Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6578/2021/1
Works approval holder	FQM Australia Nickel Pty Ltd
ACN	135 761 465
Registered business address	24 Outram Street WEST PERTH WA 6005
DWER file number	DER2021/000358
Duration	25/10/2021 to 24/10/2026
Date of issue	25/10/2021
Date of amendment	23 May 2022
Premises details	Ravensthorpe Nickel Operations Legal description - Part of Mining Tenements M74/175, M74/115 and M74/116 JERDACUTTUP WA 6346 As defined by the premises map in Schedule 1

Prescribed premises category description **(Schedule 1, *Environmental Protection Regulations 1987*)**	**Assessed production / design capacity**
Category 5: Processing or beneficiation of metallic or non-metallic ore: premises on which (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam	13,900,000 tonnes per annual period

This amended works approval is granted to the works approval holder, subject to the attached conditions, on 23 May 2022, by:

Tanya Fyfe
A/SENIOR ENVIRONMENTAL OFFICER, RESOURCE 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
25/10/2021	W6578/2021/1	Works approval granted for the construction and time limited operations of TSF2 (Combined Stage 2 and 3) embankment raise.
23/5/2022	W6578/2021/1	Amendment to extend timeframe for construction of groundwater monitoring wells and seepage recovery bores.

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

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

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

Works approval conditions

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

Construction phase

Infrastructure and equipment

1. The works approval holder must:

(a) construct the infrastructure;

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

(c) at the corresponding infrastructure location

as set out in Table 1.

Table 1: Design and construction requirements for TSF2 embankment raises

	Infrastructure	Design and construction requirements	Infrastructure location/ Drawing reference
1.	Tailings Storage Facility (TSF) 2 (Combined Stage 2 and Stage 3) embankment raise	• Eastern, Southern and a portion of the Western Embankments of TSF2 to be raised from 123.7m RL to a maximum height of 126.7m RL in accordance with design drawings F004 and F005. • Embankments are to be constructed using downstream construction method. • Downstream raise of embankment constructed using mine waste materials sourced from Hale-Bopp mine. • Place and compact fill in 500mm layers to form the required embankment profile and continue construction to the required crest level. • All TSF2 raised embankment walls are to be rolled and compacted to a minimum target density of 95% of SMDD. • Excavation and backfilling of a cut-off trench along the northern end of the western embankment to be tied into the trench of the existing embankment. • Construct safety windrows to a height of 0.5m along both edges of embankment crest. • Constructed to provide a minimum 300mm operational freeboard (including an allowance for a 1:100 AEP 72-hour rainfall event) above the normal operating pond.	TSF2 embankment raise design as shown in Figure 6 and Figure 7 of Schedule 2.
2.	TSF2 decant access causeway	• The centrally located decant causeway of TSF2 to be raised in accordance with design drawing F005. • Decant water to be pumped back into processing plant for re-use in the process circuit.	Decant access causeway raise design as shown in Figure 7 of Schedule 2.

	Infrastructure	Design and construction requirements	Infrastructure location/ Drawing reference
3.	Tailings and return water pipelines	• Pipelines to be contained within bunded open trenches to contain leaks and spillages from pipe burst events. • Pipelines to be fitted with automatic leak detection and shutoff systems to minimise discharge and allow for maintenance and recovery of materials.	Referred to as 'Deposition line' and 'Return Water Line' as shown in Figure 2 of Schedule 1.
4.	Tailings distribution system	• Install northern perimeter deposition pipeline along embankment perimeter wall of TSF2. • Pipelines to be fitted with spigots located at nominal 60m intervals along the distribution pipelines along the TSF2 embankment perimeter wall in accordance with design drawing F009. • Polyvinyl Chloride (PVC) dropper pipes to be installed along the upstream batter of embankments that will connect to the spigots along the distribution pipelines.	Referred to as 'Tailings Discharge Location' as shown in the Tailings distribution pipeline plan in Figure 2 of Schedule 1.
5.	Seepage Collection System	• Construct a 1m to 3m deep seepage collection trench along the southern flank of TSF 2 and grade towards a sump. • Collection sump to be equipped with a pump to collect tailings seepage and return to the TSF basin or evaporation ponds. • A natural sediment trap to be constructed at the discharge point of the reinstated stormwater diversion drain.	Referred to as 'Seepage Collection Trench' as shown in the Stormwater and Seepage Management Map in Figure 3 of Schedule 1.
6.	Monitoring Equipment	• Vibrating wire piezometers (VWP) to be installed in foundation and buttress along the southern embankment of TSF2 in accordance with design drawing F006.	Referred to as 'Proposed VWP (to be installed in both foundation & buttress) and Proposed VWP (to be installed in embankment))' as shown in the VMP Location Plan in Figure 8 of Schedule 2.
7.	Stormwater Management Infrastructure	• All embankment crests to have a 2% inward crossfall to direct surface water runoff into the TSF basin. • Existing stormwater diversion drain located along the western flank of TSF2 to be reinstated in accordance with F003.	Referred to as 'Reinstated Existing Stormwater Diversion Drain' as shown in the Stormwater and Seepage Management Map in Figure 3 of Schedule 1.

Construction of groundwater monitoring wells

2. The works approval holder must design, construct, and install groundwater monitoring wells in accordance with the requirements specified in Table 2.

Table 2: Infrastructure requirements – groundwater monitoring wells

Infrastructure	Design, construction, and installation requirements	Monitoring well location(s)	Timeframe
Groundwater monitoring well(s) identified as MB64, MB65, MB66 and MB67 in Schedule 1, Figure 4 (4 bores)	<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*. Wells must be constructed with a screened interval from the water table to a depth of 2 metres below the water table and 1 metre above the water table.	As depicted in Schedule 1, Figure 4: Map of groundwater monitoring bore locations and labelled as MB64, MB65, MB66 and MB67.	Must be constructed, developed (purged), and determined to be operational by no later than 31 December 2022.
	<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.		
	<u>Well development:</u> 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.		
	<u>Installation survey:</u> the vertical (top of casing) and horizontal position of each monitoring well must be surveyed and subsequently mapped by a suitably qualified surveyor.		
	<u>Well network map:</u> 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.		

3. 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 2.

Construction of seepage recovery bores

4. The works approval holder must design, construct and install the production bores in accordance with the requirements specified in Table 3.

Table 3: Design and construction/installation requirements – production bores

Infrastructure	Design and construction/installation requirements	Seepage recovery bore locations	Timeframe
Production bores for recovery of seepage from the TSF2 Stage 3 development.	• Installation of two seepage recovery bores by a suitably qualified hydrogeologist. • Drilling and construction of the seepage recovery bores will be in accordance with the *Minimum Construction Requirements for Water Bores in Australia*. • The vertical (top of casing) and horizontal position of each seepage recovery bore must be surveyed and subsequently mapped by a suitably qualified surveyor. • A seepage recovery bore location map (using aerial image overlay) must be prepared and include the location of all seepage recovery bores and their respective identification numbers.	Production bores labelled TSFRB01 and TSFRB02 as shown in Schedule 1, Figure 4.	Must be constructed and determined to be operational by no later than 31 December 2022.

5. The works approval holder must, within 60 calendar days of the production bores being constructed submit to the CEO a well construction report evidencing compliance with the requirements of condition 4.

Evaporation ponds

6. The Works Approval holder must ensure that the Premises infrastructure listed in Table 4 is repaired and operated in accordance with the requirements specified in Table 4.

Table 4: Repair and re-establishment of the damaged Evaporation Ponds at the Premises

	Infrastructure	Construction and operational requirements	Evaporation pond locations	Timeframe
1	Evaporation ponds 9, 13 and 16.	• The synthetic liners of evaporation ponds 9, 13 and 16 at the Premises must be repaired and maintained in an intact an unperforated state with a seepage rate of 10^{-9} m/s or less. • Evaporation ponds 9, 13 and 16	Evaporation ponds 9, 13 and 16 are shown in Figure 5 of Schedule 1.	Evaporation ponds 9, 13 and 16 must be repaired and determined to be operational by 31 March 2022.

	Infrastructure	Construction and operational requirements	Evaporation pond locations	Timeframe
		must be repaired before they are permitted to receive treated process water from the TSF and Process Plant. • Installation of wave breakers in evaporation ponds 9, 13 and 16 to reduce wave action against embankment walls.		
2	Evaporation pond 12	• The synthetic liners of evaporation pond 12 at the Premises must be repaired and maintained in an intact an unperforated state with a seepage rate of 10^{-9} m/s or less. • Evaporation pond 12 must be repaired before it is permitted to receive treated process water from the TSF and Process Plant. • Installation of a wave breaker in evaporation pond 12 to reduce wave action against embankment walls.	Evaporation pond 12 is shown in Figure 5 of Schedule 1.	Evaporation pond 12 must be repaired and determined to be operational by 31 December 2022.

Compliance reporting

7. The works approval holder must within 30 calendar days of an item of infrastructure 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 geotechnical 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;

(c) where a departure from the requirements specified in Table 1 occurs and is of a type allowed by Condition 1, the Works Approval Holder must provide to the CEO a description of, and explanation for the departure;

(d) evidence of compliance with the requirements of Condition 6; and

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

Time limited operations phase

Commencement and duration

9. The works approval holder may only commence time limited operations for deposition into tailings storage facility (TSF) 2 (Combined Stage 2 and Stage 3) embankments when:

(a) the Environmental Compliance Report, as required by condition 7, has been submitted by the works approval holder for all item of infrastructure in Table 1; and

(b) the evidence of compliance with condition 6, as required by condition 8(d), has been submitted for at least three evaporation ponds listed in Table 4.

10. 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 9 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 10(a).

Time limited operations requirements and emission limits

11. During time limited operations, the works approval holder must ensure that the premises infrastructure and equipment listed in Table 5 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 5.

Table 5: Infrastructure and equipment requirements during time limited operations

	Infrastructure	Design and construction requirements	Infrastructure location
1	Tailings Storage Facility (TSF) 2 (Combined Stage 2 and Stage 3) embankment raise	• Minimum operational freeboard of 300mm maintained or containment for a 1 in 100 year/72 hour rainfall event (whichever is greater) is maintained at all times.	Not applicable.
2	TSF access causeway	• Decant water shall be pumped back into processing plant for re-use in the process circuit.	TSF access causeway raise design as shown in Figure 7 of Schedule 2.
3	Tailings and return water pipelines	• Provided within secondary containment sufficient to contain any leaks and spillages from pipe burst events. • Pipelines equipped with automatic leak detection and shutoff systems to minimise discharge and allow for maintenance and recovery of materials.	Referred to as ‘Deposition line’ and ‘Return Water Line’ as shown in Figure 2 of Schedule 1.

	Infrastructure	Design and construction requirements	Infrastructure location
4	Evaporation ponds 9, 12, 13 and 16.	• Ensure two of the four damaged evaporation ponds as outlined under condition 6 are repaired and operational prior to the deposition of tailings in TSF2 (combined Stage 2 and Stage 3) embankment raise.	Evaporation ponds 9, 12, 13 and 16 that require repair are shown in Figure 5 of Schedule 1.
5	Seepage Collection System	• Trench and sump associated to the Seepage Collection system located along the southern flank of TSF2 are to be maintained for the collection and recovery of seepage. • Natural sediment trap located at the discharge point of the reinstated stormwater diversion drain to be maintained.	Referred to as 'Seepage Collection Trench' as shown in the Stormwater and Seepage Management Map in Figure 3 of Schedule 1.

Compliance reporting

12. 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.

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

(a) a summary of the time limited operations, including timeframes and amount of tailings discharged;

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

(i) seepage collection system; and

(ii) repaired evaporation ponds.

(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 or designers design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Records and reporting (general)

14. 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.

(e) be available to be produced to an inspector or the CEO as required.

15. The works approval holder must maintain accurate and auditable books including the following records, information, reports, and data required by this works approval:

(a) the works conducted in accordance with condition 1;

(b) any maintenance of infrastructure that is performed in the course of complying with this works approval;

(c) complaints received under condition 14.

16. The books specified under condition 15 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 6 have the meanings defined.

Table 6: Definitions

Term	Definition
AEP	Annual exceedance probability
annual period	a 12 month period commencing from 1 July until 30 June of the immediately following year.
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
Condition	Condition means a condition to which this Works Approval is subject under s.62 of the EP Act.
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.

Term	Definition
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).
Freeboard	means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point.
Minimum Construction Requirements for Water Bores in Australia	means the document titled Minimum Construction Requirements for Water Bores in Australia – Third edition (National Uniform Drillers Licensing Committee, February 2012), as amended from time to time.
premises	the premises to which this works approval applies, as specified at the front of this works approval 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.
RL	height relative to the NLN Mine Reference Grid.
suitably qualified geotechnical engineer	means a person who: • holds a Bachelor of Engineering recognised by the Australian Institute of Engineers; and • has a minimum of five years of experience working in geotechnical engineering including experience in the design of tailings storage facilities.
suitably qualified hydrogeologist	means a person who holds a tertiary qualification specialising in environmental science or equivalent and has a minimum of five years of experience working in the area of hydrogeology, including investigation and assessment of groundwater resources, or who is otherwise approved by the CEO to act in this capacity.
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.
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 layout map

The boundary of the prescribed premises is depicted by the red line as shown in the map below (Figure 1).

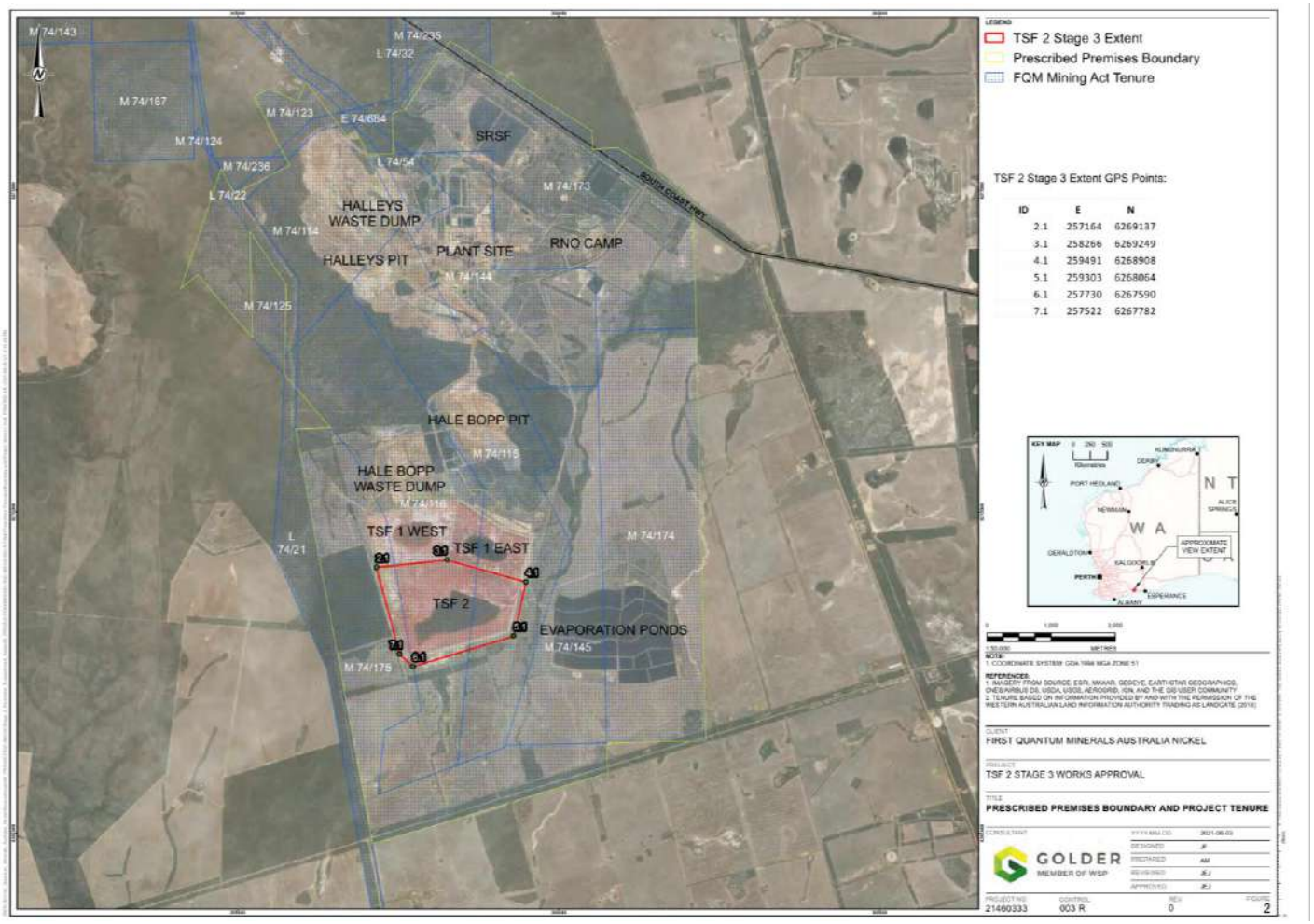

Figure 1: Map of the boundary of the prescribed premises

TSF2 Tailings Deposition Plan

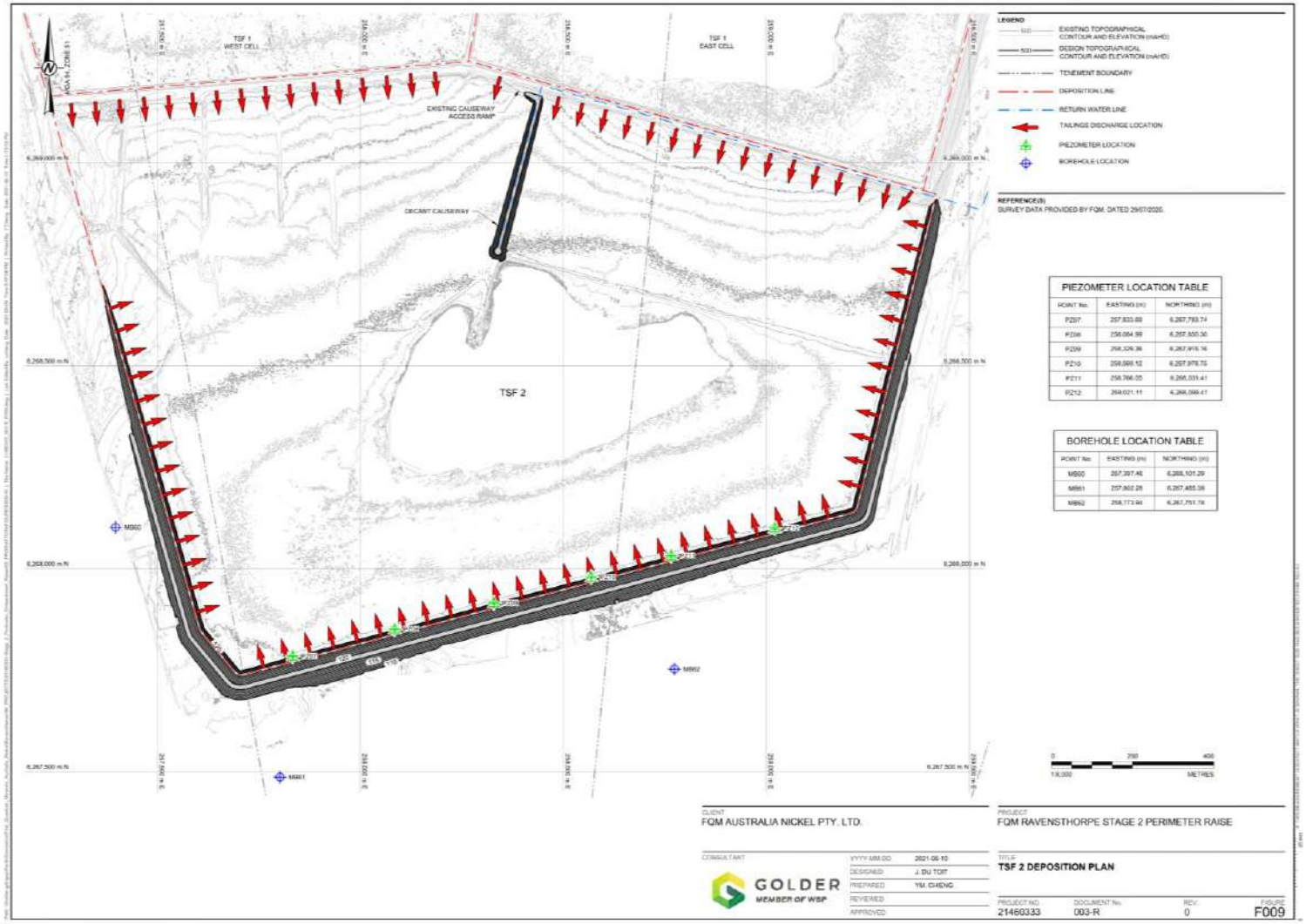

Figure 2: TSF2 Tailings Deposition Pipeline Plan

Stormwater and Seepage Management Infrastructure

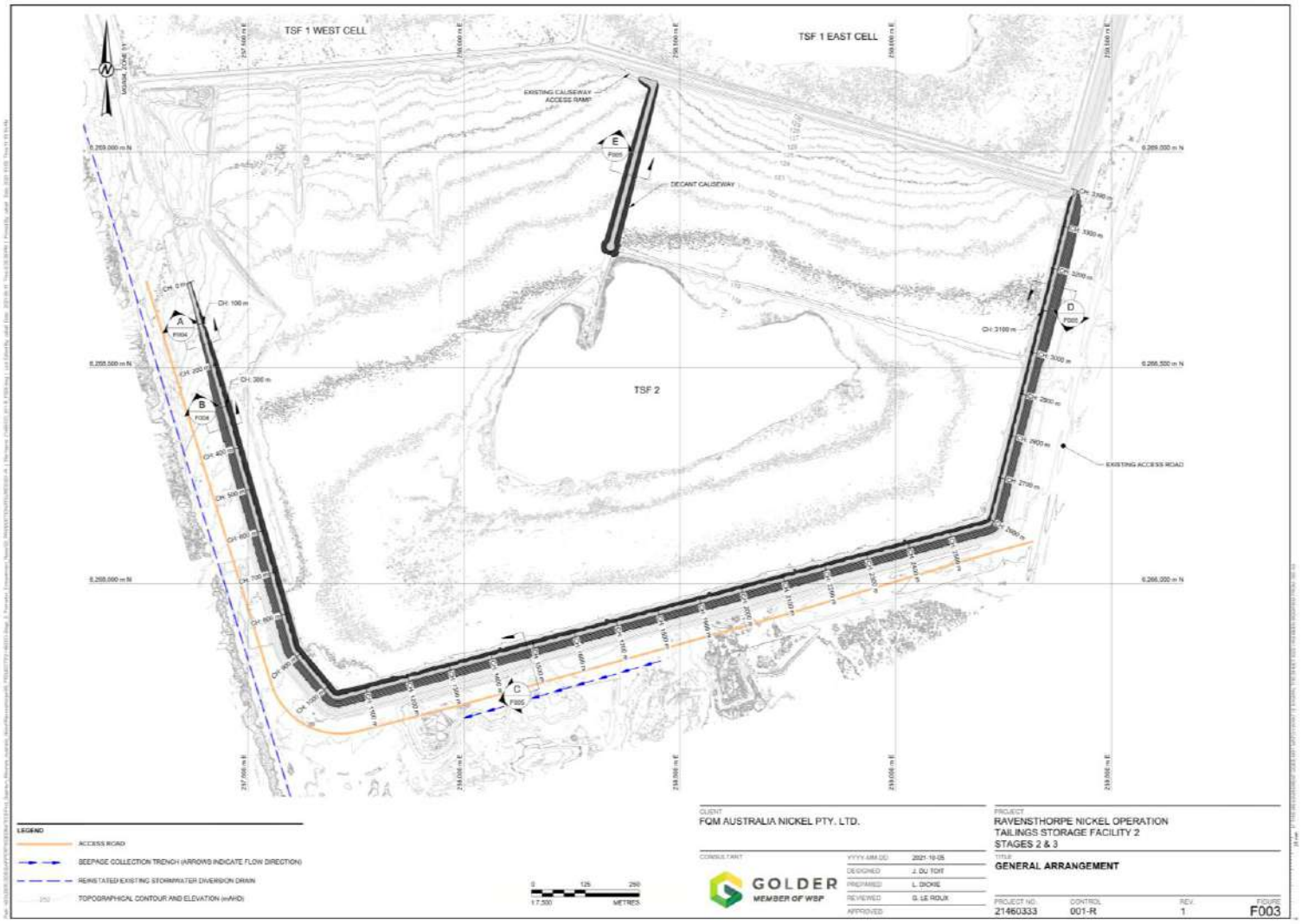

Figure 3: Stormwater and Seepage Management Infrastructure Plan

Map of monitoring bore locations

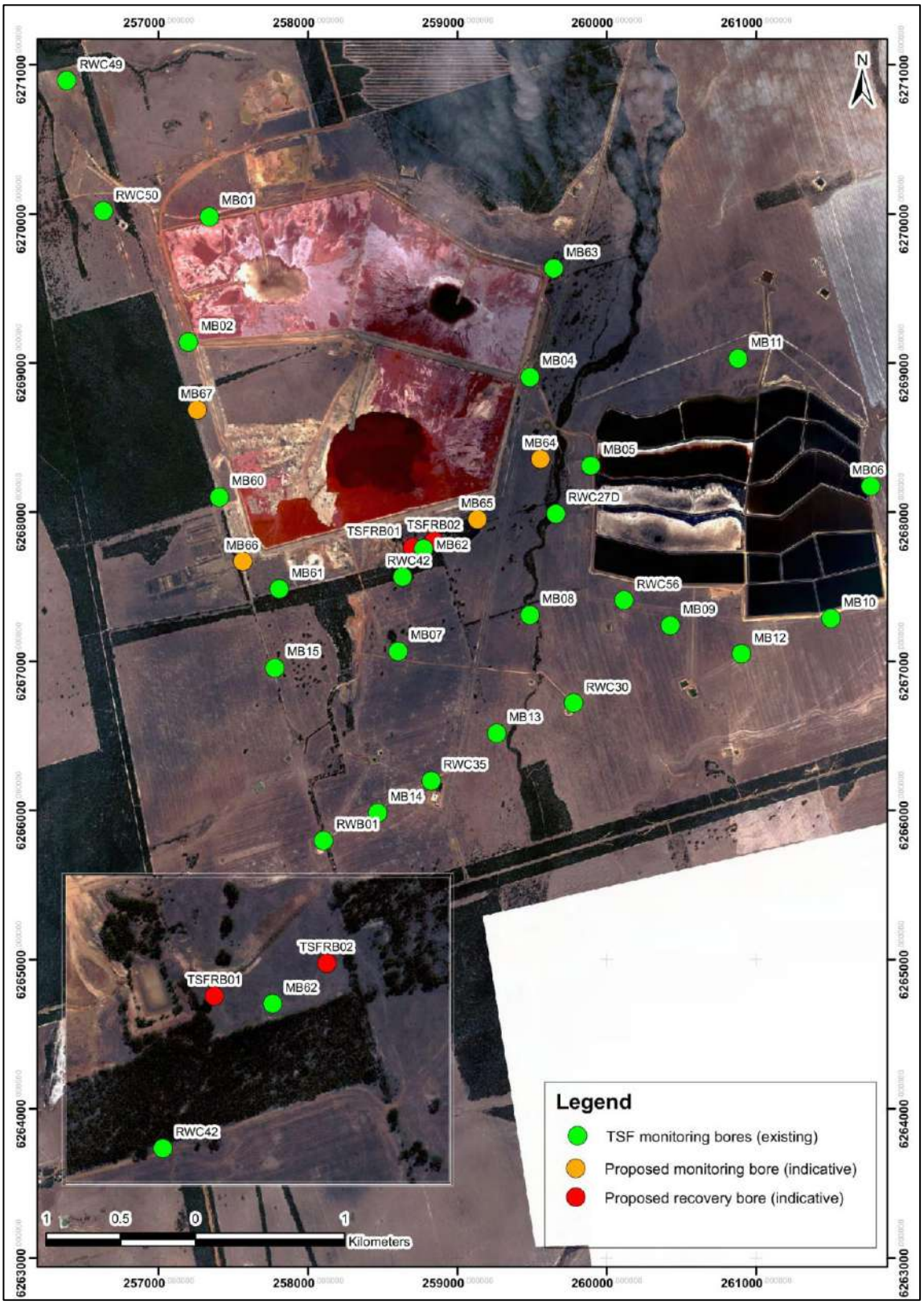

Figure 4: Groundwater monitoring and recovery bores surrounding TSF2

Premises Evaporation Ponds map

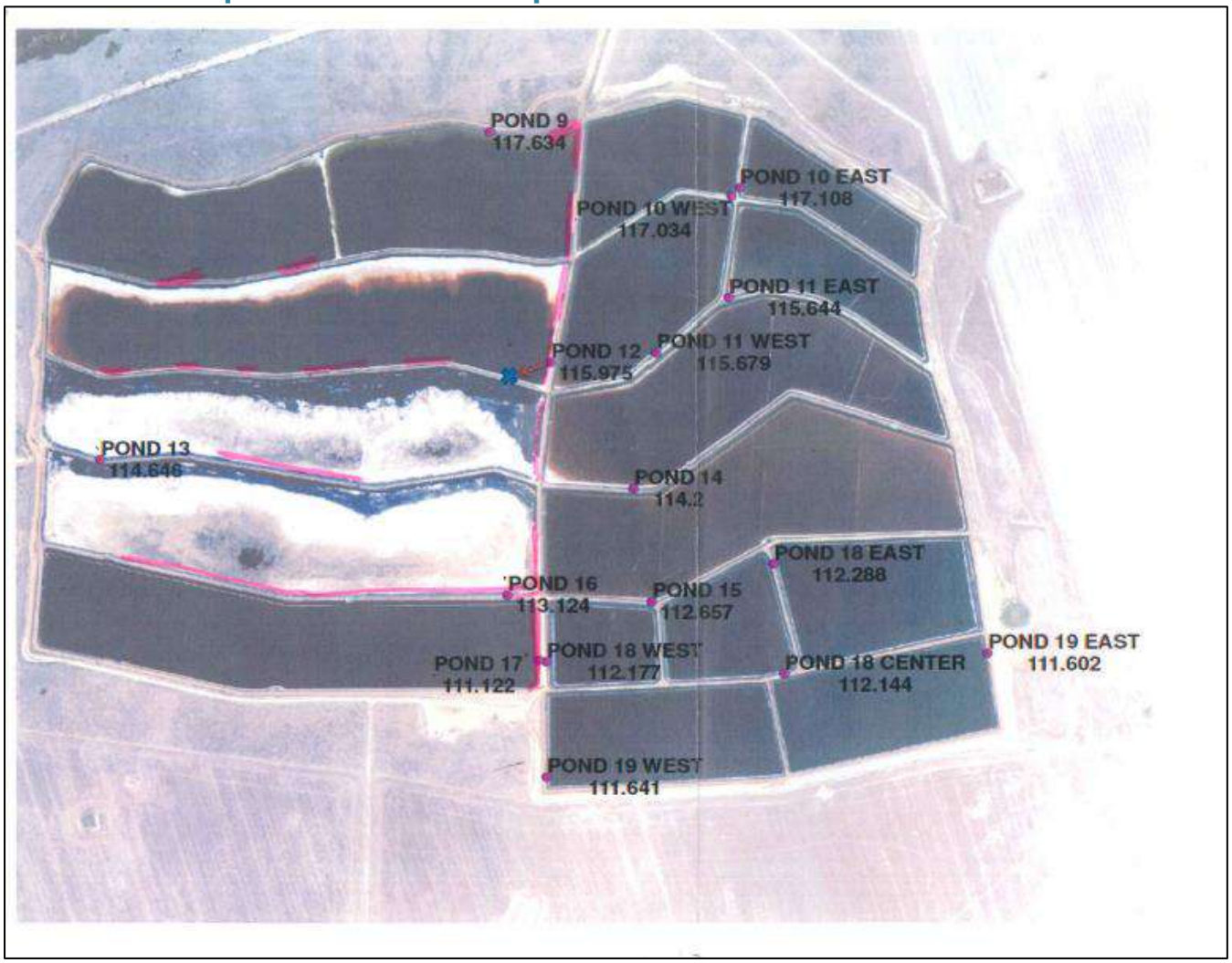

Figure 5: Map showing locations of evaporation ponds at the Premises

Schedule 2: Design drawings

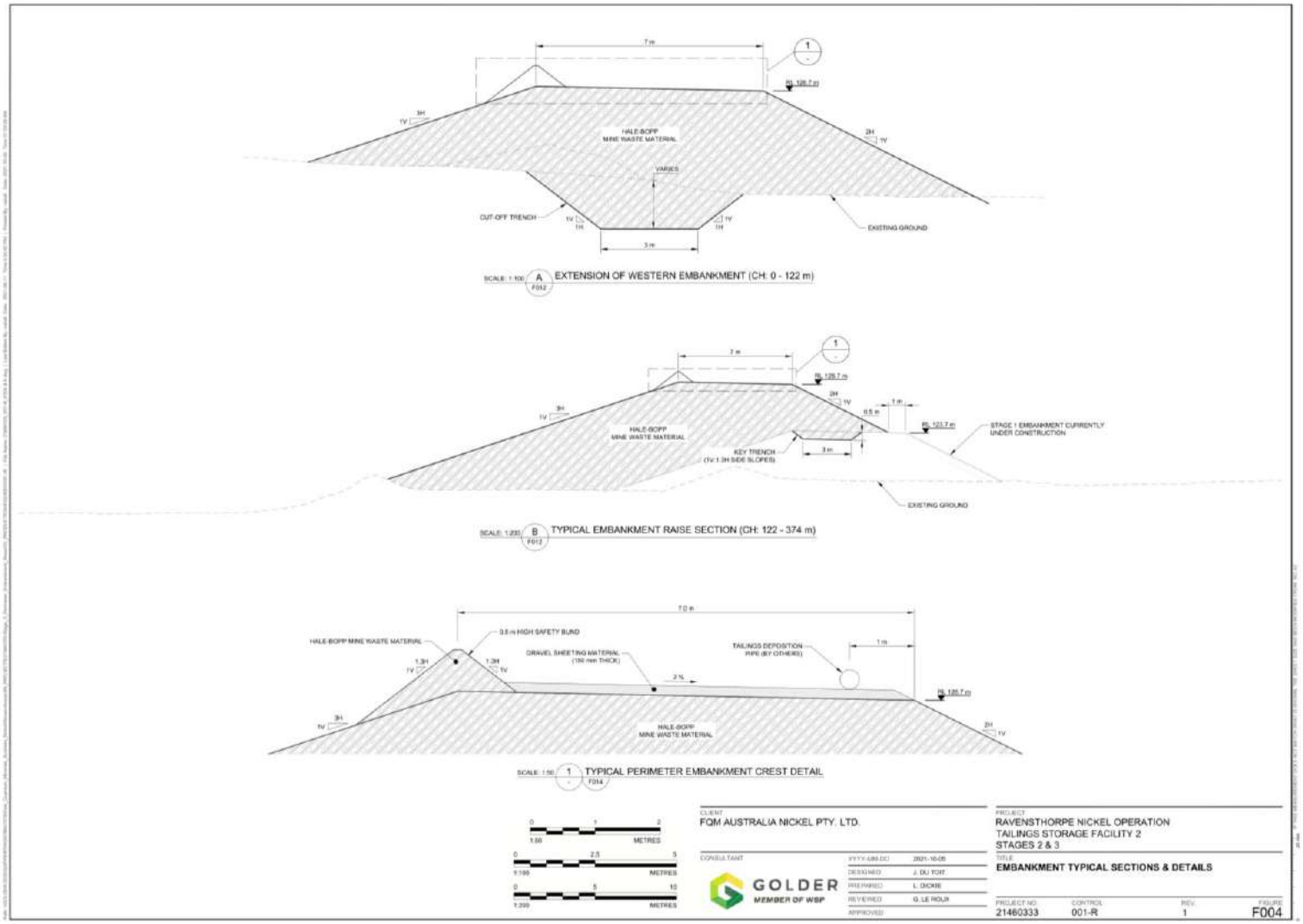

Figure 6: TSF2 embankment raise construction

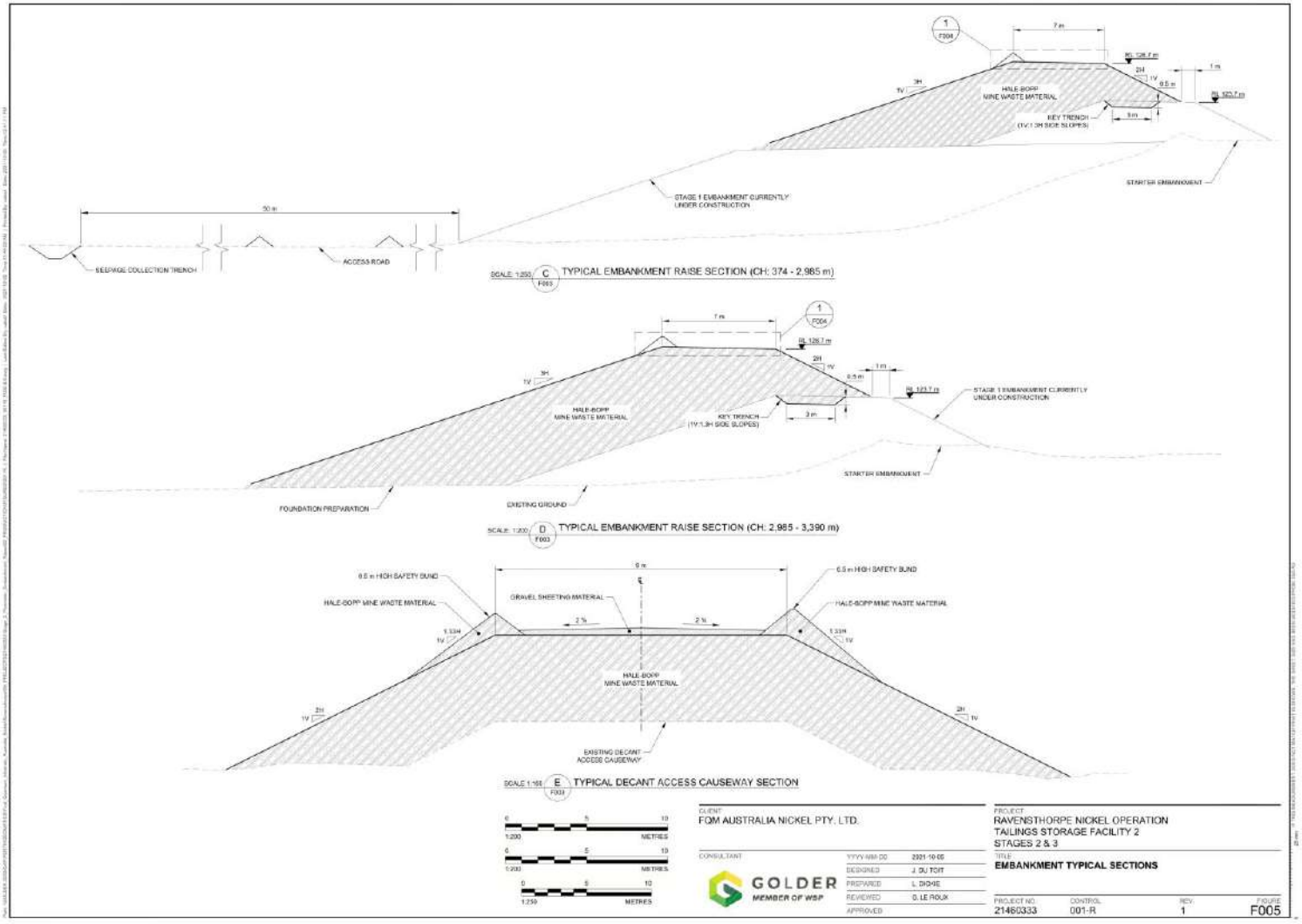

Figure 7: TSF2 embankment raise and Decant Access Causeway construction

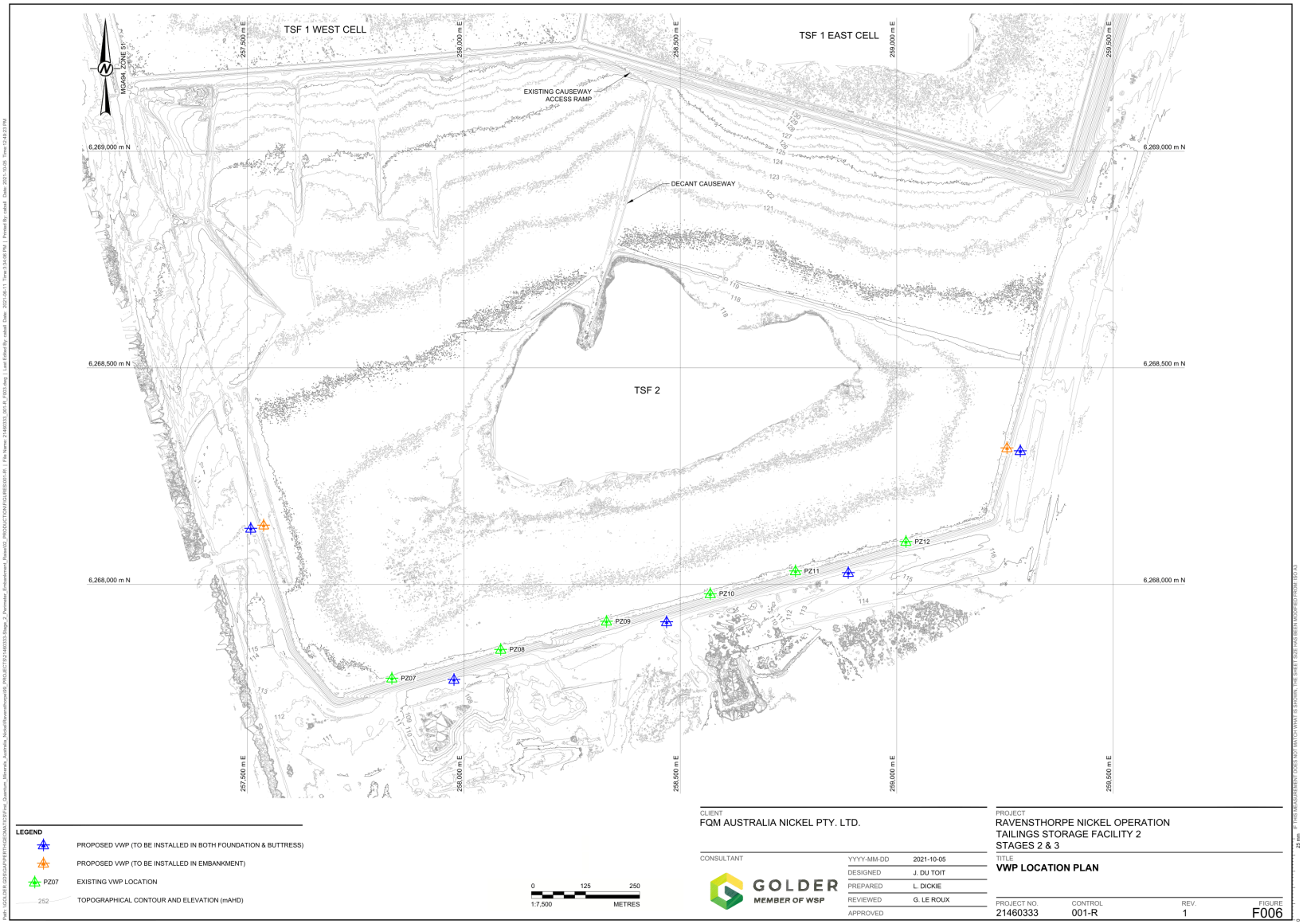

Figure 8: VWP's Location Plan