Government of Western Australia
Department of Water and Environmental Regulation

Amended Works Approval

Works approval number	W6639/2022/1
Works approval holder	Yara Pilbara Nitrates Pty Ltd
ACN	127 391 422
Registered business address	Level 5, 182 St Georges Terrace PERTH WA 6000
DWER file number	DER2021/000662
Duration	10/08/2022 to 09/08/2025
Date of amendment	23/08/2024
Premises details	Yara Pilbara Nitrates TAN Plant Village Road BURRUP WA 6714 Legal description - Part of Lot 3017 on Deposited Plan 50979 Certificate of Title Volume 2784 Folio 568 As defined by the premises map in Schedule 1 and coordinates in Schedule 2

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed production capacity**
Category 31: Chemical manufacturing: premises (other than premises within category 32) on which chemical products are manufactured by a chemical process.	Not more than 350,000 tonnes per annual period

This amended works approval is granted to the works approval holder, subject to the attached conditions, on 23 August 2024, by:

Amine Fisher

Digitally signed by Amine Fisher
Date: 2024.08.23 08:29:05 +08'00'

Amine Fisher
Manager Process Industries

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

Works approval history

Date	Reference number	Summary of changes
10/08/2022	W6639/2022/1	Works approval granted.
27/05/2024	W6639/2022/1	Works approval amended to extend time limited operations and clarify the evaporation pond discharge limit.
23/08/2024	W6639/2022/1	CEO-initiated amendment to extend the duration of time limited operations.

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
1	Perimeter Fence	• A chain wire fence with a minimum height of 1.05 m must be installed around the embankment crest of the East and West Concentration Ponds and the Precipitation Pond	Schedule 1 Figure 3 Fence line 0.8 m from inside crest for the: Concentration Pond West Concentration Pond East Precipitation Pond
2	Groundwater extraction system	• Install up to 55 100 mm diameter groundwater extraction wells with submersible pumps and level transmitters monitored by a PLC. • Below ground extraction wells must be installed with well vaults. • Permanent bollards must be installed at the location of each above ground extraction well installed in a trafficable area.	Schedule 1 Figure 2 PEW-01 to PEW-36
3	Transfer pipework for the collection and transfer of extracted groundwater and premises wastewater	• All transfer pipework and fittings must be new. • Pipework must be of HDPE construction and installed in accordance with the requirements of AS/NZS 4130:2009. • Sections of transfer pipework must be connected with electrofusion couplings. • Sections of transfer pipework which are buried must be run through a PVC pipe conduit. • The transfer pipework must be inspected and pressure tested with fresh water to 1.5	Schedule 1 Figure 2 Proposed below ground pipework Proposed above ground pipework

	Infrastructure	Design and construction / installation requirements	Infrastructure location
		times the normal operating pressure. • Leaks identified during pressure testing shall be rectified and lines re-tested. Records of pressure testing will be kept. • Pressurised sections of the transfer pipework must be fitted with low pressure indicators monitored by a PLC programmed with an automatic shutdown fail safe. • Permanent protection bollards must be installed around above ground sections of transfer pipework located in trafficable areas. • Must be fitted with a flow meter monitored by a PLC to record continuous discharge into the Evaporation Ponds.	
4	Bird deterrent system	• Must install wires at 5 m spacing on the Evaporation ponds which are attached to the perimeter fence.	Schedule 1 Figure 3 Concentration Pond West Concentration Pond East Precipitation Pond

2. The works approval holder must:

(a) construct and/or install the critical containment infrastructure;

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

(c) at the corresponding infrastructure location;,

as set out in Table 2.

Table 2: Design and construction/installation requirements

	Infrastructure	Design and construction / installation requirements	Infrastructure location
1	Evaporation Ponds – West – East – Precipitation	• Ponds must be constructed in accordance with the plans in Schedule 1 Figure 4 and Figure 5. • Each pond must be constructed with a spillway constructed in accordance with the plans in Figure 6. • The inlet of each spillway must be at least 0.6 m above the maximum operating level of the pond it is constructed on. • Spillways must be constructed with concrete underlain by a secondary liner which complies with the requirements specified in condition 3, with rock armoring (riprap) at the base. • Ponds must be constructed with a minimum	Schedule 1 Figure 3 Concentration Pond West Concentration Pond East Precipitation Pond

	Infrastructure	Design and construction / installation requirements	Infrastructure location
		storage capacity of 43,910 m^3, excluding freeboard. • Embankment slopes must be constructed to 1(V):2(H) to maximum embankment heights of: – 3.1m/ RL 5.5 mAHD (West) – 2.6 m/ RL 5.5 mAHD (East) – 2.5 m/ RL 5.0 mAHD (Precipitation) • Embankment crests must be a minimum of 5 m width. • Pond foundations must be constructed with a minimum 300 mm base compacted to achieve an average compaction of 95% SMDD at a moisture content of -2% to OMC as determined by AS 1289.5.1.1 (or equivalent), • Pond embankments must be compacted to achieve an average compaction of 98% SMDD at a moisture content of OMC to +2% as determined by determined by AS 1289.5.1.1 (or equivalent), • Pond embankments and foundations which will be lined must be graded smooth, free from sharp objects or other materials which may damage the liner and drum rolled prior to HDPE geomembrane liner installation. • The pond embankments and foundations must be double lined with HDPE geomembrane liners which comply with the requirements specified in condition 3. • A geocomposite drainage layer must be installed between the primary and secondary liners comprising a biaxial, biplanar HDPE geosynthetic drain with geotextile bonded to both sides. • HDPE geomembrane liners and the geocomposite drainage layer must be anchored into anchor trenches and extend into the recovery sumps. • Anchor trenches must be offset from the embankment crest by 0.5 m, and be 0.4 m wide and 0.7 m deep. • Anchor trenches must be backfilled with material compacted to achieve an average compaction of 98% SMDD at a moisture content of +/- 2% of OMC as determined by as determined by AS 1289.5.1.1 (or equivalent. • Two pieces of primary HDPE geomembrane liner at least 60 cm^2 in size must be welded below the maximum operating level of each pond as sacrificial tags.	

	Infrastructure	Design and construction / installation requirements	Infrastructure location
2	Evaporation Pond Recovery Sumps – West – East – Precipitation	• Two recovery sumps must be installed for each pond. • Each recovery sump must have a DN300 PE 100 PN 12.5 pipe leakage recovery pipe encased in stabilised sand and be backfilled with gravel. • A telemetered water level logger monitored by a network with an alert system must be installed in each leakage recovery pipe that is capable of continuous monitoring of water level in the pipe.	Schedule 1 Figure 3 Leakage Recovery Pipe

High density polyethylene geomembranes

3. The works approval holder must ensure all HDPE geomembrane liners comply with the properties listed in Table 3, and are installed in accordance with the requirements specified in that table.

Table 3: HDPE geomembrane liner installation requirements

	Item	Property/construction requirements
1	Primary HDPE liner properties	The HDPE liner must have the following properties: • A conductive, smooth white geomembrane with an average thickness of 1.5 mm • Specific gravity of 0.94 g/cm^3 or more; • Melt index of 1.0 g in 10 minutes; • Carbon black content of 2-3%; • Minimum tensile strength at yield of 23 N/mm and at break of 42 N/mm; • Minimum tensile elongation at yield of 13%, and at break 750% • Minimum tear resistance of 187 N and puncture resistance of 556 N • OIT of 160 minutes or more, • High Pressure OIT of 800 minutes or more • High Pressure OIT retention after 90 days of oven aging of 80% or more • High Pressure OIT retention after 1600 hours of UV exposure of 80% or more
	Secondary HDPE liner properties	The HDPE liner must have the following properties: • A non-conductive smooth black geomembrane with an average thickness of 1.5 mm • Specific gravity of 0.94 g/cm^3 or more; • Melt index of 1.0 g in 10 minutes; • Carbon black content of 2-3%; • Minimum tensile strength at yield of 22 N/mm and at break of 43 N/mm; • Minimum tensile elongation at yield of 13%, and at break 700% • Minimum tear resistance of 187 N and puncture resistance of 534 N • OIT of 100 minutes, • High Pressure OIT of 400 minutes • High Pressure OIT retention after 90 days of oven aging of 80% or more • High Pressure OIT retention after 1600 hours of UV exposure of 50% or more
3	Welding materials	• Geomembrane welding materials must be of the type recommended and supplied by the liner manufacturer.

	Item	Property/construction requirements
4	Seams and joins	• Thermal weld seams must be used to join geomembrane panels together. • All seams and joins must be inspected over their entire length and subject to continuity testing using a vacuum box test or air pressure test. • Defective welds must repaired and re-tested.

Compliance reporting

4. The works approval holder must within 30 calendar days of the infrastructure required by condition 1 being constructed and/or installed for each of Stage 1 and Stage 2 :

(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.

5. The Environmental Compliance Reports required by condition 4(b), must include as a minimum the following:

(a) certification by a 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) records of the transfer pipework pressure testing and leak rectification undertaken (relevant to Stage 1 only);

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

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

6. The works approval holder must within 30 calendar days of the Critical Containment Infrastructure identified by condition 2 being constructed for each of Stage 1 and Stage 2:

(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.

7. The Critical Containment Infrastructure Reports required by condition 6(b), must include as a minimum the following:

(a) certification by a suitably qualified and experienced civil or geotechnical engineer that the items of infrastructure or component(s) thereof, as specified in conditions 2 and 3, have been constructed in accordance with the relevant requirements specified in conditions 2 and 3;

(b) a summary of HDPE geomembrane liner defects and repairs recorded during installation of the liner in accordance with condition 3

(c) 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;

(d) records of all quality assurance/control testing undertaken to demonstrate the requirements of conditions 2 and 3 have been met;

(e) photographic evidence of the constructed infrastructure; and

(f) 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

8. The works approval holder may only commence time limited operation of the Stage 1 and Stage 2 infrastructure specified in condition 1 where the Environmental Compliance Report as required by condition 4(b) has been submitted by the works approval holder for the infrastructure in that stage.

9. The works approval holder may only commence time limited operations for the Stage 1 and Stage 2 critical containment infrastructure identified in condition 2 where:

(a) the CEO has notified the works approval holder that the Critical Containment Infrastructure Report for that stage as required by condition 6(b) meets the requirement of that condition; or

(b) where at least 10 business days have passed after the Critical Containment Infrastructure Report for that stage as required by condition 6(b) has been submitted to the CEO.

10. The works approval holder may conduct time limited operations for the Stage 1 and Stage 2 infrastructure and equipment specified in condition 1 and the Critical Containment Infrastructure specified in condition 2:

(a) until such time as the works approval expires; or

(b) until such time as a licence for that stage of infrastructure is granted in accordance with Part V of the *Environmental Protection Act 1986*;

whichever is sooner.

Infrastructure and equipment

11. During time limited operations, the works approval holder must ensure the premises infrastructure listed in Table 4 is maintained and operated in accordance with the corresponding operational requirements set out in Table 4.

Table 4: Infrastructure and equipment requirements during time limited operations

	Infrastructure and equipment	Operational requirements	Infrastructure location
1	Transfer pipework for the collection and transfer of extracted groundwater and premises wastewater	• Pressure must be monitored by a PLC programmed to automatically cease pumping in the event of pressure loss.	Schedule 1 Figure 2 Proposed below ground pipework Proposed above ground pipework

	Infrastructure and equipment	Operational requirements	Infrastructure location
2	Evaporation Ponds – West – East – Precipitation	• No more than 250 kL/day (30 day moving average) of extracted groundwater and premises wastewater may be discharged into the ponds. • An operational freeboard of at least 0.6 m must be maintained in all ponds at all times. • If the freeboard on any pond is at risk of being exceeded, premises wastewater inflows to the ponds must cease.	Schedule 1 Figure 3 Concentration Pond West Concentration Pond East Precipitation Pond
3	Bird deterrents	• Must main wires at approximate 5 m intervals across the ponds.	
4	Evaporation Pond Recovery Sumps – West – East – Precipitation	• Water level in each recovery sump leakage recovery pipe must be monitored by a telemetered water level logger monitored by a network with an alert system. • A portable submersible pump capable of pumping at least 5 m^3/day and with a flow meter must be maintained and available on the premises for the purpose of seepage recovery. • If water is present the portable submersible pump must be used to recover and transfer the water to the evaporation ponds.	Schedule 1 Figure 3 Leakage Recovery Pipe

12. During time limited operations, the works approval holder must ensure visual inspections of the infrastructure specified in Table 5 are undertaken in accordance with the inspection requirements, and at the frequency set out in Table 5.

13. The works approval holder must maintain a written log of all inspections undertaken, with each inspection signed off by the person who conducted the inspection.

Table 5: Inspection of infrastructure requirements

Infrastructure	Inspection requirements	Frequency of inspection
Transfer pipework	• Visual integrity inspection	Daily when operating
Evaporation Ponds – East Concentration Pond – West Concentration Pond – Precipitation Pond	Pond perimeter inspection which checks for: • Visual integrity of embankments and geomembranes • Freeboard capacity • Fauna death or injury	Daily

During time limited operations, the works approval holder must ensure that the emissions specified in Table 6 are discharged only from the corresponding discharge point, and only in accordance with the corresponding limitations set out in Table 6.

Table 6: Authorised discharge points

Emission	Discharge point	Limitations
Contaminated wastewater	Evaporation Pond Spillways on the; • East Concentration Pond; • West Concentration Pond; and • Precipitation Pond illustrated in Schedule 1 Figure 3.	Discharge is only authorised in the event greater than 600 mm of rainfall has occurred in the preceding 72 hours.

Reportable events during time limited operations

14. During time limited operations, the works approval holder must undertake the management actions specified in Table 7 in the event any of the reportable events specified in Table 7 occur.

Table 7: Reportable events

Infrastructure	Reportable event	Management actions
Evaporation Ponds – West – East – Precipitation	Operational freeboard of 0.6 m is exceeded	• Within 24 hours of becoming aware of a freeboard exceedance the works approval holder must notify the CEO in writing of that non-compliance and include in that notification the following information: – The date and time the freeboard was exceeded; – The amount the freeboard was exceeded by; – Timeframe expected for operational freeboard of 0.6 m to be achieved; and – Details of management actions being undertaken to reduce the water level in the ponds.
	Spillway/s are activated	• Within 24 hours of becoming aware of one or more of the spillways activating the works approval holder must notify the CEO in writing and include in that notification the following information – The date and time the spillway activated – The volume of water discharged from the spillway/s. – Details of any management actions undertaken in response. • Within 24 hours of becoming aware of one or more of the spillways activating the works approval holder must collect a sample of the water discharged from the spillway and have that sample analysed by a NATA accredited laboratory for the following parameters: – pH – Electrical conductivity @ 25°C – Total dissolved solids – Ammonia as ammoniacal nitrogen (NH3-N) – Nitrate and nitrite – Total Kjeldal nitrogen – Total nitrogen as N and total oxidised • The works approval holder must submit the results of the spillway sample analysis to the CEO within 7 calendar days of receiving them.

Infrastructure	Reportable event	Management actions
Evaporation Pond Recovery Sumps – West – East – Precipitation	Water is detected in a recovery sump	• Within 24 hours of water being detected within a recovery sump the works approval holder must commence an investigation into the source of the water, notify the CEO in writing and include in the notification the following: – The date and time water was detected; and – Details of any management actions undertaken and/or planned to be undertaken. • Within seven calendar days of detecting water within a recovery sump the works approval holder must report the results of the investigation into the source of the water to the CEO.

Monitoring during time limited operations

15. During time limited operations, the works approval holder must undertake process monitoring in accordance with the requirements specified in Table 8 and record the results of all such monitoring.

Table 8: Process monitoring

Process Description	Monitoring location	Parameter	Unit	Frequency
Extracted contaminated groundwater discharged to Evaporation Ponds	Main system control container (PLC) illustrated in Schedule 1 Figure 2	Inflow	kL/day or m^3/day	Continuous
Premises wastewater discharged to Evaporation ponds via the transfer pipework				
Premises wastewater discharged to Evaporation ponds via tanker or truck	Concentration Pond West Concentration Pond East illustrated in Schedule 1 Figure 3		kL or m^3	Per discharge event
Water level in Evaporation Pond Recovery Sumps	Leakage Recovery Pipes for Evaporation Ponds West, East and Precipitation illustrated in Schedule 1 Figure 3.	Water level	m RL	Continuous
Seepage pumped from Evaporation Pond Recovery Sumps		Recovered volume	kL or m^3 /day	Continuous when pumping occurs

Compliance reporting

16. 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 operation of Stage 1 and of Stage 2 or 30 calendar days before the expiration date of the works approval, whichever is the earliest.

17. The works approval holder must ensure the report required by condition 16 includes the following:

(a) a summary of the time limited operations, including timeframes, and amount of water discharged into the Evaporation Ponds;

(b) a summary of adverse findings during inspections undertaken during time limited operations in accordance with condition 13;

(c) a summary of monitoring undertaken during time limited operations in accordance with condition 15;

(d) a summary of the environmental performance of all infrastructure as constructed or installed (as applicable);

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

(f) where 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)

18. 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.

19. 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 condition 11;

(c) visual inspections undertaken in accordance with condition 12 and recorded in accordance with condition 13

(d) monitoring programmes undertaken in accordance with condition 15; and

(e) complaints received under condition 18.

20. The books specified under condition 19 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
AS 1289.5.1.1	means the Australia Standards .1289.5.1.1 Methods of testing soils for engineering purposes Method 5.1.1: Soil compaction and density tests—Determination of the dry density/moisture content relation of a soil using standard compactive effort
AS/NZS 4130:2009	means the *Australian/New Zealand Standard* 4130:2009– *Polyethylene (HE) pipes for pressure applications*
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
critical containment infrastructure	means the items of infrastructure listed in condition 2.
Critical Containment Infrastructure Report	means a report to satisfy the CEO that works of critical containment infrastructure have been constructed in accordance with the works approval.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V Division 3 of the EP Act.
Discharge	has the same meaning given to that term under the EP Act.
Emission	has the same meaning given to that term under the EP Act.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
Extracted contaminated groundwater	Means groundwater which is extracted from extraction wells PEW-01 to PEW-36 in Schedule 1 Figure 2
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).
HDPE	means high density polyethylene
NATA	means the National Association of Testing Authorities, Australia
NATA accredited	means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis
OIT	means oxidative induction time
OMC	means optimal moisture content
PLC	means programmable logic controller

Term	Definition
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.
Premises wastewater	means wastewater from TAN Plant ponds 1, 2, 4 or 5
prescribed premises	has the same meaning given to that term under the EP Act.
PVC	means polyvinyl chloride
SMDD	means standard maximum dry density
Stage 1	means the groundwater extraction system, transfer pipework for the collection and transfer of extracted groundwater and premises wastewater and the Evaporation Pond – East inclusive of its recovery sumps, perimeter fencing and bird deterrent system.
Stage 2	means the Evaporation Pond – West and Evaporation Pond - Precipitation inclusive of their recovery sumps, perimeter fencing and bird deterrent systems.
suitably qualified and experienced civil or geotechnical engineer	means a person who: (a) holds a tertiary academic qualification in civil or geotechnical engineering; and (b) has a minimum of five years' experience working in the area / field of design engineering and certification of dams and/or tailings storage facilities.
TAN Plant	means the Technical Ammonium Nitrate Plant located on Part of Lot 3017 on Deposited Plan 50979
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 orange in the map below (Figure 1).

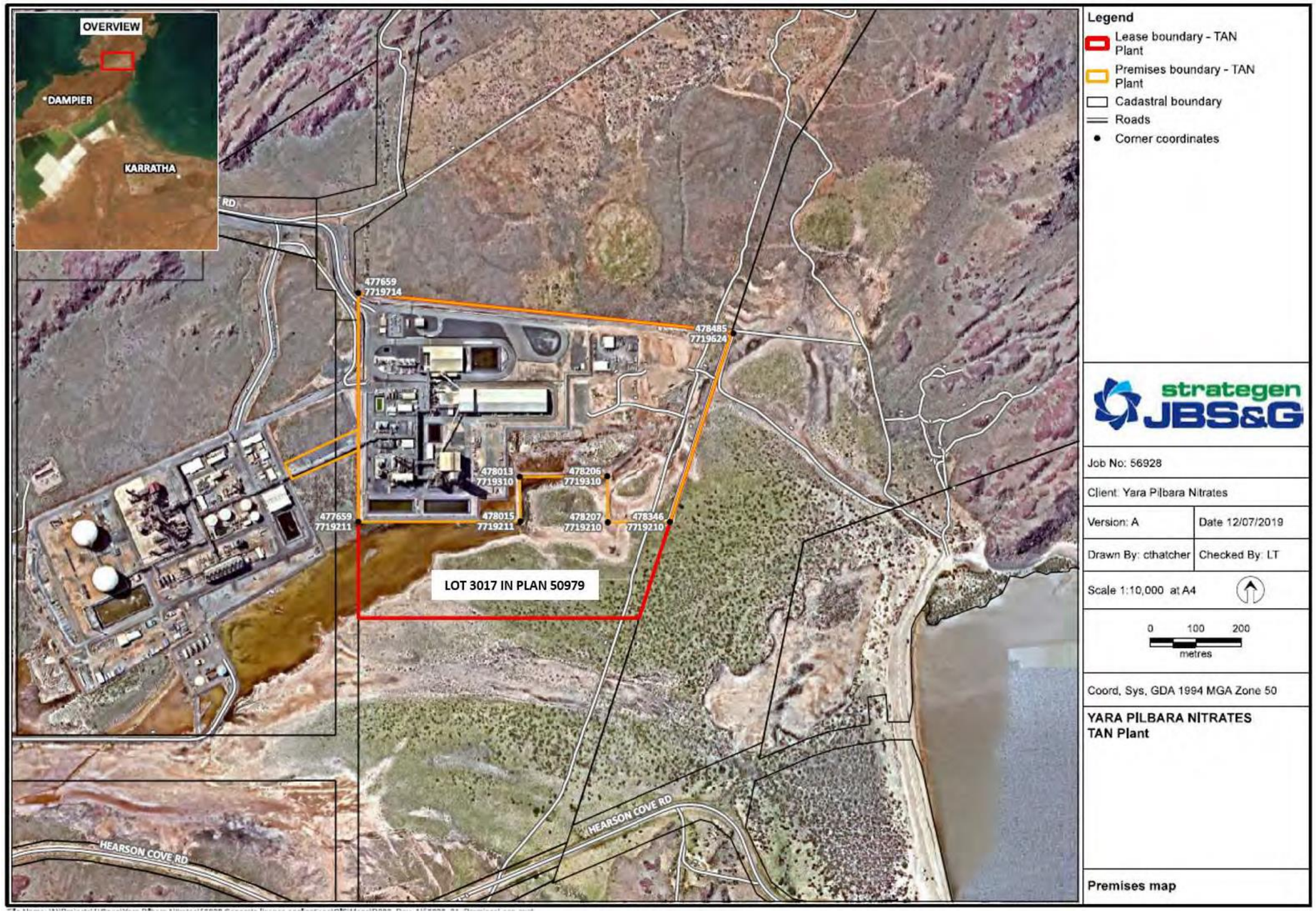


Figure 1: Map of the boundary of the prescribed premises

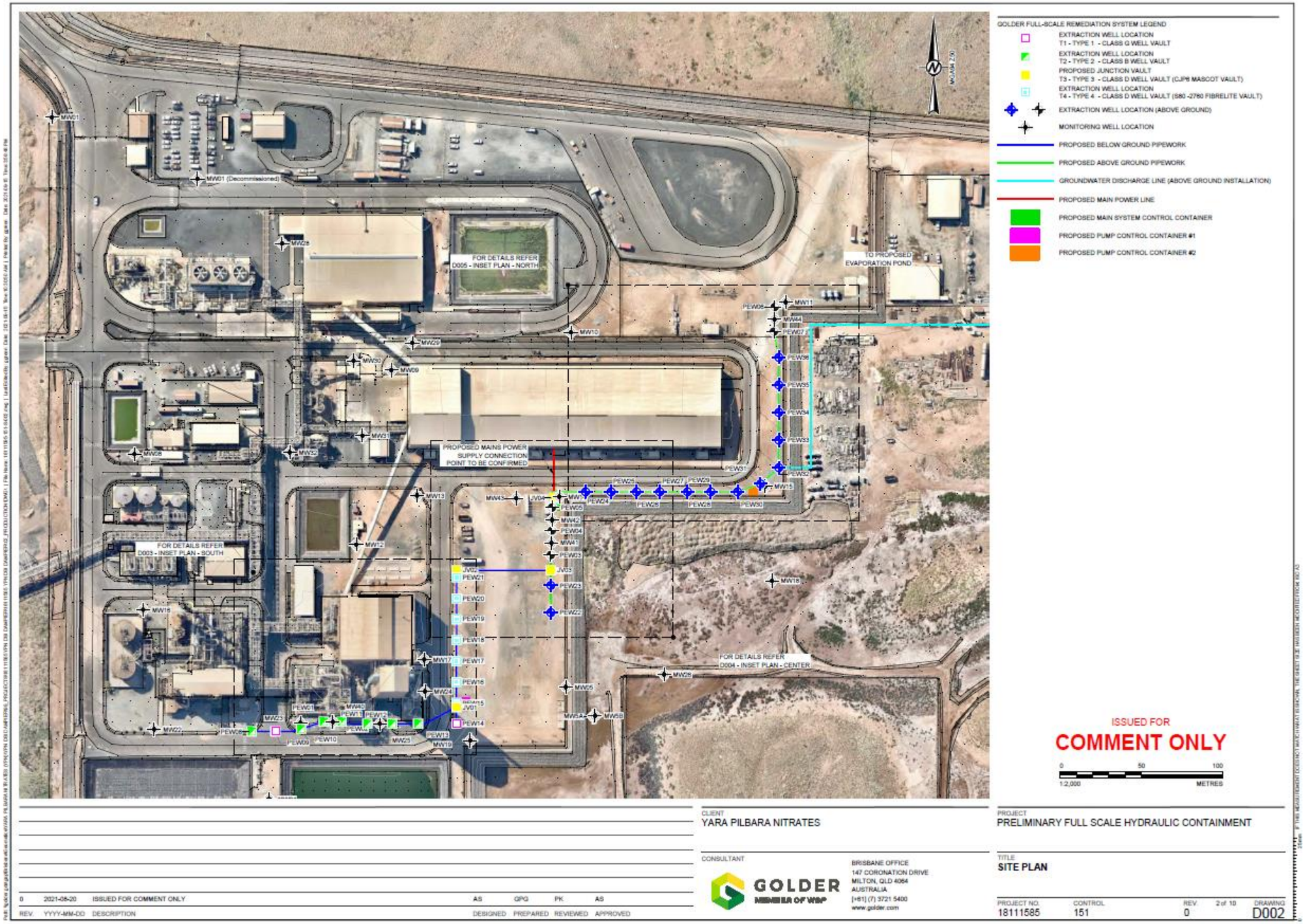


Figure 2: Map of the groundwater extraction and transfer network location and layout

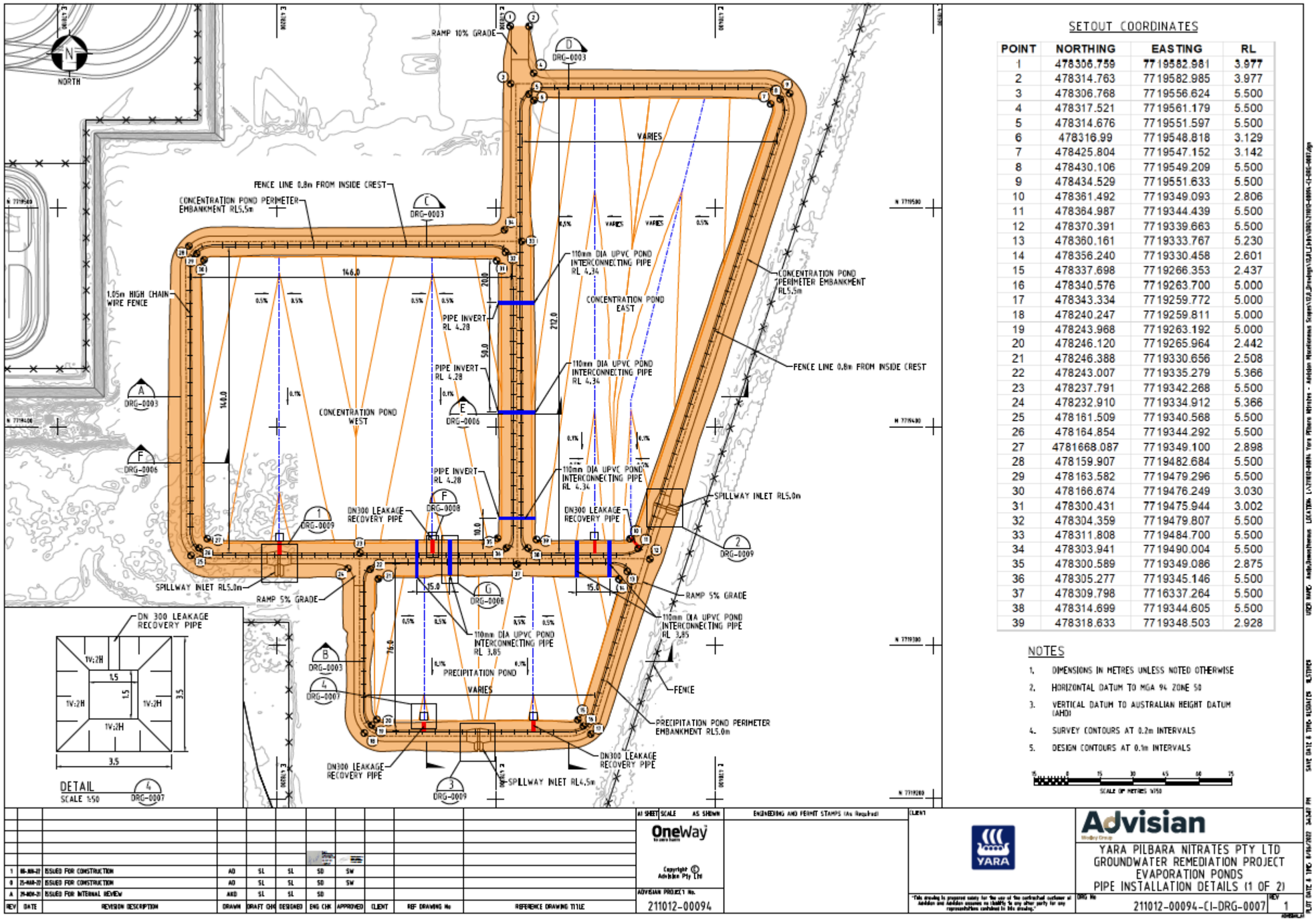
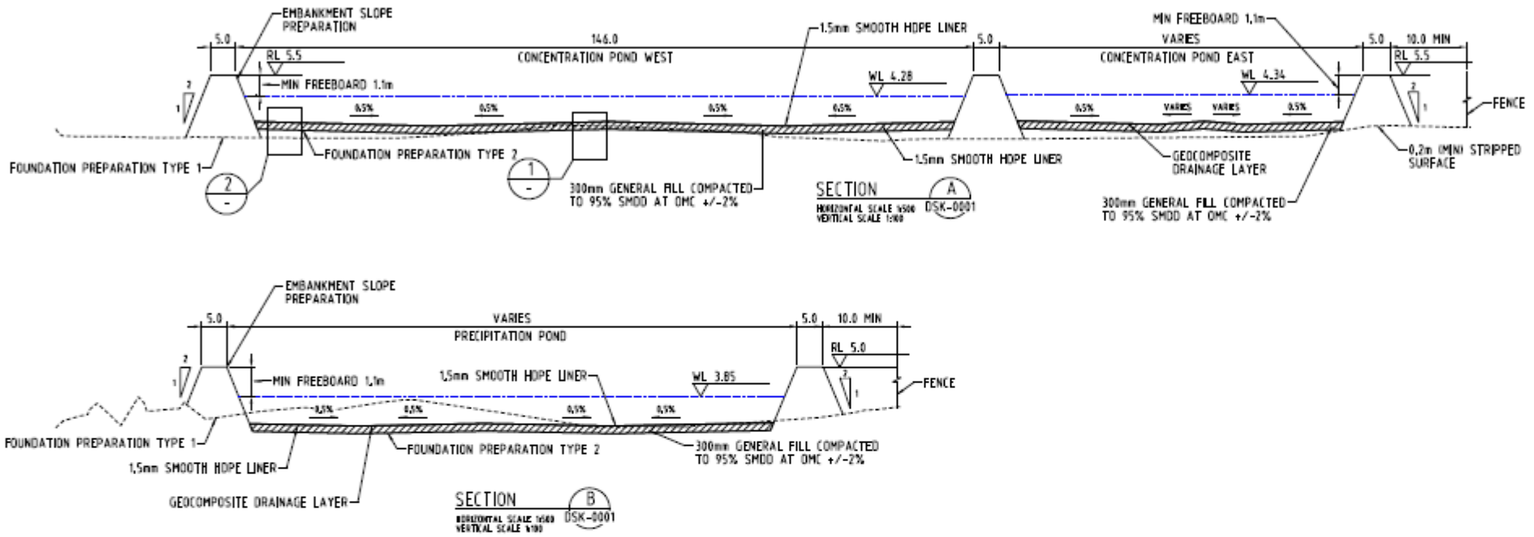


Figure 3: Map of the evaporation pond location and layout



NOTES

1. DIMENSIONS IN METRES UNLESS NOTED OTHERWISE
2. HORIZONTAL DATUM TO MGA 94 ZONE 50
3. VERTCAL DATUM TO AUSTRALIAN HEIGHT DATUM (AHD)

FOUNDATION PREPARATION TYPE 1

1. REMOVE TOP SOIL TO 200mm.
2. RIP UP TO MINIMUM 300mm AND COMPACT TO 95% SMDD AT -2% TO OMC.
3. OBSERVE FOR SOFT AREAS AND CRACK FORMING.
4. REMOVE AND REPLACE SOFT POCKETS IF ENCOUNTERED.

FOUNDATION PREPARATION TYPE 2

IN CUT AREAS (REFER TO DETAIL 1)

1. OVER EXCAVATE 150 MM BELOW BOTTOM HDPE LINER AT THE BASE IN CUT AREAS.
2. RIP AND COMPACT TO 95% SMDD AT -2% TO OMC.
3. OBSERVE FOR SOFT AREAS AND CRACKS FORMING.
4. REMOVE AND REPLACE SOFT POCKETS IF ENCOUNTERED.
5. BACKFILL USING GENERAL FILL AND COMPACT TO 95% SMDD AT -2% TO OMC.
6. NO STONEY MATERIALS TO BE VISIBLE ON THE FINAL PREPARED SURFACE.

IN FILL AREAS (REFER TO DETAIL 2)

1. REMOVE TOP SOIL TO 200mm.
2. RIP AND COMPACT TO 95% SMDD AT -2% TO OMC.
3. OBSERVE FOR SOFT AREAS AND CRACKS FORMING.
4. REMOVE AND REPLACE SOFT POCKETS IF ENCOUNTERED.
5. PLACE GENERAL FILL IN LAYERS NOT EXCEEDING 300mm IN LOOSE THICKNESS AND COMPACT TO 95% SMDD AT -2% TO OMC.
6. CONTINUE UP TO THE DESIGN POND BASE LEVEL (I.E. BOTTOM HDPE LINER LEVEL).
7. NO STONEY MATERIALS TO BE VISIBLE ON THE FINAL PREPARED SURFACE.

EMBANKMENT SLOPE PREPARATION

1. TRIM SLOPE TO DIMENSIONS.
2. COMPACT FACE/SLOPE TO 98% SMDD AT OMC TO +2%.

REV	DATE	REVISION DESCRIPTION	DRAWN	DRAFT (IN)	DESIGNED	ENG CHK	APPROVED	CLIENT	REF DRAWING No	REFERENCE DRAWING TITLE
0	25-MAR-24	ISSUED FOR CONSTRUCTION	AD	SL	SL	SD	SW			
A	12-NOV-23	ISSUED FOR INTERNAL REVIEW	AD	SL	SL	SD				

A1 SHEET SCALE AS SHOWN

OneWay

ADVISIAN PROJECT No. 211012-00094

ENGINEERING AND PERMIT STAMPS (As Required)

CLIENT

YARA

Advisian

YARA PILBARA NITRATES PTY LTD
GROUNDWATER REMEDIATION PROJECT
EVAPORATION PONDS
EMBANKMENT SECTIONS (1 OF 3)

DRG No 211012-00094-CI-DRG-0004 REV 0

Figure 4: Evaporation pond embankment and foundation design

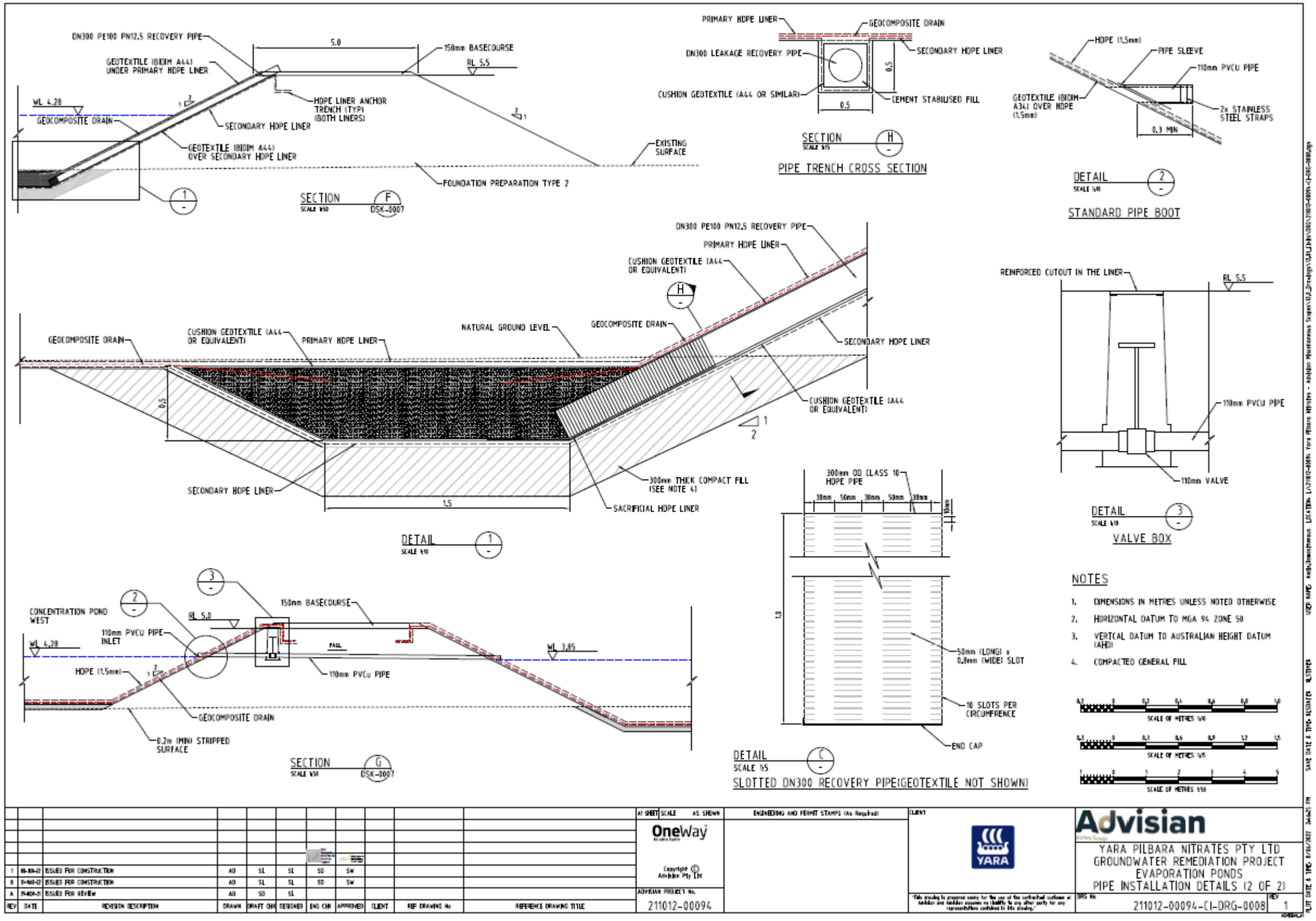
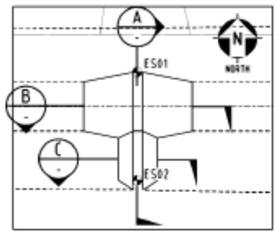
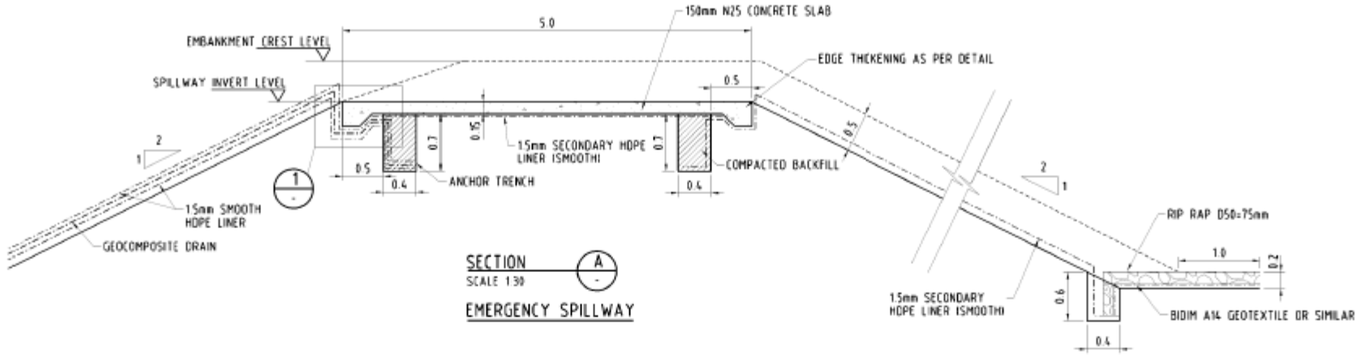


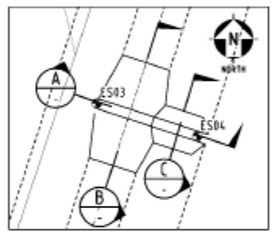
Figure 5: Evaporation pond lining and drainage design



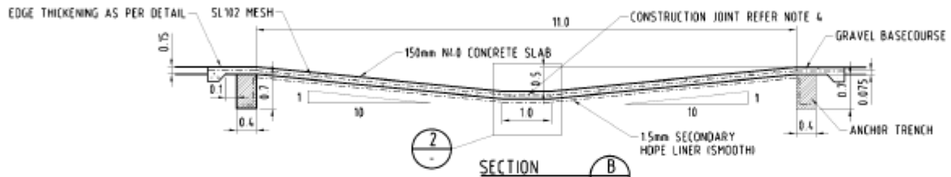
DETAIL 1 DRG-0001
SCALE 1:250
EMERGENCY SPILLWAY 1



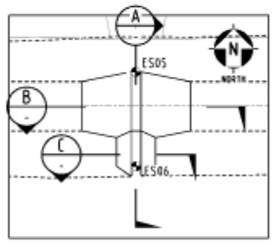
SECTION A
SCALE 1:30
EMERGENCY SPILLWAY



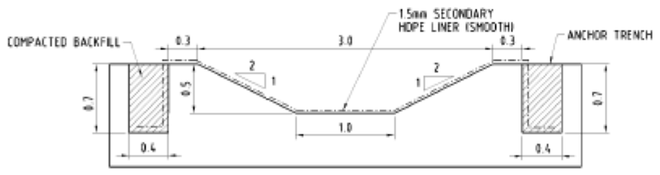
DETAIL 2
SCALE 1:250
DRG-0001
EMERGENCY SPILLWAY 2



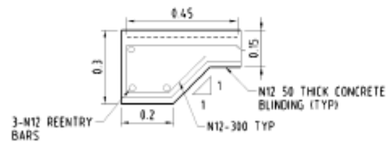
SECTION B
SCALE 1:50
EMERGENCY SPILLWAY



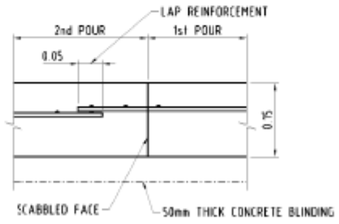
DETAIL 3
SCALE 1:250
DRG-0001
EMERGENCY SPILLWAY 3



SECTION C
SCALE 1:25
SPILLWAY CHUTE



DETAIL 1
SCALE 1:10



DETAIL 2
SCALE 1:5

EMERGENCY SPILLWAY SETTING OUT POINTS
SPILLWAY 1

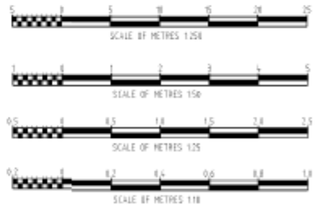
POINT	EASTING	NORTHING	INVERT LEVEL
ES01	7719343.26	478200.97	5.0
ES02	7719332.27	478200.97	5.0

EMERGENCY SPILLWAY SETTING OUT POINTS
SPILLWAY 2

POINT	EASTING	NORTHING	INVERT LEVEL
ES03	7719364.82	478372.12	5.0
ES04	7719361.4	478382.34	5.0

EMERGENCY SPILLWAY SETTING OUT POINTS
SPILLWAY 3

POINT	EASTING	NORTHING	INVERT LEVEL
ES05	7719262.26	478292.24	4.5
ES06	7719252.65	478292.13	4.5



NOTES

1. DIMENSIONS IN METRES UNLESS NOTED OTHERWISE
2. HORIZONTAL DATUM TO MGA 94 ZONE 50
3. VERTICAL DATUM TO AUSTRALIAN HEIGHT DATUM (AHD)

REV	DATE	REVISION DESCRIPTION	DRAWN	DRAFT CHK	DESIGNED	ENG CHK	APPROVED	CLIENT	REF DRAWING No	REFERENCE DRAWING TITLE
B	8-MAR-22	ISSUED FOR CONSTRUCTION	AD	SL	SL	SD	SW			
A	16-SEP-21	ISSUED FOR REVIEW	AKD							

A1 SHEET | SCALE: AS SHOWN | ENGINEERING AND PERMIT STAMPS (As Required)

OneWay

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ADVISIAN PROJECT No: 211012-00094

CLIENT: YARA

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Advisian
Worley Group

YARA PILBARA NITRATES PTY LTD
GROUNDWATER REMEDIATION PROJECT
EVAPORATION PONDS
EMERGENCY SPILLWAY DETAILS

DRG No: 211012-00094-CI-DRG-0009 | REV: 0

Figure 6: Emergency spillway design

Schedule 2: Premises boundary

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

Table 10: Premises boundary coordinates (MGA 94, Zone 50)

Easting	Northing
477659	7719714
478485	7719624
478346	7719210
478207	7719210
478206	7719310
478013	7719310
478015	7719211
477659	7719211