Government of Western Australia
Department of Water and Environmental Regulation

# Licence

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|---|---|
| **Licence number** | L7815/2001/12 |
| **Licence holder** | Northern Star (Thunderbox) Pty Ltd |
| **ACN** | 107 154 727 |
| **Registered business address** | Level 4, 500 Hay Street<br>SUBIACO WA 6008 |
| **DWER Internal number** | INS-0001544 |
| **Duration** | 17/10/2024 to 16/10/2035 |
| **Date of issue** | 17/10/2024 |
| **Date of amendment** | 6/08/2025 |
| **Premises details** | Thunderbox Operations<br>LEINSTER WA 6437<br>Legal description -<br>Mining tenements L36/155, L36/157, L36/158, L37/61, L37/73, L37/142, L37/166, L37/199, L37/215, L37/216, M36/35, M36/177, M36/421, M36/462, M36/473, M36/494, M36/503, M36/504, M36/512, M36/516, M36/525, M36/527, M36/541, M36/542, M36/582, M36/584, M36/585, M36/586, M36/587, M36/589, M36/599, M36/600, M37/222, M37/339, M37/340, M37/356, M37/357, M37/358, M37/359, M37/360, M37/361, M37/367, M37/368, M37/437, M37/465 and M37/1148<br>As defined by the premises maps in Schedule 1 (Figures 1 to 3) |

| **Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)** | **Assessed production / design capacity** |
|---|---|
| **Category 5:** Processing or beneficiation of metallic or non-metallic ore | 7,000,000 tonnes per annual period |
| **Category 6:** Mine dewatering | 8,000,000 tonnes per annual period |
| **Category 52:** Electric power generation | 38 MW in aggregate |
| **Category 54:** Sewage facility | 140 cubic metres per day |
| **Category 57:** Used tyre storage | 500 tyres |
| **Category 63:** Class I inert landfill | 5,000 tonnes per annual period |
| **Category 64:** Class II or III putrescible landfill site | 7,000 tonnes per annual period |
| **Category 73:** Bulk storage of chemicals etc. | 2,500 cubic metres in aggregate |

This licence is granted to the licence holder, subject to the attached conditions, on 6 August 2025, by:

Lauren Edmands
Digitally signed by Lauren Edmands
Date: 2025.08.06 10:07:05 +08'00'

**SENIOR MANAGER, RESOURCE INDUSTRIES**
**Approvals – Statewide Delivery**
*Officer delegated under section 20 of the Environmental Protection Act 1986*

# Instrument history

| Date | Reference number | Summary of changes |
|---|---|---|
| 21/10/2007 | L7815/2001/8 | Licence re-issue |
| 21/10/2008 | L7815/2001/9 | Licence re-issue |
| 21/10/2011 | L7815/2001/10 | Licence re-issue |
| 09/10/2014 | L7815/2001/11 | Licence re-issue and conversion to REFIRE format |
| 29/01/2015 | L7815/2001/11 | Licence amendment |
| 05/03/2015 | W5794/2015/1 | Works approval to move site out of care and maintenance |
| 29/10/2015 | L7815/2001/11 | Licence amendment to move out of care and maintenance |
| 04/04/2016 | L7815/2001/11 | Licence amendment to add categories 64 and 85. |
| 11/11/2016 | L7815/2001/11 | Licence amendment to add Bannockburn tenements and tenements for the connecting haul road and pipeline to Thunderbox as part of the North Eastern Goldfield Operations' Premises. Removal of monitoring bore MB3. Correction to the power plant generators description. |
| 31/10/2017 | L7815/2001/11 | Amendment notice 1- Licence amendment to authorize construction of stage 6 embankment lift to TSF Cell A. |
| 11/04/2018 | L7815/2001/11 | Amendment notice 2 - Licence amendment to authorise expansion of TSF Cell A and Cell B to abut the Eastern Waste Dump. |
| 17/09/2018 | L7815/2001/11 | Amendment notice 3 - Licence amendment to increase category 5 to 3.0 mtpa and to include M36/177 within premises boundary. |
| 26/09/2019 | W6181/2018/1 | Works Approval to allow construction of lifts 8-15 on TSF's Cell A and B |
| 11/03/2020 | L7815/2001/11 | This amendment – approval to construct and operate two mine dewater storage dams. Amalgamation of amendment notices and licence into one document. |
| 16/04/2021 | L7815/2001/11 | Amendment to increase the maximum daily throughput of the existing wastewater treatment plant from 75 $m^3$/day to 120 $m^3$/day and to allow wastewater discharge to both the waste rock dump and the Tailings Storage Facility (TSF) via the tailings stream. Also included the construction of saline water dam near Thunderbox pit. |
| 28/05/2021 | L7815/2001/11 | Amendment to allow the installation of a secondary crushing circuit infrastructure at the Thunderbox mill. No change to Category 5 approved throughput. |
| 02/07/2021 | W6532/2021/1 | Works Approval to allow construction for Thunderbox Mill expansion infrastructure and additional seven 2.5MW gas powered generators. |

| Date | Reference number | Summary of changes |
|---|---|---|
| 03/05/2022 | W6601/2021/1 | Works Approval to construct two additional tailings storage facilities (TSF) Cells C and D on the adjacent eastern boundary of current TSFs Cells A and B at the premises. |
| 29/04/2024 | L7815/2001/11 | Amendment to include Thunderbox Mill expansion infrastructure and additional seven 2.5MW gas powered generators constructed under W6532/2021/1 onto the licence. |
| 18/09/2024 | L7815/2001/11 | Amendment to re-commence operation of the Bannockburn pit, including changes to categories 6, 52, 54, 64 and 73. |
| 17/10/2024 | L7815/2001/12 | Administrative licence renewal. |
| 29/01/2025 | L7815/2001/12 | Deposition of tailings into the TSF Cell C and D and use of associated infrastructure and monitoring. |
| 6/08/2025 | L7815/2001/12 | Licence amendment to include:<br>• infrastructure constructed under W6918/2024/1;<br>• category 57 and associated infrastructure;<br>• category 63 and associated infrastructure; and<br>• administrative changes. |

# Interpretation

In this licence:

(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 licence:

  (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 licence requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this licence.

# Licence conditions

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

## Infrastructure and equipment

**1.** The licence holder must ensure that the tailings and materials listed in Table 1 are only discharged into and/or stored in the corresponding containment infrastructure with the relevant infrastructure requirements and at the locations specified in Table 1.

**Table 1: Containment infrastructure requirements and location**

| Tailings and materials | Containment infrastructure | Infrastructure requirements | Infrastructure location |
|---|---|---|---|
| Tailings | TSF cells A, B, C and D | • A minimum top of embankment freeboard of 500mm or containment of a 1-in-100 year 72-hour rainfall event (whichever is greater) must be maintained<br>• Fitted with a seepage collection and recovery system which is used to capture seepage from the TSF<br>• Seepage is returned to the TSF, or pumped back into the mine water circuit<br>• External toe drain<br>• A diversion drain sized 6m wide by 1 m deep, with a side slope of 2H:1V and silt traps designed to ensure surface water is diverted before reporting to the TSF and natural surface water flow is not impeded.<br>• A berm positioned between the external toe drain and the diversion drain 1m high by 6m wide. | Schedule 1, Figure 4, Figures 20-22 |
| Return tailings water | Thunderbox – Old Process Water Dam and New Process Water Dam | • Lined with 1 mm HDPE to achieve a permeability of at least <1 x $10^{-9}$ m/s or equivalent<br>• A minimum top of embankment freeboard of 300 mm must be maintained | Schedule 1, Figure 4 |
| Mine dewater | Thunderbox - Mine dewater dam | • Lined with a 0.75 mm UV resistant PVC liner<br>• A minimum top of embankment freeboard of 300 mm must be maintained | Schedule 1, Figure 4 |

| Tailings and materials | Containment infrastructure | Infrastructure requirements | Infrastructure location |
|---|---|---|---|
| Mine dewater | Thunderbox - Saline Water Dam | • 60 m x 80 m with a height of 3.8 m<br>• Lined with a 1.5 mm HDPE geotextile liner to achieve a permeability of less than 1 x $10^{-9}$ m/s<br>• A minimum top of embankment freeboard of 300 mm must be maintained<br>• Fitted with a high water level shut off switch to prevent overtopping<br>• Perimeter of the dam must be fenced<br>• Fauna egress ladders/nets must be maintained at each corner of the turkeys nest | Schedule 1, Figure 4 |
| Mine dewater | Bannockburn - East Dam | • Lined with a 1.5 mm HDPE Geotextile liner<br>• A minimum top of embankment freeboard of 300 mm must be maintained<br>• Fitted with a high water level shut off switch to prevent overtopping<br>• Perimeter of dams must be fenced<br>• Fauna egress ladders/nets must be maintained at each corner of the dams | Schedule 1, Figure 5 |
| | Otto bore operations - Mine dewatering dam | • Lined with a 0.75 mm UV resistant PVC liner<br>• A minimum top of embankment freeboard of 300 mm must be maintained | Schedule 1, Figure 6 |
| Used tyres | Class I landfill facilities (Thunderbox East WRL and Bannockburn East WRL) | • To be buried in batches not exceeding 1000 whole tyres;<br>• a separation distance of at least 100mm of soil between each batch of tyres buried;<br>• All buried tyres to have a final soil cover of at least 500mm; and<br>• A separation distance of at least 2 metres between the base of the landfill and the highest groundwater level must be maintained at all times. | Schedule 1, Figure 23 |

**2.** The licence holder must ensure that the site infrastructure and equipment listed in Table 2 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 2.

**Table 2: Infrastructure and equipment requirements - Maintenance**

| Site infrastructure and equipment | Operational requirement | Infrastructure location |
|---|---|---|
| Thunderbox - Ore crushing and screening infrastructure | • Ore and pebble crushing circuit equipment including ROM bins, apron feeder, vibrating grizzly and jaw crusher<br>• Concrete hardstands used beneath all motors, pumps, crushers, drives, screens, and leach tanks.<br>• Water sprays installed on the ROM bins<br>• Cover on ore stockpile<br>• Dust extraction units (bag house) installed on jaw crusher discharge and screen discharge chute | Schedule 1, Figure 7 |
| | • Maintenance of stormwater diversion bund. | Schedule 1, Figure 8 |
| | • Toe drain which is installed around the perimeter of the stockpile/reclaim area to capture laden stormwater. | |
| Thunderbox - Powerhouse shed | • bunded concrete hardstand to ensure it drains to oil/water separator<br>• Concrete evaporation bund to receive treated water | Power station as labelled in Schedule 1, Figure 7 and 9 |
| Pipelines | • All pipelines to be bunded or within v drains. | Not shown |
| Bore field - Fuel storage | • Total storage capacity of 126 $m^3$ comprised of 4 $m^3$ tanks at bores and 15 $m^3$ tanks at pump stations | Schedule 1, Figure 12 |
| TSF Cells C and D return water and tailings pipelines | • pipelines must be stored in V-drains sufficient to contain spillages between routine inspections<br>• Fitted with telemetry which monitors pressure<br>• Equipped with automatic shutoff systems | Schedule 1, Figure 20 |
| Groundwater monitoring bores -- TSFMB08D TSFMB09D, TSFMB10D, TSFMB11D, and TSFMB12D | • Must be maintained in good working order to allow representative groundwater samples to be taken. | Schedule 1, Figure 4 |
| Used tyre storage areas:<br>• Thunderbox Workshop<br>• Thunderbox Tyre Bay<br>• Bannockburn Workshop | • Storage area to be cleared of all vegetation and be used for used tyre storage only;<br>• Total tyres stored at all three storage areas are not to exceed 500 whole tyres at any one time;<br>• To be stored in bundles of 20 whole tyres or less; and<br>• To be stored with at least 3 metres separating each bundle of 20 tyres. | Schedule 1, Figure 23 |

**3.** The licence holder must construct and/or install the infrastructure listed in Table 3, in accordance with;

(a) The corresponding design and construction requirement; and

(b) At the corresponding infrastructure location;

As set out in Table 3.

**Table 3: Infrastructure and equipment requirements - Construction**

| Infrastructure | Design and construction requirements | Infrastructure location |
|---|---|---|
| Thunderbox - WWTP | • To be installed in the location outlined within Schedule 1, Figure 10 and Figure 17<br>• Fixed film submerged aerobic media treatment system.<br>• Splitter box to distribute influent flow between the two fixed film reactor tanks<br>• Submersible pump installed into anaerobic tank 2 of the existing wastewater treatment system to feed a fixed flow to the two fixed film reactor tanks<br>• Tanks equipped with shut off valves to allow 380 mm of free head space<br>• System to be upgraded by installing three additional sludge storage tanks and aerators in accordance with Schedule 1, Figure 10 | Schedule 1, Figure 10 and Figure 17 |
| Otto Bore Operations - Mine dewatering dam | • To be fitted with a high water level shut off switch to prevent overtopping;<br>• Fence around perimeter of dam; and<br>• Fauna egress ladders/nets to be installed at each corner of the turkeys nest | Schedule 1, Figure 6 |
| Bannockburn – East Dam | • Two turkey nest dams to be constructed with a capacity of at least 8,690 kL each<br>• Lined with a 1.5 mm HDPE Geotextile liner<br>• Must be designed and constructed with an operational freeboard of 300 mm<br>• Fitted with a high water level shut off switch to prevent overtopping<br>• Fence around perimeter of dam<br>• Fauna egress ladders/nets to be installed and maintained at each corner of turkeys nest<br>• Associated pipelines must be fitted with flowmeters, telemetry and automatic shutoff systems | Schedule 1, Figure 5 and Figure 11 |
| Bannockburn - WWTP | • To have a treatment capacity of 20 $m^3$/day<br>• Two alternating leach drains to be constructed with a 30 m length and width, providing an infiltrative area of at least 667 $m^2$<br>• Leach drains must comprise permeable drainage aggregate, 75 mm or 100 mm diameter distributing pipes and have a grade of no more than 1 in 200<br>• Barriers must be installed above the leach drains to prevent vehicles or heavy machinery from driving over the top of the leach drains | Schedule 1, Figure 11 |
| Bannockburn - Power supply | • Up to 200 kV to be provided by diesel generators<br>• Generators must be located on a bunded concrete hardstand that drains to an oil/water separator | Schedule 1, Figure 11 |

| Infrastructure | Design and construction requirements | Infrastructure location |
|---|---|---|
| Bannockburn - Fuel storage | • Total storage capacity of 500 $m^3$ to be comprised of above ground self-bunded tanks<br>• A concrete refueling apron must be provided with 1.8 m high side bunding and a sump for the collection of hydrocarbons<br>• Concrete bollards must be installed adjacent to the refueling apron to protect storage tanks from collision | Schedule 1, Figure 11 |
| 7 interception wells | • To be placed around the periphery of the TSF to mitigate water table mounding and contain leakage at a small distance from the TSF. | To be determined |

**4.** When constructing the infrastructure specified in Table 3, the licence holder must not depart from the requirements specified in Table 3 except:

(a) Where such departures are minor in nature and do not materially change or affect the infrastructure; and

(b) Where such departure improves the functionality of the infrastructure and does not increase the risks to public health, public amenity or the environment.

If condition 4(b) applies, then the licence holder must provide the CEO with a list of departures and demonstrate that these have not increased the risk to public health, public amenity or the environment.

**5.** The licence holder must within 30 days of each item of infrastructure required by condition 3 being constructed:

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

(b) prepare and submit to the CEO an audit report on that compliance.

**6.** The report required by condition 5, must:

(a) be certified by a suitably qualified professional engineer that each item of infrastructure listed in Table 3 meets the corresponding specifications and at the locations set out in Table 3 and has been constructed with no material defects; and

(b) be signed by a person authorised to represent the licence holder and contains the printed name and position of that person within the company.

**7.** The licence holder must:

(a) undertake inspections as detailed in

(b) Table 4;

(c) where any inspection identifies that an appropriate level of environmental protection is not being maintained, take corrective action to mitigate adverse environmental consequences as soon as practicable; and

(d) maintain a record of all inspections undertaken.

**Table 4: Inspection of infrastructure and equipment**

| Scope of inspection | Inspection requirement | Frequency of inspection |
|---|---|---|
| Embankment freeboard of containment infrastructure listed in Table 1 | Visual inspection to confirm freeboard capacity specified in Table 1 is available | • Weekly during care and maintenance<br>• Daily during operations<br>• TSF C and D inspected at least twice per 12 hour shift |
| Tailings pipelines | Visual inspection to confirm integrity | • Weekly during care and maintenance<br>• Daily during operations<br>• At least twice per 12-hour shift for pipelines associated with TSF Cells C and D |
| Return water pipelines | | |
| Dewatering pipelines | | • Daily during operations |
| Wastewater treatment plant pipelines | | • Weekly during operations |

**8.** The licence holder must ensure that all pipelines containing either alkaline, saline, or acidic materials or cyanide are either:

(a) equipped with automatic cut-outs in the event of a pipe failure; or

(b) provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections.

**9.** The licence holder must undertake an annual water balance for the TSF cells A and B, and cells C and D. The water balance must as a minimum consider the following:

(a) site rainfall;

(b) evaporation;

(c) decant water recovery volumes;

(d) seepage recovery volumes; and

(e) volumes of tailings deposited.

## Waste management

**10.** The licence holder must immediately recover, or remove and dispose of, spills of environmentally hazardous materials which occur outside an engineered containment system.

**11.** The licence holder must ensure that, where wastes produced on the prescribed premises are not taken off site for lawful use or disposal, they are managed in accordance with the requirements in

**12.** Table 5.

**Table 5: Management of waste**

| Waste Type | Management Strategy | Requirements |
|---|---|---|
| Inert Waste Type 2 | Receipt, handling and disposal of waste by landfilling | • No more than 5000 used tyres to be buried per annual period;<br>• Tyres to be buried in batches of less than 1000 whole tyres;<br>• a separation distance of at least 100mm of soil between each batch of tyres buried;<br>• Disposal of waste by landfilling must only take place within the landfill areas shown in Schedule 1, Figure 23; and<br>• Disposal of waste must be within an area of the landfill that is actively receiving waste rock dumping. |
| Inert Waste Type 1<br>Putrescible waste<br>Clean fill<br>Other waste that meets the acceptance criteria for Class II landfills | Receipt, handling and disposal of waste by landfilling | All waste types<br>• No more than 7,000 tonnes per year of all waste types cumulatively may be disposed of by landfilling within the Class II facility;<br>• Disposal of waste within the Class II facility by landfilling must only take place within the landfill areas shown in Schedule 1, Figure 13 and Figure 15;<br>• Waste must be placed in a defined trench or within an area enclosed by earthen bunds;<br>• The active tipping area must not exceed 30 m in length, 2 m in width and 2 m in height;<br>• Construction, operation and decommissioning of landfill cells can occur within the defined landfill area providing there is no waste within;<br>• 100 m of any surface water body; and<br>• 3 m of the highest level of the water table aquifer. |

**13.** The licence holder must ensure that cover is applied and maintained on landfilled waste types in accordance with the corresponding cover requirements in Table 6 that sufficient stockpiles of cover are maintained on the premises at all times.

**Table 6: Cover requirements**

| Waste type | Cover material | Cover depth | Timescales |
|---|---|---|---|
| Inert Waste Type 2 | Inert and incombustible | 100 mm | Within 7 days of tyre disposal |
| | | 500 mm | Final soil cover |
| • Inert Waste Type 1<br>• Putrescible waste<br>• Clean fill<br>• Other waste that meets the acceptance criteria for Class II landfills | | 1000 mm | Within three months of the final waste load in each trench |

**14.** The licence holder must ensure that:

(a) all reasonable and practicable measures are taken to ensure that no windblown waste escapes from the landfill areas; and

(b) any windblown waste is collected on at least a monthly basis and returned to the active tipping area or otherwise appropriately contained.

**15.** The licence holder must implement security measures at the landfill to prevent as far as practical, unauthorised access to the landfill.

## Emissions and discharges

### Point source emissions to air

**16.** The licence holder must ensure that where waste is emitted to air from the emissions points in Table 7 and identified on the corresponding map of emission points in Schedule 1 it is done so in accordance with this licence.

**Table 7: Emission points to air**

| Emission point reference | Emission point location | Emission point height (metres) | Source |
|---|---|---|---|
| Carbon regeneration kiln stack | As depicted in Schedule 1, Figure 14 | 21 | Liquified petroleum gas (LPG) |
| Powerhouse – 21 generators<br>• LPG generators with a single stack<br>• All others with a dual emissions stack | | 14 | • 14 LPG generators<br>• 4 dual fuel generators<br>• 3 diesel generators |
| Bannockburn – Power Generator | As depicted in Schedule 1, Figure 15 | N/A | • Diesel generators with a combined output of up to 200 kV |

**17.** The licence holder must ensure that emissions from the emission points listed in Table 7 for the corresponding parameter do not exceed the corresponding limits listed in Table 8.

**Table 8: Cumulative point source emission limits to air**

| Emission point reference | Parameter | Limit (including units)[1] | Averaging period |
|---|---|---|---|
| Carbon regeneration kiln stack | Arsenic | 10 mg/m$^3$ for each analyte | Minimum 60 minute average |
| | Antimony | | |
| | Cadmium | | |
| | Lead | | |
| | Mercury | | |
| | Vanadium | | |

**Note 1:** All units are referenced to STP dry

### Fugitive emissions

**18.** The licence holder must ensure that prior to, and during any disturbance to the following TSF components, these areas are continually wetted using water sprays, dribble bars or other suitable methods to ensure there is no visible windblown dust:

(a) The surface of the TSF

(b) The onsite roadways in the immediate vicinity of the TSF

(c) TSF embankments

(d) The 'TSF affected area', as denoted by Figure 16 in Schedule 1.

### Discharges to land

**19.** The licence holder must ensure that where waste is discharged to land from the source and discharge points in Table 9, it is done so in accordance with the corresponding requirements listed in Table 9 and the conditions of this licence.

**Table 9: Discharge points to land**

| Source including abatement | Discharge point reference | Discharge point location | Requirements |
|---|---|---|---|
| Treated effluent from the Thunderbox WWTP | Treated Effluent Discharge Point to TSF | As depicted in Schedule 1, Figure 17 | If treated effluent is not discharged to the waste dump it will be incorporated into the tailings stream via the existing pipeline network. |
| Treated effluent from the Bannockburn septic tanks | Bannockburn - Sewage Leach Drain | As depicted in Schedule 1, Figure 15 | Alternating discharge to two subsurface leach drains |
| Mine dewater | Thunderbox – Pit | As depicted in Schedule 1, Figure 18 | A minimum freeboard of 5 m must be maintained |
| | Bannockburn - Pit | As depicted in Schedule 1, Figure 19 | |
| | North Well - Pit | As depicted in Schedule 1, Figure 19 | |
| | Slaughter Yard - Pit | As depicted in Schedule 1, Figure 3 | |
| | Waterloo - Underground | As depicted in Schedule 1, Figure 18 | A minimum freeboard of 6 m must be maintained |
| | Water carts and crushing and screening infrastructure | Within the premises boundary | Discharged only for dust suppression purposes |

## Monitoring

**20.** The licence holder must ensure that:

(a) all water samples are collected and preserved in accordance with AS/NZS 5667.1;

(b) all groundwater sampling is conducted in accordance with AS/NZS 5667.11;

(c) all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measures; and

(d) laboratory sample must be analysed using the appropriate limit of reporting as to allow comparison with relevant environmental guidelines.

**21.** The licence holder must ensure that:

(a) monitoring is undertaken in each weekly period such that there are at least 4 days in between the days on which samples are taken in successive weeks;

(b) monitoring is undertaken in each quarterly period such that there are at least 45 days in between the days on which samples are taken in successive quarters;

(c) monitoring is undertaken in each six-monthly period such that there are at least 5 months in between the days on which samples are taken in successive periods of six months; and

(d) monitoring is undertaken in each annual period such that there are at least 9 months in between the days on which samples are taken in successive years.

**22.** The licence holder must monitor emissions in accordance with the requirements specified in Table 10.

**Table 10: Monitoring of point source emissions to air**

| Emission point | Parameter | Units[1] | Averaging period | Frequency[2] | Method |
|---|---|---|---|---|---|
| Carbon regeneration kiln stack | Arsenic | mg/m$^3$ | Minimum 60 minutes | Annually | USEPA Method 29 |
| | Antimony | | | | |
| | Cadmium | | | | |
| | Lead | | | | |
| | Mercury | | | | |
| | Vanadium | | | | |
| | Particulates | | | | USEPA Method 5 or 17 |
| Power station | Sulphur dioxide ($SO_2$) | mg/m$^3$ | Minimum 30 minutes | Annually | USEPA Method 6C |
| | Carbon Monoxide (CO) | | | | USEPA Method 10 |
| | NOx (Nitrogen oxides - NO and $NO_2$) | | | | USEPA Method 7E |
| | Particulates | | | | USEPA Method 5 or 17 |

**Note 1:** All units are referenced to STP dry
**Note 2:** Monitoring must be undertaken to reflect normal operating conditions and any limits or conditions on inputs or production

**23.** The licence holder must monitor tailings decant and ambient groundwater for concentrations of the parameters listed in Table 11:

(a) at the corresponding monitoring location;

(b) in the corresponding unit;

(c) at no less that the corresponding frequency;

(d) for the corresponding averaging period; and

(e) record and investigate results that do not meet any limit specified as set out in Table 11.

**Table 11: Monitoring of surface water quality of tailings decant and ambient groundwater**

| Monitoring point location | Parameter | Limit | Units | Averaging period | Frequency |
|---|---|---|---|---|---|
| Monitoring bores: TSFMB08D, TSFMB09D, TSFMB10D, TSFMB11D, and TSFMB12D (shallow and deep) | Standing water level (SWL) | >4 | mbgl | Spot sample | Quarterly |
| | pH[1] | 6.0 to 9.0 | N/A | | |
| | Total dissolved solids (TDS) | <5000 | mg/L | | |
| | Arsenic (As) | <0.5 | | | |
| | Weak acid dissociable cyanide (WAD CN) | <0.5 | | | |
| | Antimony (Sb) | N/A | mg/L | Spot sample | Six monthly |
| | Bicarbonate ($HCO_3$) | | | | |
| | Calcium (Ca) | | | | |
| | Carbonate ($CO_3$) | | | | |
| | Cadmium (Cd) | | | | |
| | Chloride (Cl) | | | | |
| | Chromium (Cr) | | | | |
| | Cobalt (Co) | | | | |
| | Copper (Cu) | | | | |
| | Iron (Fe) | | | | |
| | Lead (Pb) | | | | |
| | Magnesium (Mg) | | | | |
| | Manganese (Mn) | | | | |
| | Mercury (Hg) | | | | |
| | Molybdenum (Mo) | | | | |
| | Nickel (Ni) | | | | |
| | Nitrate ($NO_3$) | | | | |
| | Potassium (K) | | | | |

| Monitoring point location | Parameter | Limit | Units | Averaging period | Frequency |
|---|---|---|---|---|---|
| Monitoring bores: TSFMB08D, TSFMB09D, TSFMB10D, TSFMB11D, and TSFMB12D (shallow and deep) | Selenium (Se) | N/A | mg/L | Spot sample | Six monthly |
| | Sodium (Na) | | | | |
| | Sulfate ($SO_4$) | | | | |
| | Thallium (Tl) | | | | |
| | Total cyanide (CN) | | | | |
| | Zinc (Zn) | | | | |
| Tailings decant | Weak acid dissociable cyanide (WAD CN) | 50 | mg/L | Spot sample | Quarterly |
| | Arsenic[1] | N/A | | | Weekly |

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

**24.** The licence holder must, when standing water levels rise higher than 6 mbgl, provide the CEO with the following information:

(a) the monitoring bore location

(b) the measures taken to identify the cause of the exceedance(s); and

(c) the measures taken, or intended to be taken, to prevent a recurrence of the exceedance(s).

**25.** The licence holder must undertake monitoring in accordance with the requirements specified in Table 12 and record the results of all such monitoring.

**Table 12: Process monitoring**

| Location | Parameter | Units | Averaging period | Frequency | Method |
|---|---|---|---|---|---|
| Thunderbox WWTP discharge points | Volume of treated effluent discharged to the Eastern Waste Dump | kL | Annual | Continuous | Flow metering device |
| | Volume of treated effluent discharged to TSFs | | | | |
| Bannockburn WWTP leach drain | Volume of treated effluent discharged to the leach drain | | | | |

**26.** The licence holder must record and investigate the exceedance of any descriptive or numerical limit specified in any part of this licence.

## Records and reporting

**27.** The licence holder must record the following information in relation to complaints received by the licence 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 licence holder to investigate or respond to any complaint.

**28.** The licence holder must:

(a) undertake an audit of their compliance with the conditions of this licence during the preceding annual period; and

(b) prepare and submit to the CEO by no later than 60 days after the end of that annual period an Annual Audit Compliance Report in the approved form.

**29.** The licence holder must maintain accurate and auditable books including the following records, information, reports, and data required by this licence:

(a) the calculation of fees payable in respect of this licence;

(b) the works conducted in accordance with condition 3 of this licence;

(c) any maintenance of infrastructure that is performed in the course of complying with conditions 1, 2, 7, 11, 13 and 15 of this licence;

(d) monitoring programmes undertaken in accordance with conditions 9, 22, 23, 24 and 25 of this licence; and

(e) complaints received under condition 27 of this licence.

**30.** The books specified under condition 29 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) except for records listed in 30(d) be retained for at least 6 years from the date the records were made or until the expiry of the Licence or any subsequent licence;

(d) for those following records, be retained until the expiry of the Licence and any subsequent licence:

(i) off-site environmental effects; or

(ii) matters which affect the condition of the land or waters, and

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

**31.** The licence holder must submit to the CEO by no later than 60 days after the end of each annual period, an Annual Environmental Report for that annual period for the conditions listed in Table 13, and which provides information in accordance with the corresponding requirement set out in Table 13.

**Table 13: Annual Environmental Report**

| Condition or table | Parameter | Format or form |
|---|---|---|
| Condition 7 ( Table 4) | Corrective actions taken for infrastructure/equipment not performing as per inspection requirements. | None specified |
| Condition 9 | Water balance | Tabulated data |
| - | Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken | - |
| - | Actual production throughputs for prescribed premises categories. | Tabulated data |
| Condition 22 (Table 10) | Air quality monitoring | Tabulated data |
| Condition 23 (Table 11) | An interpretation of ambient groundwater monitoring data results including comparison to historical trends. | Tabulated ambient groundwater monitoring data results and time series graphs for each monitoring well showing concentrations of all parameters over a 4-year period. |
| Condition 25 (Table 12) | Process monitoring | Tabulated data |
| Condition 27 | Summary of complaints | None specified |
| Condition 28 | Compliance | Annual Audit Compliance Report (AACR) |

**32.** The licence holder must ensure that the Annual Environmental Report also contains:

(a) any relevant process, production or operational data; and

(b) an assessment of the information contained within the report against previous monitoring results and licence limits.

**33.** The licence holder must submit the information in

34. Table 14 to the CEO according to the specifications in that table.

**Table 14: Non-annual reporting requirements**

| Condition or table | Parameter | Reporting period | Reporting date (after the end of the reporting period) | Format or form |
|---|---|---|---|---|
| - | Copies of original monitoring reports submitted to the licence holder by third parties. | Not applicable | Within 14 days of the CEOs request | As received by the licence holder from third parties. |
| Condition 11 | The Licence holder shall:<br>• Record the location of each batch of used tyres buried within the waste rock landforms; and<br>• Record the number of tyres in each batch buried within the waste rock landforms. | | | N/A |

**35.** The licence holder must ensure that the parameters listed in Table 15 are notified to the CEO, in accordance with the notification requirements of the table.

**Table 15: Notification requirements**

| Condition or table | Parameter | Reporting requirement[1] | Format or form[2] |
|---|---|---|---|
| Condition 24 | Standing Water Level exceeding 6 mbgl | Within 7 calendar days of becoming aware of Standing Water Levels exceeding 6 mbgl | None specified |
| Condition 26 | Breach of any limit specified in the licence | Part A: As soon as practicable but no later than 5pm of the next usual working day.<br>Part B: As soon as practicable. | N1 |

**Note 1:** Notification requirements in the licence must not negate the requirement to comply with s72 of the EP Act.
**Note 2:** Forms are in Schedule 2.

# Definitions

In this licence, the terms in Table 16 have the meanings defined.

**Table 16: Definitions**

| Term | Definition |
|---|---|
| ACN | Australian Company Number |
| Annual Audit Compliance Report (AACR) | means a report submitted in a format approved by the CEO (relevant guidelines and templates may be available on the Department's website). |
| annual period | a 12 month period commencing from 1 October until 30 September of the immediately following year. |
| AS/NZS 5667.1 | means the Australian Standard AS/NZS 5667.1 *Water Quality – Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples*. |
| AS/NZS 5667.11 | means the Australian Standard AS/NZS 5667.11 *Water Quality – Sampling – Guidance on sampling of groundwaters*. |
| averaging period | means the time over which a limit is measured or a monitoring result is obtained; |
| books | has the same meaning given to that term under the EP Act. |
| CEO | means Chief Executive Officer of the Department.<br>"submit to / notify the CEO" (or similar), means either:<br>Director General<br>Department administering the *Environmental Protection Act 1986*<br>Locked Bag 10<br>Joondalup DC WA 6919<br>or:<br>info@dwer.wa.gov.au |
| Clean fill | has the meaning defined in Landfill Definitions |
| Department | means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3. |
| 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. |
| environmentally hazardous material | means material (either solid or liquid raw materials, materials in the process of manufacture, manufactured products, products used in the manufacturing process, by-products and waste) which if discharged into the environment from or within the premises may cause pollution or environmental harm |
| EP Act | *Environmental Protection Act 1986* (WA) |
| EP Regulations | *Environmental Protection Regulations 1987* (WA) |

| Term | Definition |
|---|---|
| freeboard | means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point |
| HDPE | means High Density Polyethylene; |
| Inert Waste Type 1 and Type 2 | has the meaning defined in Landfill Definitions |
| licence | refers to this document, which evidences the grant of a licence by the CEO under section 57 of the EP Act, subject to the specified conditions contained within. |
| licence holder | refers to the occupier of the premises, being the person specified on the front of the licence as the person to whom this licence has been granted. |
| mbgl | means metres below ground level |
| monthly period | means a one-month period commencing from day 1 of a month until the last day of that month. |
| 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 |
| NOx | means oxides of nitrogen, calculated as the sum of nitric oxide and nitrogen dioxide and expressed as nitrogen dioxide |
| premises | refers to the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map in Schedule 1 to this licence. |
| prescribed premises | has the same meaning given to that term under the EP Act. |
| PVC | means Polyvinyl Chloride plastic |
| quarterly | means the 4 inclusive periods from 1 April to 30 June, 1 July to 30 September, 1 October to 31 December and in the following year, 1 January to 31 March; |
| Schedule 1 | means Schedule 1 of this Licence unless otherwise stated |
| Schedule 2 | means Schedule 2 of this Licence unless otherwise stated |
| Schedule 3 | means Schedule 3 of this Licence unless otherwise stated |
| Six monthly | means the two inclusive periods 1 October to 31 March and 1 April to 30 September |
| spot sample | means a discrete sample representative at the time and place at which the sample is taken |
| STP dry | means standard temperature and pressure (0$^{o}$ Celsius and 101.325 kilopascals respectively), dry |

| Term | Definition |
|---|---|
| TSF | means Tailings Storage Facility |
| USEPA | means United States (of America) Environmental Protection Agency |
| USEPA Method 5 | means the United States (of America) Environmental Protection Agency *Method 5 – Determination of Particulate Matter Emissions from Stationary Sources* |
| USEPA Method 6C | means the United States (of America) Environmental Protection Agency *Method 6C – Determination of Sulfur Dioxide Emissions from Stationary Sources* |
| USEPA Method 7E | means the United States (of America) Environmental Protection Agency *Method 7E – Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyzer Procedure)* |
| USEPA Method 10 | means the United States (of America) Environmental Protection Agency *Method 10 – Determination of Carbon Monoxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)* |
| USEPA Method 17 | means the United States (of America) Environmental Protection Agency *Method 17 – Determination of Particulate Matter Emissions from Stationary Sources* |
| USEPA Method 29 | means the United States (of America) Environmental Protection Agency *Method 29 – Determination of Metals Emissions from Stationary Sources* |
| waste | has the same meaning given to that term under the EP Act. |
| WWTP | means wastewater treatment plant |

**END OF CONDITIONS**

# Schedule 1: Maps

## Premises maps

The whole of the premises boundary is shown in green in the map below.

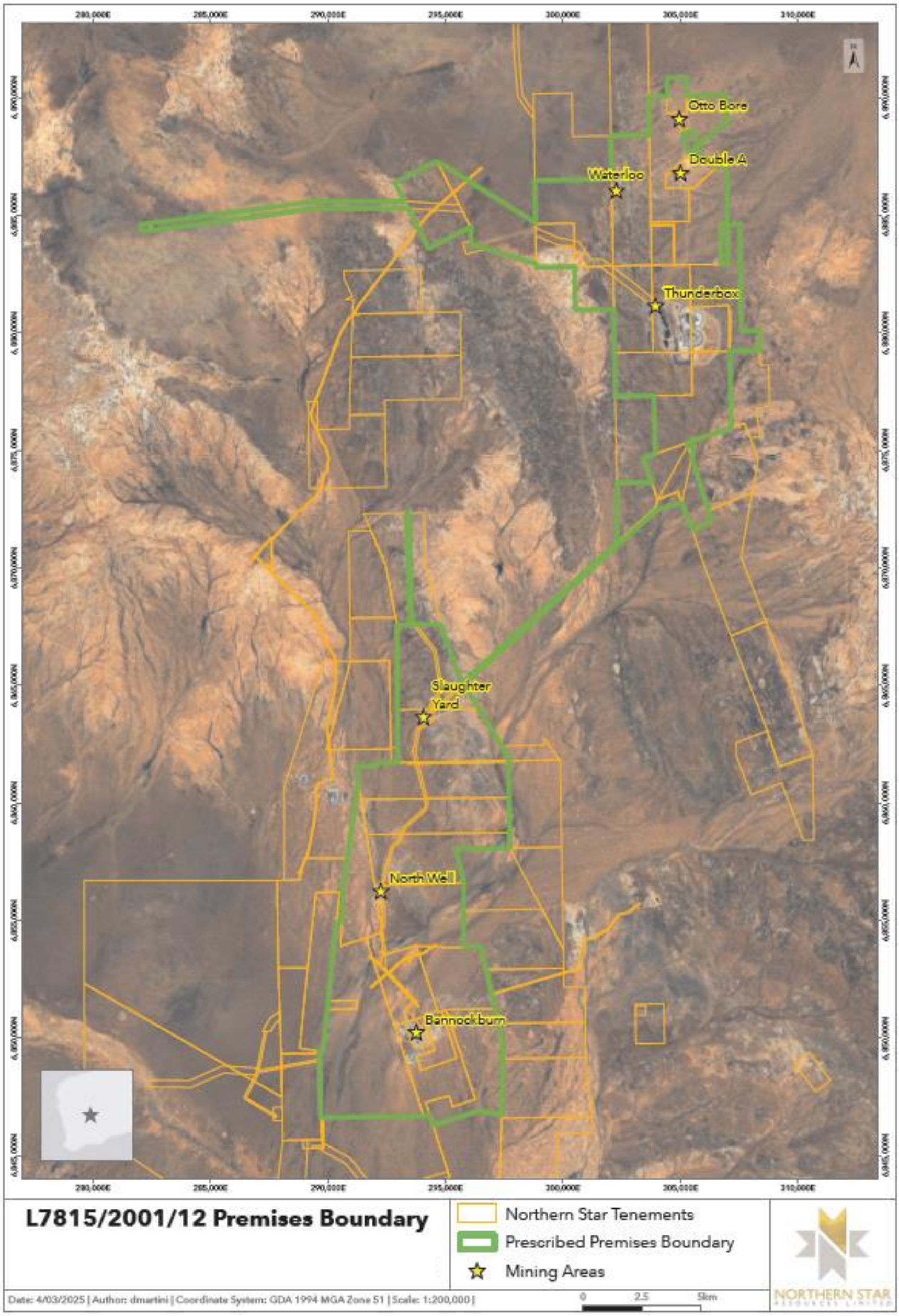


**Figure 1: Premises map**

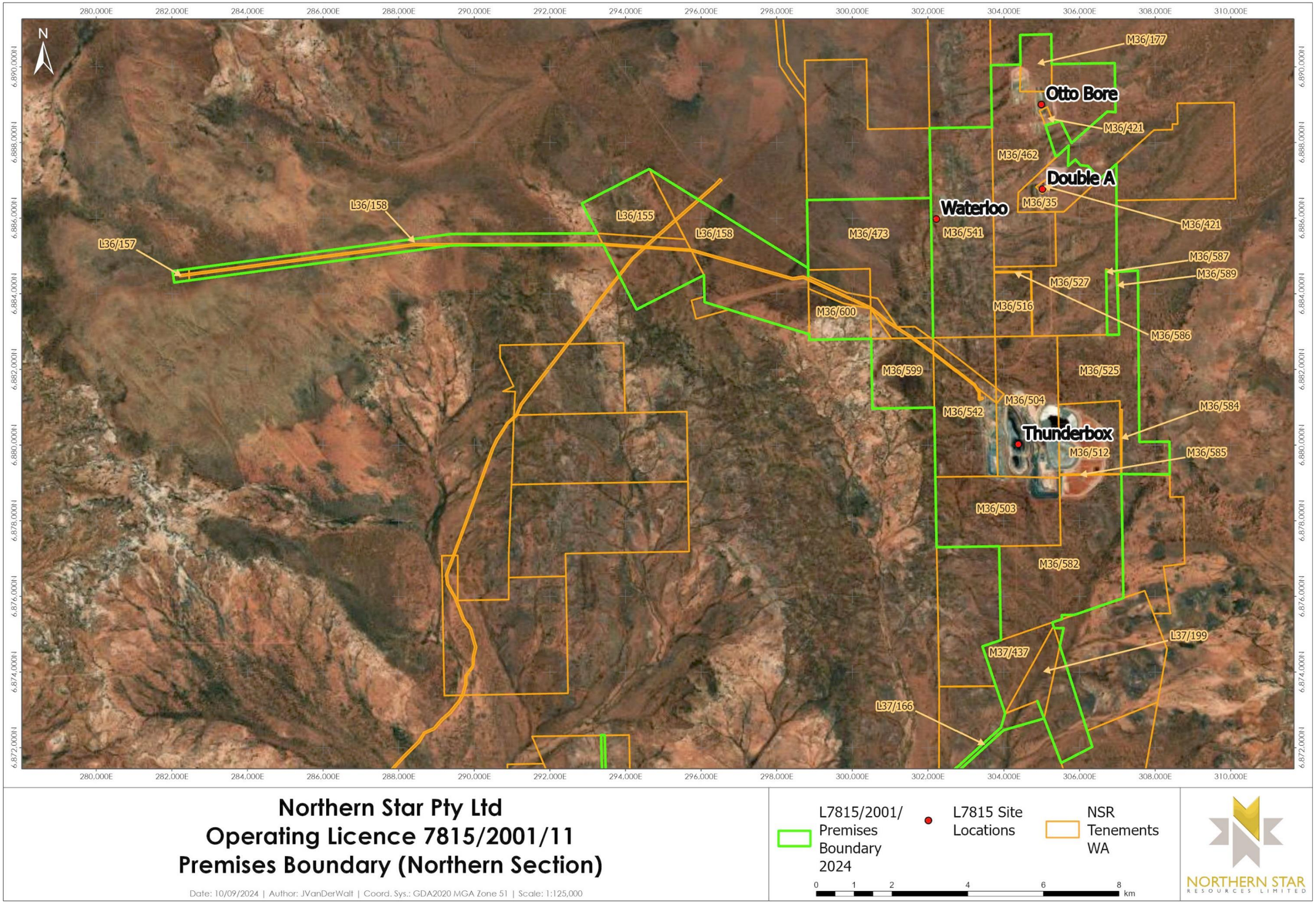


**Figure 2: Northern section (Thunderbox operations) of the premises boundary and mining tenements**


**Figure 3: Southern section (Bannockburn operations) of the premises boundary and mining tenements**

## Maps of monitoring locations and containment infrastructure

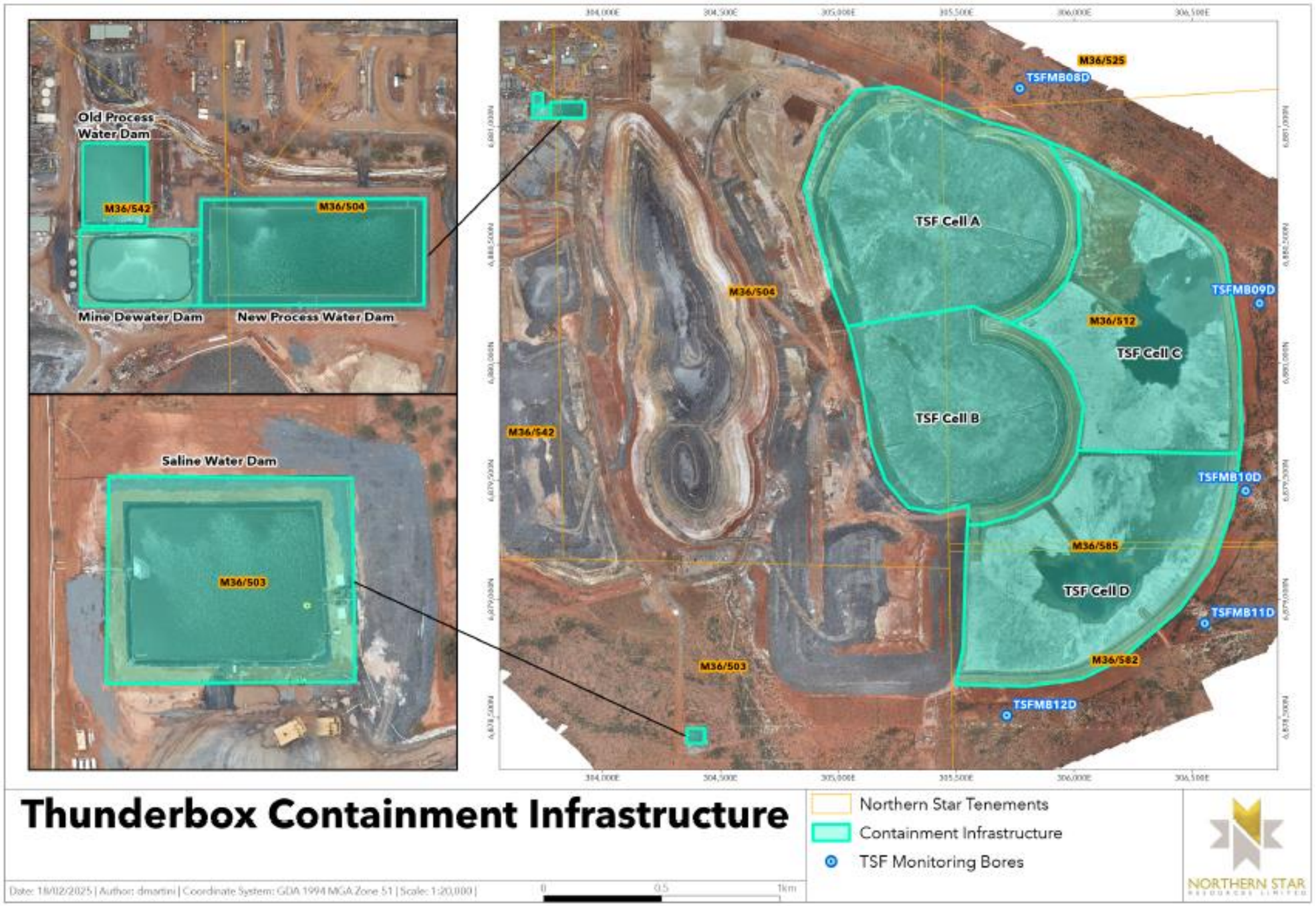


**Figure 4: Location of containment infrastructure and TSF groundwater monitoring bores at the Thunderbox operations (northern section of premises)**


**Figure 5: Location of containment infrastructure at the Bannockburn operations (southern section of premises)**

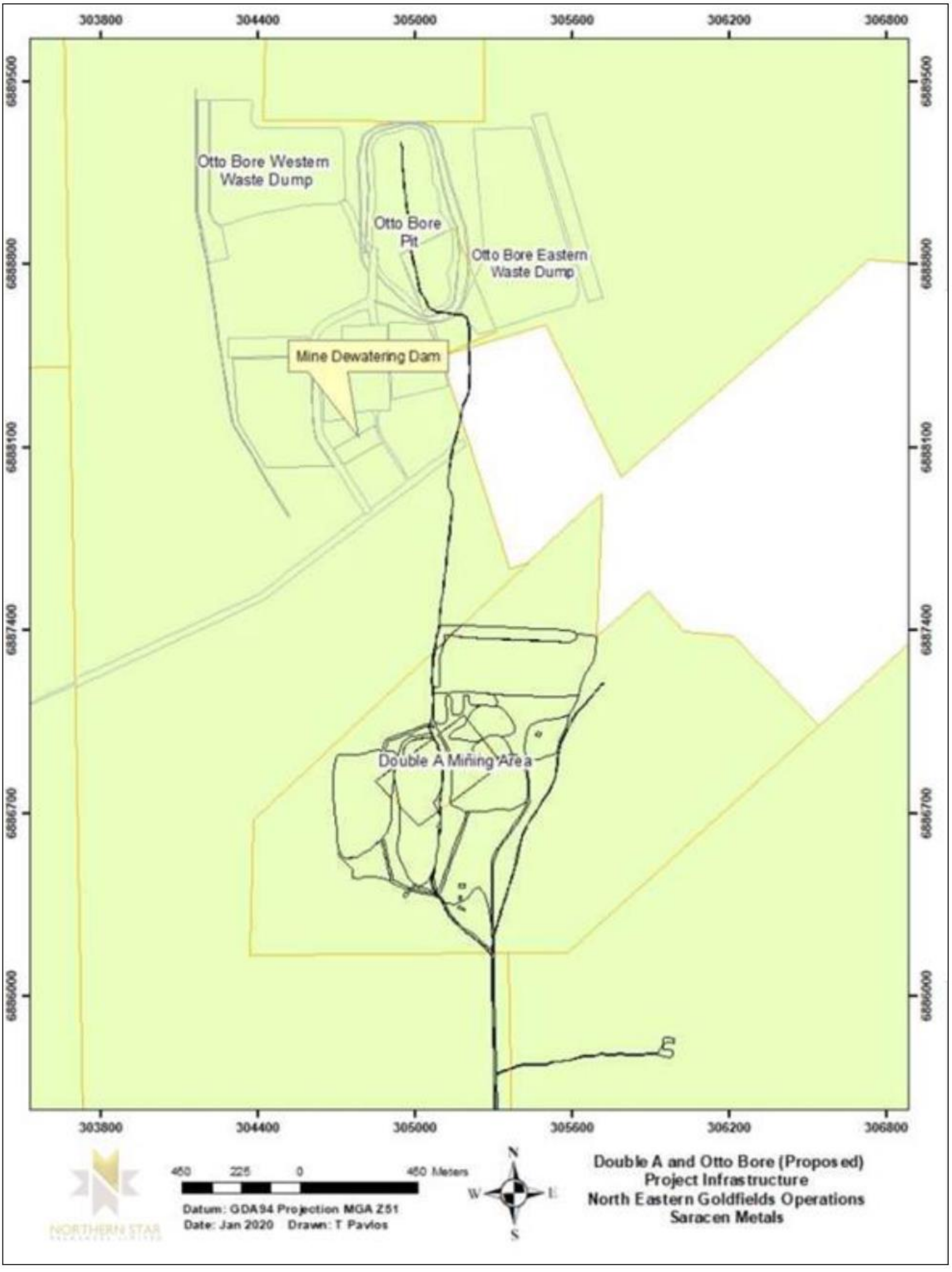


**Figure 6: Location of dewatering dam at Otto Bore.**

## Maps of site infrastructure and equipment

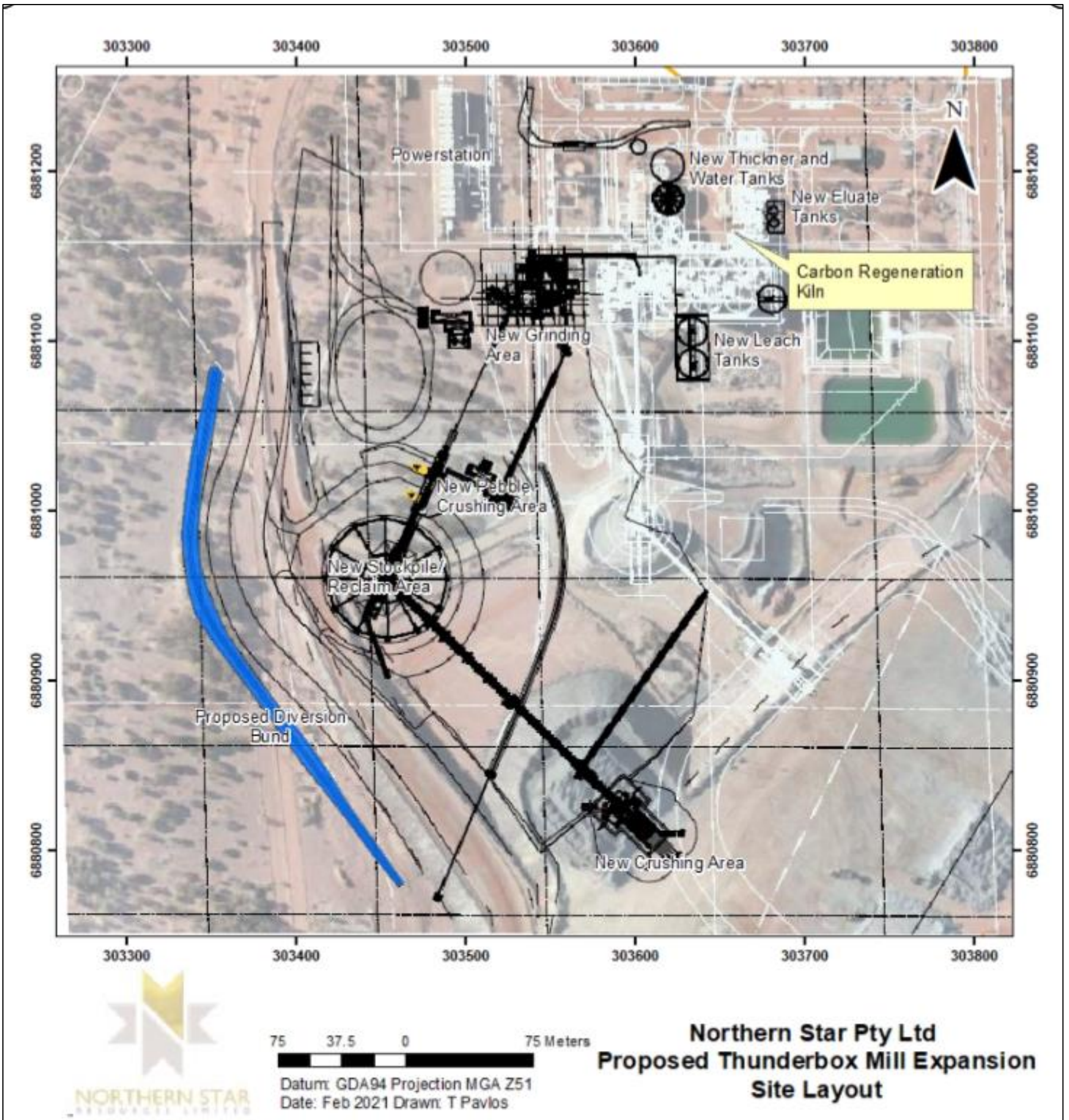


**Figure 7: Map of Thunderbox Mill expansion infrastructure layout**

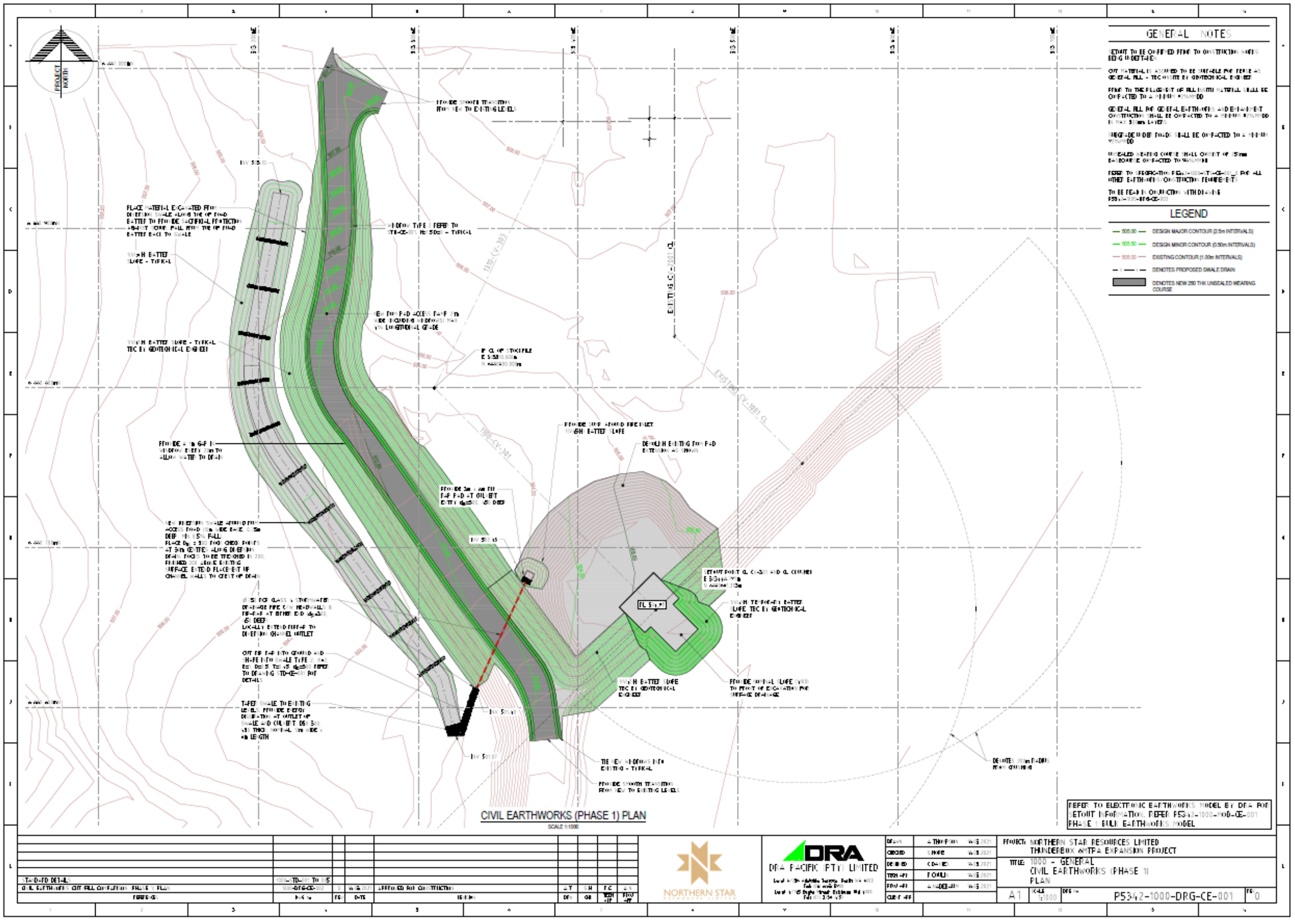


**Figure 8: Schematic drawing of the stormwater diversion bund**

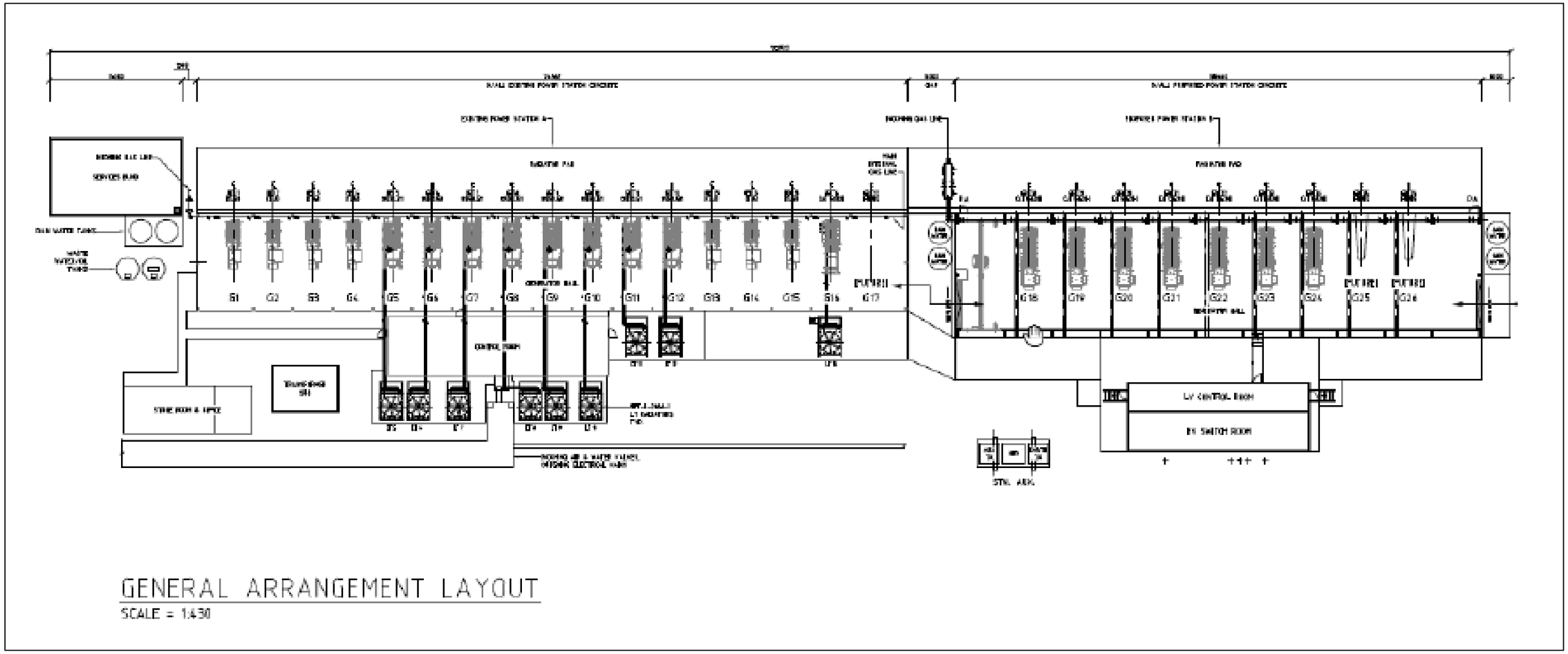


**Figure 9: Layout of Thunderbox powerhouse**

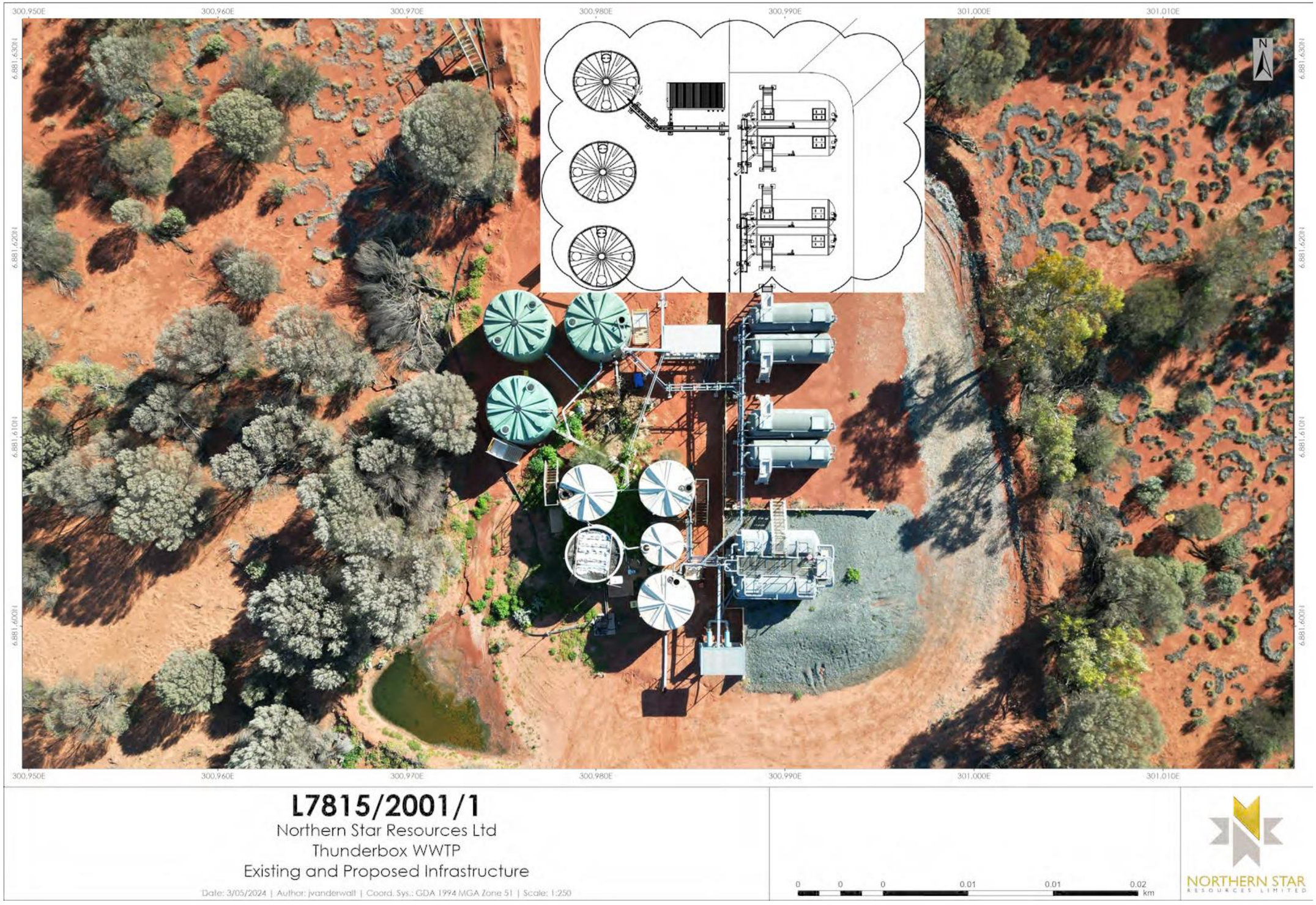


**Figure 10: Existing Thunderbox WWTP and additions to the WWTP**

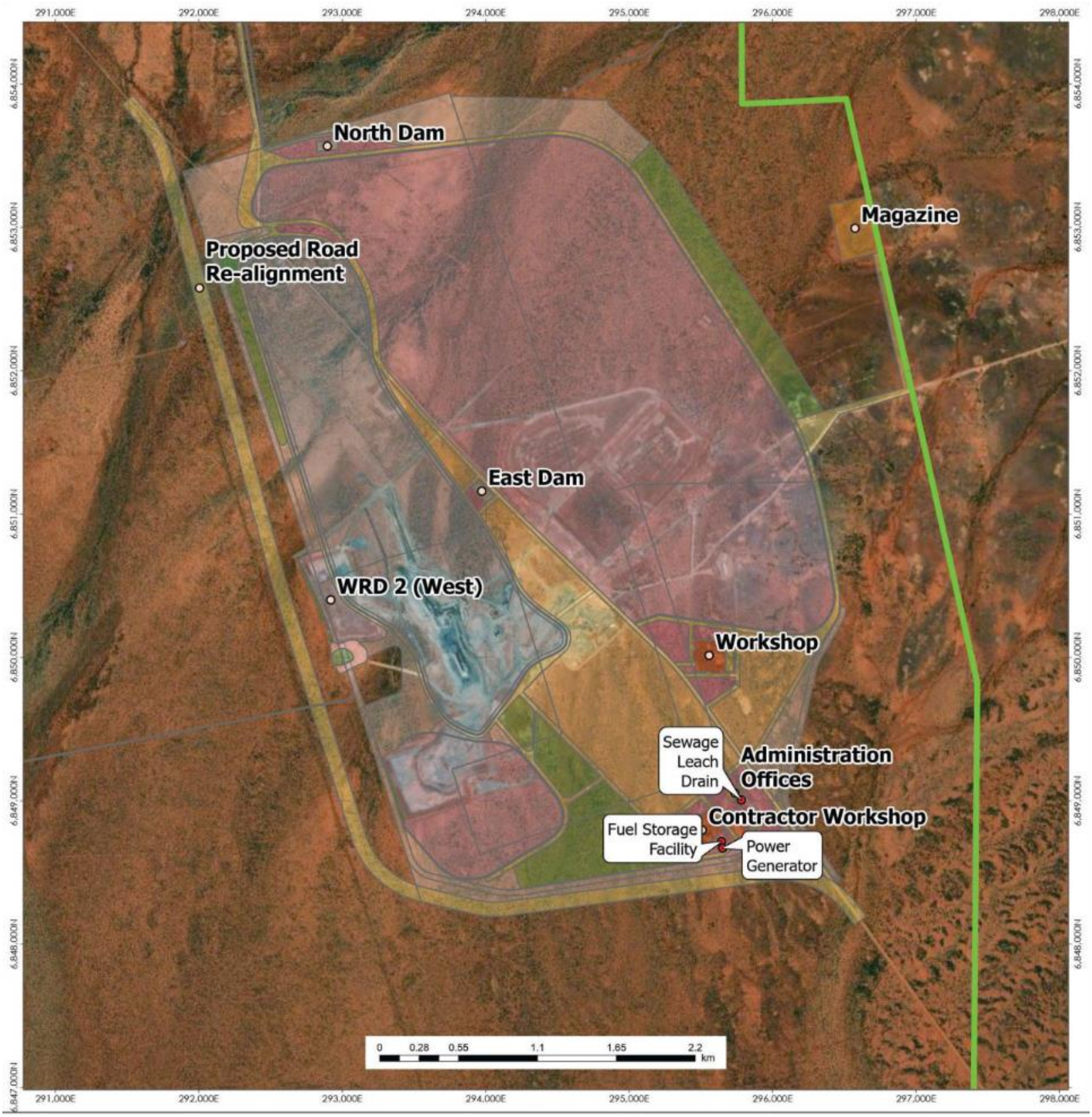


**Figure 11: Layout of site infrastructure and equipment at the Bannockburn operations**

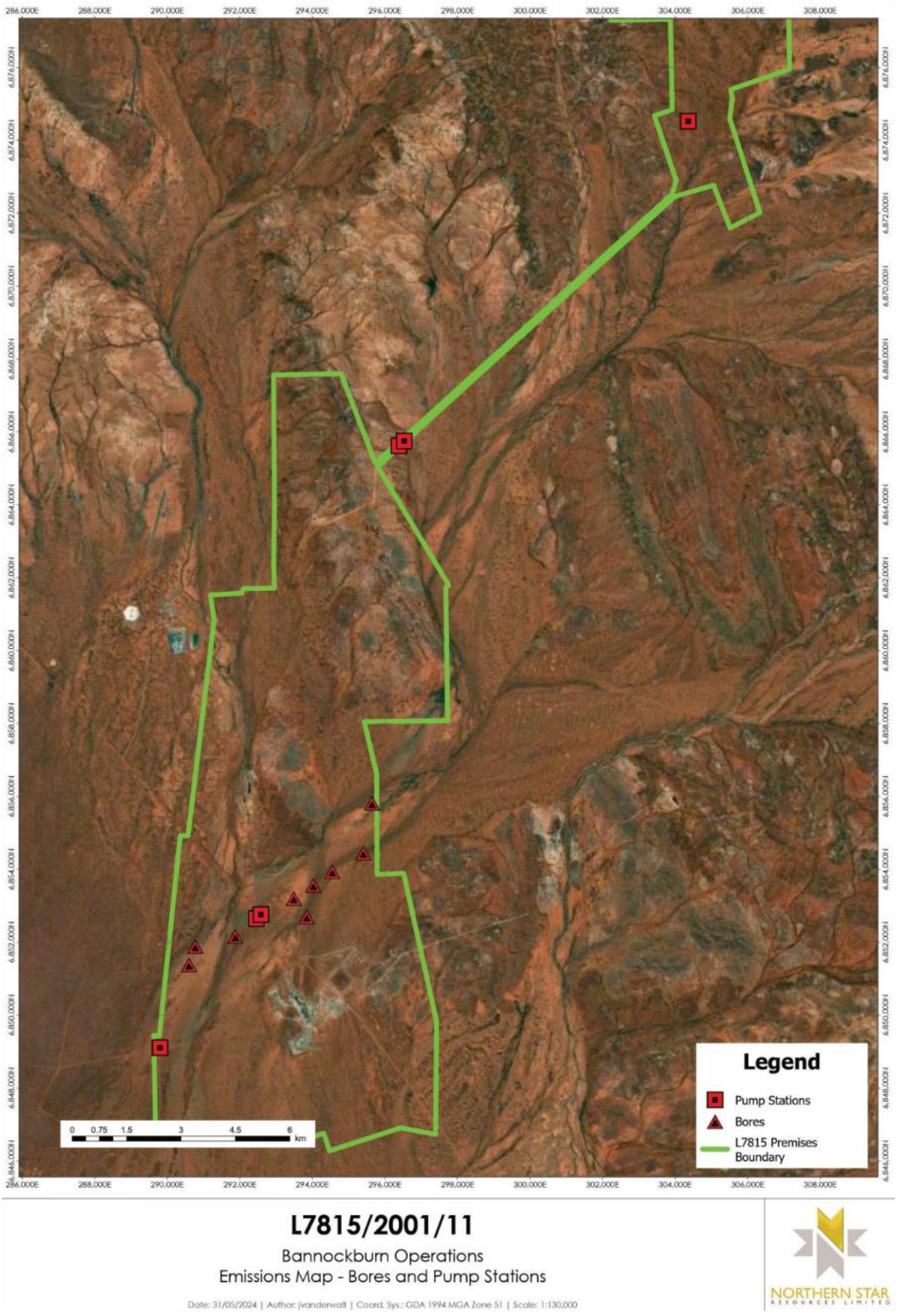


**Figure 12: Location of fuel storage tanks servicing the bore field**

## Maps of emission and discharge points


**Figure 13: Location of landfill and discharges to land at the Thunderbox operations**


**Figure 14: Locations of emission points to air at the Thunderbox operations (carbon regeneration kilns and the powerhouse).**

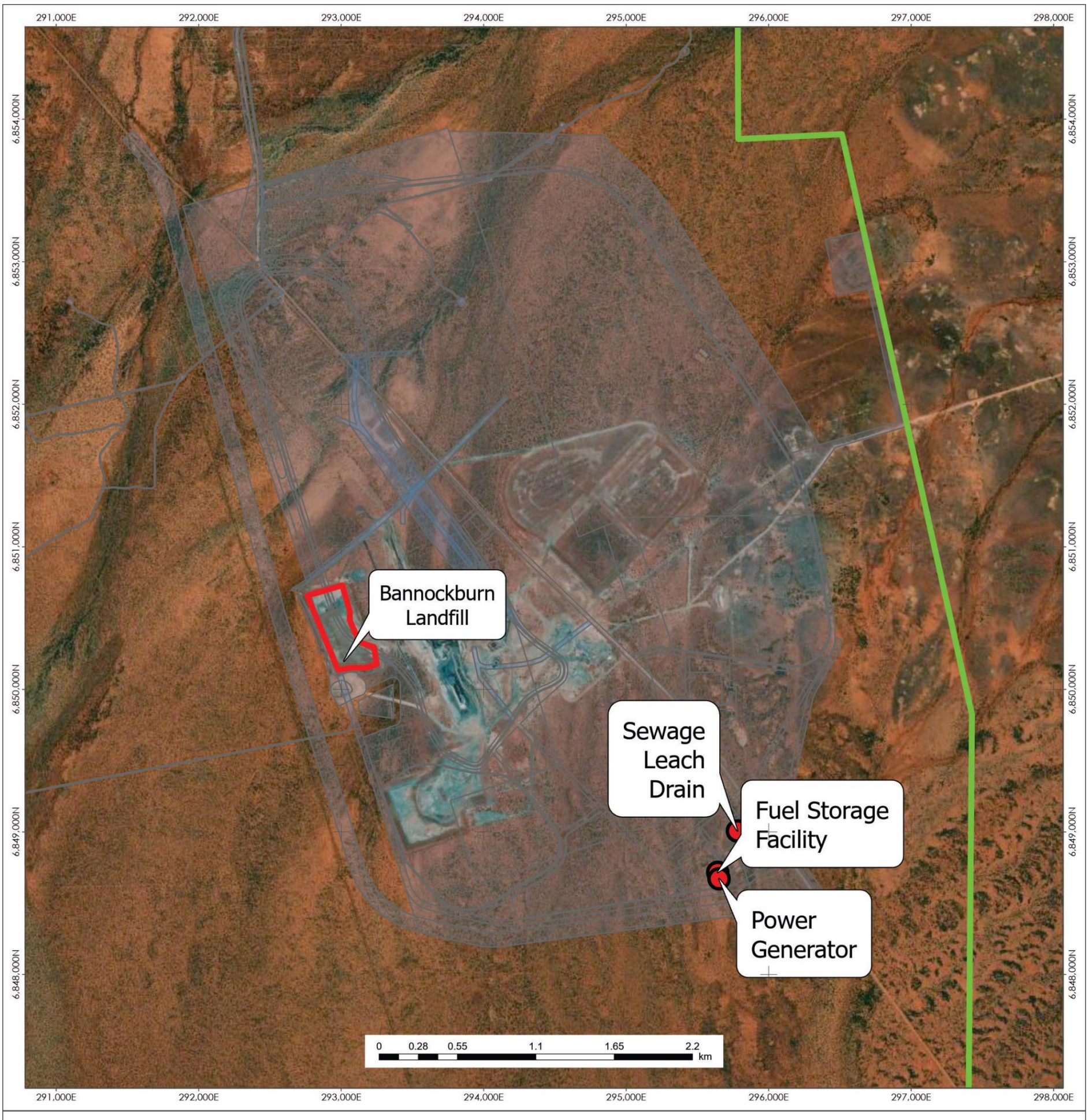


**Figure 15: Location of landfill, emission points to air and discharges to land at the Bannockburn operations**

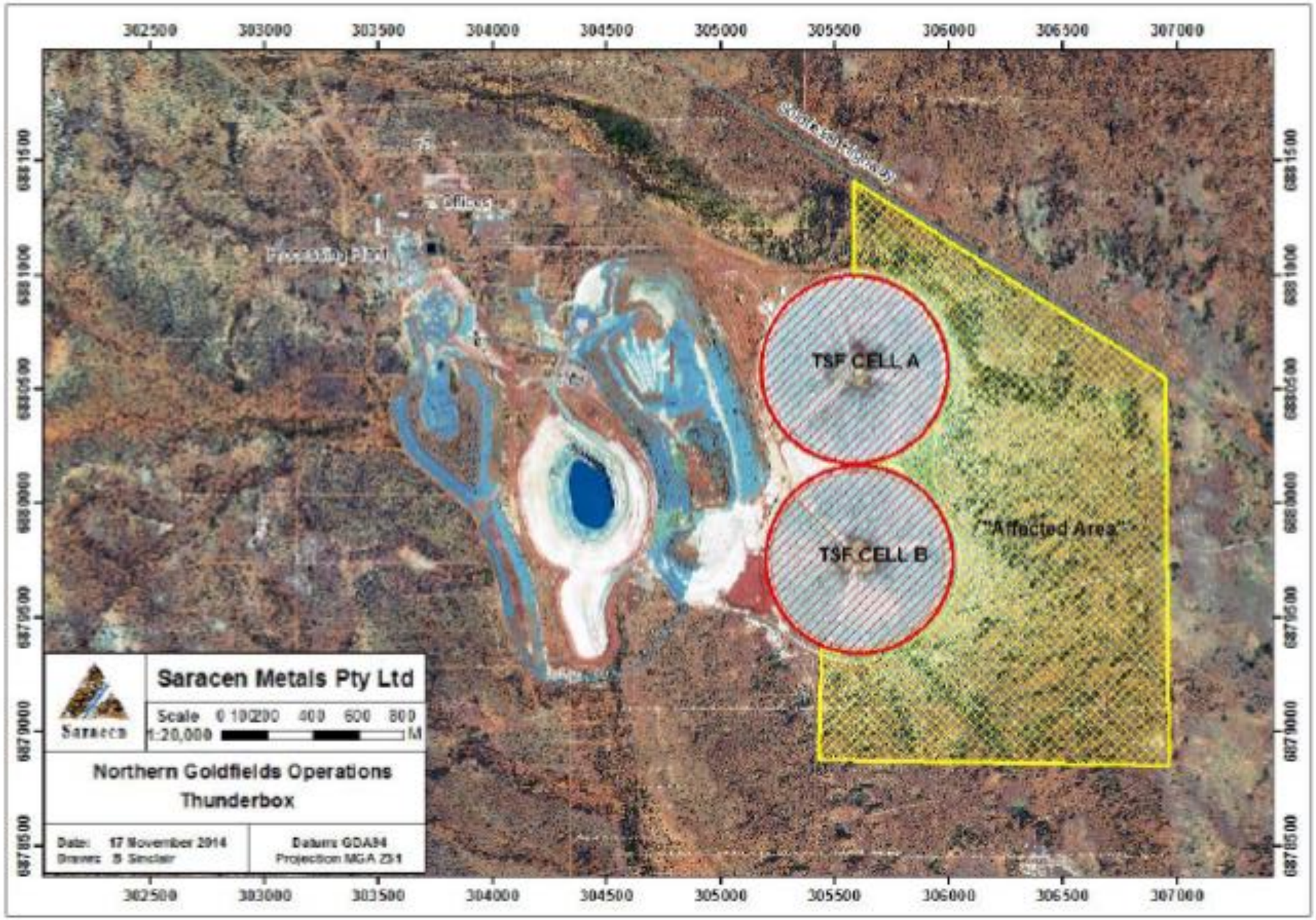


**Figure 16: Location of areas subject to fugitive dust controls in condition 18**

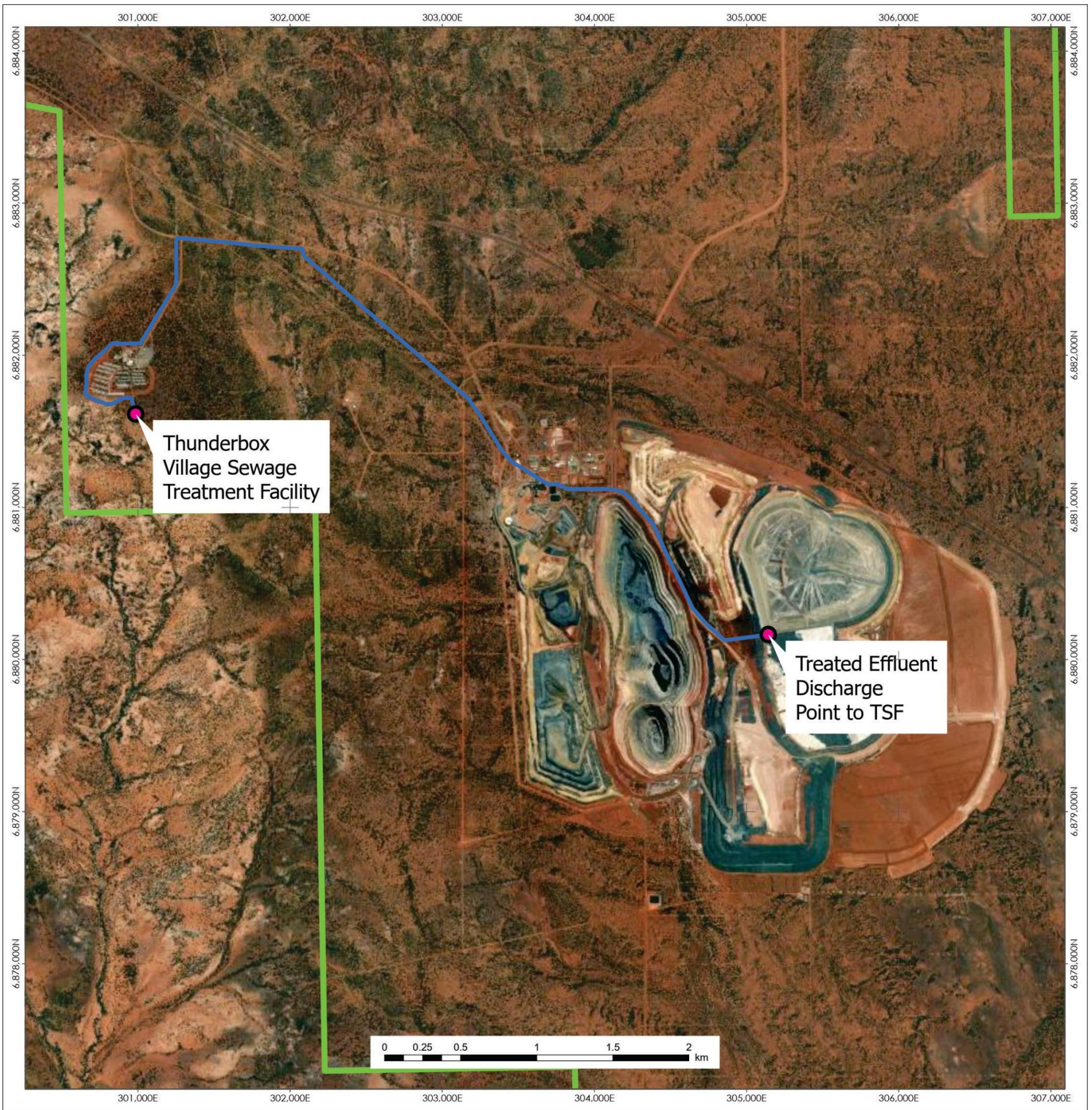


**Figure 17: Treated effluent pipelines and discharge points at Eastern Waste Dump and TSF**


**Figure 18: Location of mine dewatering discharge points at the Thunderbox pit and Waterloo underground**


**Figure 19: Location of mine dewatering discharge points at the Bannockburn and North Well pits**


**Figure 20: TSF Cells C and D and associated pipelines**

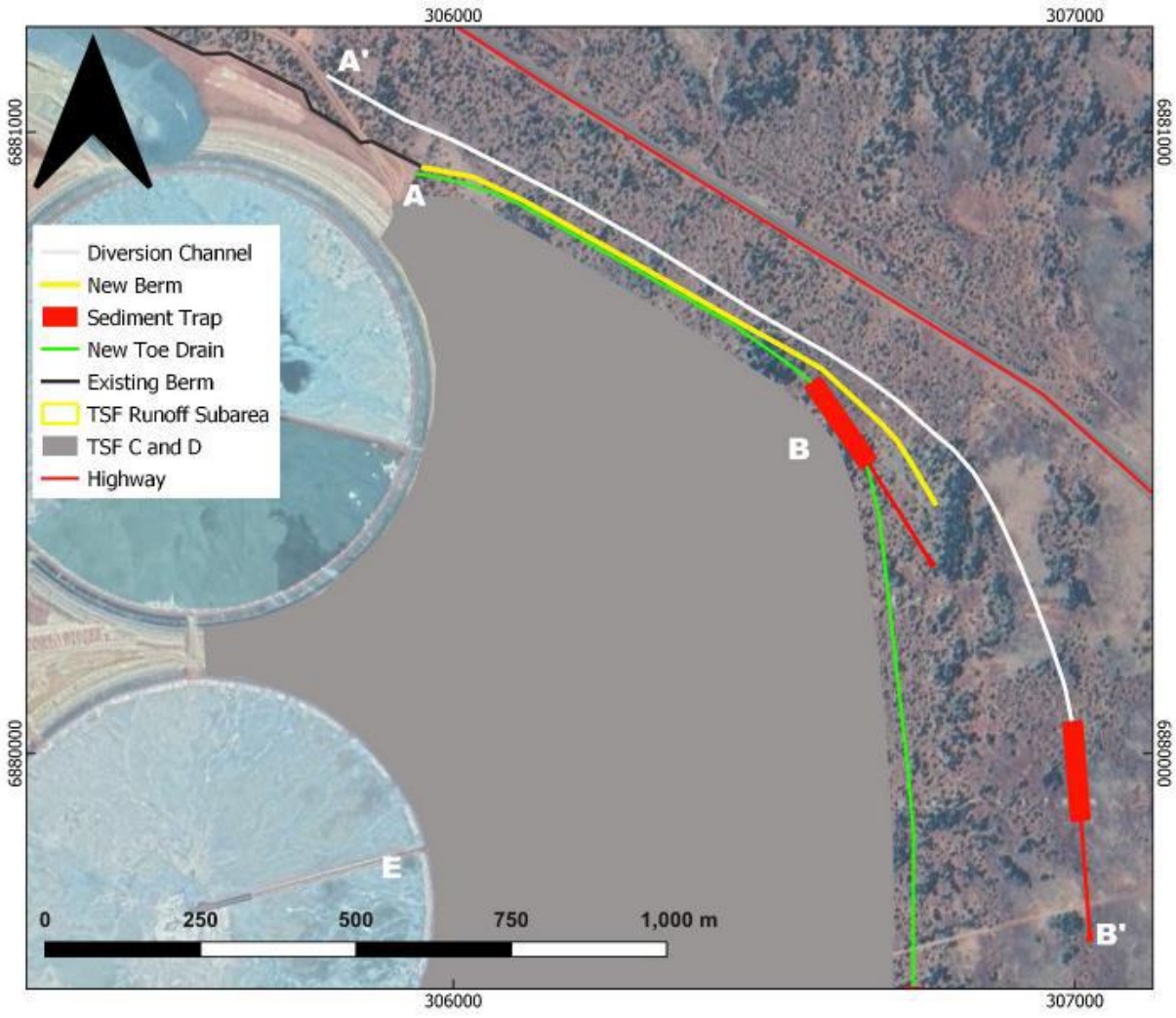


**Figure 21: Positions of external toe drain, berm and diversion channel**

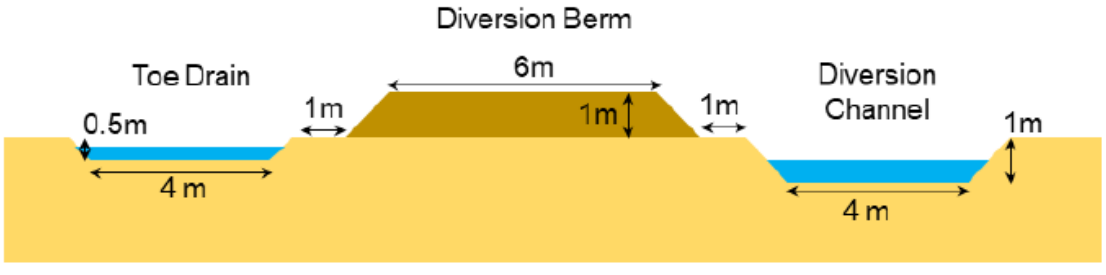


**Figure 22: Schematic of toe drain, berm and diversion channel**


**Figure 23: Location of used tyre storage and Class I landfill facilities**

# Schedule 2: Reporting and notification forms

## N1 form

The licence holder is to submit this form in accordance with the requirements of this licence

Government of **Western Australia**
Department of **Water and Environmental Regulation**

**Licence:** L7815/2001/12 **Licence holder:** Northern Star (Thunderbox) Pty Ltd

**Form:** N1 **Date of breach:**

**Notification of detection of the breach of a limit.**

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

### Part A

| | |
|---|---|
| **Licence number** | L7815/2001/12 |
| **Name of operator** | |
| **Location of premises** | |
| **Time and date of the detection** | |

| **Notification requirements for the breach of a limit** | |
|---|---|
| **Emission point reference/source** | |
| **Parameter(s)** | |
| **Limit** | |
| **Measured value** | |
| **Date and time of monitoring** | |
| **Measures taken, or intended to be taken, to stop the emission** | |

## Part B

| | |
|---|---|
| **Any more accurate information on the matters for notification under Part A.** | |
| **Measures taken, or intended to be taken, to prevent a recurrence of the incident.** | |
| **Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission.** | |
| **The dates of any previous N1 notifications for the premises in the preceding 24 months.** | |

| | |
|---|---|
| **Name** | |
| **Signature on behalf of licence holder** | |
| **Date** | |