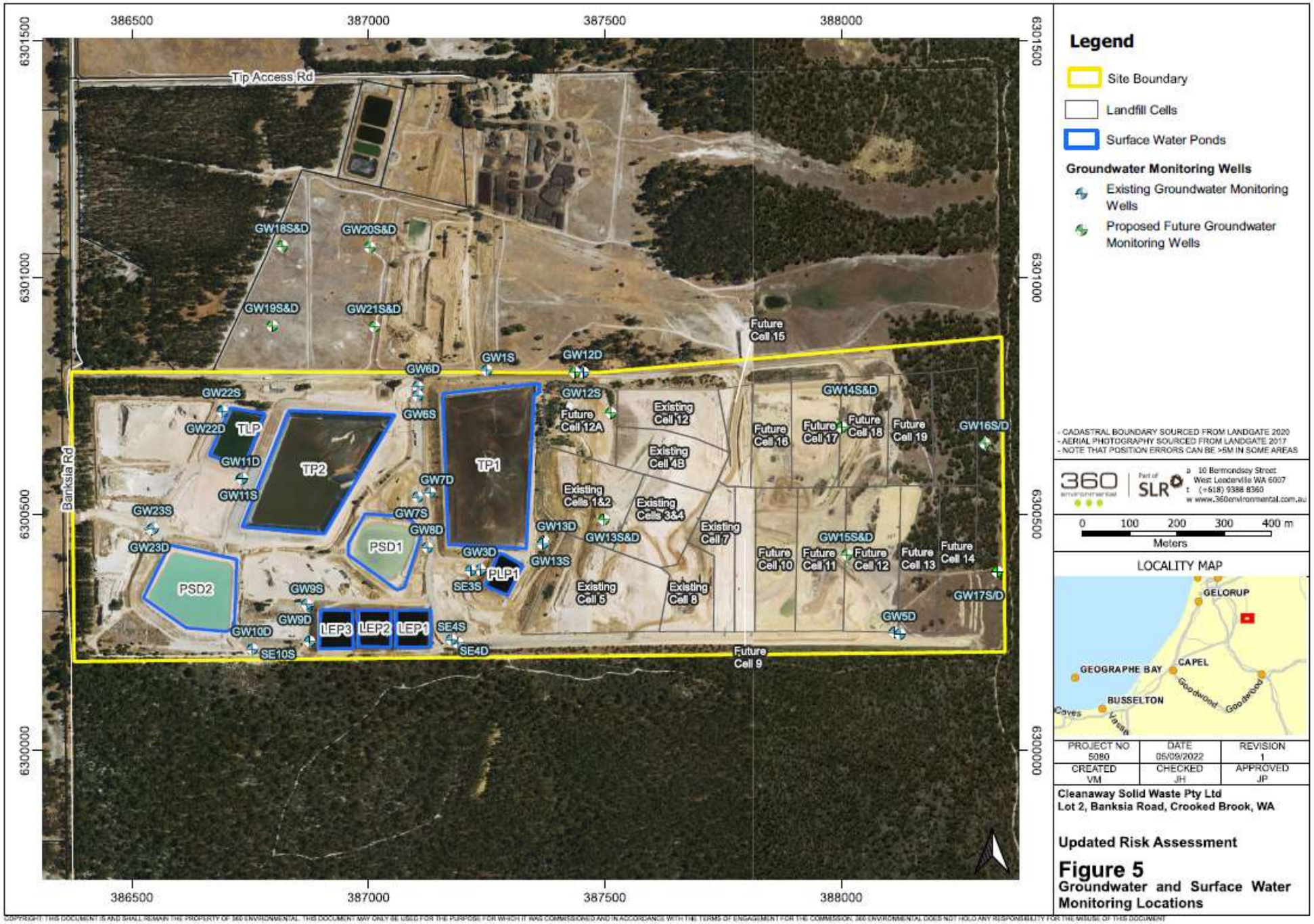


Figure 22: Groundwater monitoring network