Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6851/2023/1
Works approval holder	Eastern Metropolitan Regional Council
Registered business address	226 Great Eastern Highway BELMONT 6104
DWER file number	DER2023/000668
Duration	13/03/2024 to 12/03/2029
Date of issue	13/03/2024
Premises details	Red Hill Waste Management Facility 1094 Toodyay Road RED HILL 6056

Legal description –

Lot Number	Plan/Diagram Number	Volume	Folio
Lot 1	Diagram 15239	1128	23
Lot 2	Diagram 68630	1717	585
Lot 11	Diagram 69105	1783	671
Lot 12	Deposited Plan 26468	1672	829

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	350,000 tonnes per annual period

This works approval is granted to the works approval holder, subject to the attached conditions, on 13 March 2024, by:

Melissa Chamberlain

Digitally signed by Melissa Chamberlain
Date: 2024.03.13 16:26:35 +08'00'

Melissa Chamberlain
A/MANAGER WASTE INDUSTRIES
REGULATORY SERVICES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Works approval history

Date	Reference number	Summary of changes
13/03/2024	W6851/2023/1	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;

(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
Works phase 1 – Stage 17 landfill			
1.	Stage 17 Landfill Cell	(a) In accordance with the critical containment infrastructure requirements of condition 2; and (b) Any exposed or excavated waste resulting from the works must be covered by the end of the working day in which it was uncovered.	Future Class III Stage 17 as set out in Figure 2 and Figure 3
2.	Stage 17 leachate main	(a) A leachate main must be installed that connects the Stage 17 Landfill Cell leachate management system to the existing leachate evaporation ponds located on the premises.	As set out in Figure 11
3.	Stage 17 surface water management	(a) An open swale drainage channel must be constructed around the perimeter of the Stage 17 Landfill Cell and connected to existing surface water management infrastructure on the premises; (b) The perimeter swale must be positioned relative to the final landfill cell restoration profile, so it is able to collect surface water shedding from the top of the cell following permanent capping works; and (c) The base of the swale must be lined with rock armouring, a 150 mm filter layer and a geotextile layer in accordance with the details shown in Figure 4. The geotextile layer is not required where the filter layer material does not contain any fine-grained particles.	As set out in Figure 12

Infrastructure		Design and construction / installation requirements	Infrastructure location
Works phase 2 – Stage 18 landfill			
4.	Stage 18 Landfill Cell	(a) In accordance with the critical containment infrastructure requirements of condition 2; and (b) Any exposed or excavated waste resulting from the works must be covered by the end of the working day in which it was uncovered.	Future Class III Stage 18 as set out in Figure 2 and Figure 3
5.	Stage 18 leachate main	(a) A leachate main must be installed that connects the Stage 18 Landfill Cell leachate management system to the existing leachate evaporation ponds located on the premises.	As set out in Figure 16
6.	Stage 18 surface water management	(a) An open swale drainage channel must be constructed around the perimeter of the Stage 18 Landfill Cell and connected to existing surface water management infrastructure on the premises; (b) The perimeter swale must be positioned relative to the final landfill cell restoration profile, so it is able to collect surface water shedding from the top of the cell following permanent capping works; and (a) The base of the swale must be lined with rock armouring, a 150 mm filter layer and a geotextile layer in accordance with the details shown in Figure 4. The geotextile layer is not required where the filter layer material does not contain any fine-grained particles.	As set out in Figure 17

2. The works approval holder must construct the Stage 17 Landfill Cell and Stage 18 Landfill Cell in accordance with the infrastructure features and corresponding design and construction / installation requirements set out in Table 2.

Table 2: Critical containment infrastructure requirements

Infrastructure feature		Design and construction / installation requirements
Stage 17 and Stage 18 Landfill Cells		
1.	Cell layout	(a) In accordance with the general arrangement shown in Figure 3; and (b) Cell embankments must have a slope angle no steeper than 1 vertical to 3 horizontal (1V:3H).
2.	Subgrade	(a) The top of the landfill cell formation level must be more than 3 m above the highest seasonal groundwater level at the lowest point of the cell;

Infrastructure feature		Design and construction / installation requirements
2.	Subgrade (cont.)	(b) Unsuitable material from below the formation level must be removed and filled with suitable material; (c) Damage or deterioration of the subgrade must be repaired using suitable material; (d) The subgrade must be compacted to greater than 95% MMDD and within ±2% OMC; and (e) The subgrade surface must be smooth, free of debris, roots, sticks and sharp rocks so that it supplies a firm platform and bonding surface for the clay attenuation layer.
3.	Composite liner	(a) The cells must be lined with an engineered composite lining system that includes the following components, installed in ascending order: (i) a minimum 500 mm thick engineered clay attenuation layer; (ii) a minimum 6 mm thick GCL that has a permeability of less than 3 x 10^{-11} m/s or equivalent; (iii) a 2 mm thick double textured HDPE geomembrane; and (iv) a polypropylene or polyester cushion/protection geotextile layer. (b) The clay attenuation layer must be installed in a series of lifts with no more than 300 mm uncompacted thickness. Each lift must be compacted to greater than 95% MMDD and within ±2% OMC; (c) The surface of the clay attenuation layer must be smooth, free of debris, roots, sticks, sharp rocks, hollows or humps, prior to placement of the GCL; (d) There must be no transverse jointing/overlapping of GCL panels on side slopes and all side slope panels must extend from the anchor trench down to a minimum of 2 m onto the cell base; (e) GCL panel seams must have a minimum overlap of 300 mm and be joined by the addition of bentonite paste; (f) The HDPE geomembrane must meet the minimum requirements of the *GRI – GM13 Standard Specification* for the relevant thickness of HDPE liner; (g) HDPE panel seams must have a minimum overlap of 125 mm and, as far as practicable, be orientated so that the seam is in the down sloping direction; (h) There must be no cross tie-in seams between side slope and base HDPE panels within 2.5 m of the toe of batters; (i) The cushion/protection geotextile must be sufficient to protect the HDPE geomembrane such that it achieves a maximum allowable global strain of 4%; (j) There must be no transverse jointing/overlapping of cushion/protection geotextile panels on side slopes and all side slope panels must extend from the anchor trench down to a minimum of 2 m onto the cell base; (k) Cushion/protection geotextile panel seams must have a minimum overlap of 300 mm on side slopes and 150 mm on the cell base;

Infrastructure feature		Design and construction / installation requirements
3.	Composite liner (cont.)	(l) The composite liner must be fixed within anchor trenches in accordance with the details shown in Figure 4, Figure 5 and Figure 7; (m) Anchor trenches must be backfilled and suitably compacted in horizontal layers not exceeding 150 mm in thickness; (n) The western edge of the composite liner must tie-in with the existing Stage 14 and Stage 15 cell lining systems in accordance with the typical section shown in Figure 7; (o) The composite liner must be installed by a qualified lining installer and supervised by a CQA Consultant to ensure construction of the cell is in accordance with the relevant Technical Specification and CQA Plan; (p) Any holes, tears or other damage to liner material must be repaired in accordance with the relevant Technical Specification and CQA Plan; and (q) A leak detection survey must be undertaken following construction of the liner and prior to placement of the separation geotextile.
4.	Leachate management system	(a) A leachate management system must be installed that includes the following components: (i) a minimum 300 mm thick leachate drainage aggregate layer with a permeability greater than 1 x 10^{-3} m/s, installed above the cushion/protection geotextile; (ii) 160 mm diameter perforated secondary leachate collection pipes installed at maximum 25 m spacings across the base of the cell, in accordance with the details shown in Figure 4; (iii) a 225 mm diameter perforated primary leachate collection pipe installed diagonally across the base of the cell, in accordance with the details shown in Figure 4; (iv) a leachate sump installed to a depth of 500 mm at the lowest point of the cell, in accordance with the details shown in Figure 6; (v) two 450 mm leachate extraction side riser pipes, a 160 mm probe sleeve and an automatic submersible pump installed in accordance with the details shown in Figure 4 and Figure 6; and (vi) a polypropylene or polyester separation geotextile installed above the leachate drainage aggregate layer, in accordance with the details shown in Figure 4 and Figure 6; (b) All leachate collection pipework must be laid upon a minimum 100 mm of drainage aggregate and be covered by additional drainage aggregate to at least twice the diameter of the pipe; (c) There must be no transverse jointing/overlapping of separation geotextile panels on side slopes and all side slope panels must extend from at least 1 m beyond the drainage aggregate layer to a minimum of 2 m onto the cell base; (d) Separation geotextile panel seams must have a minimum overlap of 300 mm on side slopes and 150 mm on the cell base; and (e) The leachate management system must be connected to the external leachate main to convey extracted leachate to the existing leachate evaporation ponds.

Infrastructure feature		Design and construction / installation requirements
Stage 17 Landfill Cell only		
5.	Stage 17 Landfill Cell specific requirements	(a) Must be constructed and installed according to the specifications set out in the T*echnical Specification: Stage 17 Landfill Cell Construction;* (b) CQA activities must be undertaken according to the *CQA Plan: Stage 17 Landfill Cell Construction;* (c) Excavation of the subgrade must be to the formation levels and slope gradients set out in Figure 8 and Figure 10; (d) Installation of the clay attenuation layer must be to the levels and slope gradients set out in Figure 9 and Figure 10; (e) An intercell bund must be installed at the boundary between the Stage 17 and 18 cells, that is lined in accordance with the intercell bund at Stage 17 development details shown in Figure 4; and (f) The leachate management system must be installed in accordance with the arrangement shown in Figure 11.
Stage 18 Landfill Cell only		
6.	Stage 18 Landfill Cell specific requirements	(a) Must be constructed and installed according to the specifications set out in the *Technical Specification: Stage 18 Landfill Cell Construction*; (b) CQA activities must be undertaken according to the *CQA Plan: Stage 18 Landfill Cell Construction*; (c) Excavation of the subgrade must be to the formation levels and slope gradients set out in Figure 13 and Figure 15; (d) Installation of the clay attenuation layer must be to the levels and slope gradients set out in Figure 14 and Figure 15; (e) The intercell bund at the boundary between the Stage 17 and 18 cells must be lined in accordance with the intercell bund at Stage 18 development details shown in Figure 4; and (f) The leachate management system must be installed in accordance with the arrangement shown in Figure 16.

Critical containment infrastructure reporting

3. The works approval holder must within 30 calendar days of the Stage 17 Landfill Cell or Stage 18 Landfill Cell identified by condition 1 being constructed:

(a) undertake an audit of their compliance with the requirements of condition 2 for that stage of landfill cell; and

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

4. The Critical Containment Infrastructure Report required by condition 3 must include as a minimum the following:

(a) certification by the CQA Consultant that each item, or component thereof, of the critical containment infrastructure meets the requirements of condition 2, the relevant Technical Specification and that the works have been carried out in accordance with the relevant CQA Plan;

(b) as-constructed plans and a detailed site plan showing the location and dimensions for each item, or component thereof, of the critical containment infrastructure, as specified in condition 2. The as-constructed plans must include at a minimum:

(i) formation excavation levels;

(ii) top of the engineered clay attenuation layer levels;

(iii) construction details including levels and slope angles for the basal liner system;

(iv) location of leachate collection and extraction pipework including connections of primary pipework to secondary pipework;

(v) top of leachate drainage aggregate layer levels including mounding of material over pipework (top of bank and bottom of bank each side of mound);

(vi) location and inverts of leachate extraction pipework and sumps;

(vii) locations and identification marks of each geosynthetic panel, including anchor trenches;

(viii) locations of damaged areas and penetrations; and

(ix) locations of patch repairs.

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

(d) a copy of the approvals by the CQA Consultant for each of the hold points listed in the relevant Technical Specification for that stage of landfill cell;

(e) a copy of the CQA Validation Report required by the relevant CQA Plan; and

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

Environmental compliance reporting

5. The works approval holder must within 30 calendar days of all items of infrastructure for a works phase 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.

6. The Environmental Compliance Report required by condition 0, must include as a minimum the following:

(a) certification by a suitably qualified person that the items of infrastructure or components thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

(b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 1; and

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

Time limited operations

Commencement and duration

7. The works approval holder may only contain waste within the Stage 17 Landfill Cell and Stage 18 Landfill Cell where the CEO has notified the works approval holder that the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 3 meets the requirements of that condition (and related condition 4).

8. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 1 where the Environmental Compliance Report as required by condition 5 has been submitted by the works approval holder for that item of infrastructure.

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

(a) for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 8 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 9(a).

10. During time limited operations, the works approval holder must ensure that the premises infrastructure listed in Table 3 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 3.

Table 3: Infrastructure requirements during time limited operations

Infrastructure		Operational requirement	Infrastructure location
Phase 1 – Stage 17 landfill			
1.	Stage 17 Landfill Cell	(a) The cell must be lined with an engineered composite lining system that includes the following components, installed in ascending order: (i). a minimum 500 mm thick engineered clay attenuation layer; (ii). a minimum 6 mm thick GCL that has a permeability of less than 3 x 10^{-11} m/s or equivalent; (iii). a 2 mm thick double textured HDPE geomembrane; and (iv). a polypropylene or polyester cushion/protection geotextile layer.	Future Class III Stage 17 as set out in Figure 2 and Figure 3
2.	Stage 17 leachate main	(a) Must connect the Stage 17 Landfill Cell leachate management system to the existing leachate evaporation ponds located on the premises.	As set out in Figure 11

Infrastructure		Operational requirement	Infrastructure location
3.	Stage 17 surface water management	(a) An open swale drainage channel must be maintained around the perimeter of the Stage 17 Landfill Cell and connected to existing surface water management infrastructure on the premises.	As set out in Figure 12
Phase 2 – Stage 18 landfill			
4.	Stage 18 Landfill Cell	(a) The cell must be lined with an engineered composite lining system that includes the following components, installed in ascending order: (i). a minimum 500 mm thick engineered clay attenuation layer; (ii). a minimum 6 mm thick GCL that has a permeability of less than 3 x 10^{-11} m/s or equivalent; (iii). a 2 mm thick double textured HDPE geomembrane; and (iv). a polypropylene or polyester cushion/protection geotextile layer.	Future Class III Stage 18 as set out in Figure 2 and Figure 3
5.	Stage 18 leachate main	(a) Must connect the Stage 18 Landfill Cell leachate management system to the existing leachate evaporation ponds located on the premises.	As set out in Figure 16
6.	Stage 18 surface water management	(a) An open swale drainage channel must be maintained around the perimeter of the Stage 18 Landfill Cell and connected to existing surface water management infrastructure on the premises.	As set out in Figure 17

11. The Stage 17 Landfill Cell and Stage 18 Landfill Cell must only accept the following waste types for disposal by landfilling subject to the process limits or specifications described in Table 4.

Table 4: Waste processing

Waste type	Process limits or specifications[1, 2]
Clean Fill	• Disposal is permitted to the Stage 17 Landfill Cell and Stage 18 Landfill Cell.
Putrescible Waste, Inert Waste Type 1 and Inert Waste Type 2	• Disposal is permitted to the Stage 17 Landfill Cell and Stage 18 Landfill Cell.
Up to Class III contaminated solid waste	• Disposal is permitted to the Stage 17 Landfill Cell and Stage 18 Landfill Cell. • Must meet the acceptance criteria for Class III landfills as specified in the Landfill Definitions.

Waste type	Process limits or specifications[1, 2]
Special Waste Type 1	• Disposal is permitted to the Stage 17 Landfill Cell and Stage 18 Landfill Cell. • Special Waste Type 1 must be disposed of in a manner that prevents asbestos fibres entering the atmosphere. • The disposal area(s) for any more than one cubic metre of Special Waste Type 1 is defined by use of a satellite geographical positioning system or grid references on the premises plan. • A copy of the premises plan marked with the locations used for asbestos disposal as described above, should be kept as a permanent record. • ACM wrapped in heavy duty plastic must be covered with Clean Fill or Putrescible Waste to a depth of at least 150 mm as soon as practicable after deposit. • ACM and/or asbestos contaminated soil that is not wrapped in heavy duty plastic must be covered with Clean Fill, Inert Waste Type 1 or Putrescible Waste to a depth of at least 500 mm immediately after deposit. • A representative of the licence holder is available to witness the burial of the asbestos waste as soon as practical after placement in the landfill and sign a bound, numbered register, a numbered file register or record keeping equivalent within 2 hours of the burial to attest that it has been buried in accordance with these procedures.
Special Waste Type 2	• Disposal is permitted to the Stage 17 Landfill Cell and Stage 18 Landfill Cell. • Receipt, handling and disposal in accordance with the Department of Health *Radioactive Waste Disposal Guidelines.* • Excludes wastes which require incineration as specified in Department of *Health Code of Practice for Clinical and Related Waste Management*.
Special Waste Type 3	• Disposal is permitted to the Stage 17 Landfill Cell and Stage 18 Landfill Cell. • Must meet the acceptance criteria for Class III landfills as specified in Schedule 3 and the acceptance criteria for Class III landfills as specified in the Landfill Definitions for contaminants other than PFAS.

Note 1: Requirements for landfilling tyres are set out in Part 6 of the *Environmental Protection Regulations 1987.*
Note 2: Additional requirements for the acceptance and landfilling of controlled waste (including asbestos and tyres) are set out in the *Environmental Protection (Controlled Waste) Regulations 2004*.

Deposition of Waste

12. The works approval holder must ensure waste disposed to the Stage 17 and Stage 18 Landfill Cells is spread and compacted at regular intervals to optimise compaction of the type of waste being landfilled.

13. The works approval holder must ensure the Stage 17 and Stage 18 Landfill Cells tipping face is at no time greater than two metres in vertical height.

14. The works approval holder must ensure that all waste disposed to Stage 17 and Stage 18 Landfill Cells is covered, with cover material, at the end of each day.

15. The works approval holder must restrict the Stage 17 and Stage 18 Landfill Cells tipping area to a maximum linear length of 50 metres.

Waste disposal monitoring

16. The works approval holder must record the total amount of waste disposed to the Stage 17 Landfill Cell and Stage 18 Landfill Cell, for each waste type listed in Table 5, in the corresponding unit, and for each corresponding time period, as set out in Table 5.

Table 5: Waste accepted onto the premises

Waste type	Unit	Time period
All waste types as defined in the Landfill Definitions	Tonnes	Daily

Time limited operations – compliance reporting

17. 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 60 calendar days before the expiration date of the works approval, whichever is the sooner.

18. The works approval holder must ensure the report required by condition 17 includes the following:

(a) a summary of the time limited operations, including timeframes and amount of waste disposed of;

(b) a summary of waste disposal records obtained during time limited operations under condition 16.

(c) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable), which includes records detailing the:

(i) performance of the leachate management system;

(ii) performance of the surface water management;

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

(e) where 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)

19. 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.

20. 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) any maintenance of infrastructure that is performed in the course of complying with conditions 1 and 2; and

(c) complaints received under condition 19.

21. The books specified under condition 20 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 6: Definitions

Term	Definition
ACM	means asbestos containing material and has the meaning defined for bonded asbestos-containing material in the document titled 'Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia' published by the Department of Health
annual period	a 12 month period commencing from 1 July until 30 June of the immediately following year.
Asbestos	means the asbestiform variety of mineral silicates belonging to the serpentine or amphibole groups of rock-forming minerals and includes actinolite, amosite, anthophyllite, chrysolite, crocidolite, tremolite and any mixture containing 2 or more of those
Asbestos fibres	has the meaning defined for asbestos fines in the document titled 'Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia' published by the Department of Health
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
Clean Fill	means waste as defined in the Landfill Definitions
construction quality assurance	means a planned system of activities that provide assurance that materials or construction activities are undertaken and installed as specified in the relevant Technical Specification and in accordance with the works approval.
Contaminated solid waste	means solid waste that has a substance in it at above background concentrations that presents, or has the potential to present, a risk of harm to human health, the environment or any environmental value
Cover material	means clean fill, uncontaminated fill, other approved inert waste or proprietary alternative daily cover (ADC) treatments or other materials that satisfies the requirement to mitigate against any environmental health impacts from landfilled waste.
CQA	construction quality assurance
CQA Consultant	has the same meaning given to that term under the relevant CQA Plan.

Term	Definition
CQA Plan	for the purposes of construction of the Stage 17 Landfill Cell means: the document titled *Construction Quality Assurance Plan: Red Hill Waste Management Facility – Stage 17 Landfill Cell Construction*, version 3 dated 29 August 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd. for the purposes of construction of the Stage 18 Landfill Cell means: the document titled *Construction Quality Assurance Plan: Red Hill Waste Management Facility – Stage 18 Landfill Cell Construction*, version 2 dated 10 August 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd.
CQA Plan: Stage 17 Landfill Cell Construction	means the document titled *Construction Quality Assurance Plan: Red Hill Waste Management Facility – Stage 17 Landfill Cell Construction*, version 3 dated 29 August 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd.
CQA Plan: Stage 18 Landfill Cell Construction	means the document titled *Construction Quality Assurance Plan: Red Hill Waste Management Facility – Stage 18 Landfill Cell Construction*, version 2 dated 10 August 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd.
CQA Validation Report	means a signed final certification report by the CQA Consultant, the minimum requirements of which are set out in the relevant CQA Plan.
critical containment infrastructure	means the Stage 17 Landfill Cell and Stage 18 Landfill Cell 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.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure 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).
GCL	geosynthetic clay liner
GRI - GM13 Standard Specification	means the Geosynthetic Research Institute *GM13 Standard Specification for Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes*.

Term	Definition
HDPE	high-density polyethylene
Inert Waste Type 1	has the same meaning given to that term in the Landfill Definitions
Inert Waste Type 2	has the same meaning given to that term in the Landfill Definitions
Landfill Definitions	means the document titled 'Landfill Waste Classification and Waste Definitions 1996' published by the CEO as amended from time to time
MMDD	modified maximum dry density
OMC	optimum moisture content
premises	the premises to which this works approval applies, as specified at the front of this works approval, as shown on the premises map (Figure 1) in Schedule 1 to this works approval and as listed in the coordinates table (Table) in Schedule 2 to this works approval.
prescribed premises	has the same meaning given to that term under the EP Act.
principal	refers to the works approval holder
Putrescible Waste	means the component of the waste stream likely to become putrid – including wastes that contain organic materials such as food wastes or wastes of animal or vegetable origin, which readily bio-degrade within the environment of a landfill
Special Waste Type 1	means waste as defined in the Landfill Definitions
Special Waste Type 2	means waste as defined in the Landfill Definitions
Special Waste Type 3	means waste as defined in the Landfill Definitions
suitable material	has the same meaning given to that term under the relevant Technical Specification.
suitably qualified person	means a person who: (a) holds a Bachelor of Engineering recognised by Engineers Australia; (b) has a minimum of five years of experience working in a supervisory area of civil or landfill engineering; and (c) is a third party to the principal.
Technical Specification	for the purposes of construction of the Stage 17 Landfill Cell means: the document titled *Technical Specification: Red Hill Waste Management Facility – Stage 17 Landfill Cell Construction*, version 4 dated 22 September 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd. for the purposes of construction of the Stage 18 Landfill Cell means: the document titled *Technical Specification: Red Hill Waste Management Facility – Stage 18 Landfill Cell Construction*, version 2 dated 10 August 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd.

Term	Definition
Technical Specification: Stage 17 Landfill Cell Construction	means the document titled *Technical Specification: Red Hill Waste Management Facility – Stage 17 Landfill Cell Construction*, version 4 dated 22 September 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd.
Technical Specification: Stage 18 Landfill Cell Construction	means the document titled *Technical Specification: Red Hill Waste Management Facility – Stage 18 Landfill Cell Construction*, version 2 dated 10 August 2023, prepared for the Eastern Metropolitan Regional Council by Talis Consultants Pty Ltd.
Uncontaminated Fill	means waste as defined in the Landfill Definitions
unsuitable material	has the same meaning given to that term under the relevant Technical Specification.
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: Figures

Premises map

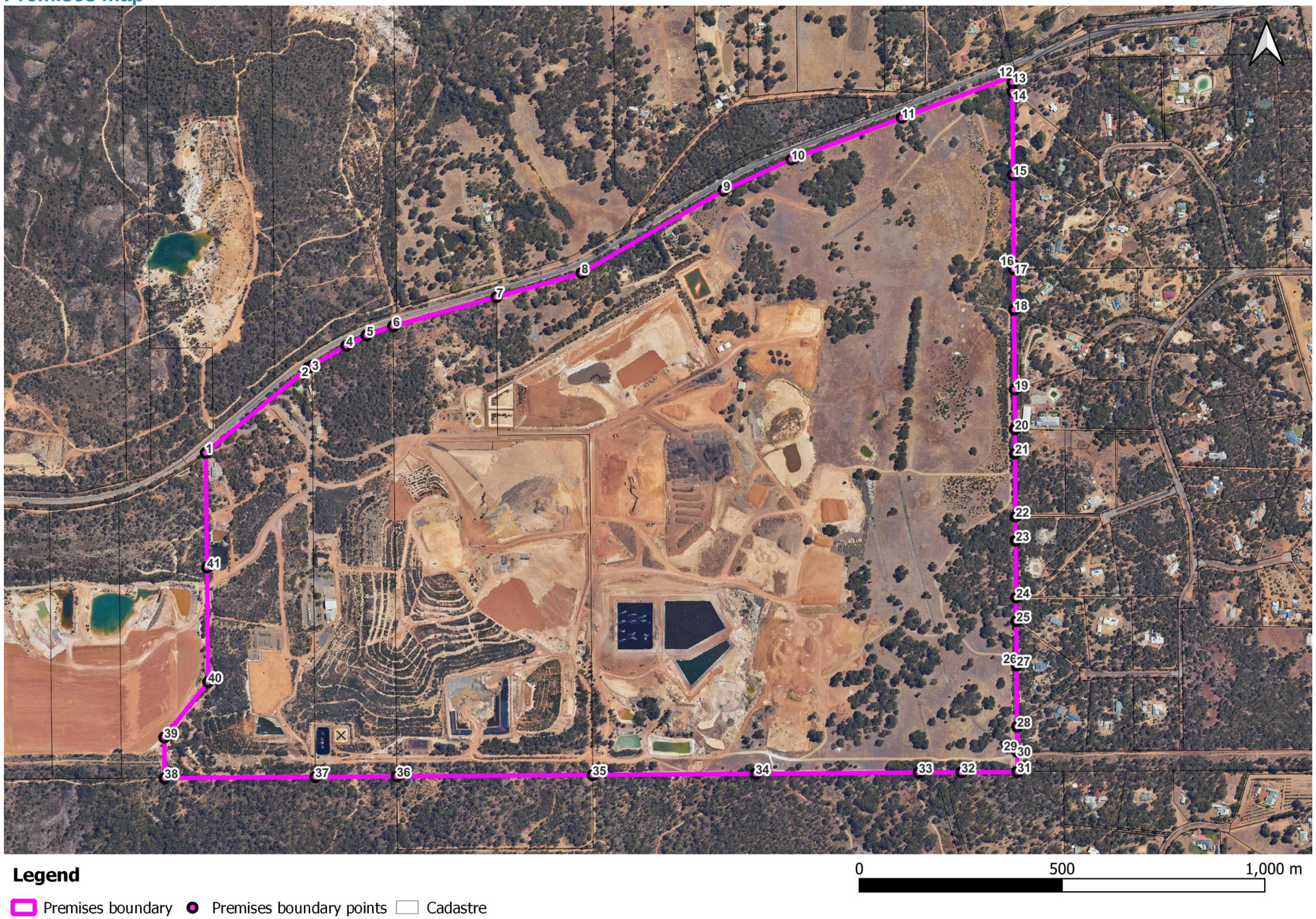


Figure 1: Map of the boundary of the prescribed premises

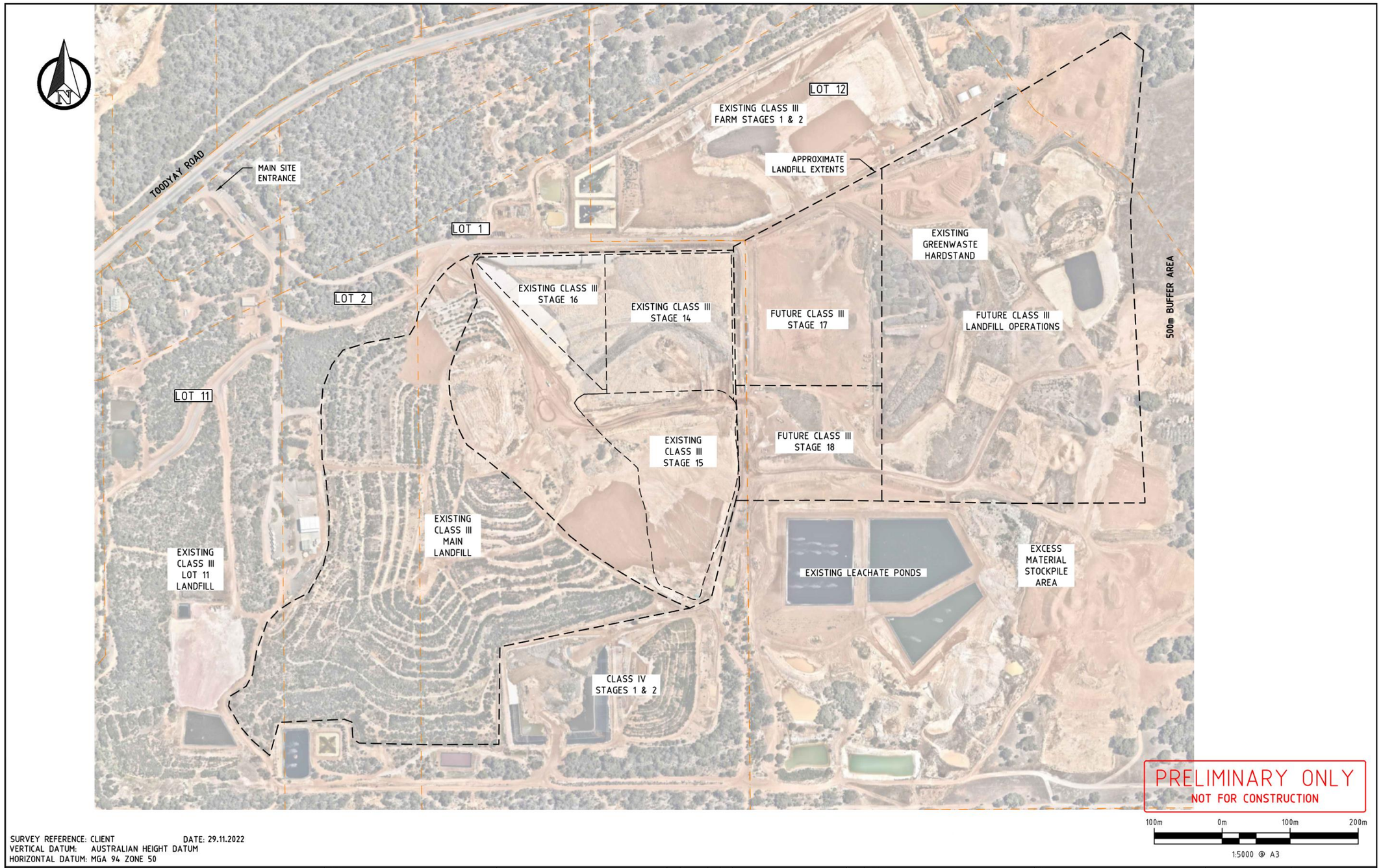


Figure 2: Site plan

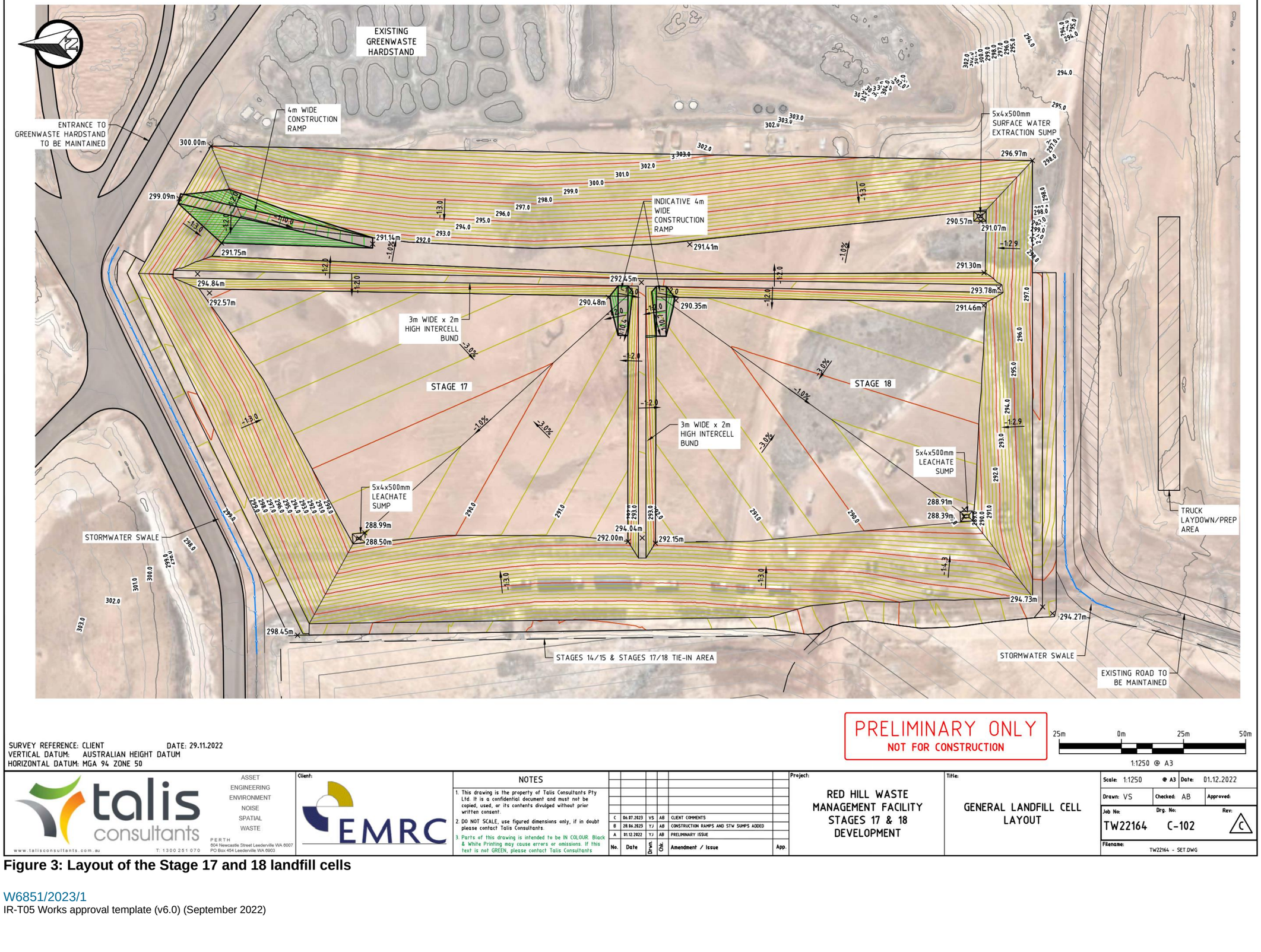


Figure 3: Layout of the Stage 17 and 18 landfill cells

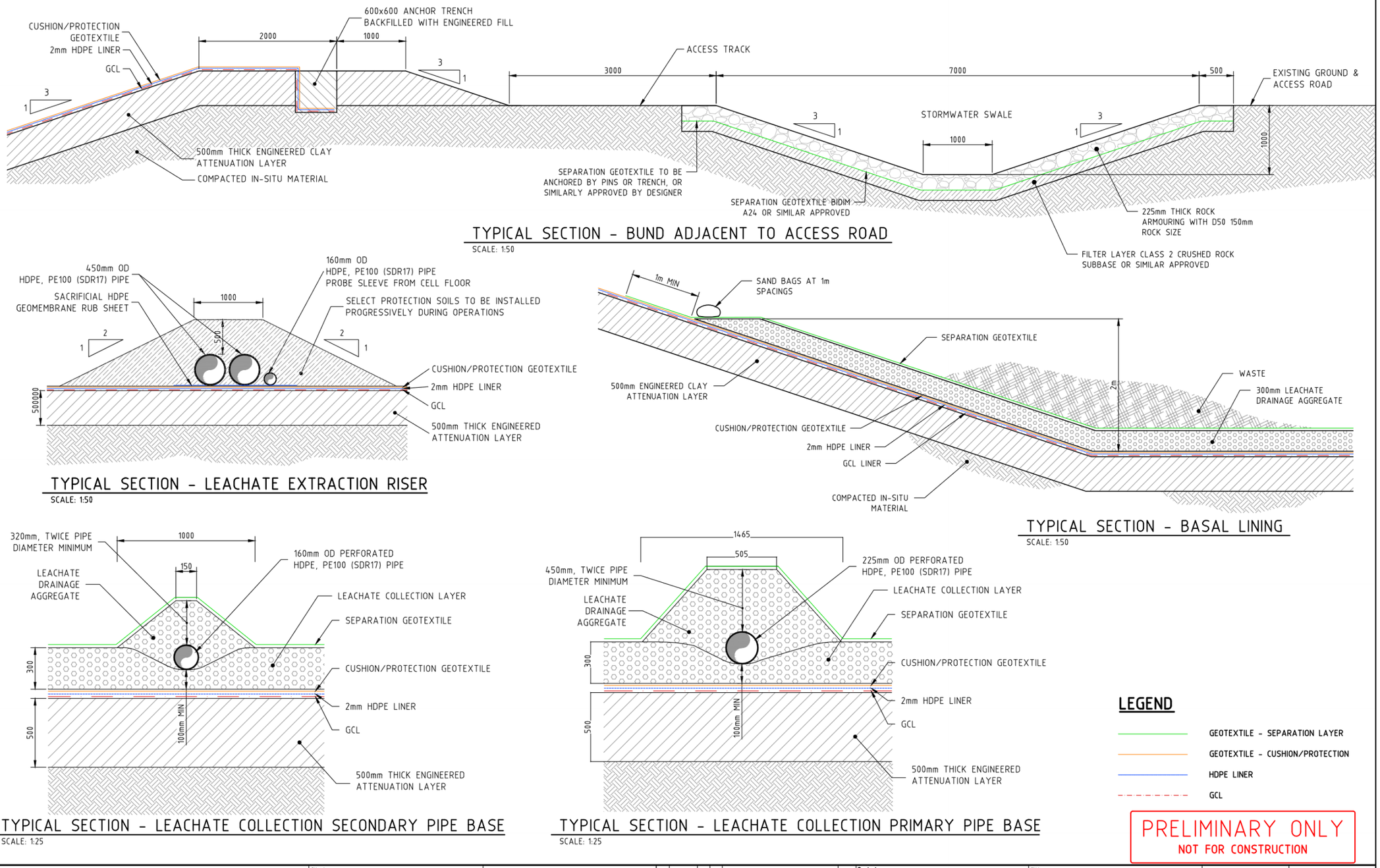
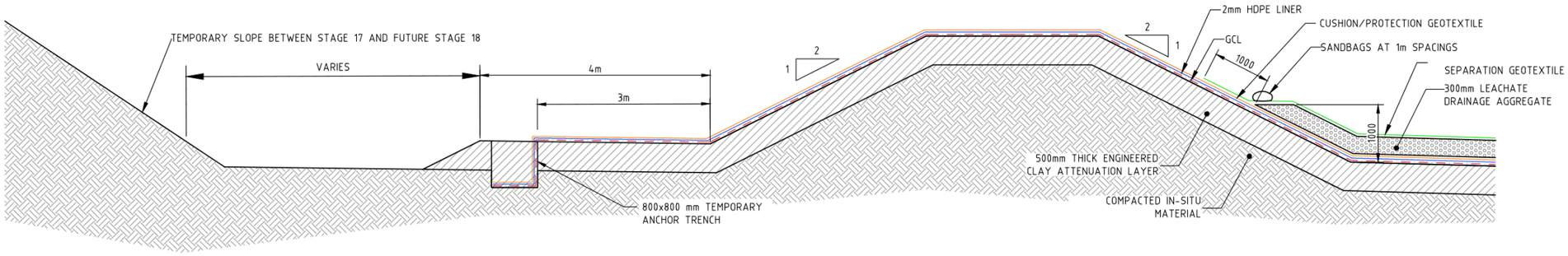
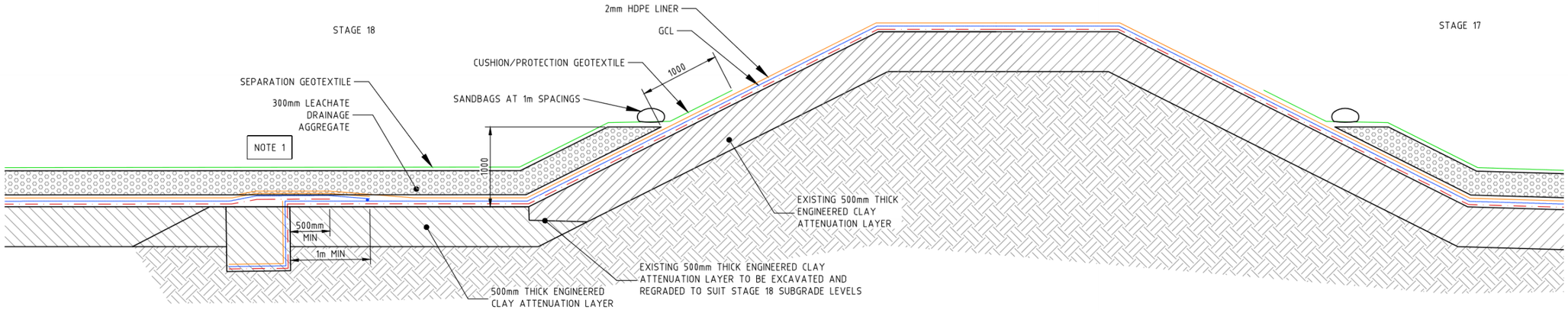


Figure 4: Details of landfill cell anchor trenches, basal liner and leachate system components



TYPICAL SECTION - STAGE 17/18 INTERCELL BUND AT STAGE 17 DEVELOPMENT

SCALE: 1:75



TYPICAL SECTION - STAGE 17/18 INTERCELL BUND AT STAGE 18 DEVELOPMENT

SCALE: 1:50

STAGE 17/18 INTERFACE NOTES

NOTE 1:

1. 1m MIN OF PROTECTION GEOTEXTILE TO BE EXHUMED/EXPOSED
2. EXISTING PROTECTION GEOTEXTILE TO BE CUT & FLAPPED BACK TO EXPOSE HDPE
3. NEW GCL TO OVERLAP EXISTING HDPE MIN 500mm
4. NEW HDPE LINER TO BE EXTRUSION WELDED TO EXISTING LINER AT LEAST 1m FROM THE START OF THE ANCHOR TRENCH
5. EXISTING PROTECTION GEOTEXTILE TO OVERLAP NEW PROTECTION GEOTEXTILE MIN 1m

LEGEND

- GEOTEXTILE - SEPARATION LAYER
- GEOTEXTILE - CUSHION/PROTECTION
- HDPE LINER
- GCL

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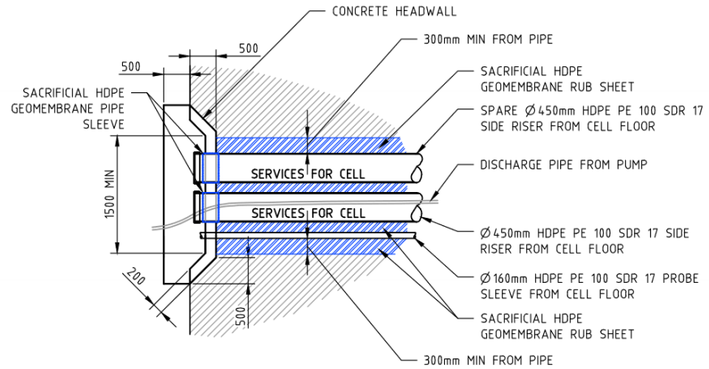
A	09.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: LANDFILL STANDARD DETAILS SHEET 2 OF 4

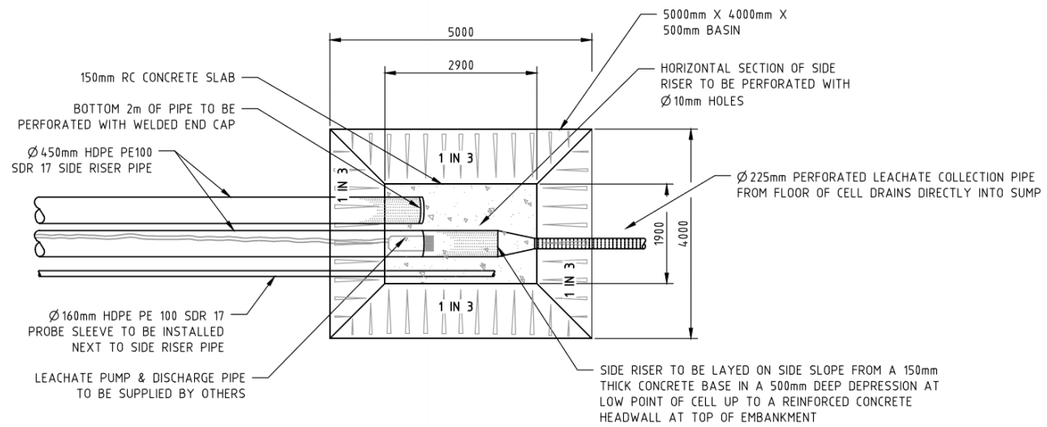
Scale: AS SHOWN @ A3 | Date: 09.12.2022
Drawn: YJ | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-402 | Rev: A
Filename: TW22164 - DETAIL SET.DWG

Figure 5: Stage 17/18 interface details



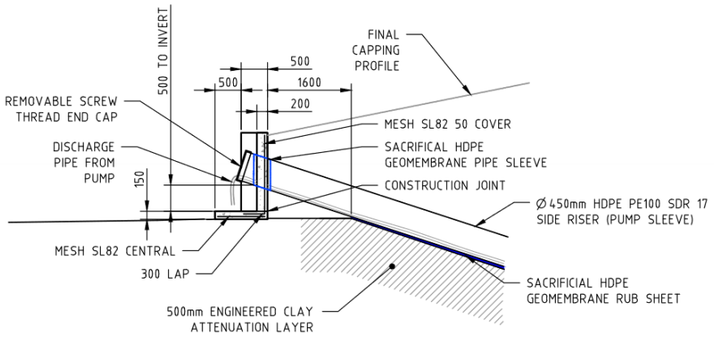
TYPICAL DETAIL - SIDE RISER HEADWALL

SCALE: NTS



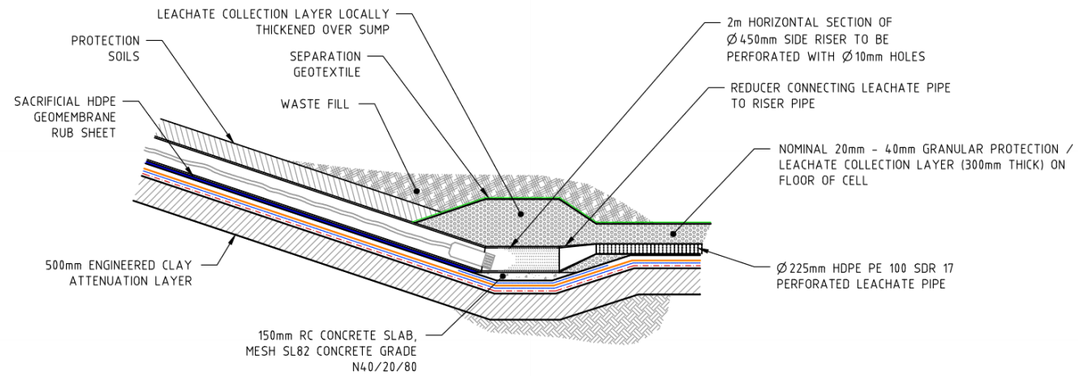
TYPICAL PLAN - LEACHATE COLLECTION SUMP

SCALE: NTS



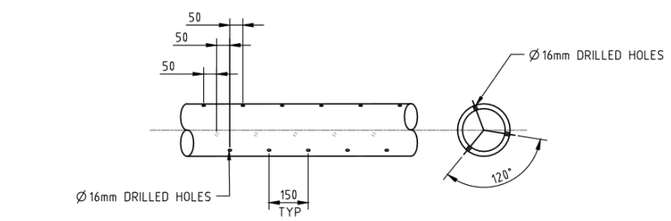
TYPICAL SECTION - SIDE RISER HEADWALL

SCALE: NTS



TYPICAL SECTION - LEACHATE COLLECTION SUMP

SCALE: NTS



TYPICAL DETAIL - LEACHATE COLLECTION PIPE DRILL DETAIL

SCALE: 1:20

LEGEND

- GEOTEXTILE - SEPARATION LAYER
- GEOTEXTILE - CUSHION/PROTECTION
- HDPE LINER
- GCL

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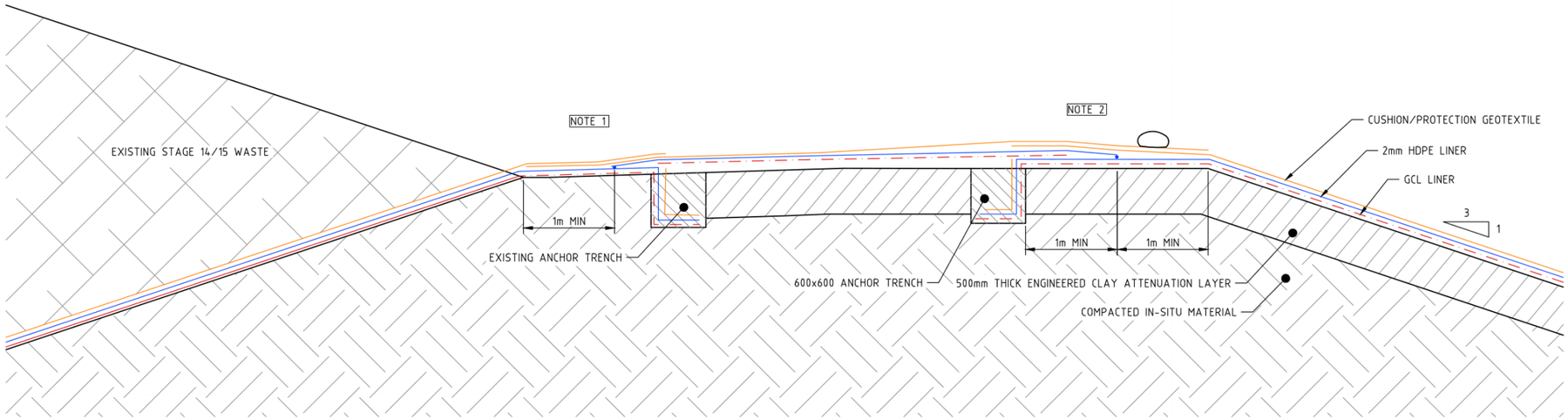
A	09.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: LANDFILL STANDARD DETAILS SHEET 3 OF 4

Scale: AS SHOWN @ A3 | Date: 09.12.2022
Drawn: YJ | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-403 | Rev: A
Filename: TW22164 - DETAIL SET.DWG

Figure 6: Details of leachate system components



TYPICAL SECTION - STAGE 14/15 & 17/18 INTERFACE

SCALE: 1:50

STAGE 14/15 & 17/18 INTERFACE NOTES

NOTE 1:

1. 1m MIN OF PROTECTION GEOTEXTILE TO BE EXHUMED ON STAGE 14/15 CREST
2. EXISTING PROTECTION GEOTEXTILE TO BE CUT AT ANCHOR TRENCH & FLAPPED BACK TO EXPOSE HDPE
3. NEW GCL TO OVERLAP EXISTING HDPE MIN 500mm
4. NEW HDPE LINER TO BE EXTRUSION WELDED TO EXISTING LINER AT LEAST 1m FROM CREST OF SLOPE
5. NEW PROTECTION GEOTEXTILE TO OVERLAP EXISTING PROTECTION GEOTEXTILE MIN 1m
6. EXISTING PROTECTION GEOTEXTILE FROM STAGES 14/15 TO GO ON TOP OF NEW CUSHION GEOTEXTILE. EXISTING PROTECTION GEOTEXTILE FROM STAGES 17/18 TO GO UNDER THE NEW CUSHION GEOTEXTILE
7. NEW PROTECTION GEOTEXTILE TO OVERLAP EXISTING HDPE MIN 500mm
8. BALLAST OF SUITABLE FILL TO BE PLACED OVER GEOTEXTILE OVERLAP

NOTE 2:

1. REPEAT STEPS 2 TO 8 ABOVE
2. TEMPORARY SURCHARGE (SAND BAGS) TO BE PLACED @ 1m SPACINGS ALONG GEOTEXTILE OVERLAP

LEGEND

GEOTEXTILE - CUSHION/PROTECTION

HDPE LINER

GCL

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Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: LANDFILL STANDARD DETAILS SHEET 4 OF 4

Scale: AS SHOWN @ A3 | Date: 09.12.2022
Drawn: YJ | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-404 | Rev: A
Filename: TW22164 - DETAIL SET.DWG

Figure 7: Stage 14/15 and 17/18 interface details

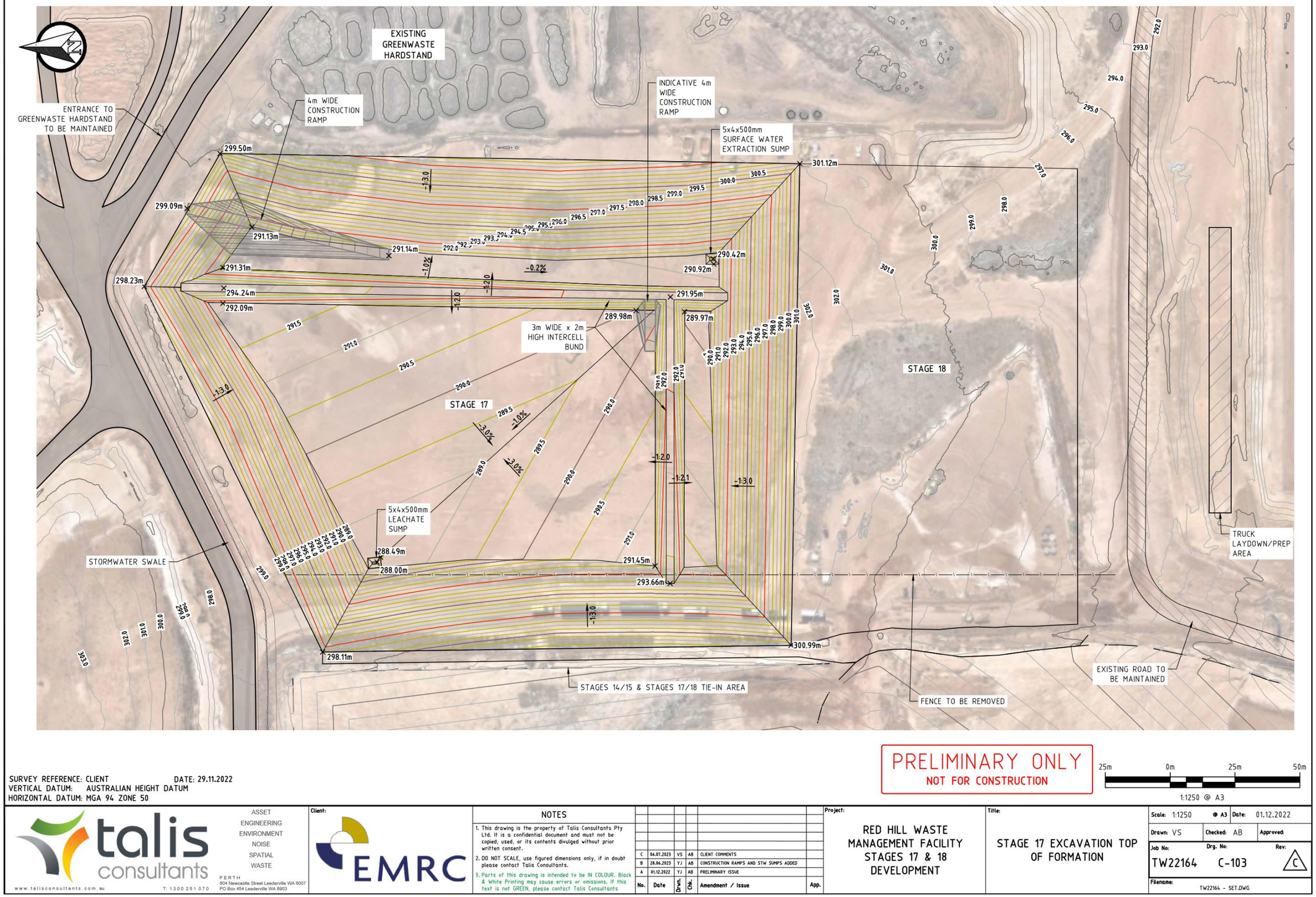
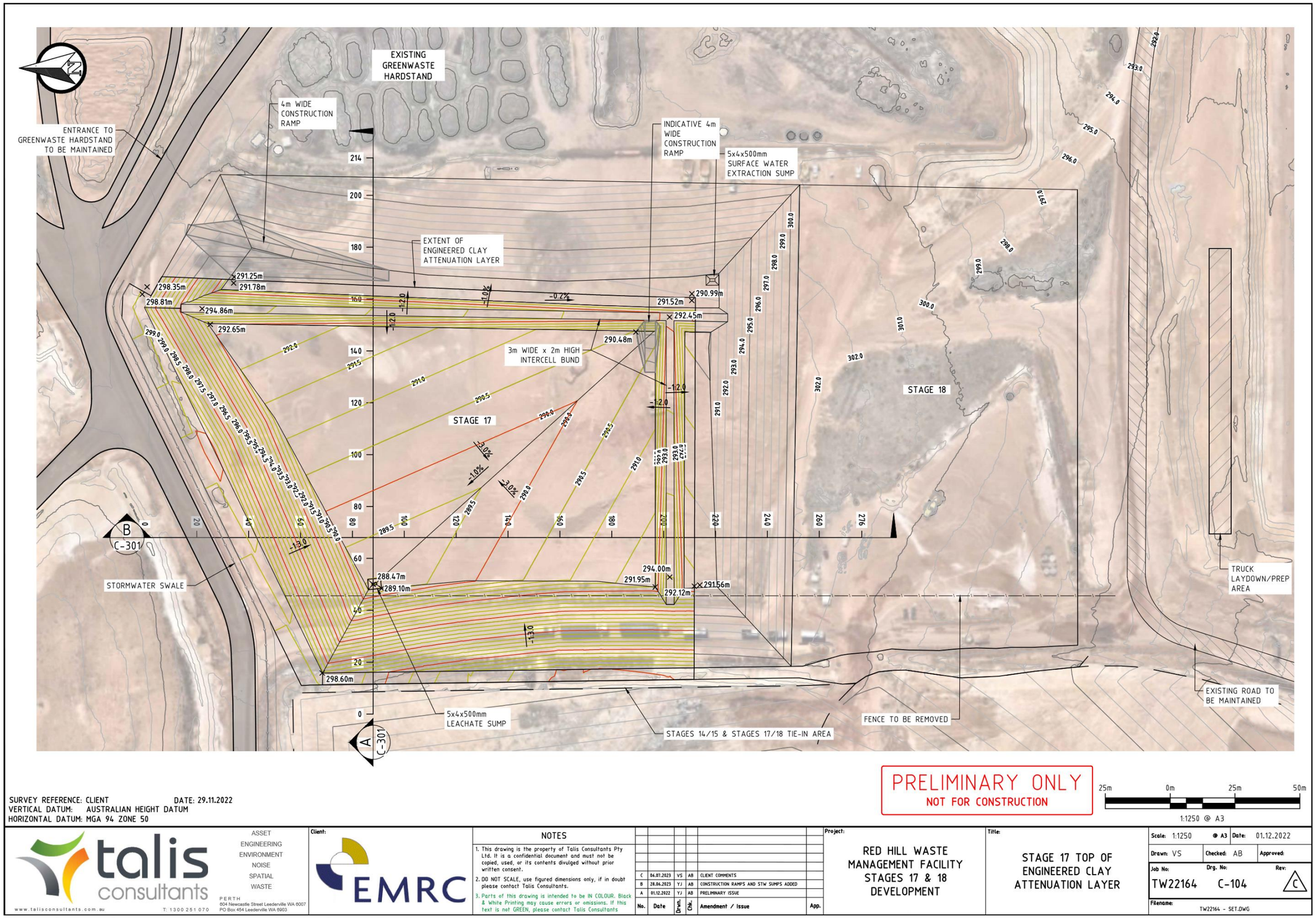


Figure 8: Base of the Stage 17 landfill cell



SURVEY REFERENCE: CLIENT DATE: 29.11.2022
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

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25m 0m 25m 50m
1:1250 @ A3

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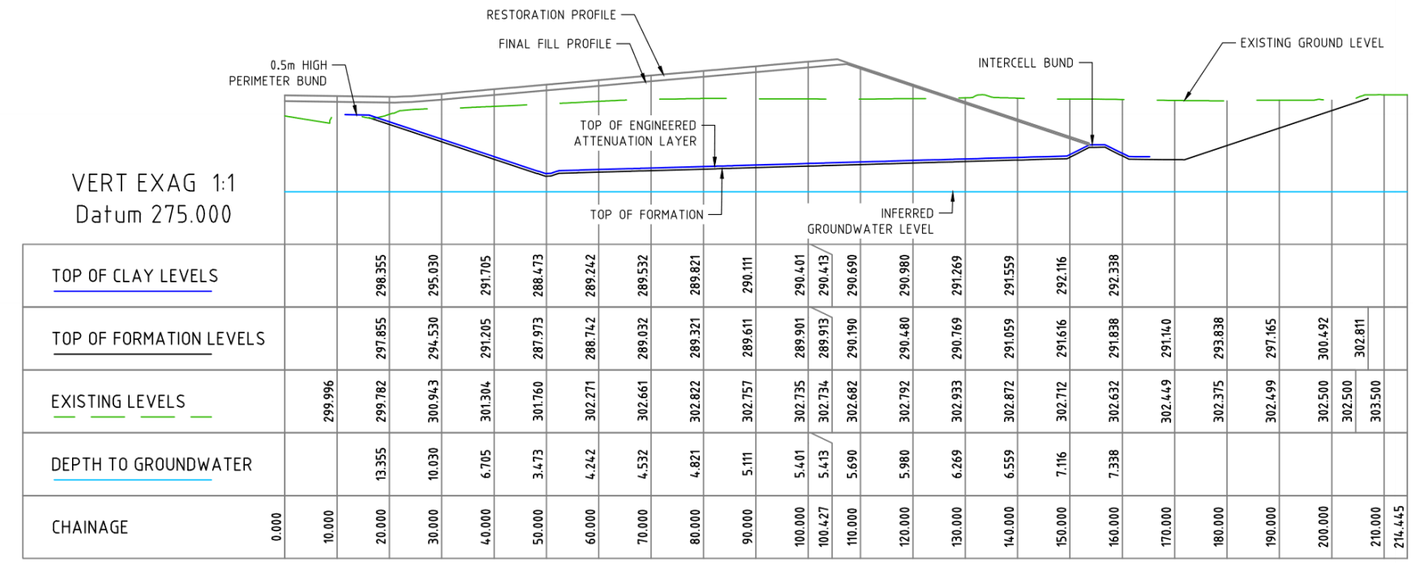
B	28.06.2023	YJ	AB	CONSTRUCTION RAMPS AND STW SUMPS ADDED	
A	01.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: STAGE 17 TOP OF ENGINEERED CLAY ATTENUATION LAYER

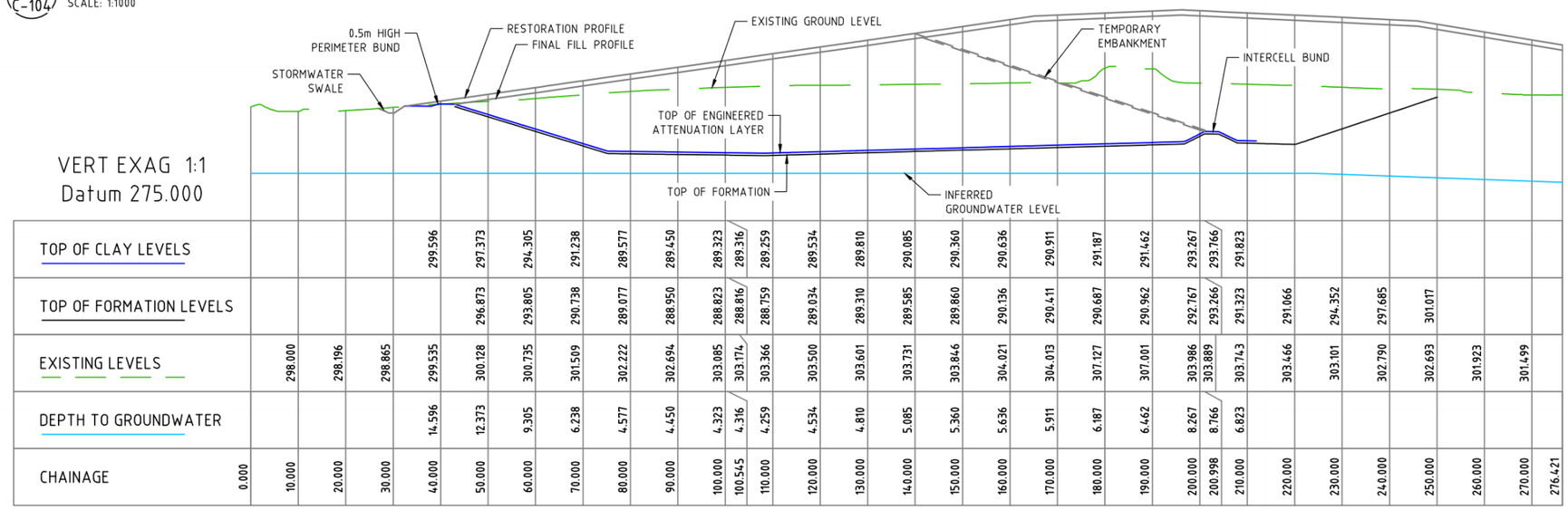
Scale: 1:1250 @ A3 | Date: 01.12.2022
Drawn: VS | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-104 | Rev: C
Filename: TW22164 - SET.DWG

Figure 9: Top of clay attenuation layer for the Stage 17 cell



TOP OF CLAY LEVELS			298.355	295.030	291.705	288.473	289.242	289.532	289.821	290.111	290.401	290.413	290.690	290.980	291.269	291.559	292.116	292.338													
TOP OF FORMATION LEVELS			297.855	294.530	291.205	287.973	288.742	289.032	289.321	289.611	289.901	289.913	290.190	290.480	290.769	291.059	291.616	291.838	291.140	293.838	297.165	300.492	302.811								
EXISTING LEVELS		299.996	299.782	300.943	301.304	301.760	302.271	302.661	302.822	302.757	302.735	302.734	302.682	302.792	302.933	302.872	302.712	302.632	302.449	302.375	302.499	302.500	302.500	303.500							
DEPTH TO GROUNDWATER			13.355	10.030	6.705	3.473	4.242	4.532	4.821	5.111	5.401	5.413	5.690	5.980	6.269	6.559	7.116	7.338													
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	100.427	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	214.445							

A C-104 LANDFILL CROSS SECTION - STAGE 17
SCALE: 1:1000



TOP OF CLAY LEVELS				299.596	297.373	294.305	291.238	289.577	289.450	289.323	289.316	289.259	289.534	289.810	290.085	290.360	290.636	290.911	291.187	291.462	293.267	293.766	291.823								
TOP OF FORMATION LEVELS					296.873	293.805	290.738	289.077	288.950	288.823	288.816	288.759	289.034	289.310	289.585	289.860	290.136	290.411	290.687	290.962	292.767	293.266	291.323	291.066	294.352	297.685	301.017				
EXISTING LEVELS		298.000	298.196	298.865	299.535	300.128	300.735	301.509	302.222	302.694	303.085	303.174	303.366	303.500	303.601	303.731	303.846	304.021	304.013	307.127	307.001	303.986	303.889	303.743	303.466	303.101	302.790	302.693	301.923	301.499	
DEPTH TO GROUNDWATER					14.596	12.373	9.305	6.238	4.577	4.450	4.323	4.316	4.259	4.534	4.810	5.085	5.360	5.636	5.911	6.187	6.462	8.267	8.766	6.823							
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	100.545	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	200.998	210.000	220.000	230.000	240.000	250.000	260.000	270.000	276.421

B C-104 LANDFILL CROSS SECTION - STAGE 17
SCALE: 1:1000

SURVEY REFERENCE: CLIENT DATE: 29.11.2022
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

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1:1000 @ A3 VERT
1:1000 @ A3 HORIZ
20m 0m 20m 40m
20m 0m 20m 40m

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A	01.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: STAGE 17 LANDFILL CROSS-SECTIONS

Scale: 1:1000 @ A3 | Date: 01.12.2022
Drawn: VS | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-301 | Rev: B
Filename: TW22164 - SET.DWG

Figure 10: Stage 17 cell cross-section

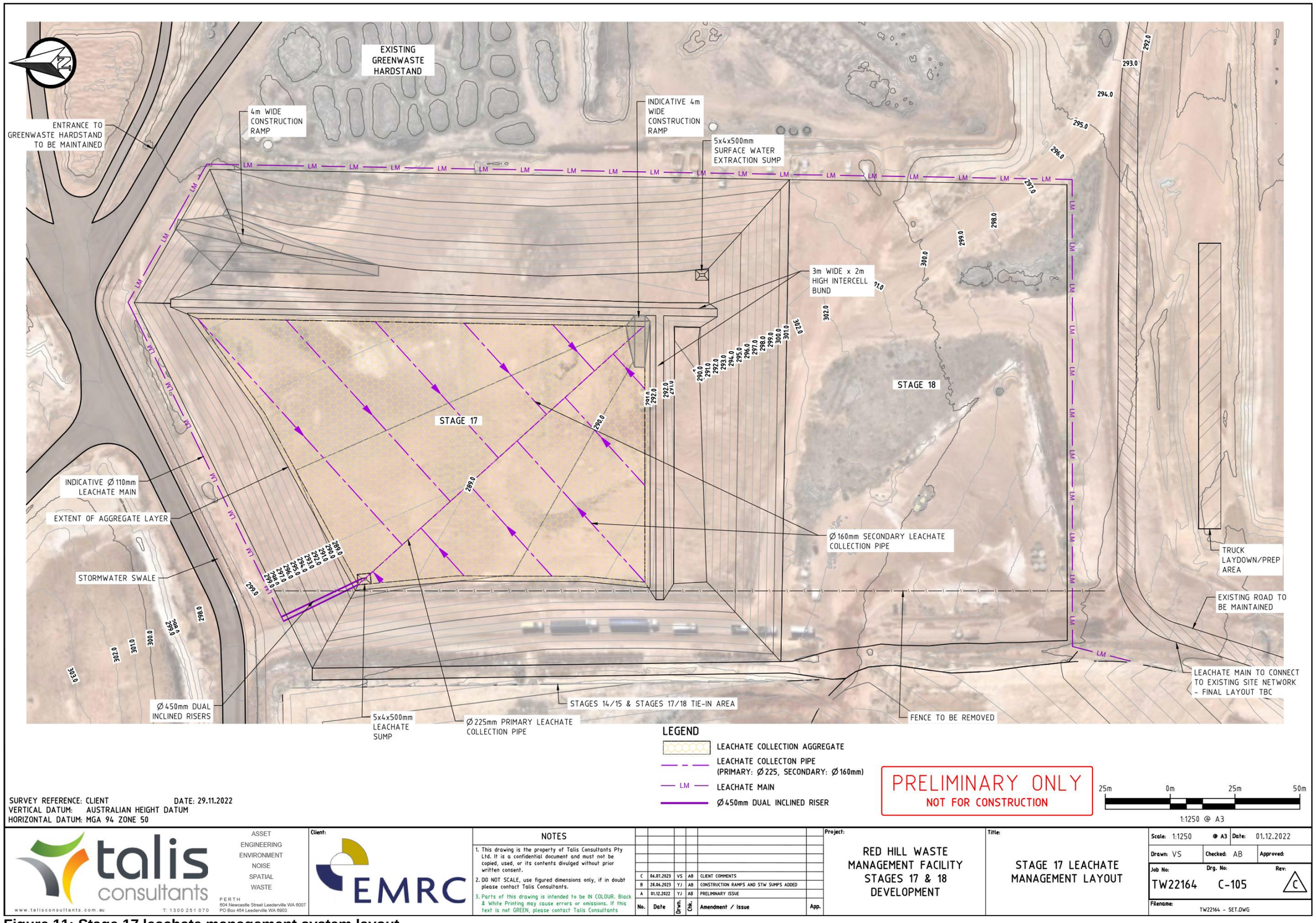
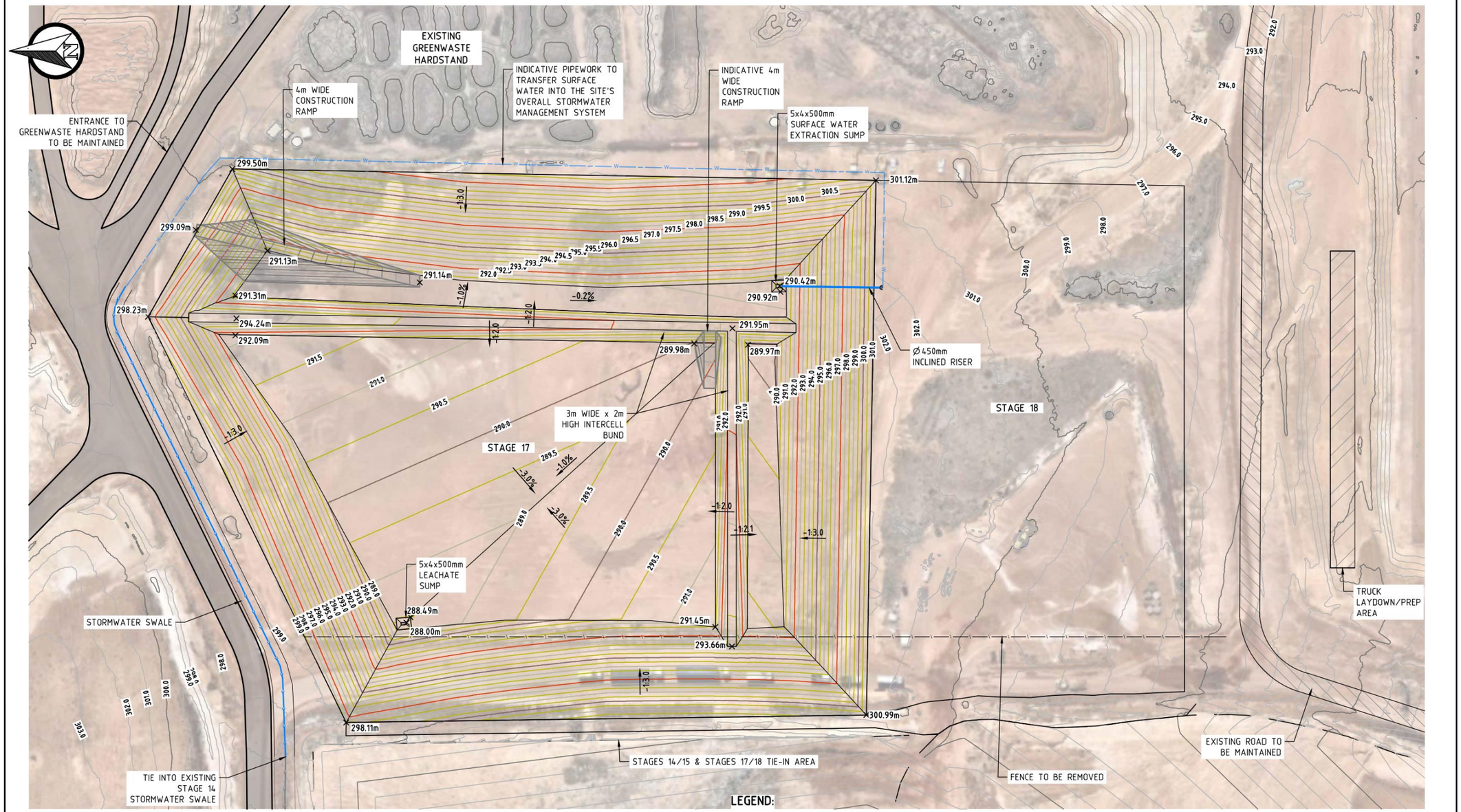


Figure 11: Stage 17 leachate management system layout



NOTE:
STORMWATER SWALE DESIGN TO BE REVIEWED DURING THE DEVELOPMENT OF FUTURE LANDFILL CELLS TO THE EAST OF STAGE 17 AND STAGE 18

LEGEND:
- INDICATIVE SURFACE WATER PIPEWORK
- Ø 450mm INCLINED RISER
- STORMWATER SWALE

SURVEY REFERENCE: CLIENT DATE: 29.11.2022
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

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25m 0m 25m 50m
1:1250 @ A3

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B	28.06.2023	YJ	AB	CONSTRUCTION RAMPS AND STW SUMPS ADDED	
A	01.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: STAGE 17 SURFACE WATER MANAGEMENT LAYOUT

Scale: 1:1250 @ A3 | Date: 01.12.2022
Drawn: VS | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-106 | Rev: C
Filename: TW22164 - SET.DWG

Figure 12: Stage 17 surface water management

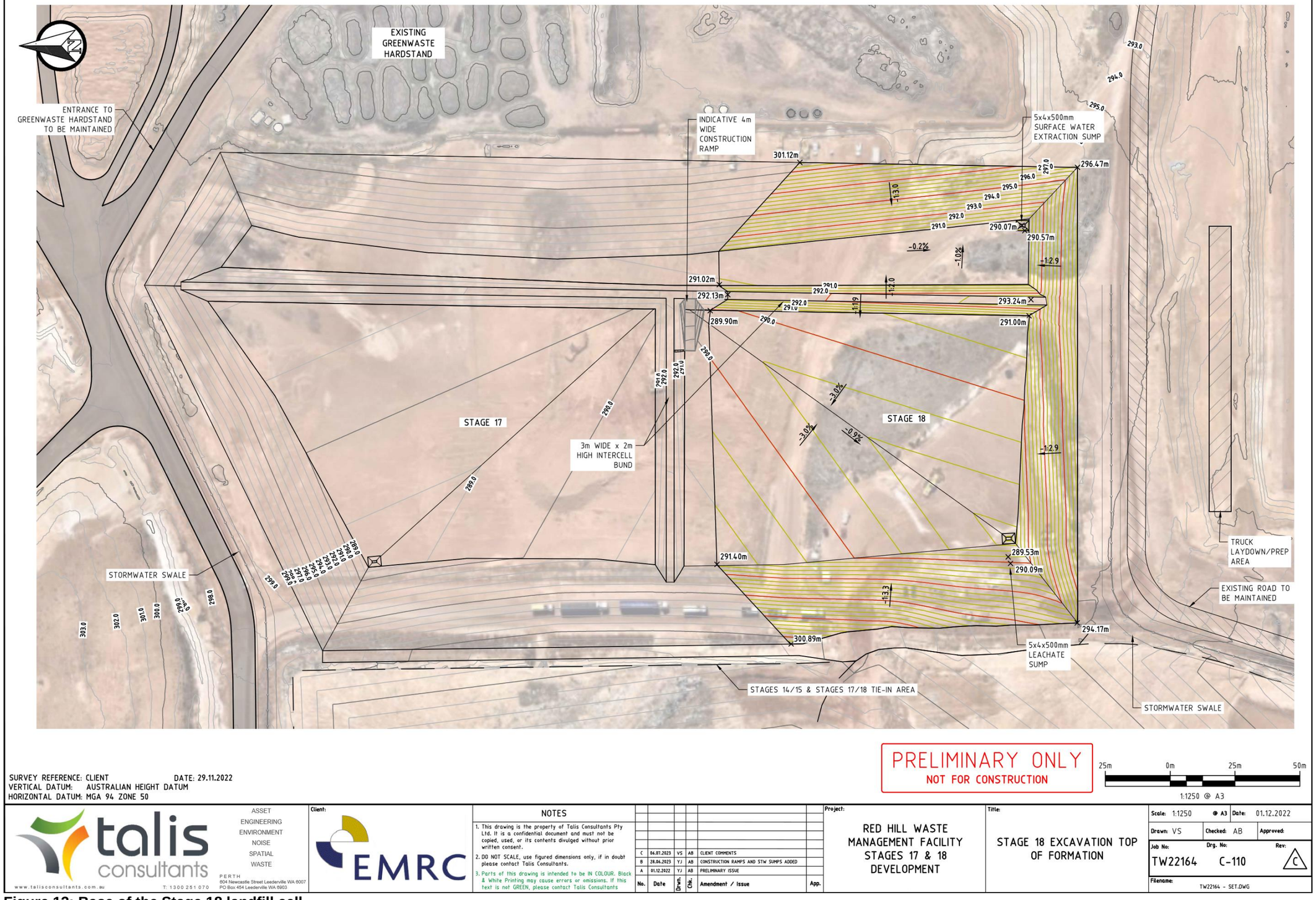
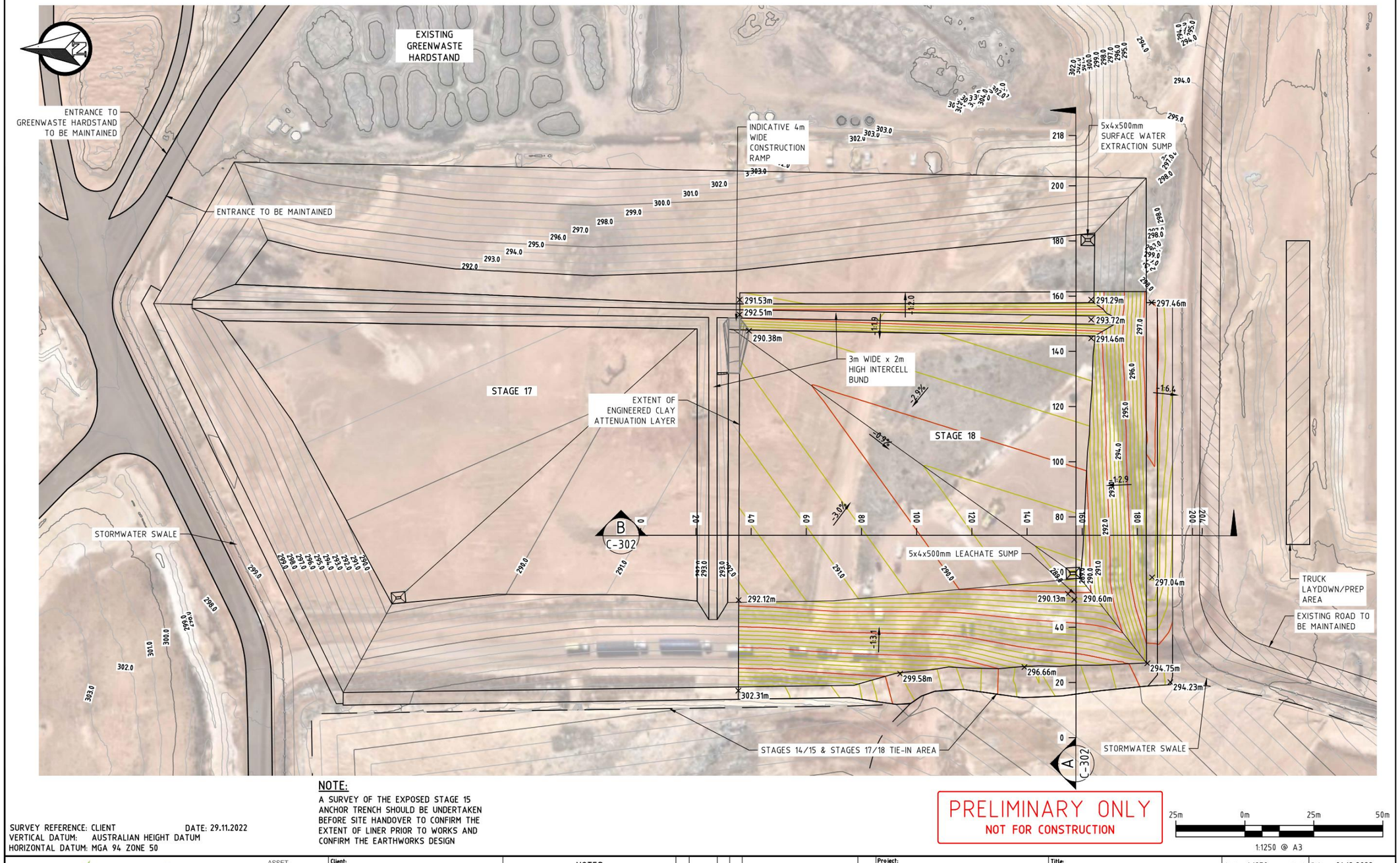


Figure 13: Base of the Stage 18 landfill cell



NOTE:
A SURVEY OF THE EXPOSED STAGE 15 ANCHOR TRENCH SHOULD BE UNDERTAKEN BEFORE SITE HANDOVER TO CONFIRM THE EXTENT OF LINER PRIOR TO WORKS AND CONFIRM THE EARTHWORKS DESIGN

SURVEY REFERENCE: CLIENT DATE: 29.11.2022
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

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25m 0m 25m 50m
1:1250 @ A3

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B	28.06.2023	YJ	AB	CONSTRUCTION RAMPS AND STW SUMPS ADDED	
A	01.12.2022	YJ	AB	PRELIMINARY ISSUE	

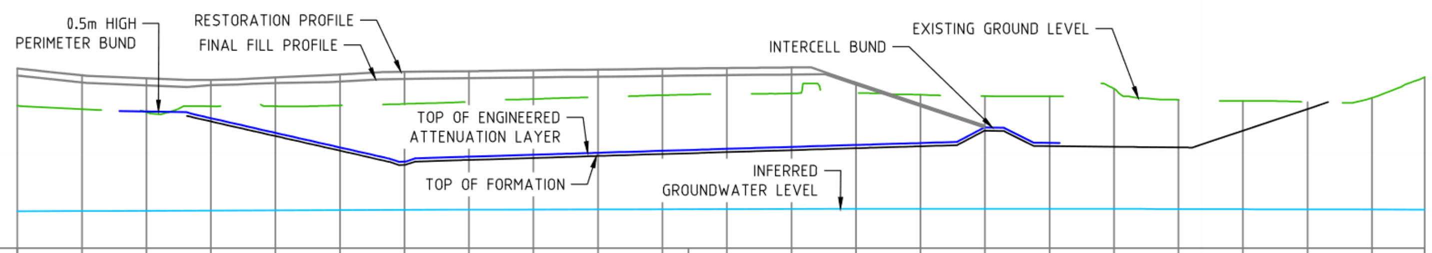
Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: STAGE 18 TOP OF ENGINEERED CLAY ATTENUATION LAYER

Scale: 1:1250 @ A3 | Date: 01.12.2022
Drawn: VS | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-111 | Rev: C
Filename: TW22164 - SET.DWG

Figure 14: Top of clay attenuation layer for the Stage 18 cell

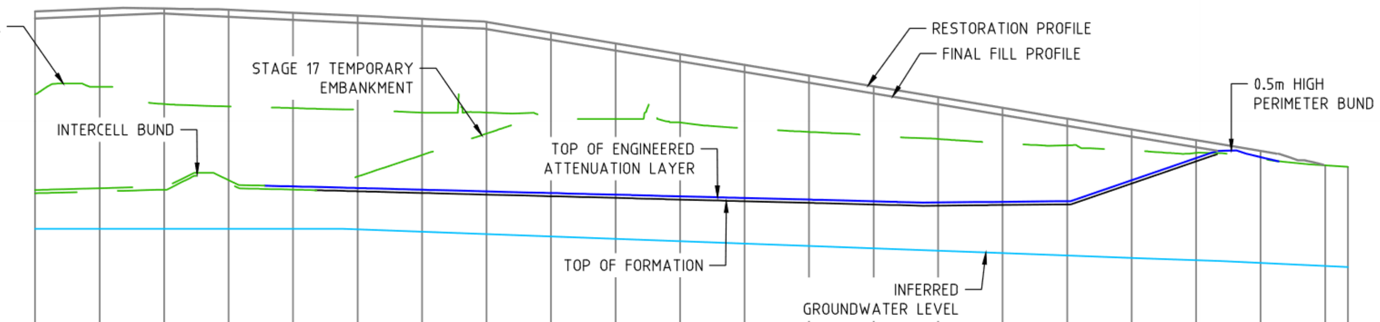
VERT EXAG 1:1
Datum 275.000



CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	104.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000		210.000	218.182
TOP OF CLAY LEVELS			296.168	295.120	292.847	290.594	288.395	289.157	289.459	289.761	290.063	290.183	290.364	290.666	290.968	291.270	293.696	291.290							
TOP OF FORMATION LEVELS				294.620	292.347	290.094	287.895	288.657	288.959	289.261	289.563	289.683	289.864	290.166	290.468	290.770	293.196	290.790	290.690	290.590	293.199	296.540			
EXISTING LEVELS		296.527	296.033	296.973	296.976	297.092	297.328	297.670	298.085	298.389	298.675	298.675	298.860	298.955	299.001	298.756	298.534	298.497	299.688	297.980	297.771	297.628	297.618	298.270	
DEPTH TO GROUNDWATER			15.396	14.312	12.003	9.713	7.479	8.207	8.487	8.757	9.044	9.153	9.319	9.606	9.914	10.200	12.632	10.222							

A LANDFILL CROSS SECTION - STAGE 18
C-111
SCALE: 1:1000

VERT EXAG 1:1
Datum 270.000



CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	105.177	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	203.524
TOP OF CLAY LEVELS					291.573	291.317	291.060	290.804	290.547	290.291	290.034	289.901	289.777	289.521	289.264	289.091	289.186	289.280	292.535	295.965	296.105		
TOP OF FORMATION LEVELS						290.817	290.560	290.304	290.047	289.791	289.534	289.401	289.277	289.021	288.764	288.591	288.686	288.780	292.031	295.456			
EXISTING LEVELS		307.003	304.348	303.956	303.705	303.460	303.026	303.019	302.159	301.998	301.471	301.237	300.559	300.011	299.432	298.916	298.241	297.927	297.198	296.757	295.832	294.843	294.614
DEPTH TO GROUNDWATER					6.573	6.401	6.512	6.623	6.734	6.845	6.956	7.013	7.067	7.178	7.289	7.484	7.945	8.408	12.031	15.826	16.394		

B LANDFILL CROSS SECTION - STAGE 18
C-111
SCALE: 1:1000

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

1:1000 @ A3 VERT
1:1000 @ A3 HORIZ
20m 0m 20m 40m

SURVEY REFERENCE: CLIENT DATE: 29.11.2022
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

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No.	Date	Drwn.	Chk.	Amendment / Issue	App.
B	04.07.2023	VS	AB	CLIENT COMMENTS	
A	01.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: STAGE 18 LANDFILL CROSS-SECTIONS

Scale: 1:1000 @ A3 Date: 01.12.2022
Drawn: VS Checked: AB Approved:
Job No: TW22164 Drg. No: C-302 Rev: B
Filename: TW22164 - SET.DWG

Figure 15: Stage 18 cell cross-section

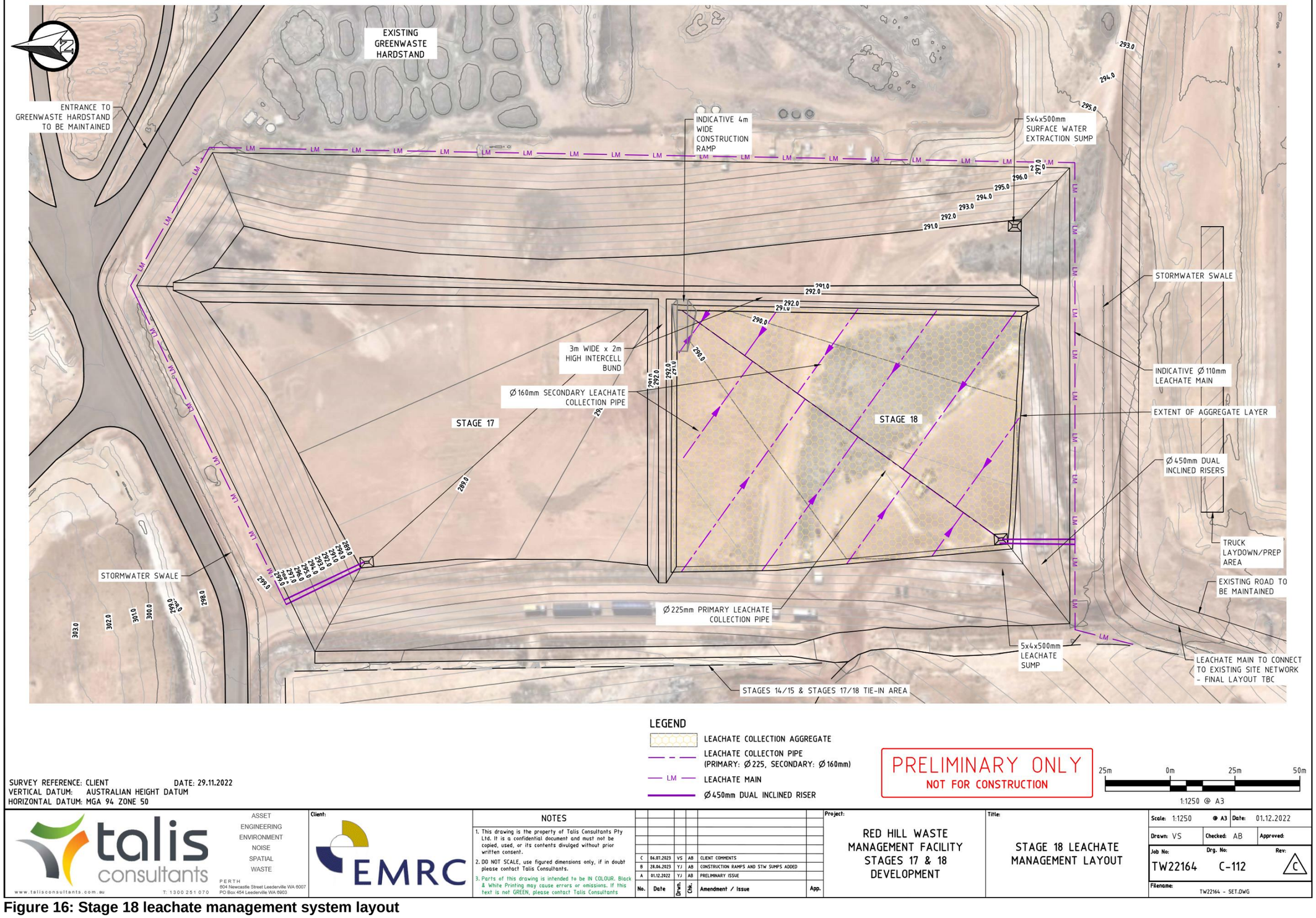
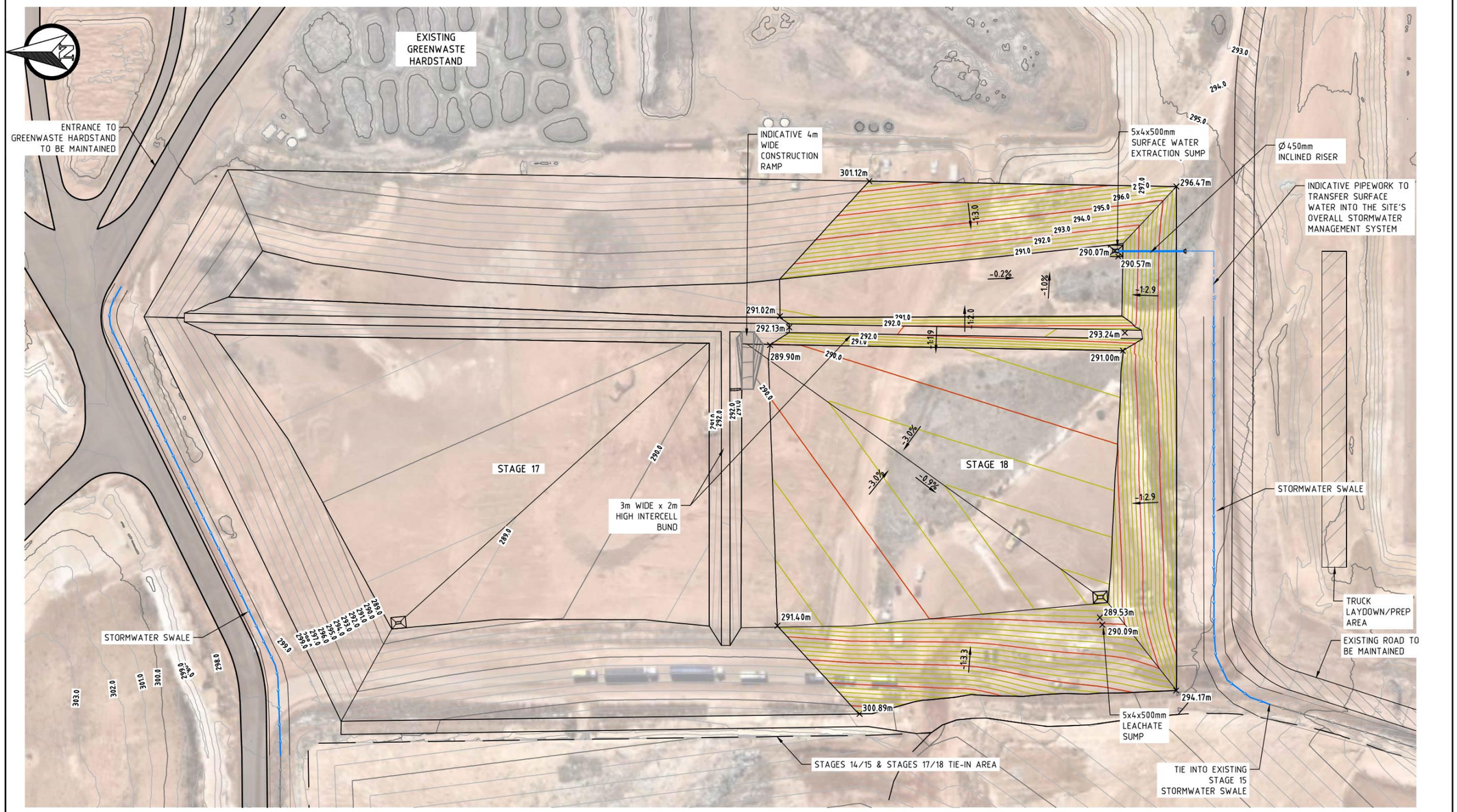


Figure 16: Stage 18 leachate management system layout



NOTE:
STORMWATER SWALE DESIGN TO BE REVIEWED DURING THE DEVELOPMENT OF FUTURE LANDFILL CELLS TO THE EAST OF STAGE 17 AND STAGE 18

LEGEND:
- INDICATIVE SURFACE WATER PIPEWORK
- Ø450mm INCLINED RISER
- STORMWATER SWALE

PRELIMINARY ONLY
NOT FOR CONSTRUCTION

SURVEY REFERENCE: CLIENT DATE: 29.11.2022
VERTICAL DATUM: AUSTRALIAN HEIGHT DATUM
HORIZONTAL DATUM: MGA 94 ZONE 50

25m 0m 25m 50m
1:1250 @ A3

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No.	Date	Drwn	Chk	Amendment / Issue	App.
C	06.07.2023	VS	AB	CLIENT COMMENTS	
B	28.06.2023	YJ	AB	CONSTRUCTION RAMPS AND STW SUMPS ADDED	
A	01.12.2022	YJ	AB	PRELIMINARY ISSUE	

Project: RED HILL WASTE MANAGEMENT FACILITY STAGES 17 & 18 DEVELOPMENT

Title: STAGE 18 SURFACE WATER MANAGEMENT LAYOUT

Scale: 1:1250 @ A3 | Date: 01.12.2022
Drawn: VS | Checked: AB | Approved:
Job No: TW22164 | Drg. No: C-113 | Rev: C
Filename: TW22164 - SET.DWG

Figure 17: Stage 18 surface water management

Schedule 2: Premises boundary

The vertices of the premises boundary are the coordinates listed in Table .

Table 7: Premises boundary coordinates (GDA2020 MGA Zone 50)

Point	Easting	Northing
1.	414743.425	6477919.144
2.	414996.284	6478129.036
3.	415005.428	6478134.313
4.	415089.836	6478183.124
5.	415139.823	6478208.519
6.	415205.307	6478231.427
7.	415460.231	6478303.164
8.	415669.96	6478362.185
9.	416020.026	6478565.917
10.	416187.304	6478642.508
11.	416459.853	6478745.134
12.	416732.404	6478847.761
13.	416732.512	6478832.767
14.	416732.677	6478809.918
15.	416734.162	6478604.525
16.	416735.771	6478381.8
17.	416735.844	6478371.803
18.	416736.567	6478271.843
19.	416737.989	6478075.23
20.	416738.697	6477977.267
21.	416739.129	6477917.639

Point	Easting	Northing
22.	416740.255	6477762.019
23.	416740.684	6477702.635
24.	416741.699	6477562.382
25.	416742.118	6477504.41
26.	416742.865	6477401.1
27.	416742.909	6477394.952
28.	416743.999	6477244.365
29.	416744.42	6477186.008
30.	416744.446	6477182.4
31.	416744.805	6477132.73
32.	416606.759	6477131.735
33.	416501.631	6477130.975
34.	416099.502	6477128.075
35.	415697.374	6477125.173
36.	415214.578	6477121.69
37.	415013.574	6477120.252
38.	414642.052	6477117.598
39.	414640.98	6477217.56
40.	414749.479	6477354.308
41.	414746.452	6477636.726

Schedule 3

Landfill acceptance criteria for Special Waste Type 3

Landfill Class		**Landfill Acceptance Criteria**[1]	
		PFOS + PFHxS	PFOA
Class III landfill	ASLP leachable concentration (µg/L) (ASLP 3)	0.7 µg/L	5.6 µg/L
	Concentration Limit (CL3) (mg/kg)	50 mg/kg	50 mg/kg

Note 1: Concentrations must be less than both the relevant leachable concentration and the concentration limit.