Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6455/2020/1
Works approval holder	Element 25 Limited
ACN	119 711 929
Registered business address	Level 2, 45 Richardson Street WEST PERTH WA 6005
DWER file number	DER2020/000384
Duration	14/12/2020 to 13/12/2025
Date of issue	14/12/2020
Premises details	Butcherbird Manganese Project – Stage 1 Mining tenement M52/1074 MEEKATHARRA WA

Prescribed premises category description **(Schedule 1, *Environmental Protection Regulations 1987*)**	**Assessed production capacity**
Category 5: Processing or beneficiation of metallic or non-metallic ore	1,600,000 tonnes per year

This works approval is granted to the works approval holder, subject to the attached conditions, on 14 December 2020, by:

Alana Kidd

Digitally signed by Alana Kidd
Date: 2020.12.14 14:05:21 +08'00'

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

Interpretation

In this works approval:

(a) the words ‘including’, ‘includes’ and ‘include’ in conditions mean “including but not limited to”, and similar, as appropriate;

(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;

(c) where tables are used in a condition, each row in a table constitutes a separate condition;

(d) any reference to an Australian or other standard, guideline, or code of practice in this works approval:

  (i) if dated, refers to that particular version; and

  (ii) if not dated, refers to the latest version and therefore may be subject to change over time;

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and

(f) unless specified otherwise, all definitions are in accordance with the EP Act.

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

Works approval conditions

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

Construction phase

Infrastructure and equipment

1. The works approval holder must:

(a) construct and/or install the infrastructure and/or equipment;

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

(c) at the corresponding infrastructure location; and

(d) within the corresponding timeframe,

as set out in Table 1.

Table 1: Design and construction / installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location
1.	Processing Plant including crushing, log-washing, screening and ore sorting infrastructure	Must be installed in the general area as identified in the infrastructure location map specified. Crushing and screening circuit equipped with dust suppression sprays to reduce dust generation. Wet screening and ore sorter circuit located on a concrete hardstand which is designed to capture spilt materials. Hardstand graded so any spilt material or stormwater is directed to sumps which are fitted with appropriately sized pumps so any captured materials are sent back to the processing circuit. Stormwater drains installed adjacent to the raised hard stand areas to direct stormwater around the Processing Plant.	Schedule 1: Figure 1 and Figure 2
2.	Process water pond	Constructed with the following dimensions: - Internal walls 50 m x 50 m - Depth of pond 1.5 m (excluding freeboard) - Storage capacity of 3,750 m^3 Lined with a HDPE liner with a minimum thickness of 1.0 mm (tolerance of up to 5%). Constructed to provide a minimum 0.5 metre total freeboard (including an allowance for a 1% AEP 72 hour rain event) above the normal operating pond. Freeboard markers to be installed.	Schedule 1: Figure 1 and Figure 2
3.	Tailings discharge pipeline and return water pipelines	Tailings pipelines located within open bunded trenches with sufficient capacity to ensure liquors are captured for a period equal to the time between routine inspections (minimum once per 12 hour shift). Pipelines constructed in HDPE. Pipelines fitted with flow meters to record the volume of tailings discharged to the TSF and return water discharged to the Process Water Pond.	Schedule 1: Figure 1

2. 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; and

(d) within the corresponding timeframe,

as set out in Table 2.

Table 2: Critical containment infrastructure design and construction requirements

Infrastructure	Design and construction requirements	Infrastructure location
TSF starter embankment	• Storage capacity of 441,441 m^3 • Maximum crest level RL 621.5 m • Cut-off trench installed beneath the TSF starter embankment. • Constructed with an in-situ compacted soil liner (minimum 300 mm thick) to achieve a maximum hydraulic conductivity of $5x10^{-8}$ m/s (95% UCL). • Testing of the compacted soil liner completed at a rate of one test per hectare. • Diversion drains installed on the downstream toe. • Constructed to provide a minimum 0.5 metre total freeboard (including an allowance for a 1% AEP 72 hour rain event) above the normal operating pond. • Install a decant rock ring in the center of the TSF fitted with pump(s) to facilitate water recovery. The water recovery system must have a minimum capacity of not less than 96 m3/hr. Collected water to be transferred to the process water pond via return water pipeline(s). • Tailings to be discharged from the embankment via spigots with erosion protection placed beneath each spigot location. • The spigotting sequence is designed so the supernatant water pond is maintained around the decant rock ring structure with a maximum radius of 50 m.	Schedule 1: Figure 1, Figure 4 and Figure 8
TSF Stage 1 lift	• Storage capacity of 339,248 m^3 • Maximum crest level RL 624.0 m • Diversion drains installed on the downstream toe. • Constructed to provide a minimum 0.5 metre total freeboard (including an allowance for a 1% AEP 72 hour rain event) above the normal operating pond. • Maintain a decant rock ring in the center of the TSF fitted with pump(s) to facilitate water recovery. The water recovery system must have a minimum capacity of not less than 96 m3/hr. Collected water to be transferred to the process water pond via return water pipeline(s).	Schedule 1: Figure 1, Figure 5 and Figure 8

Infrastructure	Design and construction requirements	Infrastructure location
	• Tailings to be discharged from the embankment via spigots with erosion protection placed beneath each spigot location. • The spigotting sequence is designed so the supernatant water pond is maintained around the decant rock ring structure with a maximum radius of 50 m.	
TSF Stage 2 lift	• Storage capacity of 369,927 m^3 • Maximum crest level RL 626.5 m • Diversion drains installed on the downstream toe. • Constructed to provide a minimum 0.5 metre total freeboard (including an allowance for a 1% AEP 72 hour rain event) above the normal operating pond. • Maintain a decant rock ring in the center of the TSF fitted with pump(s) to facilitate water recovery. The water recovery system must have a minimum capacity of not less than 96 m3/hr. Collected water to be transferred to the process water pond via return water pipeline(s). • Tailings to be discharged from the embankment via spigots with erosion protection placed beneath each spigot location. • The spigotting sequence is designed so the supernatant water pond is maintained around the decant rock ring structure with a maximum radius of 50 m.	Schedule 1: Figure 1, Figure 6 and Figure 8
TSF Stage 3 lift	• Storage capacity of 319,637 m^3 • Maximum crest level RL 628.5 m • Diversion drains installed on the downstream toe. • Constructed to provide a minimum 0.5 metre total freeboard (including an allowance for a 1% AEP 72 hour rain event) above the normal operating pond. • Maintain a decant rock ring in the center of the TSF fitted with pump(s) to facilitate water recovery. The water recovery system must have a minimum capacity of not less than 96 m3/hr. Collected water to be transferred to the process water pond via return water pipeline(s). • Tailings to be discharged from the embankment via spigots with erosion protection placed beneath each spigot location. • The spigotting sequence is designed so the supernatant water pond is maintained around the decant rock ring structure with a maximum radius of 50 m.	Schedule 1: Figure 1, Figure 7 and Figure 8

Construction of groundwater monitoring wells

3. The works approval holder must design, construct and install 4 new groundwater monitoring wells in accordance with the requirements specified in Table 3.

Table 3: Infrastructure requirements – groundwater monitoring wells

Infrastructure	Design, construction, and installation requirements	Monitoring well location (s)
TSF groundwater monitoring bores	Four new groundwater monitoring bores to be installed at the TSF to monitor for SWLs and water quality: • Well screens must target the part, or parts, of the aquifer most likely to be affected by contamination. Where temporary/seasonal perched features are present, wells must be nested, and the perched features individually screened; • Designed and constructed in accordance with ASTM D5092/D5092M-16: Standard practice for design and installation of groundwater monitoring bores; and • A bore location map (using aerial image overlay) must be prepared and include the location of all monitoring bores in the monitoring network and their respective identification numbers.	Schedule 1: Figure 3

4. The works approval holder must, within 60 calendar days of the monitoring bores in Table 3 being constructed, submit to the CEO a bore construction report evidencing compliance with the requirements of condition 3.

Compliance reporting

5. Subject to condition 1, within 30 days of the completion of the works specified in Table 1, the works approval holder must submit to the CEO an Environmental Compliance Report certified by a suitably qualified professional engineer that:

(a) lists and describes the completed works and any associated items of infrastructure and equipment listed in Table 1;

(b) certifies whether or not each item of infrastructure or component of infrastructure specified in Table 1 has been constructed with no material defects and to the requirements specified in Table 1;

(c) contains 'as constructed' plans for each item of infrastructure or component of infrastructure specified in Table 1; and

(d) is signed by a person authorised by the works approval holder and contains the printed name and position of that person within the company.

6. Subject to condition 5, where an item of infrastructure or component of infrastructure has been certified as not being constructed, or does not comply with the corresponding requirements, or contains material defects, the works approval holder must:

(a) correct the non-compliant or defective works, prior to re-certifying in accordance with condition 5(b); or

(b) provide to the CEO a description of, and explanation for, any departures from the requirements specified in Table 1 that do not require rectification and do not constitute a material defect along with the report required by condition 5.

7. Subject to condition 2, within 30 days of the completion of an item of infrastructure specified in Table 2, the works approval holder must submit to the CEO a Critical Containment Infrastructure Report certified by the Tailings Design Engineer or their delegate that:

   (a) lists and describes the completed works and any associated items of infrastructure and equipment listed in Table 2;

   (b) certifies whether or not each item of infrastructure or component of infrastructure specified in Table 2 has been constructed with no material defects and to the requirements specified in Table 2;

   (c) contains 'as constructed' plans for each item of infrastructure or component of infrastructure specified in Table 2; and

   (d) is signed by a person authorised by the works approval holder and contains the printed name and position of that person within the company.

8. Subject to condition 7, where an item of infrastructure or component of infrastructure has been certified as not being constructed, or does not comply with the corresponding requirements, or contains material defects, the works approval holder must:

   (a) correct the non-compliant or defective works, prior to re-certifying in accordance with condition 7(b); or

   (b) provide to the CEO a description of, and explanation for, any departures from the requirements specified in Table 2 that do not require rectification and do not constitute a material defect along with the report required by condition 7.

Environmental commissioning phase

Environmental commissioning requirements

9. The works approval holder may only commence environmental commissioning of an item of infrastructure identified in condition 1 once the Environmental Compliance Report has been submitted for that item of infrastructure in accordance with condition 5 of this works approval.

10. The works approval holder may only commence environmental commissioning of an item of infrastructure identified in condition 2 once the Critical Containment Infrastructure Report has been submitted for that item of infrastructure in accordance with condition 7 of this works approval

11. Any environmental commissioning activities undertaken for an item of infrastructure specified in Table 4 may only be carried out:

   (a) in accordance with the corresponding commissioning requirements; and

   (b) for the corresponding authorised commissioning duration.

Table 4: Environmental commissioning requirements

Infrastructure	Commissioning requirements	Authorised commissioning duration
Processing Plant	Subject to completing the requirements of conditions 5 and 6	14 weeks
Tailings and decant water discharge pipelines	Subject to completing the requirements of conditions 5 and 6	14 weeks
Process water pond	Subject to completing the requirements of conditions 5 and 6	7 days
TSF	Subject to completing the requirements of conditions 7 and 8	14 weeks

12. During environmental commissioning and time limited operations, the works approval holder must ensure that the emission(s) specified in Table 5, are discharged only from the corresponding discharge point(s) and only at the corresponding discharge point location(s).

Table 5: Authorised discharge points during commissioning and time limited operations

	Emission	Discharge point	Discharge point location
1	Tailings	TSF via one or more discharge points from spigots located around the TSF perimeter	As per Figure 1 in Schedule 1
2	Return water	Process water pond via discharge outlet	As per Figure 1 in Schedule 1

Environmental commissioning reporting

13. The works approval holder must submit to the CEO an Environmental Commissioning Report within 60 calendar days of the completion date of environmental commissioning for each item of infrastructure specified in Table 4.

14. The works approval holder must ensure the Environmental Commissioning Report required by condition 13 of this works approval includes the following:

(a) a summary of the environmental commissioning activities undertaken, including ore processed, product produced, tailings produced and timeframes;

(b) a summary of the environmental performance of each item of infrastructure as constructed or installed;

(c) a review of the works approval holder's performance and compliance against the conditions of this works approval; and

(d) where they have not been met, measures proposed to meet the manufacturer's design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Time limited operations phase

Commencement and duration

15. The works approval holder may conduct time limited operations for an item of infrastructure specified in Table 6 for a period not exceeding the number of calendar days specified in Table 6 from the day the works approval holder meets the requirements of conditions 1 and 2, for that item of infrastructure.

Table 6: Duration of time limited operations

Infrastructure	Authorised time limited operation duration
Processing Plant	180 calendar days
TSF, including tailings deposition pipeline	
Return water pipeline and Process Water Pond	

Time limited operations requirements

16. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 7 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 7.

Table 7: Infrastructure and equipment requirements during time limited operations

	Site infrastructure and equipment	Operational requirement	Infrastructure location
1.	Processing Plant	• Operate dust controls to manage dust emissions; • Capacity of sumps is maintained; • Operate sump pumps to recover loss material back to the processing circuit; • Maintain stormwater drains installed adjacent to the raised hard stand areas to direct stormwater around the Processing Plant; and • Record the volume of ore processed.	Schedule 1: Figure 1 and 2
2.	TSF	• Freeboard able to store a 1:100 year 72-hour rainfall event, whilst maintaining 500 mm of freeboard to the crest; • Operate decant pumping system to recover supernatant water; • Record the volume of tailings discharged; and • Record the volume of water recovered from the decant pond.	Schedule 1: Figure 1 and 3
3.	Process Water Pond	• Freeboard able to contain a 1 in 100 year, 72 hour AEP rainfall event, whilst maintaining 500 mm of freeboard to the crest of the pond.	Schedule 1: Figure 1 and Figure 2
4.	Tailings discharge pipeline and return water pipeline	• Inspect tailings discharge and return water pipelines daily when operational; • Inspect the discharge outlet daily when discharging; • Maintain pipeline flow meters; and • Maintain pipeline bunding capacity to ensure any lost tailings are captured for a period equal to the time between routine inspections.	Schedule 1: Figure 1

Monitoring during environmental commissioning and time limited operations

17. The works approval holder must monitor emissions during environmental commissioning and time limited operations in accordance with Table 8.

Table 8: Emissions monitoring during commissioning and time limited operation

Discharge point	Monitoring location	Parameter	Frequency	Averaging Period	Unit	Method	
						Sampling	Analysis
Seepage from TSF	4 new groundwater monitoring bores as per condition 3	Standing water level (SWL)	At least once prior to the commencement of commissioning then monthly thereafter	Spot sample	Metres below ground level (mbgl)	AS/NZS 5667.1 AS/NZS 5667.11	In field non-NATA accredited analysis permitted
		pH			pH units		
		Aluminium Arsenic Antimony Barium Boron Cadmium Chromium Cobalt Copper Iron Lead Manganese Mercury Molybdenum Nickel Selenium Tin Vanadium Zinc Total dissolved solids			mg/L		By a NATA accredited laboratory
Tailings to TSF	Supernatant pond	pH	Once during commissioning then monthly during time limited operations	Spot sample	pH units		In field non-NATA accredited analysis permitted
		Aluminium Arsenic Antimony Barium Boron Cadmium Chromium Cobalt Copper Iron Lead Manganese Mercury Molybdenum Nickel Selenium Tin Vanadium Zinc Total dissolved solids			mg/L		By a NATA accredited laboratory

Inspections

18. The works approval holder must conduct visual inspections of the infrastructure during commissioning and time limited operations at the frequency specified Table 9.

Table 9: Inspections of infrastructure

Infrastructure (refer to Schedule 1 Premises Plan)	Type of inspection	Frequency
Tailings waste delivery pipelines	Integrity check/ loss of containment	daily
Tailings decant water return pipelines		daily
TSF	To confirm required freeboard capacity is available	daily
Process Water Dam	To confirm required freeboard capacity is available	daily

Time Limited Operations compliance reporting

19. The works approval holder must submit to the CEO a report on the time limited operations within 60 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.

20. The works approval holder must ensure the report required by condition 19 includes the following:

(a) a summary of the time limited operations, including timeframes and amount of ore processed;

(b) quantity of product produced;

(c) volume of tailings deposited;

(d) volume of tailings return water recovered;

(e) tailings waste fines density (solid vs water content);

(f) water balance at the TSF including calculated seepage;

(g) monitoring results recorded in accordance with conditions 17;

(h) a summary of the environmental performance of all plant and equipment as installed, which at minimum includes records detailing the:

(i) operations of the infrastructure; and

(ii) testing the infrastructure.

(i) a review of performance against the works approval; and

(j) where they have not been met, measures proposed to meet the manufacturer's design specification and conditions of this works approval, together with timescales for implementing the proposed measures.

Records and reporting (general)

21. 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.

22. 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 of this works approval;

(c) monitoring programmes undertaken in accordance with condition 17; and

(d) complaints received under condition 21.

23. The books specified under condition 22 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 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AEP	means annual exceedance probability
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 Water quality – sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.
AS/NZS 5667.11	means the Australian Standard AS/NZS 5667.11 Water quality – sampling – guidance on sampling groundwater.
ASTM	means American Society for Testing and Materials
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 commissioning	means the sequence of activities to be undertaken to test equipment integrity and operation, or to determine the environmental performance, of equipment and infrastructure to establish or test a steady state operation and confirm design specifications.
Environmental Commissioning Report	means a report on any commissioning activities that have taken place and a demonstration that they have concluded, with focus on emissions and discharges, waste containment, and other environmental factors.
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.

Term	Definition
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
monthly period	means a one-month period commencing from the first day of a month until the last day of the same month.
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.
quarterly	means the 4 inclusive periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September, and 1 October to 31 December.
RL	means reduced level.
Suitably qualified geotechnical engineer	Means a person who: 1. hold a Bachelor of Engineering recognised by the Australian institute of Engineers; and 2. has a minimum of five years of experience working in geotechnical engineering including experience in the design of tailings storage facilities.
TSF	Means tailings storage facility.
time limited operations	refers to the operation of the infrastructure and equipment identified under this works approval that is authorised for that purpose, subject to the relevant conditions.
waste	has the same meaning given to that term under the EP Act.
works approval	refers to this document, which evidences the grant of the works approval by the CEO under section 54 of the EP Act, subject to the conditions.
works approval holder	refers to the occupier of the premises being the person to whom this works approval has been granted, as specified at the front of this works approval.

END OF CONDITIONS

Schedule 1: Maps

Premises map

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

Figure 1: Map of the boundary of the prescribed premises and infrastructure layout

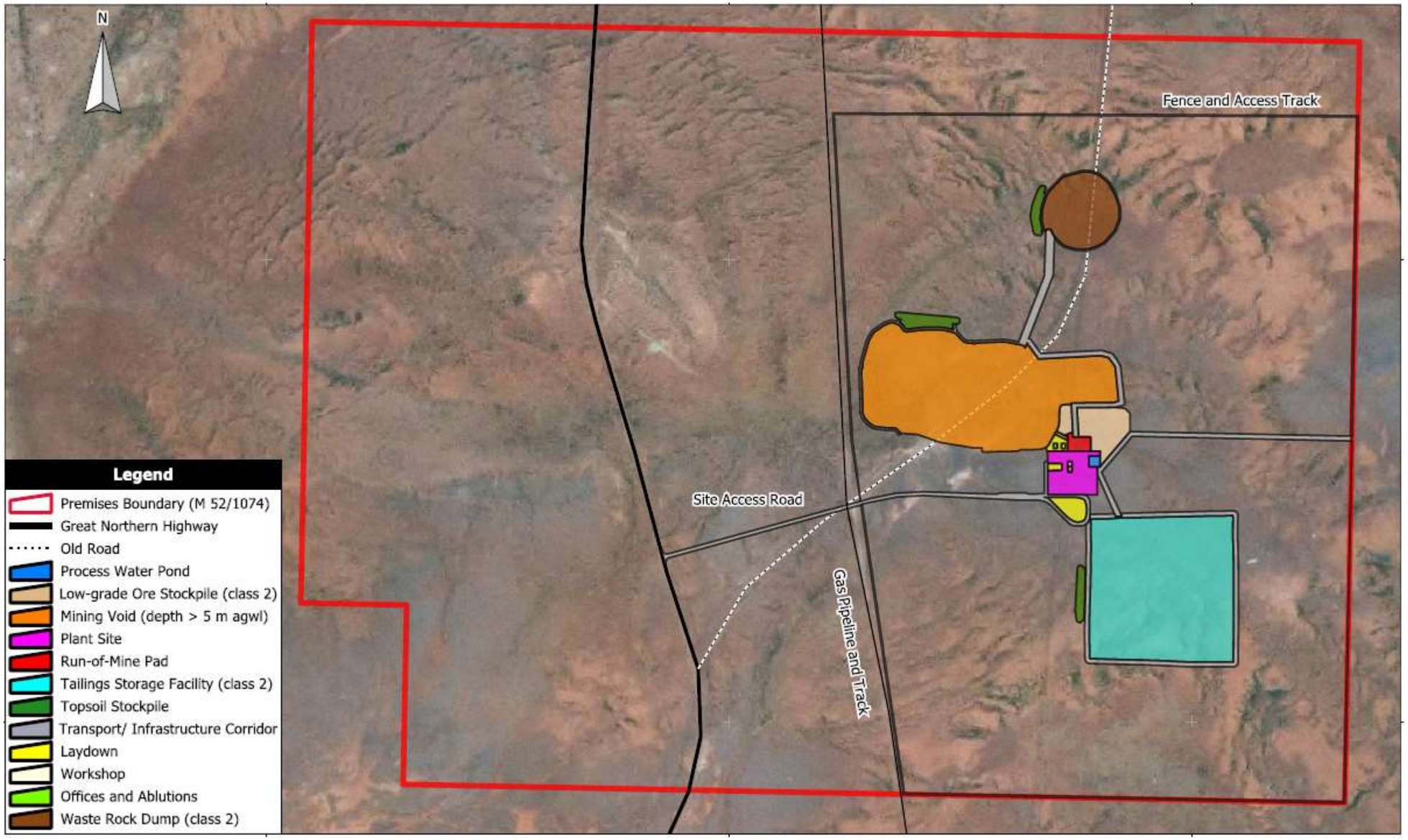

Figure 2: Processing Plant layout

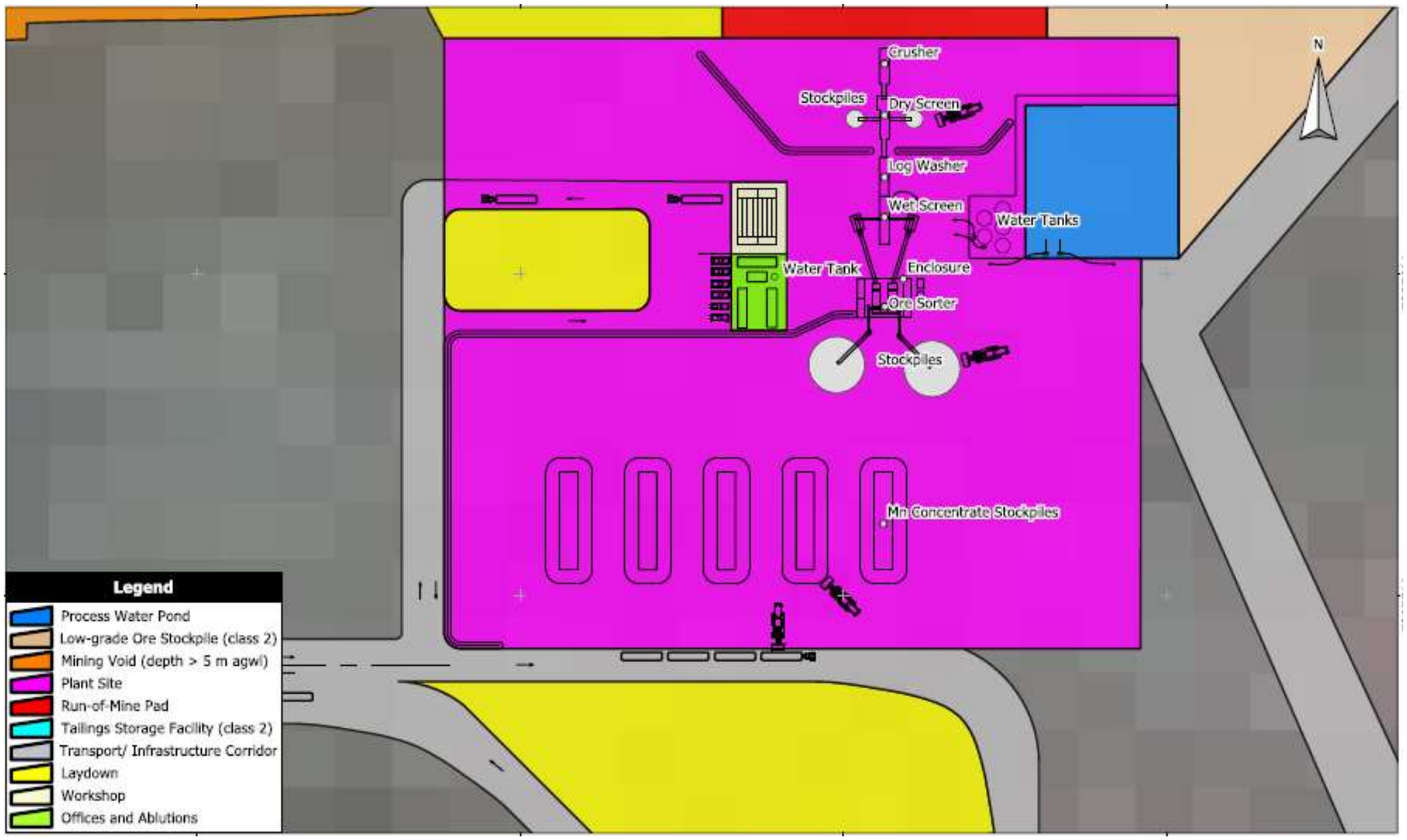

Figure 3: Indicative TSF Layout including proposed monitoring bore locations

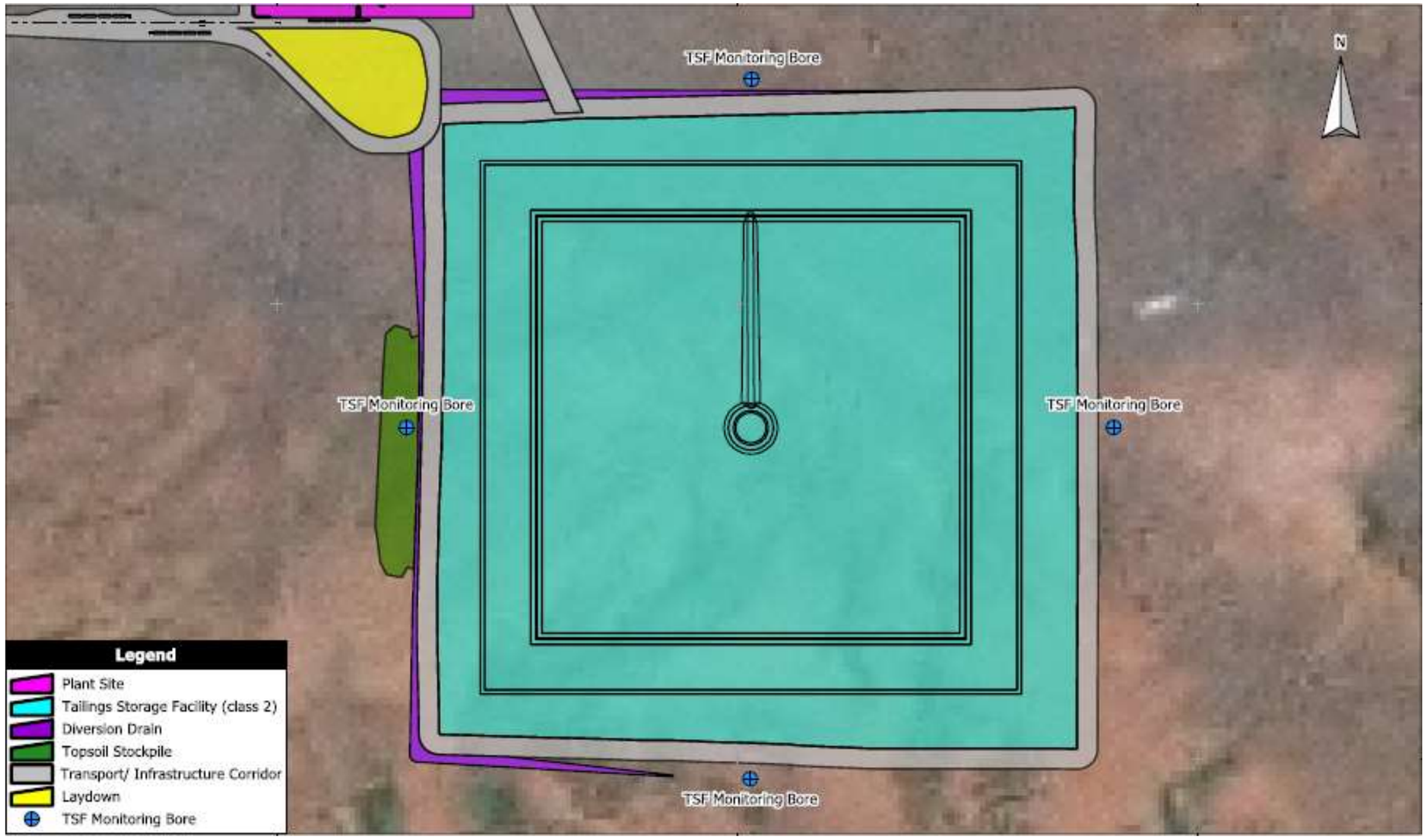

Figure 4: Starter Stage Plan and embankment sections

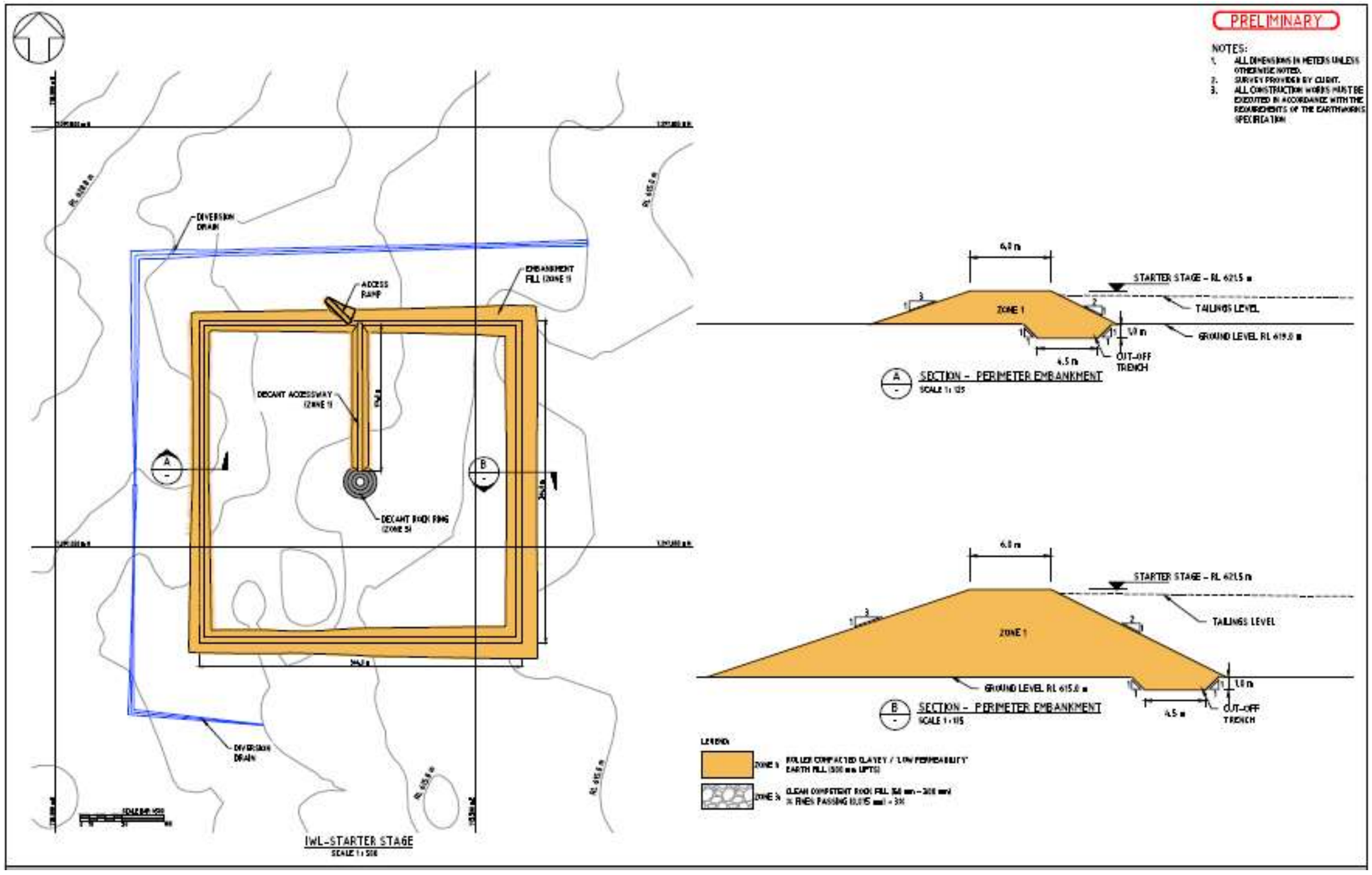

Figure 5: Stage 1 lift Plan and embankment sections

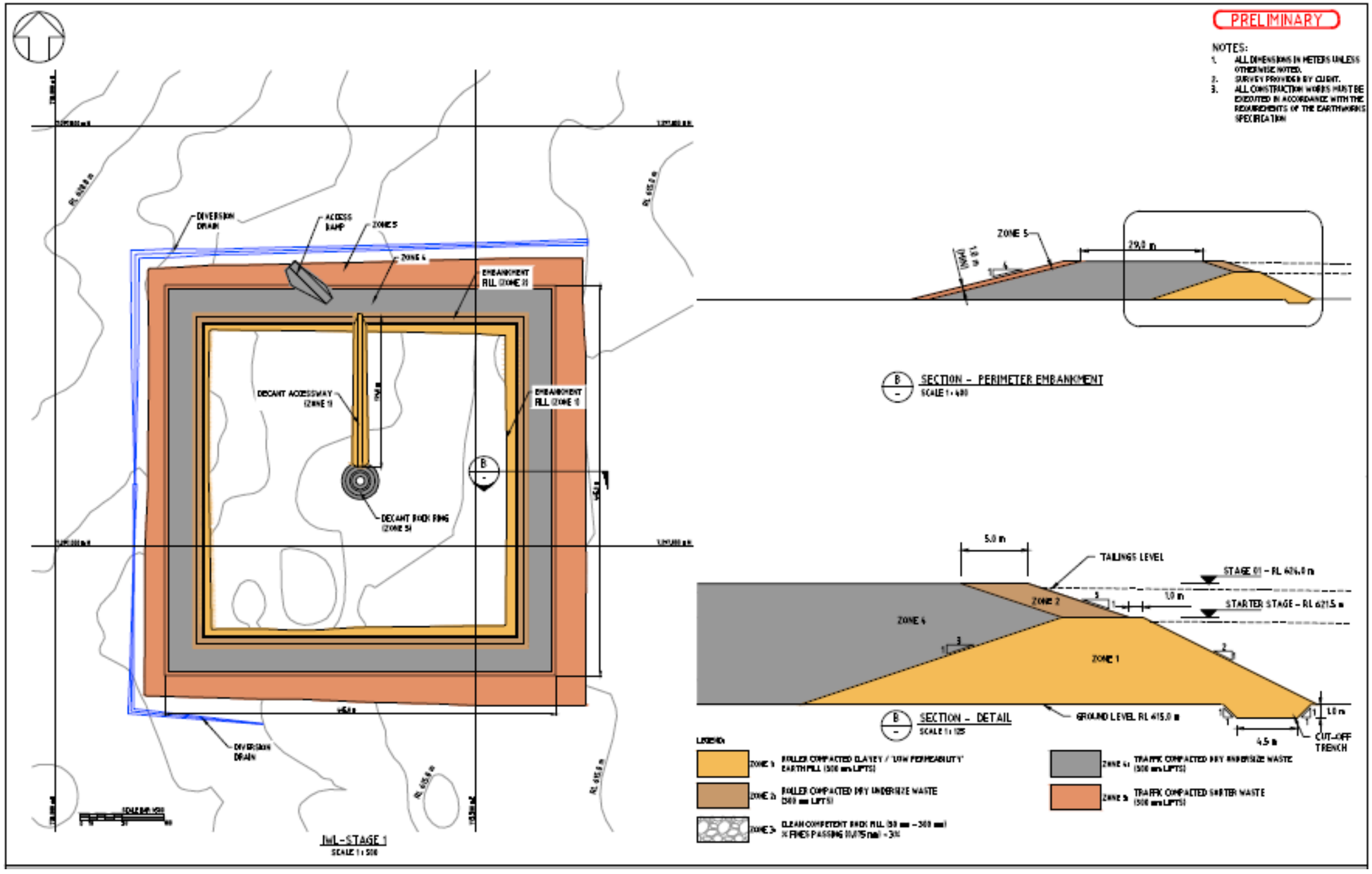

Figure 6: Stage 2 lift Plan and embankment sections

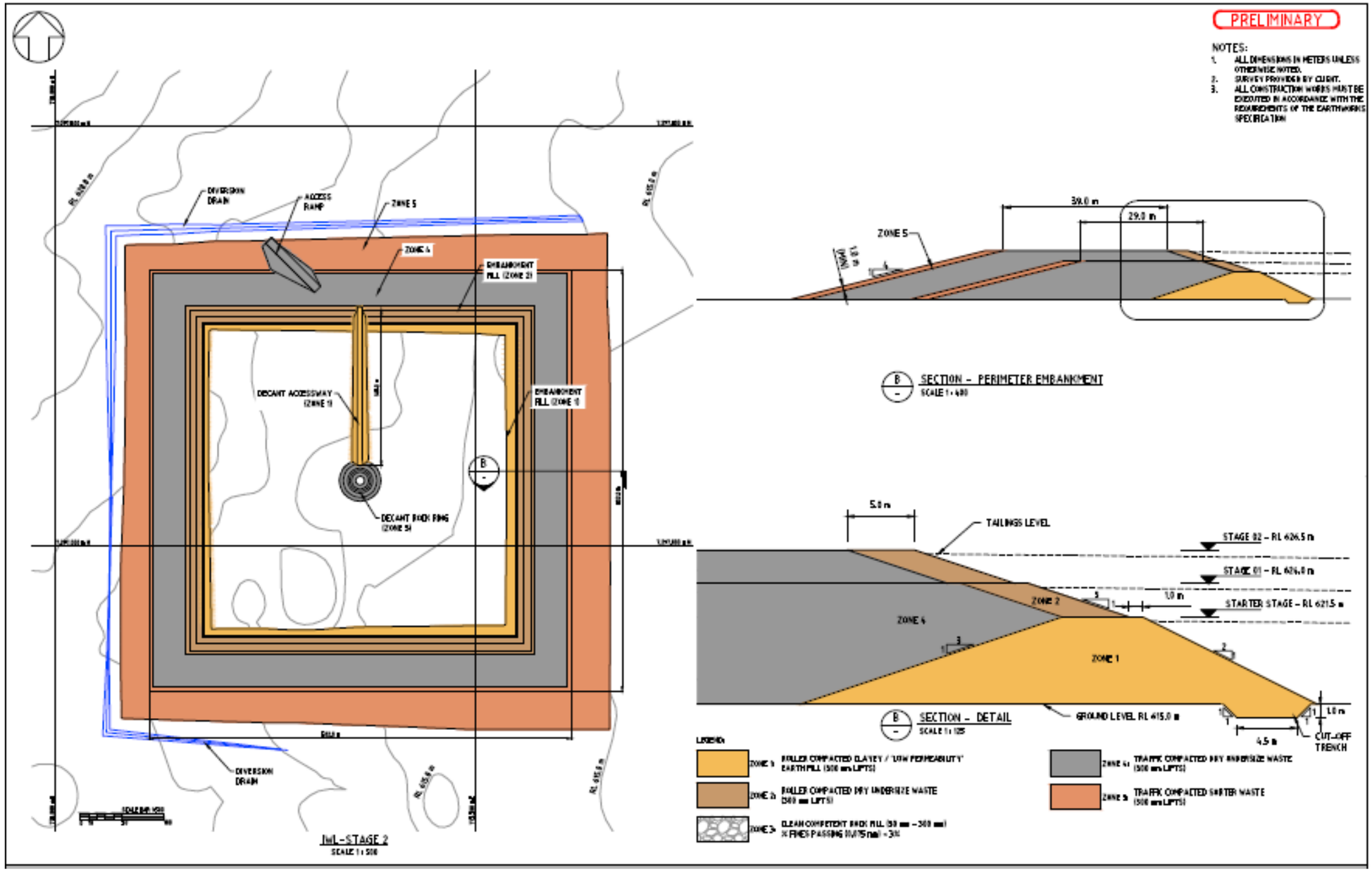

Figure 7: Stage 3 lift Plan and embankment sections

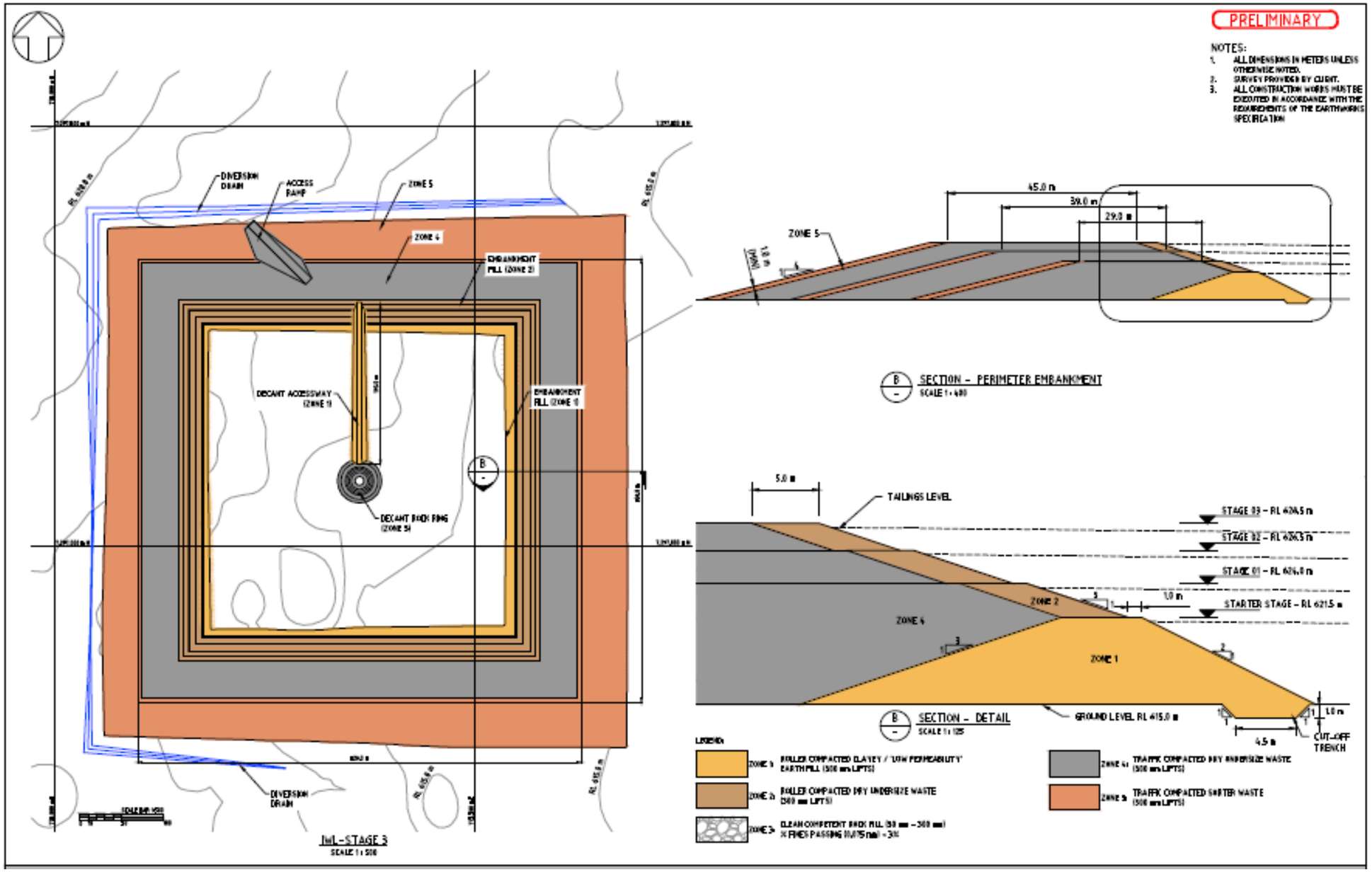

Figure 8: TSF Sections and Details