Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6575/2021/1
Works approval holder	Premium Gold Recovery Services Pty Ltd
ACN	616 884 827
Registered business address	Suite 11 2 Hardy Street SOUTH PERTH WA 6151
DWER file number	DER2021/000374
Duration	05/11/2021 to 04/11/2023
Date of issue	05/11/2021
Date of Amendment	17/06/2022
Premises details	Zelica Mine Site Legal description Within mining tenement M39/1101 As defined by the coordinates in Schedule 1

Prescribed premises category description (Schedule 1, Environmental Protection Regulations 1987)	Assessed production capacity
Category 7: Vat or in situ leaching of metal	25,000 tonnes per annual period

This amended works approval is granted to the works approval holder, subject to the attached conditions, on 17 June 2022, by:

Michael Greenslade
Digitally signed by Michael Greenslade
Date: 2022.06.17 13:11:58 +08'00'

MANAGER, 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
05/11/2021	W6575/2021/1	Works approval granted.
17/06/2022	W6575/2021/1	Works approval amended to remove references to Cell 2 of the Vat Leach Dam and modify groundwater monitoring requirements

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 construct and/or install the infrastructure listed in Table 1, in accordance with;

(a) the corresponding design and construction requirement / installation requirement; and

(b) at the corresponding infrastructure location; and

as set out in Table 1.

Table 1: Design and construction / installation requirements

Infrastructure	Design and construction / installation requirement	Infrastructure location
Ore processing infrastructure	Infrastructure to consist of: (a) An agglomerator capable of producing prill balls of 2-2.5cm in size using a 2% cement mixture; (b) Cyanide lixiviant distribution sprinklers placed over the vat leach dam (Cell 1 only); (c) Cyanide lixiviant addition area; (d) Three carbon tanks; (e) Associated pumps and pipework (connected to concrete sumps within Cell 1 only); and (f) All conveyance pipework must be impervious and free of leaks.	Within and adjacent to the vat leach dam as indicated in Figure 1 of Schedule 1
Evaporation pond	(a) The evaporation pond must be 40m in width, 50m long and 5m deep; (b) The evaporation pond must be constructed with capacity to contain a 1 in 100 year rainfall event of 24hrs duration; (c) The evaporation pond must be lined with a 1mm thick HDPE liner; (d) The evaporation pond must be bunded to divert stormwater away from the inside of the pond; (e) Pipework connecting the vat leach dam to the evaporation pond must be impervious and free of leaks; and (f) Pipework to incorporate a sprinkler system for distribution of lixiviant across the evaporation pond area. (g) Must incorporate eight leak detection	As indicated in Figure 1 of Schedule 1

	bores, consisting of: i. 150mm slotted PVC casing; ii. At least 2m deep (below the floor level of the Evaporation Pond); iii. Capped to prevent water ingress; and iv. Located at approximately 30m intervals around the perimeter of the Evaporation Pond (within 10m of the toe of the external wall).	

Critical Containment Infrastructure (CCI) and equipment

2. The works approval holder must:

(a) construct the critical containment infrastructure;

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

(c) at the corresponding infrastructure location;

as set out in Table 2.

Table 2: Critical containment infrastructure design and construction requirements

Infrastructure	Design and construction / installation requirements	Infrastructure location
Vat leach dam	(a) Vat leach dam must be 35m in width, 50m long and 5m deep. (b) Must consist of only one cell (being Cell 1) (c) External wall of Cell 1 must be at least 5m high with internal and external slopes meeting 1V:5H. (d) Vat leach dam must be bunded to divert stormwater away from the inside of the dam. (e) Vat leach dam must be constructed with capacity to contain a 1 in 100 year rainfall event of 24hrs duration. (f) The base of the vat leach dam must be graded with a 2% slope from the centre of the dam to the embankment in both directions. (g) Eight 600m diameter slotted concrete sumps must be installed at low points within the vat leach dam to the following specifications: i. The top of the sumps must be RL457m in elevation and countersunk so the base of the sump is level with the base of the vat leach dam ii. The base of the sump will be closed and the upper ring will be open, with geonet material placed over the slot to	As indicated in Figure 1, 2, 3 and 4 of Schedule 1

Infrastructure	Design and construction / installation requirements	Infrastructure location
	prevent the ingress of ore (h) The vat leach dam must be lined with a 1mm thick HDPE liner. (i) Must incorporate a leak detection system beneath the 1mm HDPE liner consisting of: i. Sub drainage HDPE slotted pipework, which will drain to a nearby HDPE lined sump ii. 500 x 500mm drainage layer of gravel underlaid by sand bedding iii. A 1mm thick HDPE liner underlying the sand bedding and pipework. (j) Must incorporate eight leak detection bores, consisting of: i. 150mm slotted PVC casing; ii. At least 2m deep (below the floor level of the Vat Leach Dam); iii. Capped to prevent water ingress; iv. Located at approximately 30m intervals around the perimeter of the Vat Leach Dam (within 10m of the toe of the external wall), as specified in Figure 5 of schedule 1.	

3. The works approval holder must undertake construction quality assurance testing for the items listed in Column 1 of Table 3, for the corresponding properties listed in Column 2 of Table 3, using the corresponding standards listed in Column 3 of Table 3, at the corresponding frequency listed in Column 4 of Table 3, within the corresponding tolerance standards listed in Column 5 of Table 3.

Table 3: Construction quality assurance testing

Column 1	Column 2	Column 3	Column 4	Column 5
Item	**Property**	**Standards**	**Frequency**	**Tolerance standard**
Conformance testing upon shipment to site 1mm HDPE liner for vat leach dam cells and evaporation pond	Thickness (min. average)	ASTM D5994	Every 5 rolls	0.9 mm
	Thickness (min.)			0.85 mm
	Tensile properties	ASTM D6693 Type IV		
	Strength at break			10 N/mm
	Elongation at break			100 %
	2% Modulus (max.)	ASTM D5323		630 kN/m

Column 1	Column 2	Column 3	Column 4	Column 5
Item	**Property**	**Standards**	**Frequency**	**Tolerance standard**
	Tear resistance (min. average)	ASTM D1004		125 N
	Puncture resistance (min. average)	ASTM D4833		320 N
	Carbon black content (core prior to lamination)	ASTM D4218		2.0 – 3.0 %
	Carbon black dispersion	ASTM D5596		Category 1/Category 2
	Sheet density (min. avg.)	ASTM D792	Every 10 rolls	≤ 0.939 g/cc
	Dimensional stability	ASTM D1204	Certified	± 2 %
	Multi-Axial Tensile (min.)	ASTM D5617	Per formulation	30 %
	Oven Aging at 85ºC	ASTM D5721		% retained after 90 days
	Standard Oxidative Induction Time (min. avg.)	ASTM D3895		55 %
	OR High Oxidative Induction Time (min. avg.)	ASTM D5885		80 %
	UV Resistance	ASTM D7238		% retained after 1600hrs
	High Oxidative Induction Time (min. avg.)	ASTM D5885		50%
	Roll dimension - width	None specified.	Every roll	6.80 m
Start-up test weld 1mm HDPE liner for vat leach dam cells and evaporation pond	Welding equipment	None specified.	• Start of works daily and whenever welding equipment is shut off for more than one hour; and • After significant changes in weather conditions	None specified.
	Weld conditions	None specified.	• Test weld strips will be required whenever personnel or equipment are	None specified.

Column 1	Column 2	Column 3	Column 4	Column 5
Item	**Property**	**Standards**	**Frequency**	**Tolerance standard**
			changed and/or wide temperature fluctuations are experienced; and • Minimum 1.5 m continuous seam.	
Destructive weld testing 1mm HDPE liner for vat leach dam cells and evaporation pond	Onsite, hand tensiometer in peel and shear	ASTM 6392	Every weld	Peel: 290 N/25mm Shear: 394 N/ 25mm
Non-destructive weld testing 1mm HDPE liner for vat leach dam cells and evaporation pond	Air pressure test	ASTM D5820	All seams over full length	Observed, validated and recorded by the consultant
	Vacuum box test	ASTM D5641		Presence/absence of bubbles
Visual inspection 1mm HDPE liner for vat leach dam cells and evaporation pond	Tears, punctures, abrasions, cracks, indentations and thin spots	None specified.	Every roll	None specified.

4. The works approval holder must ensure that all laboratory tests, as required for items of infrastructure in Table 3, are be performed in a NATA accredited geosynthetics laboratory.

Baseline groundwater monitoring

5. The works approval holder must undertake baseline ambient groundwater monitoring in accordance with Table 4.

6. The works approval holder must adhere to the field quality assurance and quality control procedures specified in Schedule 3 for the monitoring required by condition 5.

7. All sample analysis must be undertaken by laboratories with current accreditation from the National Association of Testing Authorities (NATA) for the relevant parameters, unless otherwise specified, in Table 4.

Table 4: Determination of baseline ambient groundwater conditions

Monitoring Bore	Parameter	Unit	Frequency	Method
Water bores 1, 2, 3 As depicted in Schedule 1, Figure 1	Standing Water Level (SWL)[1]	mbgl	One off sample	Spot sample, in accordance with AS/NZS 5667.11
	Electrical Conductivity (EC)[1]	µS/cm		
	pH[1]	pH units		
	Total Dissolved Solids (TDS)	mg/L		
	Weak Acid Dissociable (WAD) Cyanide			
	Total Metals (Al, As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn)			
	Sulfate, Nitrate, Nitrite			

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

Compliance reporting – non CCI

8. The works approval holder must within 30 calendar days of an item of infrastructure or equipment required by condition 1 being constructed and/or installed:

(a) undertake an audit of their compliance with the requirements of condition 1; and

(b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.

9. The works approval must ensure that the Environmental Compliance Report required by condition 8, includes as a minimum the following:

(a) certification by a Qualified, Competent Civil or Structural Engineer that the items of infrastructure or component(s) thereof, as specified in condition 1, have been constructed in accordance with the relevant requirements specified in condition 1;

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

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

Compliance reporting – CCI

10. The works approval holder must within 30 calendar days of the Critical Containment Infrastructure identified by condition 2 being constructed:

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

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

11. The works approval holder must ensure that the Critical Containment Infrastructure Report required by condition 10, includes as a minimum the following:

(a) certification by a Qualified, Competent Civil or Structural Engineer that each item of critical containment infrastructure or component thereof, as specified in condition 2, has been built and installed in accordance with the requirements specified in condition 2;

(b) as constructed plans and a detailed site plan showing the location and dimensions for each item of critical containment infrastructure or component thereof, as specified in condition 2;

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

(d) monitoring data indicating the baseline ambient groundwater environmental conditions at the premises; 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

12. The works approval holder may only commence time limited operations for an item of infrastructure identified in condition 15 where the Environmental Compliance Report as required by condition 8 has been submitted by the works approval holder for that item of infrastructure.

13. The works approval holder may only commence time limited operations for an item of critical containment infrastructure identified in condition 15 where the CEO has notified the works approval holder that the Critical Containment Infrastructure Report for that item of infrastructure as required by condition 10 meets the requirements of that condition.

14. The works approval holder may conduct time limited operations for an item of infrastructure specified in condition 15 (as applicable):

(a) for a period not exceeding 180 calendar days from the day the works approval holder meets the requirements of condition 8 (for non CCI) and condition 10 (for CCI) 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 14(a).

Time limited operations requirements and emission limits

15. 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

	Site infrastructure and equipment	Operational requirement	Infrastructure location
1.	Vat leach dam	(a) Ore may only be processed and/or contained within Cell 1 of the vat leach dam. (b) No more than 5000 tonnes of ore can be processed in any one batch. (c) Moisture content of the ore must be maintained above 20% within the vat leach dam. (d) The cyanide concentration of the lixiviant must not exceed 100mg/L. (e) The neutralisation of the cyanide lixiviant with hydrogen peroxide and copper must only occur within the vat leach dam. (f) Prior to transfer to the evaporation pond, the lixiviant must demonstrate that cyanide concentrations are below 0.08 mg/L. (g) No spent prill balls are to be stored outside of the vat leach dam area. (h) A 300mm freeboard must be maintained within the vat leach dam at all times.	As indicated in Figure 1 of Schedule 1
2.	Ore processing infrastructure	(a) Ore must be processed by the agglomerator prior to deposition into the vat leach dam. (b) Conveyance and storage infrastructure must be maintained in good working order and be free of leaks or defects.	Within and adjacent to the vat leach dam as indicated in Figure 1 of Schedule 1
3.	Evaporation pond	(a) No neutralisation of lixiviant must occur within the evaporation pond. (b) Sprinklers must ensure an even distribution of lixiviant along the base of the evaporation pond. (c) A 300mm freeboard must be maintained within the evaporation pond at all times.	As indicated in Figure 1 of Schedule 1

16. The works approval holder must store environmentally hazardous chemicals within low permeability compounds (10^{-9} metres per second or less) designed to contain not less than 100% of the volume of the largest storage vessel or inter-connected system, and at least 25% of the total volume of substances stored in the compound.

17. The works approval holder must immediately recover, or remove and dispose of, spills of environmentally hazardous materials, whether inside or outside an engineered containment system.

18. During time limited operations, the works approval holder must conduct inspections of the infrastructure specified in Table 6.

Table 6: Inspections of infrastructure

	Infrastructure	Type of inspection	Frequency
1.	Vat leach dam	(a) Visual inspection to ensure integrity of HDPE liner and maintenance of freeboard; and (b) Visual inspection of the leak detention bore network for presence of seepage.	Weekly
2.	Leak detection system sump	Visual inspection for the presence of seepage	Daily
3.	Evaporation pond	(a) Visual inspection to ensure integrity of HDPE liner and maintenance of freeboard (b) Visual inspection of the leak detention bore network for presence of seepage.	Weekly

Monitoring during time limited operations

19. The works approval holder must monitor lixiviant during time limited operations in accordance with Table 7.

Table 7: Monitoring during time limited operations

Monitoring location	Parameter	Frequency	Unit	Method
Vat leach dam Cell 1	pH[1]	Weekly	pH units	Spot Sample, in accordance with AS/NZS 5667.10
	Total Dissolved Solids (TDS)		mg/L	
	Weak Acid Dissociable (WAD) Cyanide			
	Total Metals (Al, As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn)			
	Sulfate, Nitrate, Nitrite			

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

20. The works approval holder must monitor the groundwater during time limited operations for concentrations of the identified parameters in accordance with Table 8.

Table 8: Monitoring of ambient groundwater concentrations during time limited operations

Monitoring Bore	Parameter	Unit	Limit	Frequency	Method
Water bores 1, 2, 3 As depicted in Schedule 1, Figure 1	Standing Water Level (SWL)[1]	mbgl	4 mbgl	Monthly	Spot sample, in accordance with AS/NZS 5667.11
	Electrical Conductivity (EC)[1]	µS/cm	-		
	pH[1]	pH units	-		
	Weak Acid Dissociable (WAD) Cyanide	mg/L	0.5 mg/L		
	Total Dissolved Solids (TDS)		-		
	Total Metals (Al, As, Cd, Cr, Cu, Hg, Mn, Ni, Pb, Zn)				
	Sulfate, Nitrate, Nitrite				

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

21. The works approval holder must record the results of all monitoring activity required by conditions 19 and 20.

22. The works approval holder must adhere to the field quality assurance and quality control procedures specified in Schedule 3 for the monitoring required by conditions 19 and 20.

23. The works approval holder must ensure that all sample analysis is undertaken by laboratories with current accreditation from the National Association of Testing Authorities (NATA) for the relevant parameters, unless otherwise specified, in Table 7 and Table 8.

Compliance reporting

24. The works approval holder must submit to the CEO a report on the time limited operations within 30 calendar days of the completion date of time limited operations or 30 calendar days before the expiration date of the works approval, whichever is the sooner.

25. The works approval holder must ensure the report required by condition 24 includes the following:

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

(b) a summary of lixiviant and ambient groundwater monitoring results obtained during time limited operations under conditions 19 and 20;

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

(i) results of the visual inspections required for the vat leach dam, leak detection system sump, the evaporation pond, and leak detection bores;

(ii) ongoing concentrations of cyanide within the lixiviant;

(iii) timeframes for the neutralisation of the cyanide lixiviant, including the

quantities of hydrogen peroxide and soluble copper required to achieve neutralisation;

(iv) dates and quantities of spent prill balls removed from the premises for disposal; and

(v) prill ball moisture content during the vat leach process;

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

(e) where the manufacturer's design specifications and the conditions of this works approval have not been met, what measures will the works approval holder take to meet them, and what timeframes will be required to implement those measures.

Records and reporting (general)

26. 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.

27. 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, 2 and 3;

(b) any maintenance of infrastructure that is performed in the course of complying with condition 1, 2 and 3;

(c) monitoring programmes undertaken in accordance with condition 19 and 20; and

(d) complaints received under condition 26.

28. The books specified under condition 27 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 9 have the meanings defined.

Table 9: Definitions

Term	Definition
annual period	a 12 month period commencing from 1 January until 31 December 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
critical containment infrastructure	means the items of infrastructure listed in condition T2.
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.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
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.
Qualified, Competent Civil or Structural Engineer	means a person who: a) holds a Bachelor's degree recognised by Engineers Australia; and b) has a minimum of five years of experience working in a supervisory role in civil or structural engineering; and c) is employed by an independent third party external to the Works Approval Holder's business;

Term	Definition
	or is otherwise approved in writing 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.
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 (**Error! Reference source not found.**).

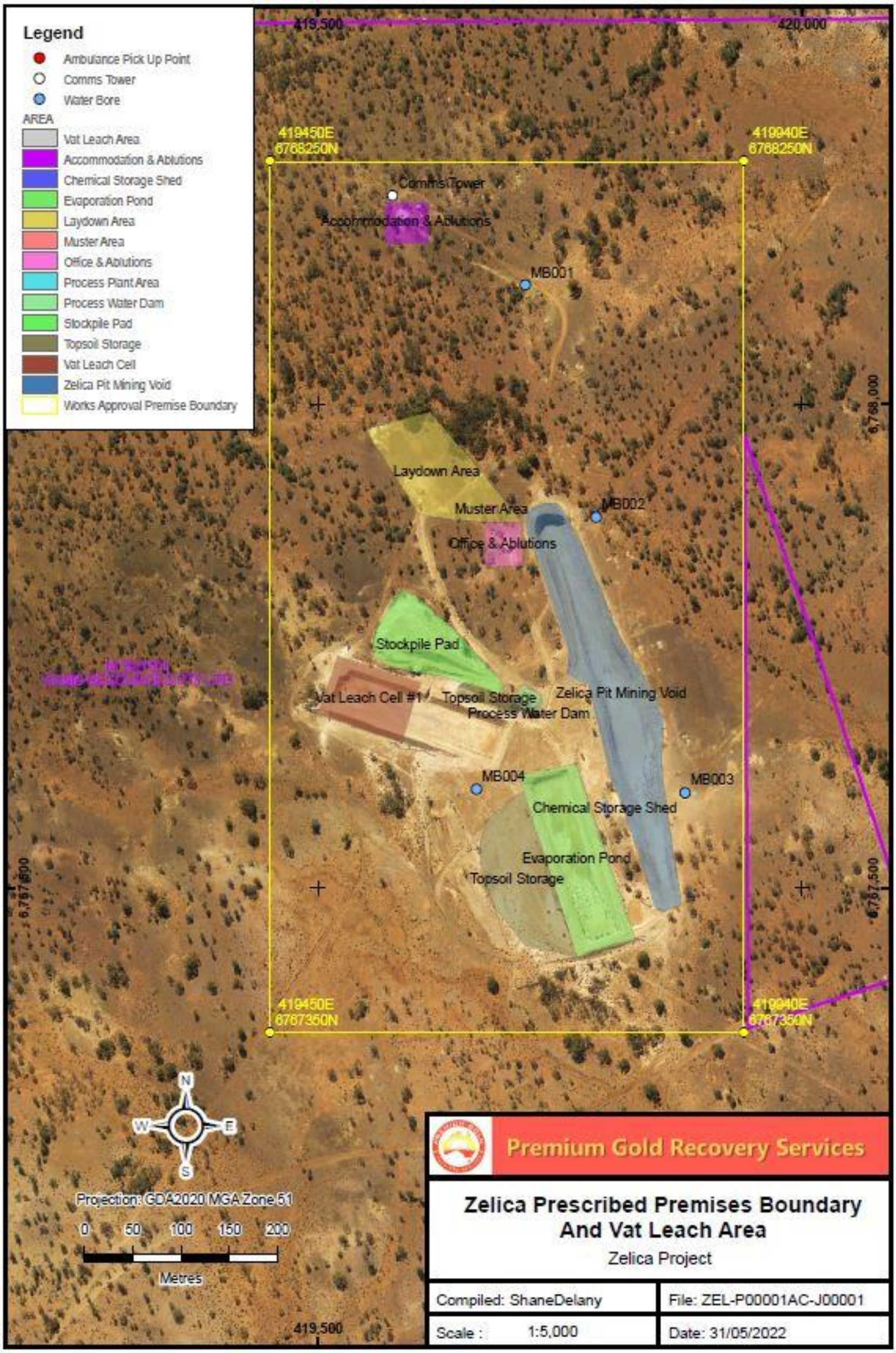

Figure 1: Map of the boundary of the prescribed premises

Construction specifications

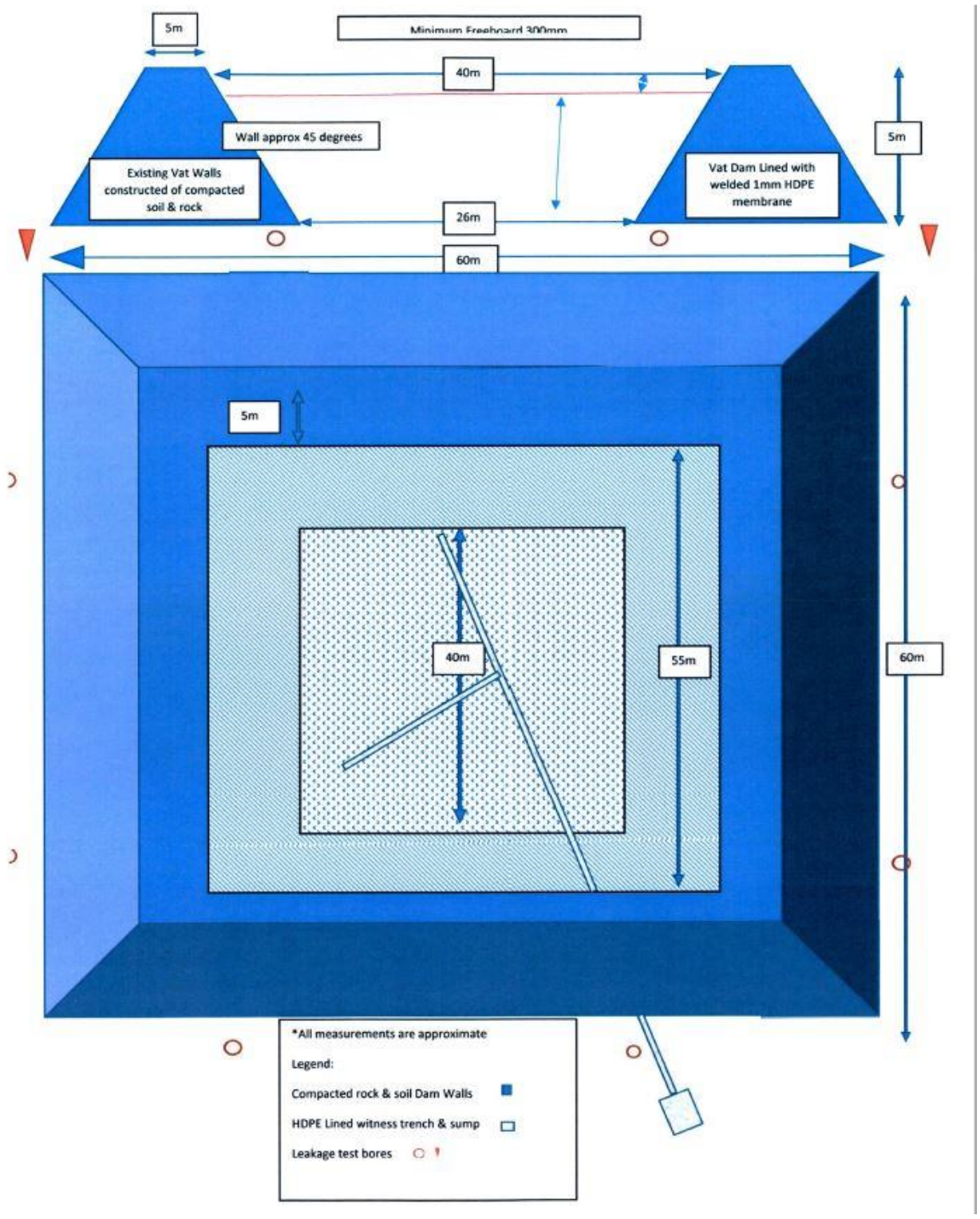

Figure 2: Vat leach dam construction specifications

Figure 3: Vat leach dam – leak detection system location

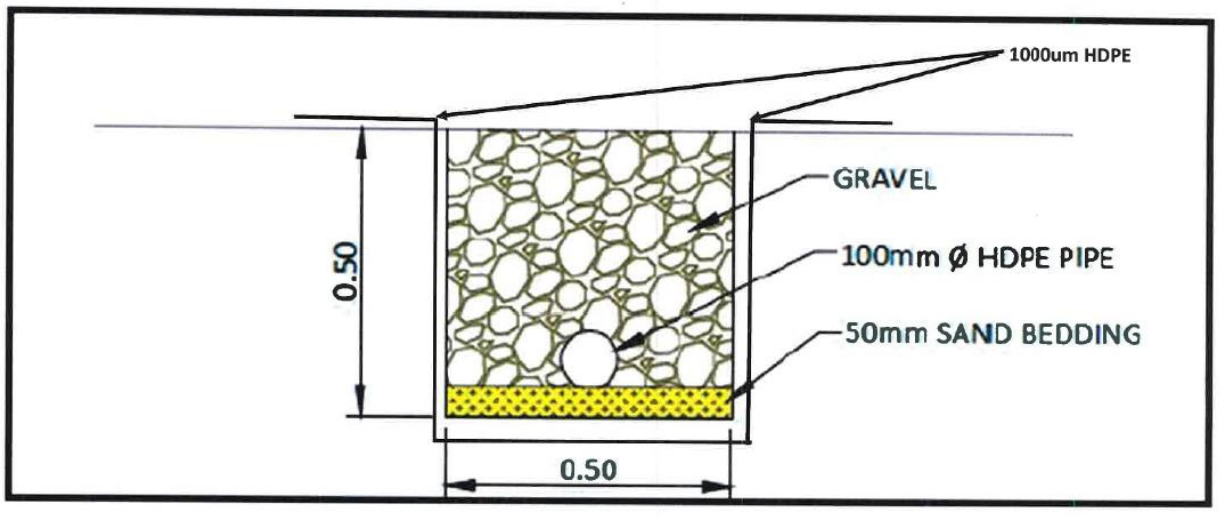

Figure 4: Vat leach dam – leak detection system specifications

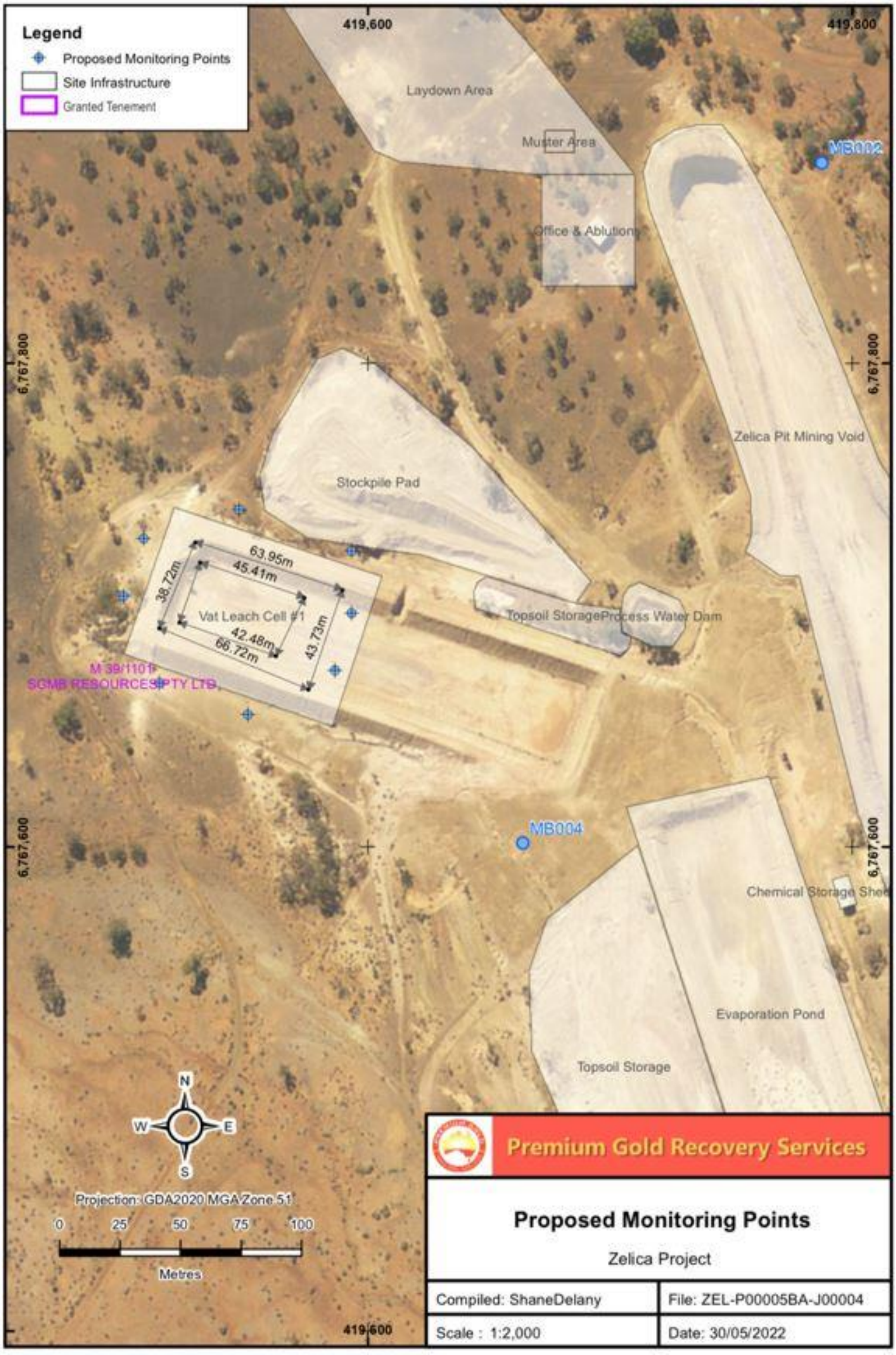

Figure 5: Monitoring Points

Schedule 2: Premises boundary

The premises boundary is defined by the coordinates in Table 10.

Table 10: Premises boundary coordinates

Easting	Northing
419940	6768250
419940	6767350
419450	6767350
419450	6768250

Schedule 3: Monitoring

Quality assurance and quality control requirements

The works approval holder must adhere to the following field quality assurance and quality control procedures, as specified in Schedule B2 of the Assessment of Site Contamination NEPM, and must include as a minimum:

(a) decontamination procedures for the cleaning of tools and sampling equipment before sampling and between samples;

(b) field instrument calibration for instruments used on site;

(c) blind replicate samples and rinsate blanks must be collected in the field and sent to the primary laboratory to determine the precision of the field sampling and laboratory analytical program;

(d) completed field monitoring sheets / sampling logs for each sample collected, showing:

- (i) time of collection;
- (ii) location of collection;
- (iii) initials of sampler;
- (iv) sampling method;
- (v) field analysis results;
- (vi) duplicate type / location (if relevant); and
- (vii) site observations and weather conditions, and

(e) chain-of-custody documentation must be completed which details the following information:

- (i) site identification;
- (ii) the sampler;
- (iii) nature of the sample;
- (iv) collection time and date;
- (v) analyses to be performed;
- (vi) sample preservation method;
- (vii) departure time from site;
- (viii) dispatch courier(s); and
- (ix) arrival time at the laboratory.