Water Supply Operating Strategy

Ventnor Mining Pty Ltd

North and Central Silica Sand Projects

M70/1389, M70/1392

To be read in conjunction with Licence to Take Water GWLXXXXXXX

Declaration:

I understand that the commitments given in the attached operating strategy will be a condition of an associated water licence and the noncompliance with a commitment or any licence condition may be a breach of the Rights in Water and Irrigation Act 1914.

Signatures:

Ventnor Mining Pty Ltd

Name: Bruce Maluish (General Manager)

Signature: Date:

Department of Water and Environmental Regulation

Midwest Gascoyne Region

Name:

Signature: Date:

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1. Administrative requirements

1.1 Other relevant water licences

This Operating Strategy relates to GWLXXXXXX and abstraction from both the Yarragadee groundwater resources.

1.2 Staged development

The Licence to take Water does not involve a staged development. Groundwater demand is expected to remain fairly constant over the operational life of the project, although the configuration of the production borefield may change as mining progresses northwards at each site.

1.3 Investigation and reporting

The following studies and reports are relevant to this Operating Strategy:

- H3 Hydrogeological Assessment of the Arrowsmith North and Central Project Areas. This report includes drilling, test pumping and groundwater modelling data.

1.4 Relevant management / allocation plan

The North and Central Silica Sands Projects are located in the Dongara and Eneabba Sub-areas of the Arrowsmith Groundwater Area (Figure 1)

1.5 Contact details

The person responsible for the Operating Strategy is:

Bruce Maluish
Managing Director
Ventnor Mining Pty Ltd
52 Kings Park Road, West Perth WA
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Mobile: 0418 940 417
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1.6 Reporting dates

The following dates are specified:

- The “water year” is 1 July to 30 June 12 months later.
- A groundwater monitoring summary will be submitted to the Department of Water and Environmental Regulation no later than 30 September each year covering the previous water year’s monitoring, and will follow the reporting structure details in *Operation policy 5.12: Hydrogeological reporting associated with a groundwater well licence* (DoW 2009);

- Water use metering is to be reported for the previous year (i.e. 1 July to 30 June) to the Department of Water and Environmental Regulation via the "Water On-line" portal by 30 July each year.
- Groundwater Monitoring Reviews are due every three years with the first due 30 September 2025.

1.7 Operating strategy review cycle

The Operating Strategy will undergo a review three months prior to the expiry of the associated groundwater licence.

2 Water source description

2.1 Production bores

Groundwater supplies for the North Silica Sands Project and the Central Silica Sands Project will be abstracted from single production bores at each site. The processing water supply will be accessed from the Yarragadee Formation aquifer. Figures 2 and 3 show the location of the bores at each site.

For the processing water supply two production bores, YPB1 at North and YPB2 at Central, were installed in 2022 during the groundwater investigation. In the longer-term additional production water bores may be added.

The details of these process water supply production bores are presented in Table 1.

Table 1: Process Water Supply Production Bore Details

Bore ID	Northing (MGA94 Z50J	Easting (MGA94 Z50J	Approximate Ground RL (mAHD)	Slotted Interval (m BGL)	Diameter (mm)
YPB1	6733521	313924	24	320 - 392	250
YPB2	6716280	322872	53	152 - 200	250

Coordinates are by handheld GPS

2.2 Monitoring bores

Four monitoring bores, one in the Yarragadee Formation and one in the superficial formations aquifer have been installed at each site. The purpose of each monitoring bore is described in Table 2.

The details of the installed monitoring bores are presented in Table 2.

Table 2: Monitoring Bores

Bore ID	Northing (MGA94 Z50J)	Easting (MGA94 Z50J)	Approx. Ground RL (mAHD)	Slotted Interval (m BGL)	Purpose
YMB1	6733518	313923	24	326 – 332, 362 - 374	Yarragadee water level monitoring
SMB1	6733530	313950	24	18 - 30	Superficial formations water level monitoring
YMB2	6716247	322883	53	122 - 152	Yarragadee water level monitoring
SMB2	6716256	322891	53	30 - 36	Superficial formations water level monitoring

Coordinates are by handheld GPS

2.3 Groundwater dependent vegetation

The computer modelling has indicated a small amount (<0.5m) of possible drawdown in the superficial aquifer over a 30 year period in the Central project area. This possible drawdown is the result of drainage from the superficial aquifer through the underlying Unit B aquitard of the Yarragadee aquifer into Unit A of the Yarragadee aquifer.

The computer modelling has indicated that there is no drawdown of the superficial aquifer in the North project area related to Yarragadee abstraction.

There are no groundwater dependent ecosystems (GDE) on either M70/1389 or M70/1392 (Figure 4). The depth to water of any vegetation on these tenements is generally in excess of 15m.

There are some possible GDE's to the west and north west of M70/1389, associated with Arramall Lake and the superficial aquifer. These are in excess of 4km from the Yarragadee production bore YPB1 and therefore unlikely to be affected by abstraction.

Ngunkakara Well has been identified as a GDE and is located on the western boundary of M70/1389 about 2.2km north of the Yarragadee production bore YPB1. The superficial aquifer water level at this site would be in the order of 6m RL AHD with the surface level being in the order of 25m AHD resulting in a depth to water in the order of 19m.

Between the North and Central project areas the Department of Water and Environmental Regulation has identified the Arrowsmith River and Arrowsmith Lake areas as requiring consideration. These areas also have depths to water exceeding 15m indicating and therefore do not contain GDE's. Any vegetation in these areas would be reliant on perched water coming from surface flow events for the Arrowsmith River.

At the Central area the Department of Water and Environmental Regulation have identified Casuarina Well, located on private property just over 2km west of the superficial production bore (SPB2) and the superficial monitoring bore (SMB2) as a potential GDE. The surface RL of the neighbouring lake is 44m AHD and the superficial aquifer standing water level at SMB2 is in the order of 27m AHD resulting in a depth to water of approximately 17m.

To identify any risks to these possible GDE's, the superficial aquifer water level at SPB1 and SMB2 will be monitored monthly to identify any superficial aquifer groundwater trends. Should an adverse trend be identified then quadrats could be set up at representative sites to form a baseline vegetation survey.

3 Identifying and managing impacts

Priority groundwater management issues have been identified and through consultation and engagement with relevant stakeholders, including the Department of Water and Environmental Regulation. These issues and their management are described in detail in the following sections and summarized in Table 3.

Table 3: Priority Groundwater Related Issues, Their Management and Monitoring (Operational Phase)

Potential issue	Receptor	Management Objective	Operational Controls	Measurement & Monitoring	Trigger/Response
Reliability of supply	Project	To have a supply that matches the licensed entitlement To maximise water use efficiencies	Employ industry standard water efficiency measures, based on DWER policy (2009)	Maintain water balance to identify areas for further optimization.	Increased abstractions over the course of a year must be justified through internal review.
			Maximise collection and re-use of process water	SWL in monitored bores (monthly)	Groundwater mounding or decline may indicate re-use inefficiencies.
			Install meters on all operational production bores.	Cumulative abstraction (kL)	Cumulative abstraction exceeding 80% of target maximum will result in an internal review.
			Routinely inspect water storage, distribution and stormwater collection systems for losses.	Routine visual inspections of infrastructure.	Repair or replace, as necessary. Review design if frequent or considerable losses.
			Proactively seek alternative water supplies if draw looks to become unsustainable.	Cumulative annual rainfall. SWL of monitoring bores (monthly).	Drought conditions and/or absence of seasonal recovery will prompt an internal review, incorporating hydrogeological and/or DWER advice.
Impacts to other groundwater users - quantity	Other third-party bores	Not to impact on neighbour's water availability (without prior agreement)	New production bores will be placed at least 800m away from existing and active supply bores.	SWL of monitoring bores (monthly).	Consult with bore owner to establish relative use and to ensure continuity of supply, if impact is mine-related.
Groundwater dependent ecosystems	Potential groundwater dependent ecosystems	Not to adversely affect the health of potentially groundwater dependent vegetation	Refer to trigger/response column	SWL of SMB1 and SMB2 (monthly).	Any monitoring result that shows a superficial aquifer decline of >0.1m in any 12-month period will trigger a review to identify the cause and assess the significance of the decline. A rapid vegetation health assessment will be conducted and quadrats established.

4 Operational rules

4.1 Project overview

The North and Central Silica Sands Projects are located about 30km and 52km respectively southeast of Dongara, Western Australia.

The Arrowsmith North project is the more advanced of the 2 proposed projects, and is progressing through the EPA PER process. The Project plan for Arrowsmith North has progressed to detailed design of the process flow and engineering design for a 2.2Mtpa Operation. The water requirements for Arrowsmith North have been determined and are presented in Appendix A, being 0.9GL/a.

The Arrowsmith Central Project is at an early stage in the EPA Referral process and as a result the Project does not have the same level of process flow and engineering study's. The current anticipated production from Central is projected to be 1Mtpa and therefore the water requirements are estimated pro rata from Arrowsmith North at 0.4GL/a. Ventnor Mining Pty Ltd have therefore be withdrawing the GWL application 41387 for 500,000KL/a from the Superficial Swan.

Mining and processing rates are planned to ramp up to full processing rates within 2 years of commissioning the processing circuit.

The processing plants will be located in near the production bores in each of the tenements.

Open-pit mining will be by FEL and Mining Unit Plant (MUP) that will screen and slurry the ore at the MUP and pump ore to the Processing Plant. All material that processed will be separated in to saleable products.

Ore processing will be by attritioning and screening. Mining is free digging.

4.2 Project water requirements and water balance

Abstracted Yarragadee Formation aquifer groundwater, which is expected to have a salinity of 6,670mg/L total dissolved salts at North and 480mg/L total dissolved salts at Central would be used mainly for sand processing, with minor amounts required for dust suppression and equipment wash down.

At a 2.2Mtpa ore processing rate, the annual project demand at the North site is about 900,000kL, with the following major water use categories:

- Ore processing – 703,630kL.
- Stockpile dust suppression – 140,160kL
- Dust suppression – 54,750kL.
- Potable Water – 1,460kL.

As explained in the project overview the Central Project will have a smaller footprint and require less process and dust suppression water.

The estimated dust suppression water volume is based on use at other sand mining sites that project personnel have worked at.

4.3 Abstraction limits and targets

Ventnor Mining Pty Ltd will set itself an upper abstraction target of 95% of its annual water entitlement, which is set at 900,000kL per year at the North Project site and 400,000kL per year at the Central project site. The target maximum draw of both projects will be 1,235,000kL per year. Conformance with the target will be assessed on a monthly basis and will consider the monthly draw as well as the cumulative draw for that time of the "water year". Non-conformance may require abstraction to be reduced, depending on the project phase and time of year. As Ventnor Mining Pty Ltd increases its understanding in regards to changes in seasonal water demand, the monthly and cumulative targets may be revised to reflect these changes.

5 Monitoring and reporting

5.1 Primary objective

The purpose of the monitoring program is to utilise a suite of suitable environmental indicators collected at appropriate intervals to track the effectiveness of the Operating Strategy (as well as other environmental management measures), so that a timely response can be implemented is performance appears unsatisfactory.

5.2 Key indicators and purpose

Consistent with the priority management issues identified in Table 3, the key water management indicators are:

- Metered cumulative abstraction volumes and daily rates, collected and recorded as indicators or performance against expected and approved abstraction volumes and rates;
- Groundwater levels (SWL) are required from monitoring bores to record and assess aquifer response to Ventnor Mining Pty Ltd abstraction;
- Groundwater salinity, measured as Electrical Conductivity (EC), is a simple indicator to identify if abstraction is reducing groundwater quality and restricting options for use; and
- Groundwater levels (SWL) are required from superficial monitoring bores to record and access aquifer response and possible effects on distant groundwater dependent ecosystems.

5.3 Groundwater monitoring schedule

The monitoring schedule, which details the broad approaches set out in Table 4. All methods and equipment used in water quality sampling will be undertaken in accordance with Australian Standard AS/NZS 5667. The monitoring schedule will be reviewed as part of each years's annual reporting process.

Table 4: Detailed Monitoring Schedule

Bore Group	Bores	Elements	Parameters	Frequency
Production Bores	YPB1 and YPB2	Abstraction	Individual and combined total volumes and daily rates	Monthly as close to end of month as practicable
		Quality	Field EC, pH	Monthly
			Major ions	Annually
Monitoring Bores	YMB1, SMB1, YMB2 & SMB2	Levels	SWL	Monthly

Notes SWL = static water level
EC = Electrical Conductivity
Majors ions = pH, EC, TDS, Ca, Mg, K, Na, CO3, HCO3, Cl, SO4, NO3, SiO2, Al, Fe, Mn, Dissolved Carbon Dioxide

5.5 Vegetation monitoring schedule and procedure

Should a declining superficial water table, as the result of Yarragadee abstraction, be identified the following vegetation condition monitoring will be undertaken at sites agreed with the Department of Water and Environmental Regulation.

The vegetation condition assessment transects will be established at identified sites and will comprise 20 contiguous $1m^2$ quadrats (20m by 1m). The corners of each transect will be marked by four 'star' pickets. Transects will be photographed from the north side, and a vegetation condition rating assigned based on the scale outlined in the table below will be undertaken.

Data will be summarised for each 20m transect to provide a mean condition rating. Data from each assessment will be compared using one-way analysis of variance testing (α=0.05) to elucidate statistically significant differences. Condition assessment and reporting will be undertaken by a suitably qualified and experienced person, such as a botanical or ecological consultant with familiarity with groundwater dependent vegetation.

5.6 Reporting

Reporting of monitoring results and annual reviews will as per section 1.6 of the Operating Strategy. The reporting of adverse events will occur in accordance with the Licence to Take Water and Section 6 of this Operating Strategy.

6 Contingency Program

6.1 Introduction

The following program outlines contingency actions that have been identified as suitable to mitigate potential impacts. Dependent on the situation, further or different contingency actions may be developed at the time of the response being triggered or an impact being identified.

6.2 Excessive abstraction

Water volumes will be reviewed monthly and compared against the target as well as the annual water entitlement. In the event that the individual or cumulative monthly targets are exceeded, a decrease in individual bore pumping rates of sufficient combined volume to bring abstraction below the 95% of the licensed allocation will be undertaken.

6.3 Resource quantity and other users

In response to any of the following events:

- Yarragadee Formation monitoring bores (YMB1 and YMB2) show a decline in groundwater levels of more than 1.0m over any annual period; or
- Superficial formations aquifer monitoring bores (SMB1 and SMB2) showing a rise (mounding) or a fall of more than 0.5m over any annual period.

Ventnor Mining Pty Ltd will undertake a review of water level and water quality monitoring data and advise the DWER on the proposed course of action within 30 days of the trigger being breached. Possible response may include but are not limited to:

- A reduction of abstraction rates of production bores nearest to the greatest water level declines

6.4 Resource quality

In response to any of the following events:

- Any continuously increasing trend or spike in process water EC is observed,

Ventnor Mining Pty Ltd will:

- Review and verify that appropriate sample collection, preparation, handling and analysis methods were used;
- Conduct an in-depth review of groundwater quality in bores and/or the process water circuit;
- Increase monitoring of the bore to weekly, until groundwater quality returns to within the range of baseline values;
- Review groundwater levels across the area to identify groundwater gradients and the potential source and direction of any contamination; and
- Reduction of abstraction in nearest production bores to determine if over abstraction resulting in a reduction of water quality may be the cause.

The outcomes of the review will be discussed with the DWER, prior to determining the appropriate response.

6.5 Groundwater dependent vegetation

In response to a decline in superficial aquifer groundwater levels of more than 0.5m in any annual period in the superficial formations aquifer monitoring bores, Ventnor Mining Pty Ltd will:

- Initiate a vegetation condition rapid assessment (see section 6.6.1 for method) and, if a deterioration in vegetation health is observed, compare changes in vegetation

health with groundwater monitoring results and other relevant information, such as rainfall, and continue with the condition assessments on a monthly basis until groundwater levels have recovered, or an alternative cause for the decline is reasonably confirmed;

- Alter the regime, or elements of it, that may be causing or contributing to the decline;
- Conduct an expediated review of the scale and potential adverse outcomes of the decline, and to identify possible options to protect the vegetation;
- Notify DWER within 30 days of water level trigger being breached or decline in health assessment noted; and

A contingency action that may be considered as suitable is to establish and maintain and artificial watering/groundwater supplementation system to reduce stress on at risk vegetation and assist groundwater recovery.

The above management responses may also be triggered if vegetation assessments or observation indicate that vegetation health appears to be declining due to a decline in the superficial aquifer water levels.

7 Water use efficiency

7.1 Approach

The design and operating principles for the processing plant and project in general will be tailored towards maximising the re-use of water, which in turn will help minimise the abstraction of groundwater for 'makeup' supplies. Major water re-use opportunities that will be exploited by the project compromise:

- An appropriately sized thickener will be installed to receive the water return from the processing circuit. This facility is located proximal to the proposed process plant and will recover over 95% of the process water.
- Monitoring of water and slurry pipelines to reduce water losses of water from the process water system.
- The main process water pond or other pond will be lined in order to limit seepage losses. System monitoring of the dam water level to ensure no losses to overflows.
- Trialling alternative dust-suppression techniques, other than water sprays.
- Continuous improvement of the water and water use systems to improve water efficiency.

Table 5 summarises the inputs and outputs of the nominal Process Mass Balance (PMB) as determined for the North project by BHM Process Consultants. The PMB letter outlining the Water Balance is included as Appendix A.

Table 5: Process Mass Balance Summary

Inputs	**Base Case Nominal Water Requirement (kL/h)**
ROM feed	12.500
Bore Water	65.700
Depressant dilution water	0.130
Flocculant dilution pump	0.410
Flocculant to centrifuge	4.330
Gland water pump	5.000
Non-process water	0.100
Raw water for sodium carbonate powder mixing	0.490
Neat depressant	0.040
Collector	0.110
Frother	0.007
Coagulant bulki	0.003
Total Inputs	**88.82**
Outputs (water losses)	**Base Case Nominal Water Requirement (kL/h)**
Fines Product stockpile	2.700
Fines product stockpile evaporation and seepage	14.500
Centrifuge cake	2.890
Tailings	0.000
Coarse product stockpile	1.500
Coarse product stockpile evaporation and seepage	12.500
Intermediate product stockpile	6.150
Intermediate product stockpile evaporation and seepage	20.300

Coarse rejects product stockpile	1.448
Coarse rejects stockpile evaporation and seepage	13.700
Gland water pump	5.000
Non-process water	0.100
Process water pond evaporation	1.420
Dust suppression / Standpipe	6.250
Raw water for flocculant primary dilution	0.410
Total Outputs / Losses	88.868

7.2 Assessment

Ventnor Mining Pty Ltd will routinely update its water balance model (see section 4) as a key tool for identifying and assessing opportunities for recycling and water use optimisation. Other possible indicators that the water use efficiency measures in place require review include:

- Overall abstraction shows an increasing trend, although there is no obvious or expected reason.

Ventnor Mining Pty Ltd will respond appropriately and will present newly successful water efficiency measures in its annual report.

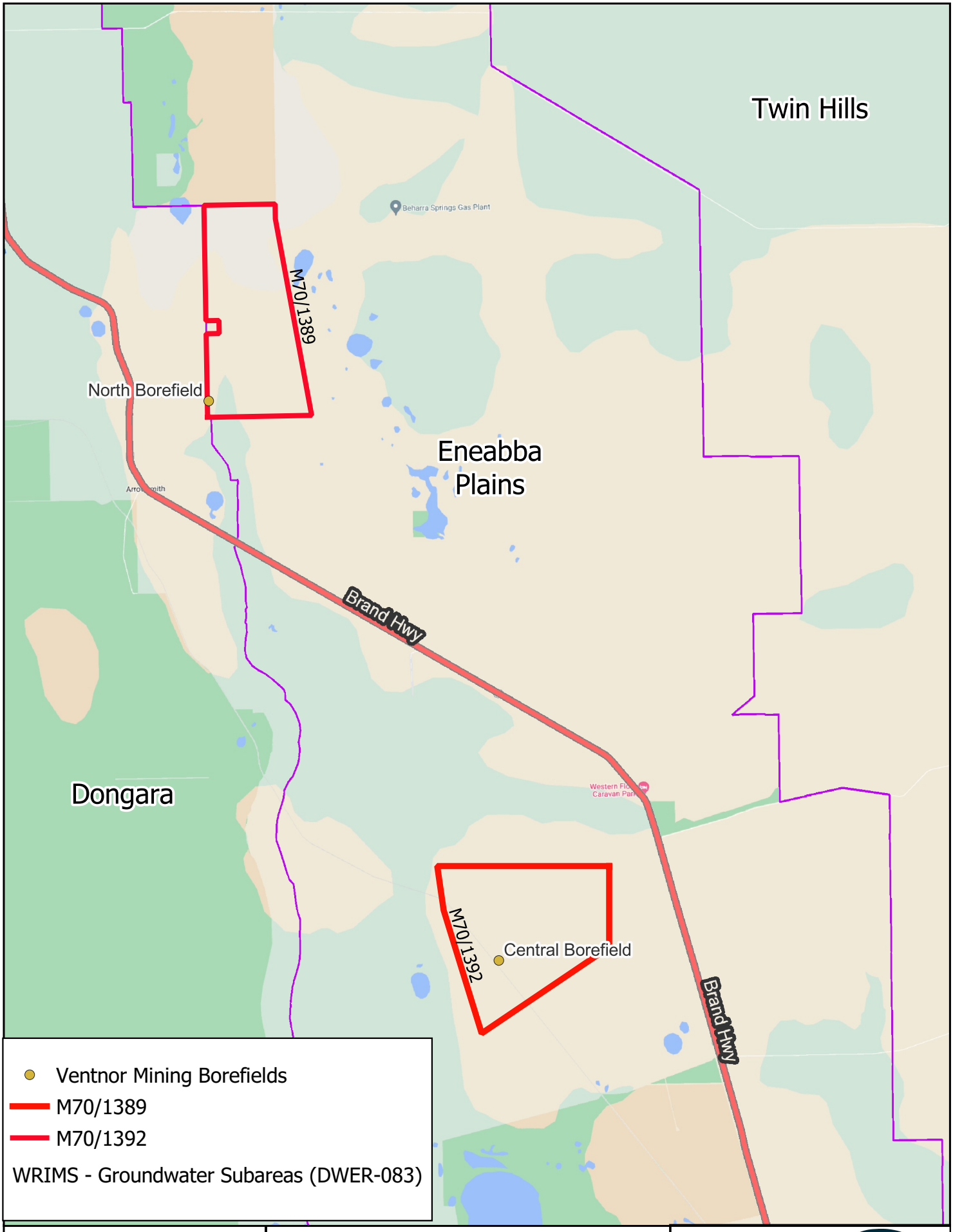
8 Summary list of commitments

Commitment	**Due Date**
Submit to Water Online meter readings for the water year (1 July to 30 June) within 30 days of the end of the water year	July 30 each year commencing 2023
Submit to the Department of Water and Environmental Regulation, Geraldton office a Groundwater Monitoring Summary every year commencing 2023 (except in a year when a Groundwater Monitoring Review is due)	By September 30 each year commencing 2023
Submit to the Department of Water and Environmental Regulation Geraldton office a Groundwater Monitoring Review every third year commencing 2025	By September 30 every third year commencing 2025
Reports will be prepared in accordance with Operational policy 5.12 “Hydrogeological reporting associated with a groundwater well licence”	Ongoing
Reports will include details of any missing data and what action will be taken to rectify the situation	Ongoing
Monitoring as specified in Section 5 / Table 4 of this operating strategy will be undertaken	Ongoing

9 References

DoW 2011, Operational policy 5.08 – Use of operating strategies in the water licensing process. Government of Western Australia.

Figures



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DATE: 20-Dec-22	
DESIGNED: RDM	

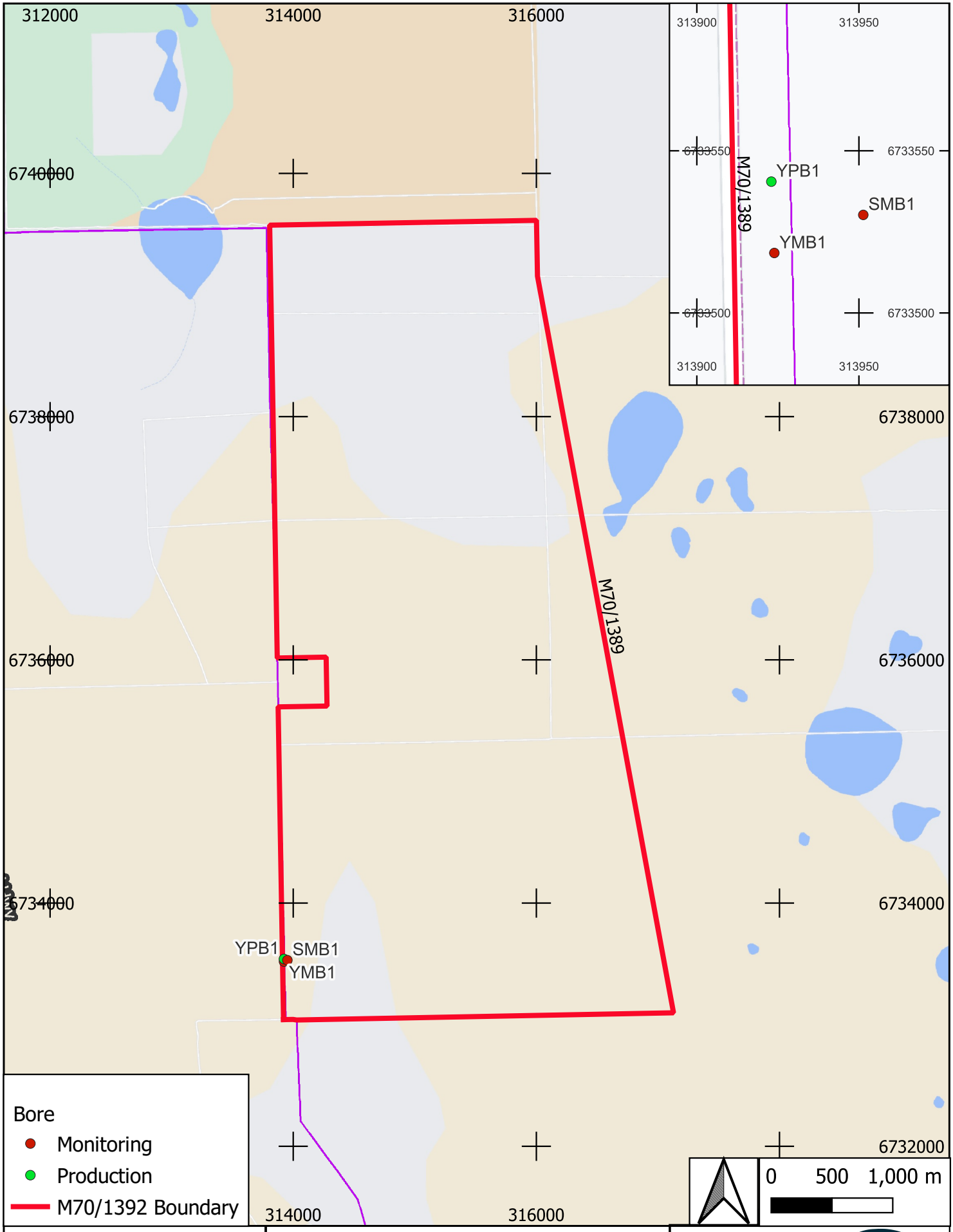
CLIENT: Ventor Mining Pty Ltd

Project:Arrowsmith North & Central Silica Sands

TITLE: Mineral Tenements, Borefield Locations & Subarea Boundaries

Waterdirect Pty Ltd

FIGURE:1



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Subarea boundaries sourced from DWER
DATE: 20-Dec-22
DESIGNED: RDM

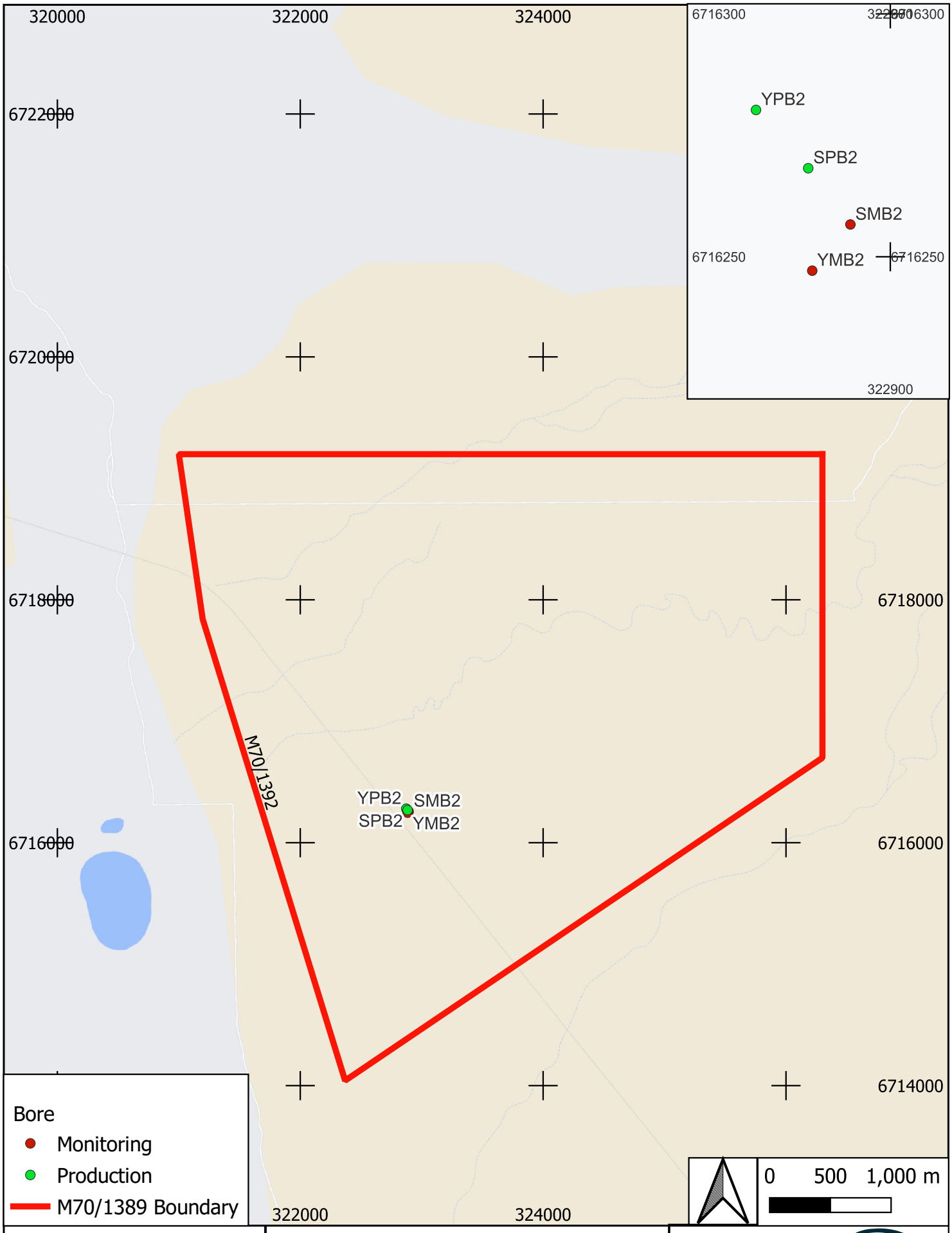
CLIENT: Ventor Mining Pty Ltd

Project:Arrowsmith North & Central Silica Sands

TITLE: Arrowsmith North Bore Locations

Waterdirect Pty Ltd

FIGURE:2



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DESIGNED: RDM

CLIENT: Ventor Mining Pty Ltd

Project:Arrowsmith North & Central Silica Sands

TITLE: Arrowsmith Central Bore Locations

Waterdirect Pty Ltd

FIGURE:3

Appendix A
Process Mass Balance

MEMORANDUM

To	Bruce Maluish, David Reid		
Copy to	ProjX		
From	BHM Process Consultants		
Subject	Arrowsmith North Water Balance – Sensitivity	Client Ref.	
Date	20th December 2022	Doc. No.	1075-VRX-TN-025

Introduction

The water balance for VRX's Arrowsmith North project has been reviewed and updated with respect to current inputs and the overall expected water consumption. Sensitivity of the water balance has been reviewed with respect to several factors.

A previous review was conducted earlier, as documented in 1075-VRX-TN-014, however the flowsheet has undergone some changes through the development process.

1. OVERVIEW OF INPUTS

The following key assumptions have been made in respect to water requirements:

- Mining related water required includes the In-pit Mining Unit and an allowance for dust suppression in the pit
  - Dust Suppression has been estimated at 6 water trucks/day (25m^3 per truck).
- Potable water requirements estimate 20 onsite personnel, at a consumption rate of 200 L/day.
- Evaporation losses in the process water pond have been estimated based of meteorological data (Western Australia's Bureau of Meteorology) at an average of ~2100mm/annum.
  - Based on the surface area of processing pond (6000m^2) This equates to ~1.45m^3/hr as an average consumption rate over a year
- Stockpile dust control water for the various products (Coarse/Fine/Intermediate) have been estimated at a preliminary rate of 10m^3/hr
  - Note that this is currently undergoing a review but will be subject to high variability and is expected at times to be significant
  - Stockpiles are currently assumed to not be recovering any of the drained water
- The rejects stockpile (Coarse and Fines) are depositing on their respective pads at a substantially higher moisture level than the other stockpiles and have been assumed to generate negligible dust as a result.
- The plant site and product storage area is subject to extreme weather conditions with extremely high temperatures and evaporation which may require significant water during these events
- Adequate water is required to maintain moisture levels on site sufficient to be at dust suppression levels during transportation, during port storage and during ship loading
- The water requirement will be subject to high variability determined by weather conditions.

A general overview of the water flow can be seen in the figure below.

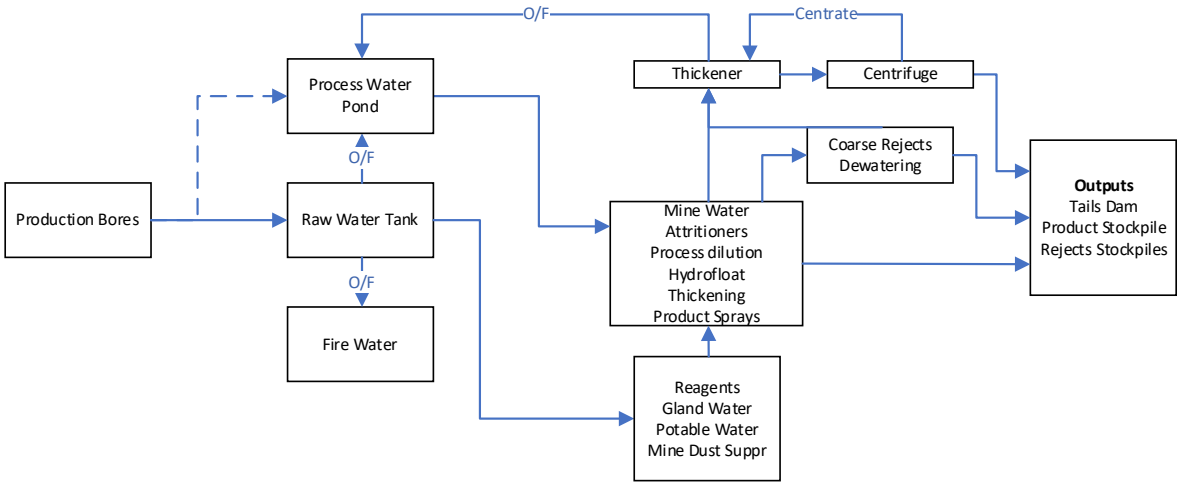

Figure 1 - General Water Flow

2. MASS BALANCE OUTPUTS – BASE CASE

The mass balance outputs and expected consumption can be seen in Table 1 below for the multiple feed cases (Nominal/Coarse/Fine). This is the base case demand required with the flowsheet that is currently implemented. As can be seen it is on average sitting around the 0.6 GL/a requirement.

There are several variations that could occur during operation with the assumptions currently in place. Those of note are:

- Dust Suppression on the product stockpiles
  - Being high purity silica there is significance placed upon ensuring that there is ample dust suppression as one of the strategies that will need to be implemented during operation to limit occupational health and safety (OHS) around silicosis. The current assumptions around 10m^3/h have been put in place as an estimate to allow for sufficient engineering. This is currently undergoing a review under detailed design with respect to required spray water including in regard to local conditions (ie wind, evaporation rate)
- Centrifuge operation
  - One of the tailings streams is fine reject material that is currently being assessed whether it requires dewatering so that it can be stockpiled and sold and whether the capital and operating costs around the centrifuge are justified

Table 1 – Base Case Variation

		Flow (m^3/h)		
	Stream ID	Base Case - Nominal	Base Case - Coarse	Base Case - Fine
Input				
ROM feed	1	12.5	12.5	12.5
Bore water to process water dam required	317	65.7	66.7	62.7
Depressant dilution water	181	0.13	0.13	0.13
Raw water for sodium carbonate mixing	206	0.49	0.48	0.47
Flocculant dilution pump	306	0.41	0.50	0.70
Flocculant to centrifuge	265	4.33	5.25	7.33
Gland water pump	310	5.00	5.00	5.00
Non-process water	312	0.10	0.10	0.10
Neat depressant	179	0.04	0.04	0.04
Collector	188	0.11	0.11	0.11
Frother	197	0.007	0.007	0.007
Coagulant bulki	277	0.003	0.004	0.0
Outputs (water Losses)				
Fines Product stockpile	244	2.70	1.86	3.39
Fines Product stockpile evaporation and seepage	246	14.5	13.1	15.6
Centrifuge cake	266	2.89	3.51	4.90
Tailings	264	0.00	0.00	0.00
Coarse product stockpile	321	1.50	2.06	1.20
Coarse product stockpile evaporation and seepage	323	12.5	13.4	12.0
Intermediate product stockpile	327	6.15	6.95	4.96
Intermediate product stockpile evaporation and seepage	329	20.3	21.6	18.3
Coarse rejects product stockpile	331	1.448	1.001	1.719
Coarse rejects stockpile evaporation and seepage	333	13.7	14.0	13.5
Gland water pump	310	5.00	5.00	5.00
Non-process water	312	0.1	0.1	0.1
Process Water Pond Evaporation		1.42	1.42	1.42
Dust suppression / Standpipe	287	6.25	6.25	6.25
Raw water for flocculant primary dilution	273	0.41	0.50	0.70
Annual Water Consumption	***GL/a***	***0.59***	***0.60***	***0.59***

2.1. Sensitivity

Several scenarios are summarised below. A worst case summer evaporation (extreme temperatures and high winds) has been estimated at ~2.5 m3/h. A roughly 60% increase of spray water per stockpile, $10m^3/hr$ to $16m^3/h$, has been estimated. As mentioned above, this is currently under review.

Table 2 – Annual Water Consumption sensitivity across multiple scenarios

	Stream ID	Nominal	Coarse	Fine
Base Case	***GL/a***	0.59	0.60	0.59
Base Case – No Centrifuge	***GL/a***	0.68	0.72	0.74
Winter Evaporation	***GL/a***	0.60	0.61	0.60
Summer Evaporation	***GL/a***	0.61	0.62	0.61
Additional Water on Stockpile – Annual	***GL/a***	0.74	0.76	0.74
Additional Water on Stockpile – Summer	***GL/a***	0.75	0.77	0.75
Add Water on Stockpile – No CFG, Summer	***GL/a***	0.83	0.87	**0.89**

From a water licensing perspective, in order to minimise project risk the water allocation should not simply be equated to the nominal operating scenario.

BHM would recommend that the licensing application be based on the conservative fines production case of 0.75 GL/a and have a contingency factor of 10 % applied in order to cater for any process variation away from the design figures. With the worse case scenario (no centrifuge and high summer evaporation rates) a maximum water demand rate of 0.89 GL/a has been estimated.

Regards ,

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