



Works approval number	W6088/2017/1
Works approval holder	Thunderbird Operations Pty Ltd
ACN	611 351 743
Registered business address	Level 2, 41 – 47 Colin Street WEST PERTH WA 6005
DWER file number	DER2017/001386-1
Duration	22/08/2018 to 22/08/2024
Date of amendment	8/18/2022
Premises details	Thunderbird Mineral Sands Project Great Northern Hwy WATERBANK WA 6725 Legal description – Part of mining tenements M04/459; L04/84; L04/85 and L04/86

Prescribed premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>)	Assessed design/production capacity
Category 8: Mineral sands mining or processing: premises on which mineral sands ore is mined, screened, separated or otherwise processed.	Processing Rates: 9,000,000 tonnes per annual period (Stage 1) 18,000,000 tonnes per annual period (Stage 2) Mining Rates: 12,500,000 tonnes per annual period (Stage 1) 25,000,000 tonnes per annual period (Stage 2)
Category 54: Sewage facility: premises – (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	Wastewater treatment plant (WWTP) 1 100 m ³ /day
	WWTP 2 – 17.5 m ³ /day
Category 89: Putrescible landfill site: premises on which waste (as determined by reference to	1,100 tonnes per annual period

the waste type set out in the document entitled “Landfill Waste Classification and Waste Definitions 1996” as published by the Chief Executive Officer, as amended from time to time) is accepted for burial.	
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This amendment is granted to the works approval holder, subject to the attached conditions, on 18 August 2022, by:

Christine Pustkuchen
A/Manager, Resource Industries
REGULATORY SERVICES

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

Works approval history

Date	Ref number	Summary of changes
24/08/2018	W6088/2017/1	Works approval granted.
08/10/2019	W6088/2017/1	Amendment Notice 1 – addition of Stage 1B infrastructure relating to tailings disposal.
06/03/2020	W6088/2017/1	Amendment to reflect changes to project design, including removal of the ilmenite processing circuit (this amendment).
18/08/2022	W6088/2017/1	<p>Amendment application for the following:</p> <ul style="list-style-type: none"> • Modifications to the secondary process plant design; • Modifications to the design and function of the tailings storage facility (TSF) and Stormwater Storage Pond (SPP); and • Construction and time limited operations of a new wastewater treatment plant (WWTP 2).

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:

Infrastructure and equipment

1. The works approval holder must install and undertake the works for the infrastructure and equipment specified in Table 1, to the requirements specified in that table.
2. Subject to condition 1, within 28 calendar days of the completion of the works specified in Table 1 for each of phase 2, phase 3, phase 4 and phase 5, the works approval holder must submit to the CEO an Environmental Compliance Report (ECR) certified by a suitably qualified professional engineer that:
 - (a) lists and describes the completed works and any associated items of infrastructure and equipment listed in Table 1;
 - (b) certifies whether or not each item of infrastructure or component of infrastructure specified in Table 1 has been constructed with no material defects and to the requirements specified in Table 1 (including certification by the tailings storage facility (TSF) designer, or their representative, for the initial above ground TSF);
 - (c) contains 'as constructed' plans for each item of infrastructure or component of infrastructure specified in Table 1;
 - (d) contains photographic evidence of the 'as constructed' infrastructure; and
 - (e) is signed by a person authorised by the works approval holder and contains the printed name and position of that person within the company.
3. Subject to condition 2, where an item of infrastructure or component of infrastructure has been certified as not being constructed, or does not comply with the corresponding requirements, or contains material defects, the works approval holder must:
 - (a) correct the non-compliant or defective works, prior to re-certifying in accordance with condition 2(b); or
 - (b) provide to the CEO a description of, and explanation for, any departures from the requirements specified in Table 1 that do not require rectification and do not constitute a material defect along with the report required by condition 2.

Table 1: Infrastructure and equipment requirements table

Infrastructure/Equipment	Requirements (design and construction)	Site plan reference
<i>Phase 2 – Construction of sewage treatment plants, landfill and pre-production mining</i>		
WWTP 1	Must be constructed in accordance with drawings 6000-STD-01-001, STD-DWG-100, 180301-01 and 180301-02, as per the memo dated 23 April 2018 submitted as an addendum to the application by MBS Environmental on 23/04/2018.	“WWTP 1”, as shown in the map in Schedule 1
WWTP 2	<p>The sewage treatment system must be designed and constructed so as to meet the following specifications:</p> <ol style="list-style-type: none"> All sewage storage and treatment tanks, vessels, transfer pipelines and conveyance infrastructure must be impermeable, free of leaks and defects; All sewage conveyance, storage and treatment infrastructure must be designed and constructed to ensure that stormwater does not enter the sewage and treated wastewater system or storage infrastructure; Store environmentally harmful materials in secured, covered, impervious and bunded areas; Bunded areas to have a minimum capacity of 110% of the largest container stored within it, or 25% of the volume of all containers, whichever is the larger; Chemicals to be stored in accordance with Australian Standards AS1940-2004, AS3780-2008 and/or AS3833-2007 dependent on the type of chemical to be stored; All above ground infrastructure located on compacted soil foundation; Be able to receive and treat a sewage inflow of up to 100 m³/day; Able to treat sewage to the following wastewater output limits: <ol style="list-style-type: none"> Biochemical oxygen demand (BOD₅) <20 mg/L; Total suspended solids (TSS) <30 mg/L; Total nitrogen (TN) <20 mg/L; Total phosphorus (TP) <2 mg/L; <i>Escherichia coli bacterial</i> (E.coli) <10 coliform forming units per 100 mL 	“WWTP 2”, as shown in the map in Schedule 1

Infrastructure/Equipment	Requirements (design and construction)	Site plan reference
	<p>(cfu/100mL);</p> <ul style="list-style-type: none"> vi. pH 6.5 to 8.5; and vii. Free chlorine 0.5 - 2.0 mg/L. <ul style="list-style-type: none"> i. Final treated effluent irrigation storage tank capable of storing all wastewater not able to be discharged to the irrigation field (WWTP 2); j. Sludge must be contained within sealed sludge tanks prior to removal by a licensed controlled waste carrier for disposal to an approved waste facility; k. Have sealed connection point(s) for pumping out tank sludge; l. Flow meters to be installed to record the influent/effluent volumes that are received/sent from WWTP 2; m. Flow meters to be located on the output line to the irrigation field (WWTP 2); n. Incorporate an alarm system (audible and visual) with remote monitoring capabilities, which will activate in the event of: <ul style="list-style-type: none"> i. pump faults; ii. high tank levels; and iii. tank overflows. 	
Irrigation field (WWTP 2)	<p>The irrigation field must be designed and constructed so as to meet the following specifications:</p> <ul style="list-style-type: none"> a. Not less than 0.7 hectares in size; b. Irrigation field area enclosed with a fence around the entire perimeter to restrict access to the area; c. Above ground sprinklers installed; and d. A minimum 5 metre spray drift buffer between the edge of the sprinkler radius and the perimeter fence. 	
Landfill	First cell must be constructed no greater than 30 x 10 x 4 metres, within the specified	"Landfill", as shown in

Infrastructure/Equipment	Requirements (design and construction)	Site plan reference
	landfill area (200 x 400 m). Cell must be surrounded by a 1 m high earthen bund, to prevent surface water runoff from entering.	the map in Schedule 1
Phase 3 – Construction of TSF		
Initial above ground TSF	<ul style="list-style-type: none"> Must be constructed in accordance with drawings provided in Schedule 3. Foundation must be compacted to achieve a permeability of at least 5×10^{-7} m/s. The decant sump must be lined to achieve a permeability of at least 1×10^{-13} m/s. 	"TSF", as shown in the map in Schedule 1
Groundwater monitoring bores	<p>Must install at least six groundwater monitoring bores in the vicinity of the above ground TSF and SPP, including one, at a suitable location upgradient of the TSF, to monitor background groundwater quality. Bores must be:</p> <ul style="list-style-type: none"> installed to meet the requirements of <i>Minimum Construction Requirements for Water Bores in Australia</i>; sited in accordance with <i>WQPN #30: Groundwater Monitoring Bores</i> ("Siting of monitoring bores" section); surveyed to allow the ground level (to AHD) at each location to be accurately determined; be screened to permit effective monitoring of shallow and deep groundwater; and must be installed prior to commencing deposition of tailings within the TSF. 	"Monitoring Bore", as shown in Figure 29, Schedule 5
SPP	<ul style="list-style-type: none"> Must be constructed in accordance with drawings in Schedule 5. The foundation for the northern cell of the SPP must be compacted to achieve a permeability of at least 5×10^{-7} m/s. The southern cell of the SPP must be lined to achieve a permeability of at least 1×10^{-13} m/s. 	"SSP", as shown in the map in Schedule 1
Return water pipelines	Must be constructed with:	Not specified

Infrastructure/Equipment	Requirements (design and construction)	Site plan reference
	(c) secondary containment sufficient to contain any spill for a period equal to the time between routine inspections; or (d) telemetry systems and pressure sensors along pipelines to allow the detection of leaks and failures; and (e) equipped with remotely controlled cut-outs in the event of a pipe failure.	
Phase 4 – Construction of process plant (WCP/CUP 1) Phase 5 – Construction of process plant (WCP/CUP 2)		
Wet Concentration Plant (WCP)/Concentrate Upgrade Plant (CUP)	Must be constructed in accordance with PFD drawings KMP-2000-F-002, KMP-2000-F-003 and KMP-2000-F-004	Schedule 4: PFD Drawings
Process water supply system	Must be constructed in accordance with PFD drawings –KMP 2000-F-007, KMP 2000-F-008, KMP 2000-F-009 and KMP2000-F-010	Schedule 4: PFD Drawings
Non-magnetic stockpiles	Must be constructed in accordance with PFD drawing KMP 2000-F-007	
Central Storage and Transfer Pond	Must be lined to achieve a permeability of at least 1x10 ⁻⁹ m/s	
WCP Process Water Pond		
WCP Settling Ponds		
Return water and tailings pipelines	Must be constructed with: (a) secondary containment sufficient to contain any spill for a period equal to the time between routine inspections; or (b) telemetry systems and pressure sensors along pipelines to allow the detection of leaks and failures; and (c) equipped with remotely controlled cut-outs in the event of a pipe failure.	
WCP drain	Must be constructed to capture surface water runoff from WCP areas with water directed	

Infrastructure/Equipment	Requirements (design and construction)	Site plan reference
	to sumps with sufficient capacity to contain an extreme rainfall event.	
MSP drain	Must be constructed to capture surface water runoff from MSP areas (including product stockpiles) with water directed to sumps with sufficient capacity to contain an extreme rainfall event.	
Pit bund	Must be constructed around the edge of the active mining pit, with the location moving as the active mining area changes over time.	

Commissioning phase

4. The works approval holder must notify the CEO, at least 7 calendar days prior to, the commencement date of commissioning of each of phase 3, phase 4 and phase 5.
5. The works approval holder must not commission each of phase 3, phase 4 and phase 5 for a period exceeding 16 weeks.
6. The works approval holder must commission each of phase 4 and phase 5 with not more than 1,000,000 tonnes of ore.
7. The works approval holder must notify the CEO, within 7 calendar days of, the completion date of commissioning of each of phase 3, phase 4 and phase 5.

Commissioning report

8. The works approval holder must submit to the CEO an Environmental Commissioning Report within 3 months of the completion date of commissioning each of phase 3, phase 4 and phase 5.
9. The works approval holder must ensure the report required by condition 8 includes:
 - (a) a summary of the commissioning activities undertaken for each of phase 3 and phase 4, including timeframes and the amount of heavy mineral content (HMC) processed;
 - (b) a summary of the environmental performance of all plant and equipment as installed for each of phase 3, phase 4 and phase 5;
 - (c) a review of the environmental performance of all plant and equipment as installed against the manufacturer's design specification; and
 - (d) where they have not been met, measures proposed to meet the manufacturer's design specification and conditions of this works approval, together with timescales for implementing the proposed measures.

Time limited operations phase

10. The works approval holder may conduct full mineral ore processing operations during a time limited operational phase, for a period not exceeding 180 calendar days from the completion date of commissioning of each of phase 3, phase 4 and phase 5, or until such time as a licence for the same is granted.
11. The works approval holder must ensure that the premises infrastructure and equipment listed in Schedule 3 is maintained and operated in accordance with the corresponding operational requirements set out in Schedule 3.

Emissions and discharges

Disposal of mine tailings

12. Following construction of phase 3, the works approval holder must ensure that tailings produced during commissioning of phase 4, phase 5 and the time limited operational phase are deposited in accordance with the requirements specified in Table 2.

Table 2: Tailings disposal requirements table

Tailings type	Disposal requirements
WCP sand rejects	Must be: <ul style="list-style-type: none"> deposited directly within the initial above ground TSF; or blended with thickened WCP clay slimes and deposited as a wet slurry within the initial above ground TSF.
WCP clay slimes	Must be: <ul style="list-style-type: none"> thickened and blended with WCP sand rejects and deposited as a wet slurry within the initial above ground TSF; or used as dust suppression on exposed areas within the premises.
Combined CUP and MSP tailings	Must be deposited within the initial above ground TSF.

Disposal of treated wastewater

13. Following construction of the sewage treatment plant, the works approval holder must ensure that treated wastewater is only discharged in accordance with the requirements specified in Table 3.

Table 3: Treated wastewater disposal requirements table

Emission type	Discharge point	Discharge point location
Treated effluent sourced from the wastewater treatment plants (WWTP 1 and WWTP 2)	Sprinklers located within irrigation spray fields	'WWTP 1 and WWTP 2' as shown in Figure 1 of Schedule 1.

Disposal of non-mining waste

14. Following construction of the landfill, the works approval holder must ensure that non-mining waste is deposited in accordance with the requirements specified in Table 4.

Table 4: Non-mining waste disposal requirements table

Waste type	Disposal requirements
Non-mining waste	Waste must: <ul style="list-style-type: none"> meet the definition of putrescible and type 1 inert waste; meet the definition of a solid; be disposed by burial within the area delineated as "Landfill" on the map in Schedule 1; and be deposited at least 2 metres above the highest known water table.

Monitoring (general)

15. The works approval 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 5667.10 and AS/NZS 5667.11; and
 - (c) all laboratory samples are submitted to and tested by a laboratory with current National Association of Testing Authorities (NATA) accreditation for the parameters being measured, unless indicated otherwise in the relevant table.
16. The works approval holder must ensure that quarterly monitoring is undertaken at least 45 calendar days apart.
17. The works approval holder must ensure that all monitoring equipment used on the premises to comply with the conditions of this works approval is calibrated in accordance with the manufacturer's specifications.

Process monitoring

18. During the time limited operational phase, the works approval holder must undertake monitoring of the process specified in Table 5, for the parameters and in the units set out in that table.

Table 5: Process monitoring requirements table

Process description	Parameter	Units
Overburden removal	Amount of overburden removed.	BCM
Processing of ore	Amount of ore processed through each WCP/CUP.	Wet tonnes
	Amount of mineral concentrate produced.	
Disposal of tailings	Amount of tailings disposed, by type and location.	

Sewage facility monitoring

19. The works approval holder must monitor emissions during time limited operations in accordance with Schedule 2.

Management actions for limit exceedances

20. The works approval holder must, in the event of a parameter in condition 19 exceeding the corresponding limit specified in that condition, undertake the management actions that correspond with the corresponding monitoring location within the corresponding timeframe as specified in Table 6.

Table 6: Management actions required in the event of limit exceedance

Monitoring location	Management action	Timeframe
WWTP outlet	<ul style="list-style-type: none">• Investigate cause of exceedance; and• Submit a report to the CEO within 14 calendar days.	Management actions to commence immediately upon being notified of the exceedance and to continue for the duration of the exceedance.

- 21.** The works approval holder must include the following information in the report referred to in condition 20 in relation to any exceedances of any of the limits identified in that condition:
- (a) the nature, volume, and characteristics of the emission(s);
 - (b) the time and date when the exceedance occurred;
 - (c) whether any environmental impact occurred as a result of the exceedance and, if so, what that impact was and where the impact occurred;
 - (d) the details of the management action(s) taken pursuant with condition 20 in response to the exceedance;
 - (e) the details and result of the investigation undertaken into the cause of the exceedance; and
 - (f) the details of any action or specified measures that have been taken, or will be taken, to prevent the exceedance occurring again and for the purpose of minimising the likelihood of pollution or environmental harm.

Ambient environmental monitoring

- 22.** The works approval holder must undertake monitoring of ambient groundwater at the locations and for the parameters listed in Table 7, in the corresponding units, over the averaging period and at the frequency set out in that table.

Table 7: Groundwater monitoring table

Monitoring point ref	Parameter	Units	Averaging period	Monitoring frequency
Groundwater monitoring bores ¹ : • MB01 • MB02 • MB03 • MB04 • MB05 • MB06	Standing Water Level (SWL) ^{2,3}	mbgl	Spot sample	Quarterly ⁴
	pH ²	–		
	Electrical conductivity @ 25°C ²	µS/cm		
	Redox potential ²	mV		
	Total dissolved solids ²	mg/L		
	Major ions: bicarbonate, calcium, chloride, magnesium, potassium, sodium, sulfate, total dissolved solids			
	Metals and metalloids: aluminum, arsenic, cadmium, chromium (total Cr and CrVI), cobalt, copper, iron, mercury, nickel, selenium, thallium, uranium, zinc			
			At least once throughout the duration of this works approval	

Note 1: Refers to the six monitoring bores to be installed in accordance with condition 1.

Note 2: In-field, non-NATA accredited analysis permitted.

Note 3: SWL to be determined prior to the collection of other samples.

Note 4: Monitoring to commence following installation.

Record-keeping

- 23.** The works approval holder must maintain accurate and auditable books including the following records, information, reports and data required by this works approval during the time limited operational phase:

- (a) process monitoring required by condition 18; and
- (b) groundwater monitoring required by condition 22.

24. The books specified under condition 23 must:

- (a) be legible;
- (b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible or 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 8 have the meanings defined.

Table 8: Definitions

Term	Definition
ACN	Australian Company Number
AHD	Australian Height Datum
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 <i>Water Quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.</i>
AS/NZS 5667.10	means the Australian Standard AS/NZS 5667.10 – <i>Water quality - Sampling Guidance on sampling of waste waters.</i>
AS/NZS 5667.11	means the Australian Standard AS/NZS 5667.11 <i>Water Quality – Sampling – Guidance on sampling of groundwaters.</i>
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.
BCM	bank cubic metre
Category / categories	categories of prescribed premises as set out in Schedule 1 of the <i>Environmental Protection Regulations 1987</i> (WA) (EP Regulations).
CEO	means Chief Executive Officer of the department. “submit to / notify the CEO” (or similar), means either: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 or: info@dwer.wa.gov.au
cfu/100 mL	number of colonies counted per 100 millilitres
commission/ commissioning	means a period of time to allow for stabilisation and optimisation of the process following input of raw materials under operation conditions (including emissions) on the works approval for the limited period of operations required.
condition	means a condition to which this works approval is subject under s.62 of the EP Act.
CUP	Concentrate Upgrade Plant
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (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.

E. coli	<i>Escherichia coli bacterial</i>
emission	has the same meaning given to that term under the EP Act.
Environmental Compliance Report (ECR)	means a report to satisfy the CEO that the works have been constructed in accordance with the works approval.
Environmental Commissioning Report	means a report on commissioning activities that have taken place and a demonstration that they have concluded, with focus on emissions and discharges, waste containment and other environmental factors.
EP Act	means the <i>Environmental Protection Act 1986</i> (WA)
EP Regulations	means the <i>Environmental Protection Regulations 1987</i> (WA)
freeboard	means the distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point.
HMC	Heavy Mineral Concentrate
material defect	means a defect in any item, whether tangible or intangible, that substantially prevents the item from operating or functioning as designed or according to its specifications.
m	metre
m ³ /day	cubic meter per day
mg/L	milligrams per litre
mbgl	metres below ground level
<i>Minimum Construction Requirements for Water Bores in Australia</i>	means the document <i>Minimum Construction Requirements for Water Bores in Australia</i> , National Uniform Drillers Licensing Committee (3 rd Edition, 2012).
mining waste	means waste generated during mining and processing activities, including topsoil, subsoil and overburden removal, mine tailings (sand and clay), and reject tailings (gangue) from MSP processing.
mm	millimetre
m/s	metres per second
MSP	Mineral Separation Plant
Mtpa	million tonnes per annum
NATA	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.
non-mining waste	means waste (other than mining waste) typically generated during construction, operation and rehabilitation activities, including household and office type wastes from the worker's accommodation camp.

phase 2	means construction of the worker's accommodation camp, two wastewater treatment plants (WWTP 1 and WWTP 2), landfill and pre-production mining.
phase 3	means construction of the initial above ground TSF.
phase 4	means construction of process plant – WCP/CUP 1
phase 5	means construction of process plant – WCP/CUP 2
premises	the premises to which this works approval applies, as specified at the front of this works approval and as shown on the map in Schedule 1 to this works approval.
prescribed premises	has the same meaning given to that term under the EP Act.
professional engineer	means a person who holds a Bachelor of Engineering and has demonstrated experience working in the relevant discipline.
putrescible	means the component of a waste stream that is, or is likely to become, putrid.
quarterly	means the 4 inclusive periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September and 1 October to 31 December in the same year.
significant rainfall event	a significant rainfall event is defined based on the Bureau of Meteorology website for the location of Broome. A significant rainfall event has been based on Intensity Frequency Duration (IFD), being 24 hours rainfall duration at 20% Annual Exceedance Probability (AEP). Note that a 20% AEP is equivalent to a 4.48 Annual Recurrence Interval (ARI).
spot sample	means a discrete sample representative of the time and place at which the sample is taken.
solid	means material that: <ul style="list-style-type: none"> • has an angle of repose of greater than 5 degrees; • does not contain, or is not comprised of, any free liquids; • does not become free flowing at or below 60 degrees Celcius or when being transported; and • is generally capable of being moved by a spade at normal temperatures (i.e. is spadeable).
Stage 1	refers to years 1 to 4 of the project, where the nominal mining rate is 12.5 Mtpa and ore processing 9 Mtpa.
Stage 2	refers to year 5 and onwards of the project, where the nominal mining rate increases to 25 Mtpa and ore processing 18 Mtpa.
SWL	standing water level
time limited operations phase	means full mining and mineral processing activities permitted under this works approval, subject to conditions, whilst an application for an amendment to the licence for the premises is being assessed.
TSF	Tailings Storage Facility
type 1 inert waste	means any non-hazardous, no-biodegradable (half-life greater than 2 years) waste containing contaminant concentrations less than Class I landfill

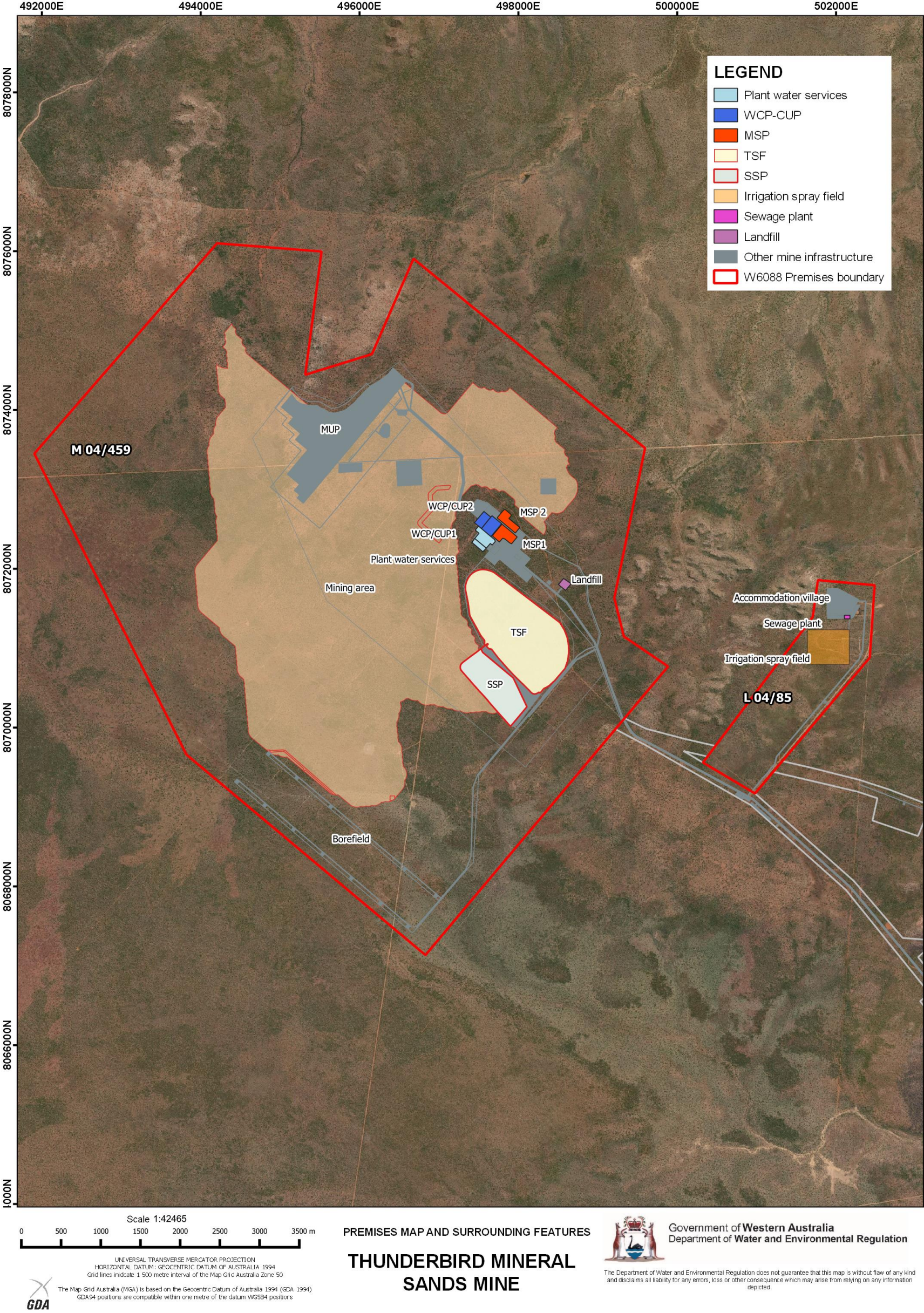
	acceptance criteria (refer to the document entitled “Landfill Waste Classification and Landfill Definitions 1996” as published by the CEO and as amended from time to time).
waste	has the same meaning given to that term under the EP Act.
WWTP	wastewater treatment plant
WCP	Wet Concentrator Plant
works approval	refers to this document, which evidences the grant of the works approval by the CEO under s.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.
WQPN #30	means the document <i>Water Quality Protection Note #30: Groundwater monitoring bores</i> , Department of Water (February 2006). Available at: www.water.wa.gov.au/_data/assets/pdf_file/0010/4033/59685.pdf .

END OF CONDITIONS

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in the map below.



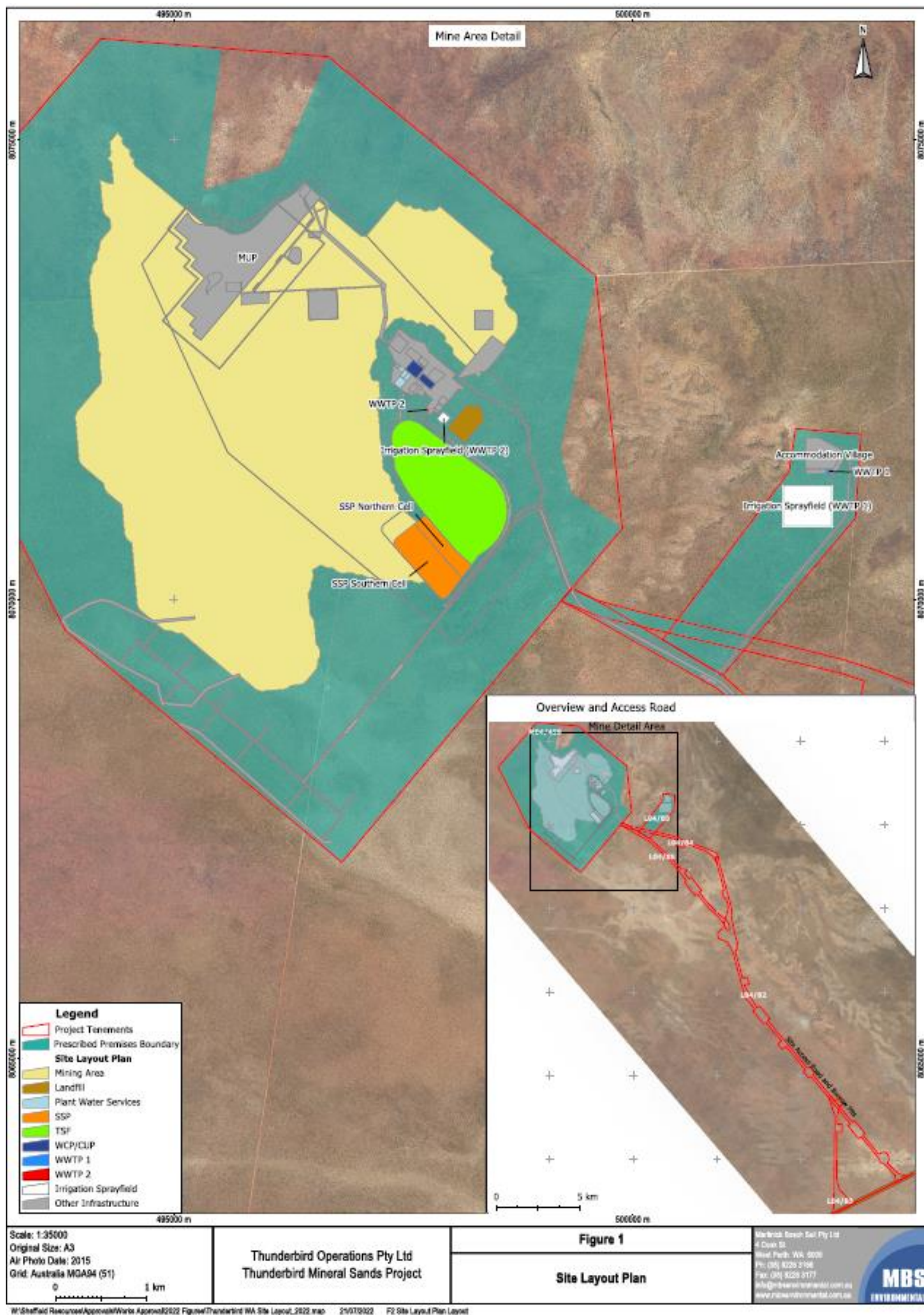


Figure 1: Map of the boundary of the prescribed premises

Premises layout maps

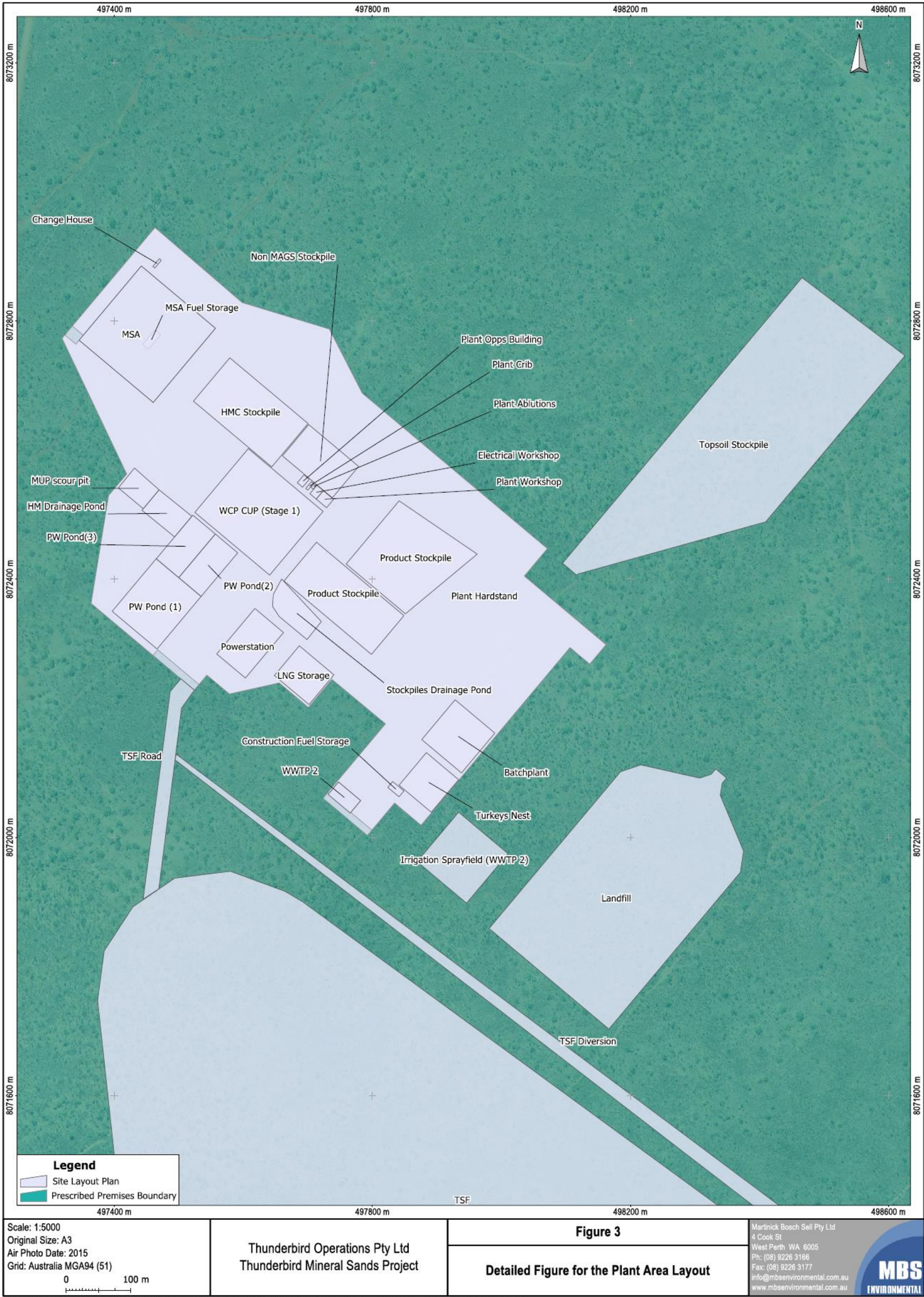


Figure 2: Map of the prescribed premises infrastructure (category 64: sewage facility and category 89: putrescible landfill site)

Schedule 2: Emissions and discharge monitoring during time limited operations

Discharge point location	Monitoring location	Parameters	Units	Limit	Frequency	Sampling method
Category 54: sewage facility						
'WWTP 1 and WWTP 2' as shown in Figure 1 of Schedule 1.	Flow meter	Cumulative volume of wastewater discharged to the irrigation spray fields	m ³ /day	–	Continuous	–
		<i>Escherichia coli</i> bacteria (E. coli)	Cfu/100 ml	1,000	Weekly ²	AS/NZS 5667.1 AS/NZS 5667.10
	WWTP outlet	Total coliforms	mg/L			
		Biochemical oxygen demand (BOD ₅)		20		
		Total suspended solids (TSS)		30		
		Total Nitrogen		20		
		Total Phosphorus		2		
		Free Chlorine		0.2-2.0		
		pH ¹	pH units	6.5-8.5		

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

Note ²: Weekly monitoring is undertaken at least 5 days apart.

Schedule 3: Infrastructure and equipment requirements during time limited operations

Item	Infrastructure and equipment	Operational requirements	Infrastructure location
Category 8: Mineral sands mining or processing			
1.	<ul style="list-style-type: none"> • TSF • SPP 	Maintain a minimum freeboard of 500 mm.	'TSF and SPP' as shown in Figure 1 of Schedule 1.
Category 54: sewage facility			
2.	WWTP1 and WWTP 2	<ul style="list-style-type: none"> • Visual inspections daily when in operation to check the integrity of the tanks, pipelines, flow meters, alarm system (audible and visual) and stormwater drainage infrastructure. • WWTP must be capable of storing a minimum of two consecutive days of effluent. • All sewage storage and treatment tanks, vessels, pipelines and conveyance infrastructure must be maintained so they are impermeable and free of leaks and defects. • Alarm system (audible and visual) must be maintained to notify the operator of: <ul style="list-style-type: none"> ○ pump faults; ○ high tank levels; and ○ tank overflows. • Sludge must be contained within sealed sludge tanks prior to removal by a licensed controlled waste carrier for disposal to an approved waste facility. • Stormwater must be prevented from entering the sewage treatment system and storage infrastructure. 	'WWTP 1 and WWTP 2' as shown in Figure 1 of Schedule 1.

Item	Infrastructure and equipment	Operational requirements	Infrastructure location
		<ul style="list-style-type: none"> Spills of wastewater or chemicals outside of a tanks, vessels and pipelines must be contained and cleaned-up as soon as they occur, if safe to do so. 	
3.	Irrigation spray fields	<ul style="list-style-type: none"> Visual inspections daily when in operation to check the integrity of the irrigation system valves, pumps, pipelines and other fittings. Maintain fence around entire perimeter and ensure spray drift does not extend beyond perimeter fence. Flow meter must be maintained on the WWTP outlet to the irrigation spray field to monitor volumes discharged to irrigation spray field. Spray irrigator to be maintained to ensure no blockages to allow even and effective spray production and ensure mobility, stopping and cutoff mechanisms are functioning as per manufacturer specifications. Irrigation must managed to prevent ponding and pooling of effluent on the ground surface of the irrigation discharge area. Irrigation operations must not occur during significant rainfall events. 	'Irrigation Sprayfield (WWTP 1) and Irrigation Sprayfield (WWTP) 2' as shown in Figure 1 of Schedule 1.

Schedule 4: PFD Drawings

The PFD drawings referenced in Table 1 are listed below and attached thereafter.

PDF Drawing	Description
KMP-2000-F-002	Wet Concentrator Plant (WCP) – 2220 Process Flow Diagram 1 of 3
KMP-2000-F-003	Wet Concentrator Plant (WCP) – 2220 Process Flow Diagram 2 of 3
KMP-2000-F-004	Wet Concentrator Plant (WCP) – 2220 Process Flow Diagram 3 of 3
KMP 2000-F-007	Concentrate Upgrade Plant (CUP) – 2313 Process Flow Diagram 1 of 4
KMP 2000-F-008	Concentrate Upgrade Plant (CUP) – 2313 Process Flow Diagram 2 of 4
KMP 2000-F-009	Concentrate Upgrade Plant (CUP) – 2313 Process Flow Diagram 3 of 4
KMP2000-F-010	Concentrate Upgrade Plant (CUP) – 2313 Process Flow Diagram 3 of 4
KMP 2000-F-017	Plant Water System (PWS) – 2420 Process Flow Diagram 1 of 2
KMP 2000-F-018	Plant Water System (PWS) – 2420 Process Flow Diagram 2 of 2
TMS-2000-F-110	Stockpile Area – 2314 Process Flow Diagram

Figure 3 Wet Concentrator Plant Process Flow Diagram 1 of 3

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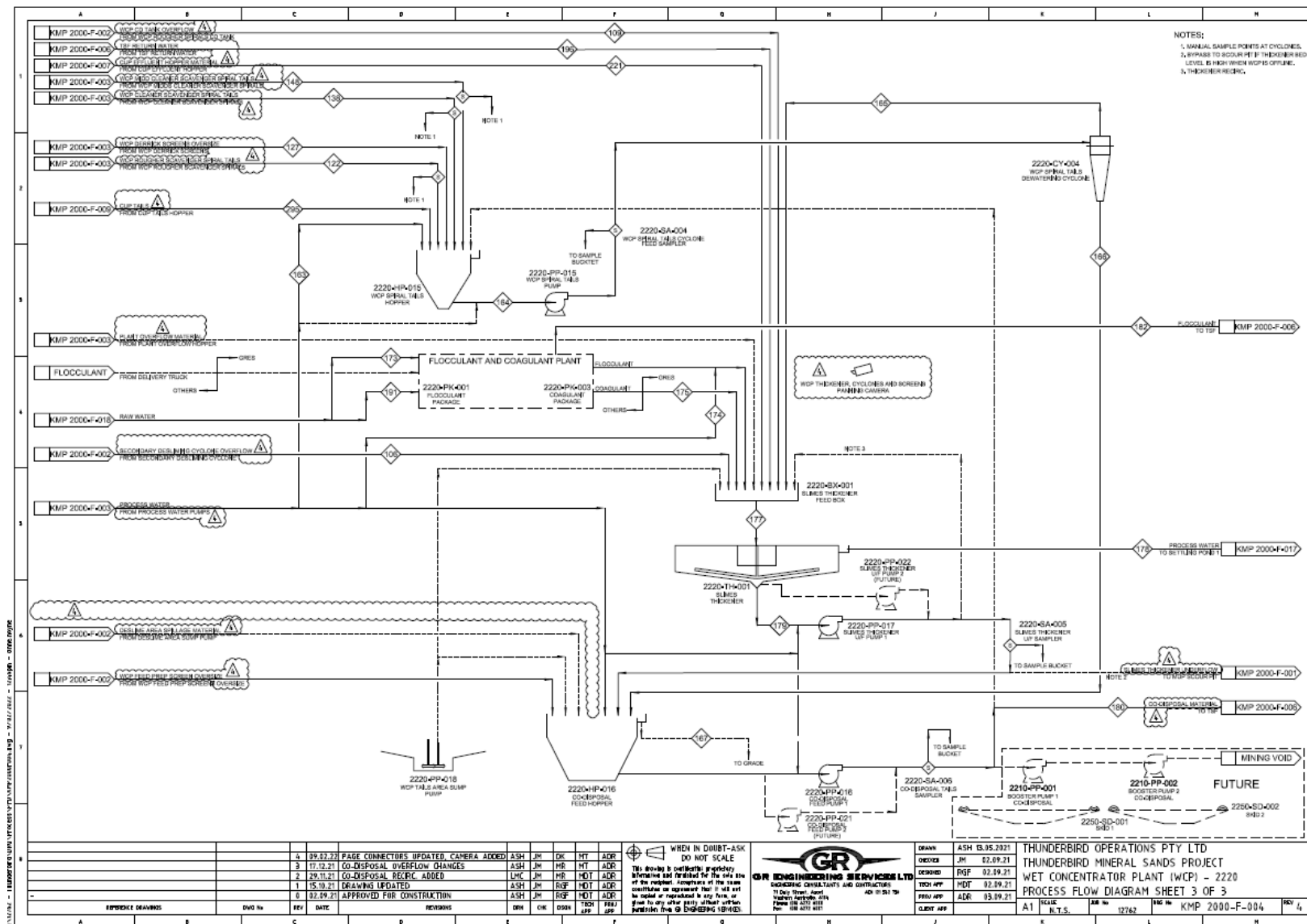


Figure 5: Wet Concentrator Plant Process Flow Diagram 3 of 3

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

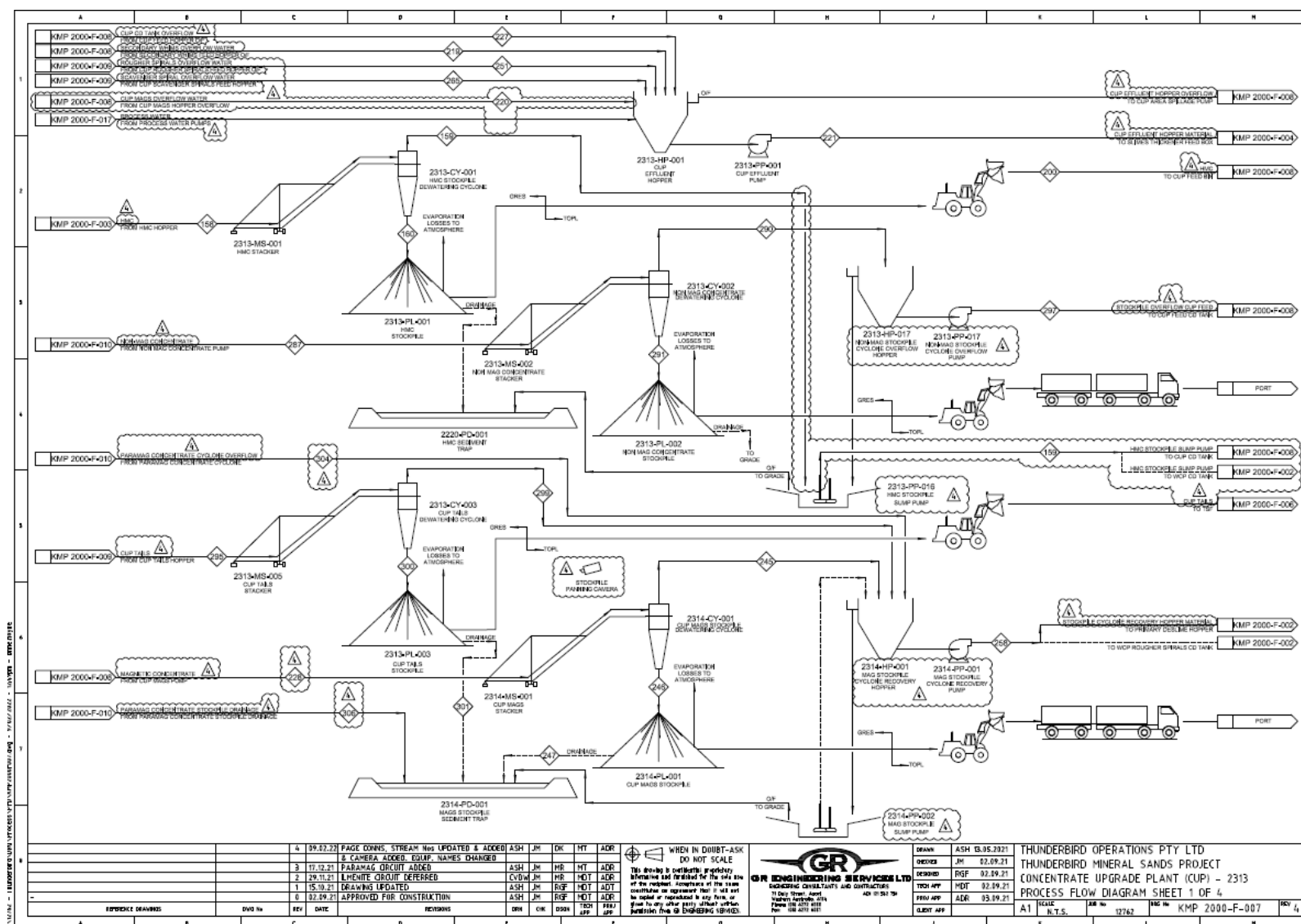


Figure 6: Concentrate upgrade plant Process Flow Diagram 1 of 4

Works approval: W6088/2017/1
IR-T05 Works approval template (v4.0) (December 2019)

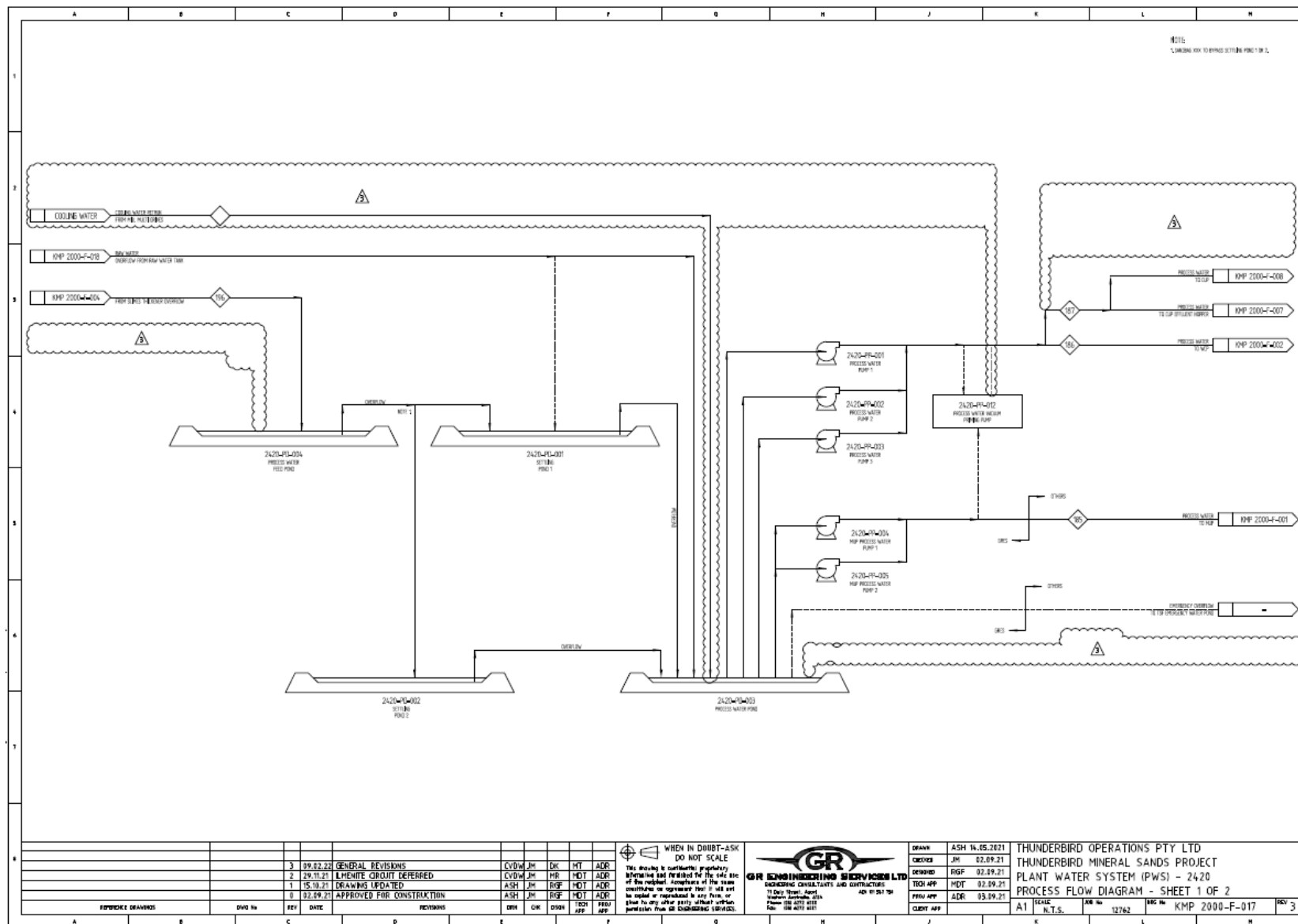


Figure 10: Plant Water Systems Process Flow Diagram 1 of 2

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

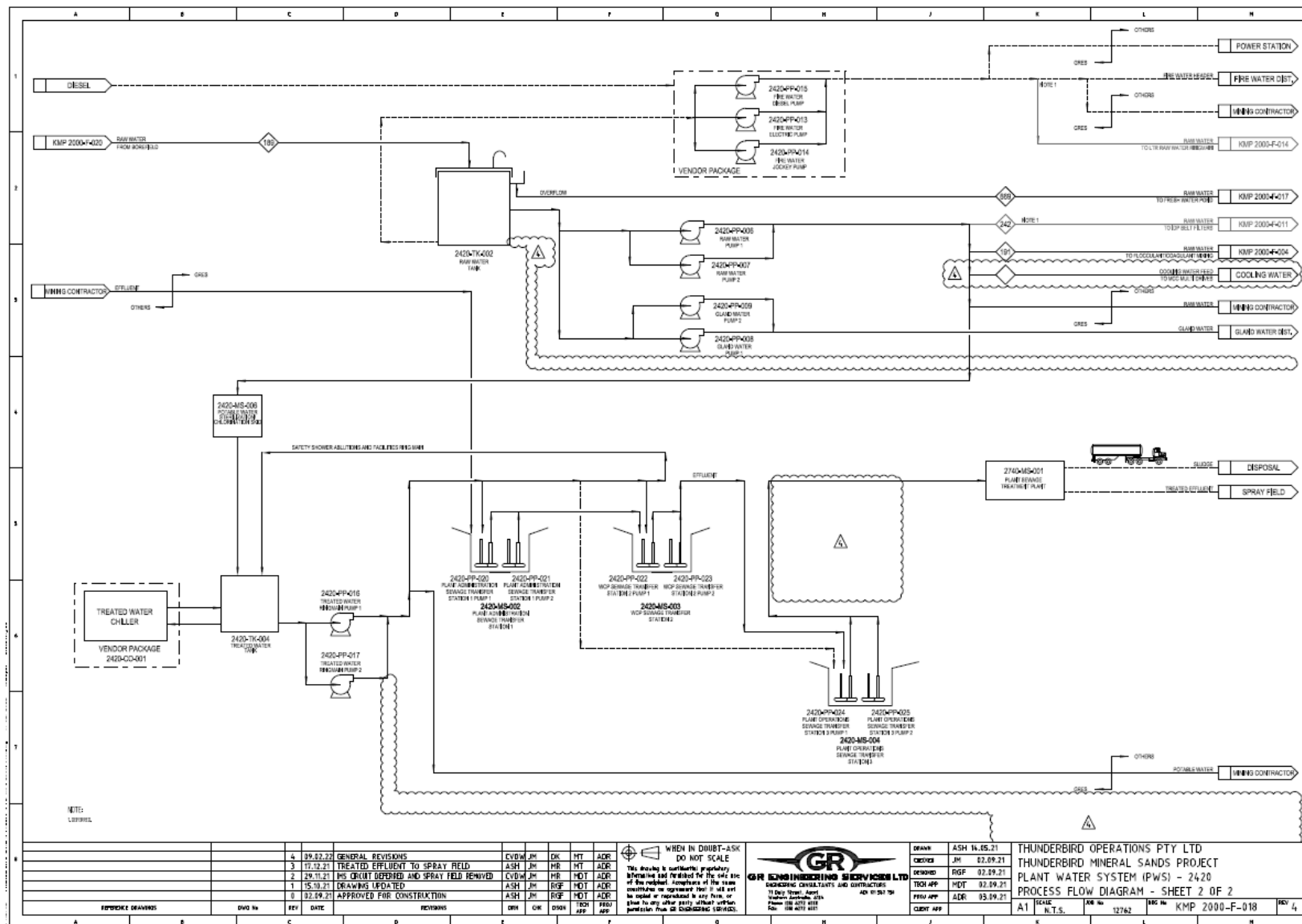


Figure 11: Plant Water Systems Process Flow Diagram 2 of 2

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

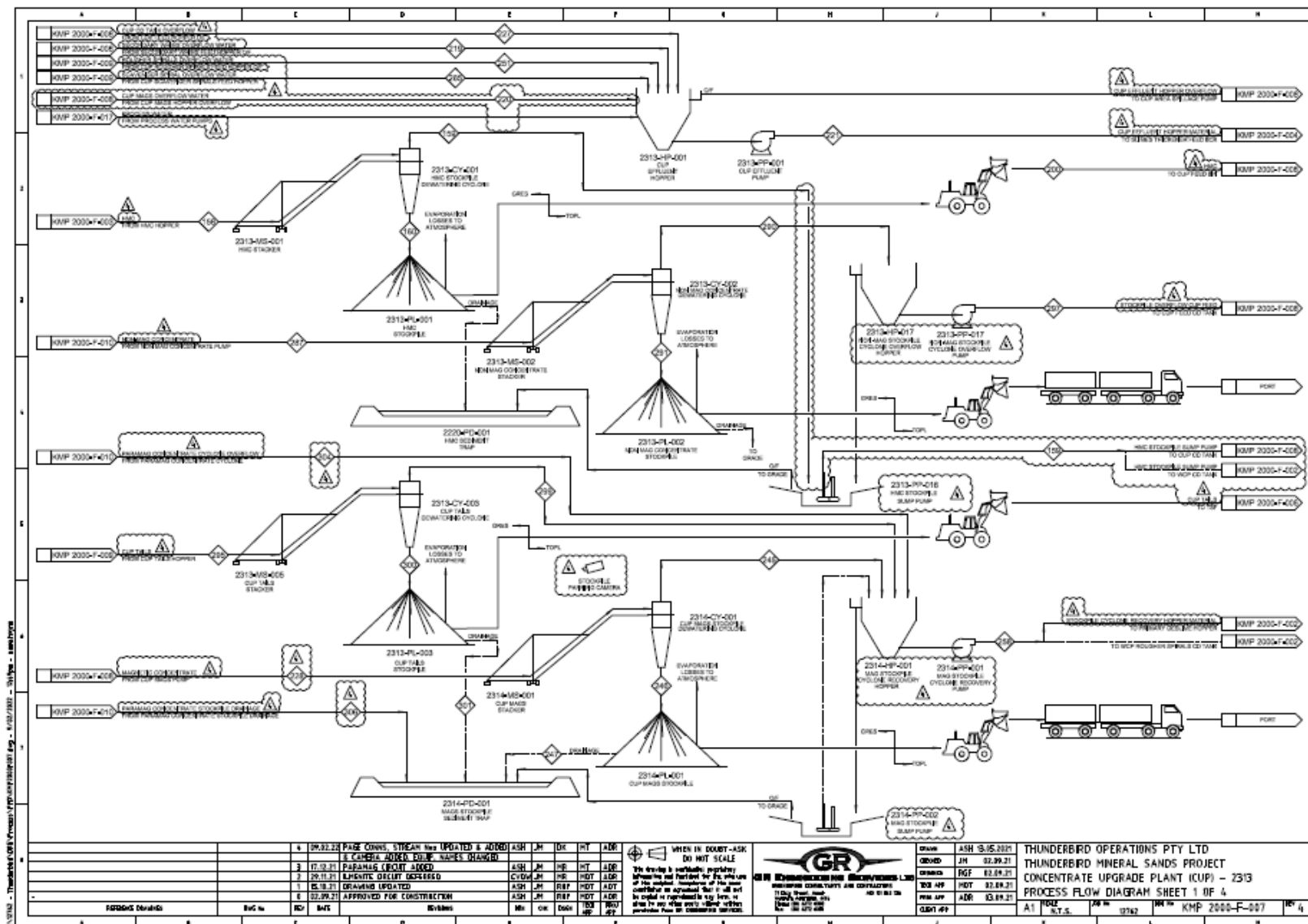


Figure 12: Concentrate Upgrade Plant Process Flow Diagram

Works approval: W6088/2017/1

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Schedule 5: TSF and SPP Drawings

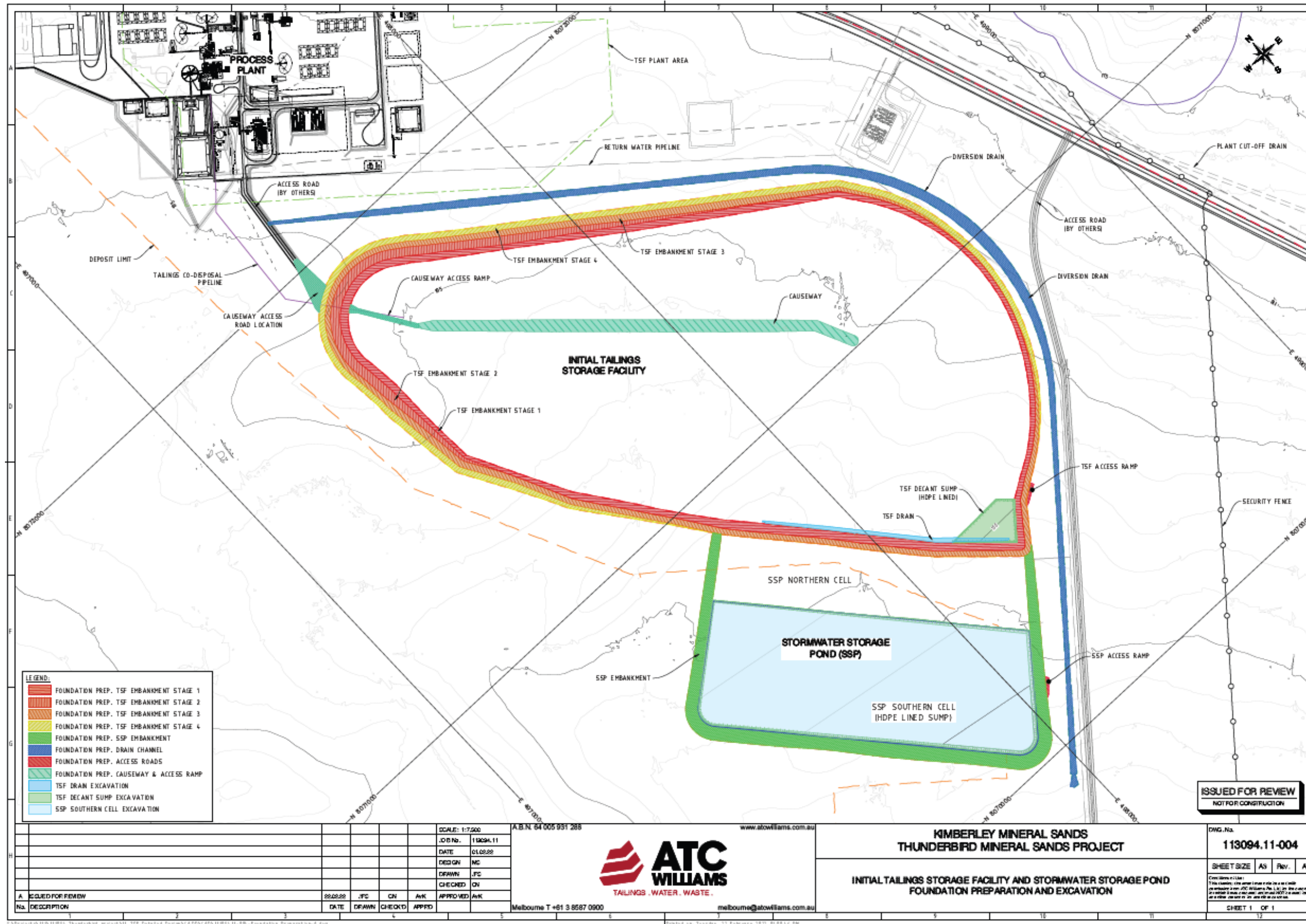


Figure 13: Drawing – Initial TSF and SPP, foundation preparation and excavation

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

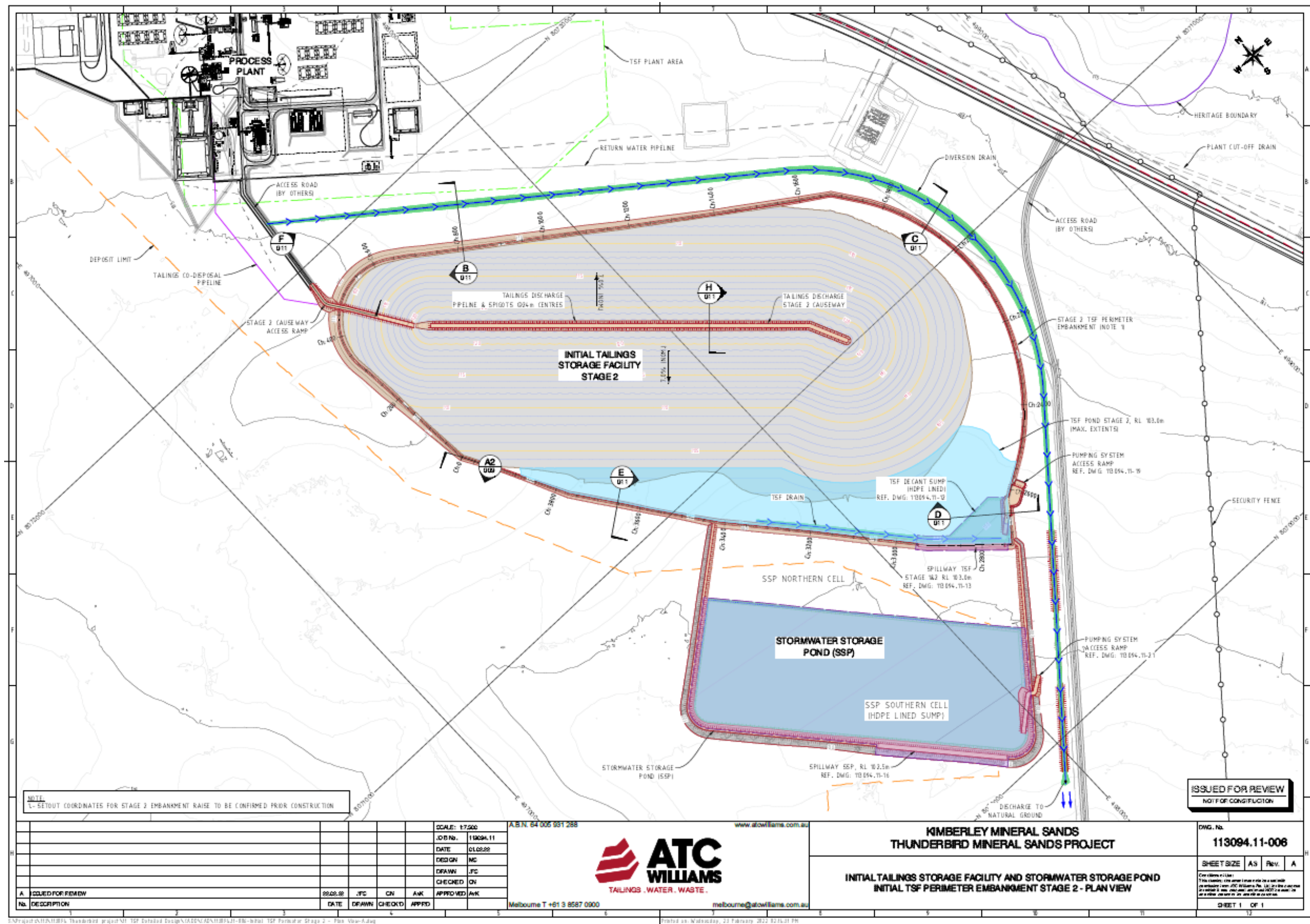


Figure 15: Drawing – Initial TSF and SPP, TSF perimeter embankment stage 2 plan view

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

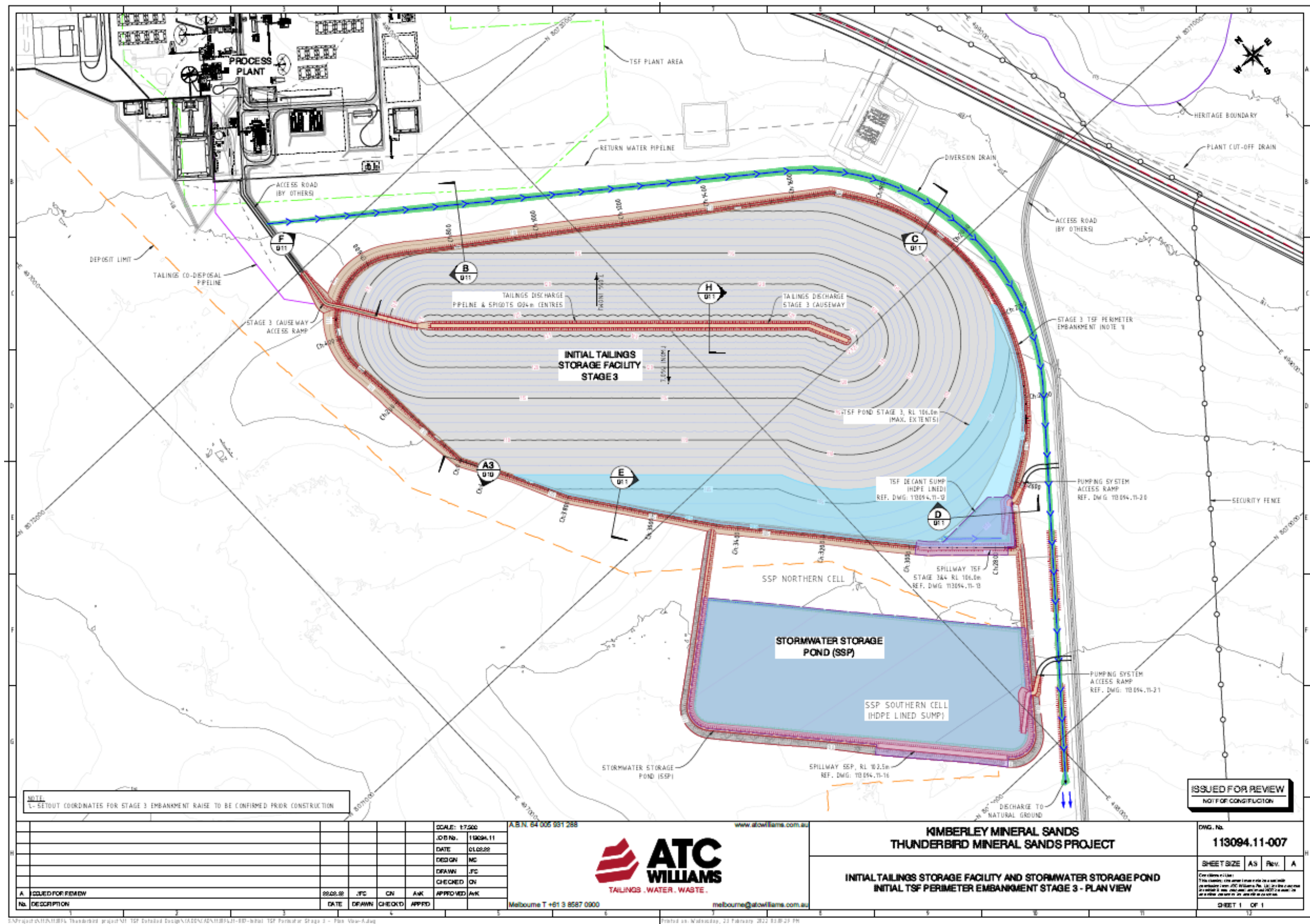


Figure 16: Drawing – Initial TSF and SPP, TSF perimeter embankment stage 3 plan view

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

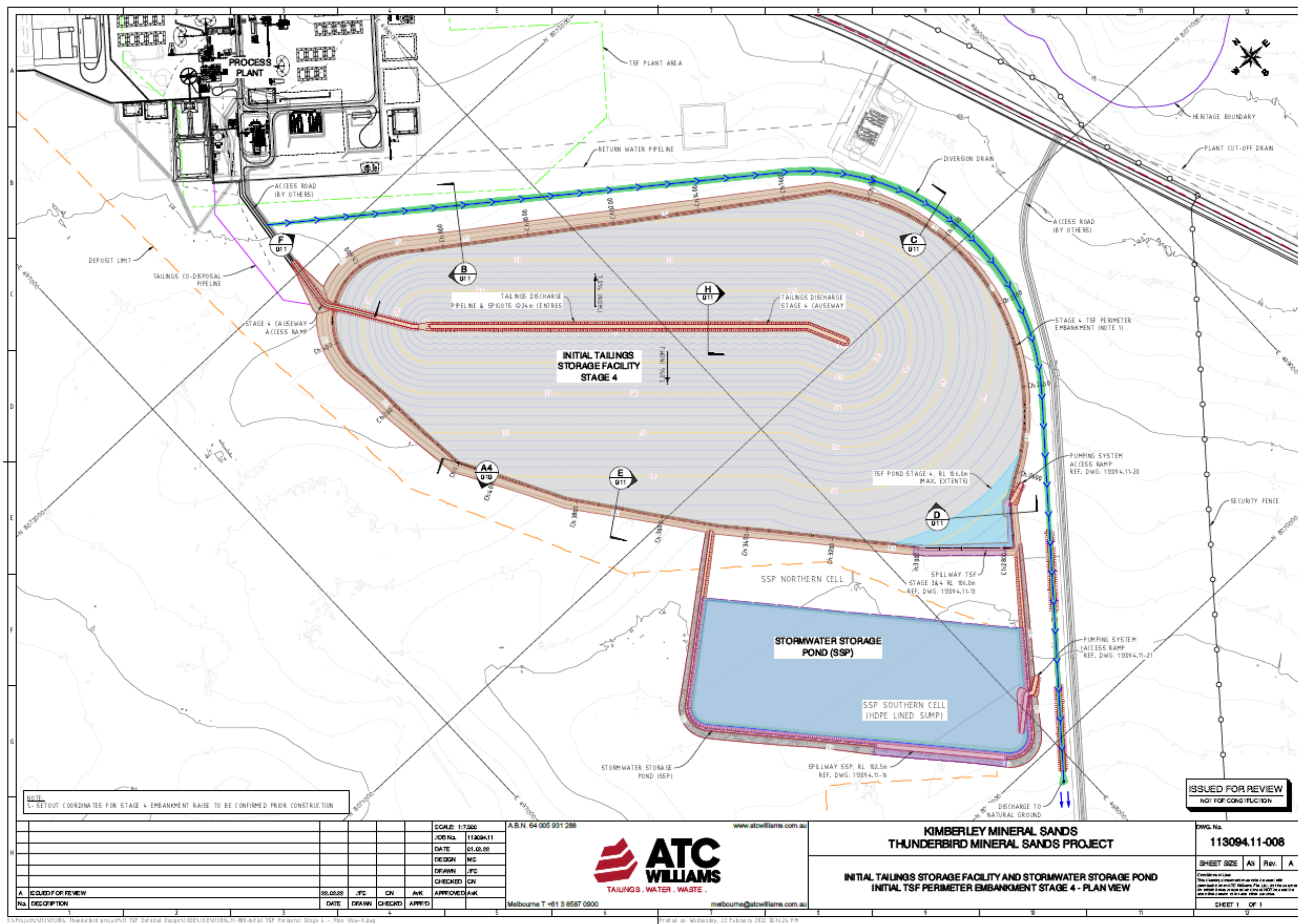


Figure 17: Drawing – Initial TSF and SPP, TSF perimeter embankment stage 4 plan view

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

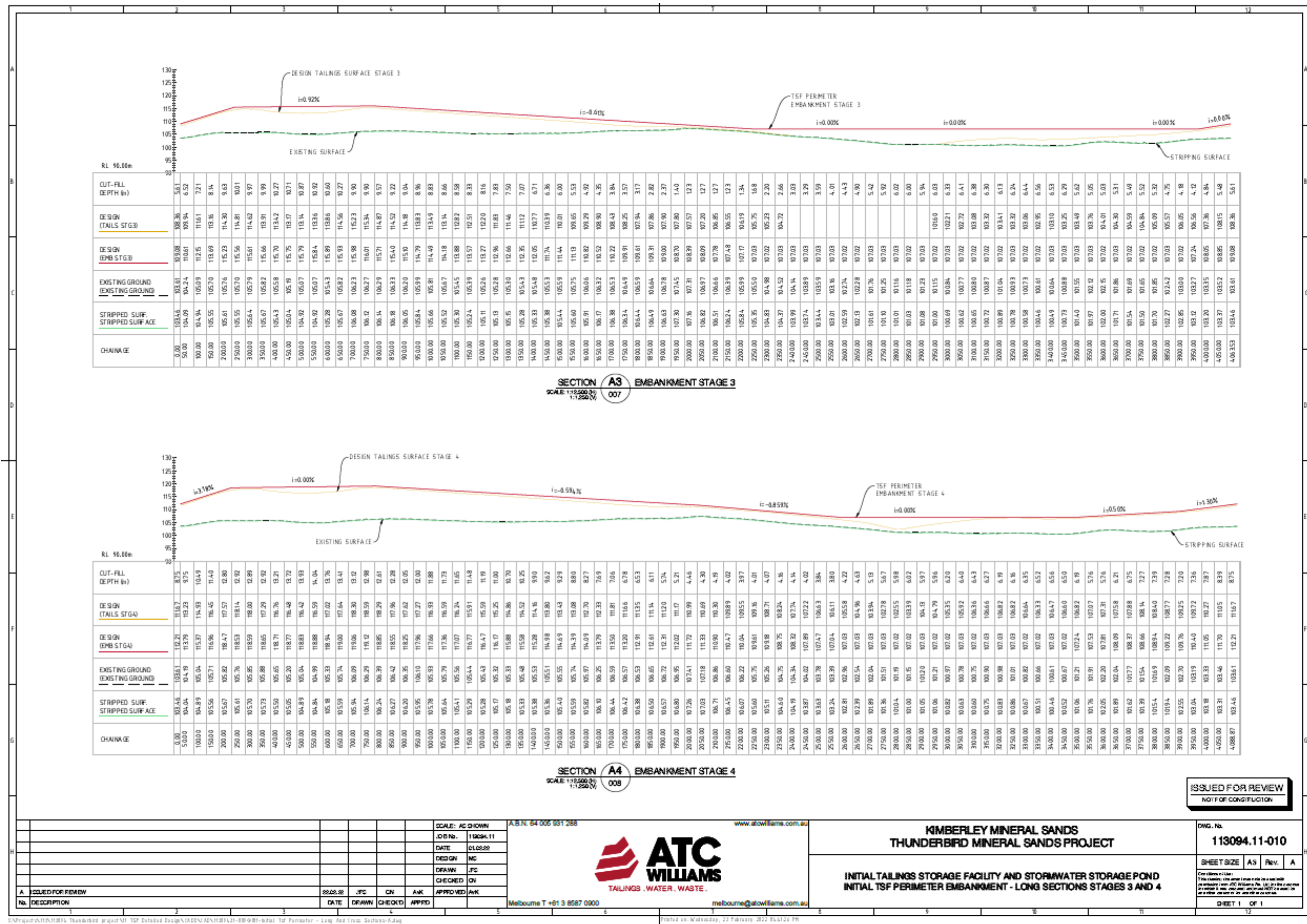


Figure 19: Drawing – Initial TSF and SPP, TSF perimeter embankment, long sections stages 3 and 4

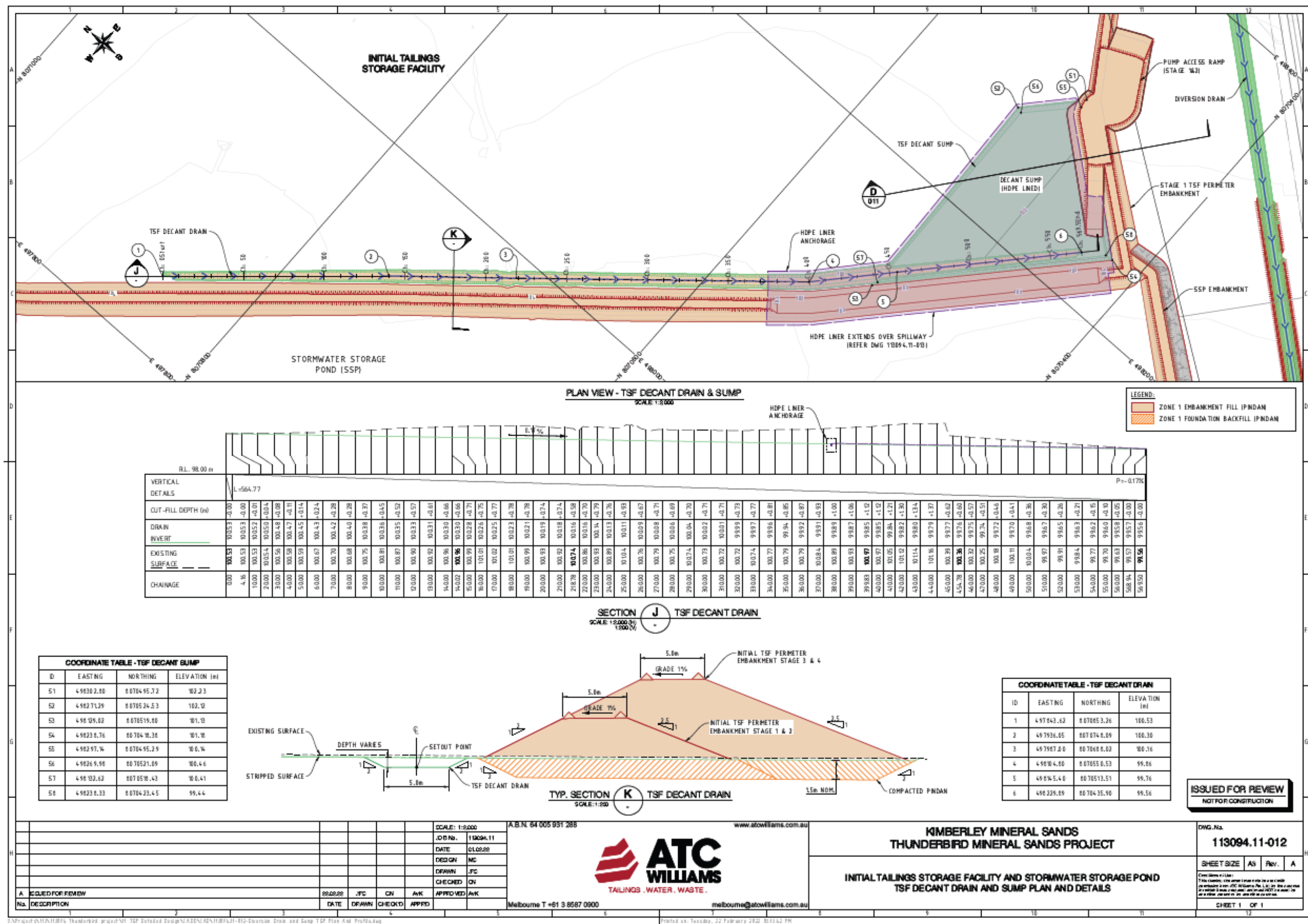


Figure 21: Drawing – Initial TSF and SPP, TSF decant drain and sump plan and details

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IR-T05 Works approval template (v4.0) (December 2019)

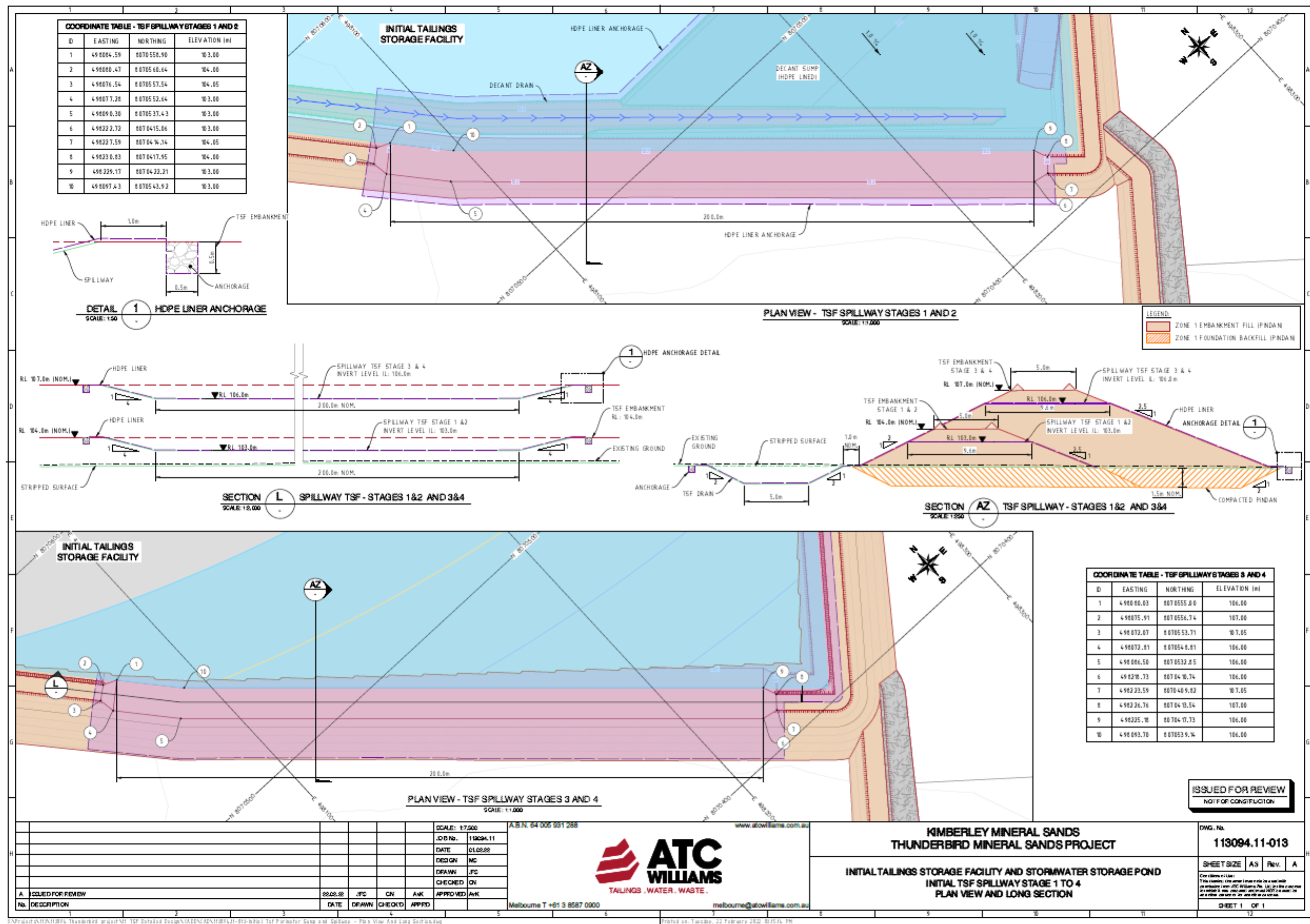


Figure 22: Drawing – Initial TSF and SPP, TSF spillway stage 1 to 4 plan view and long section

Works approval: W6088/2017/1

IR-T05 Works approval template (v4.0) (December 2019)

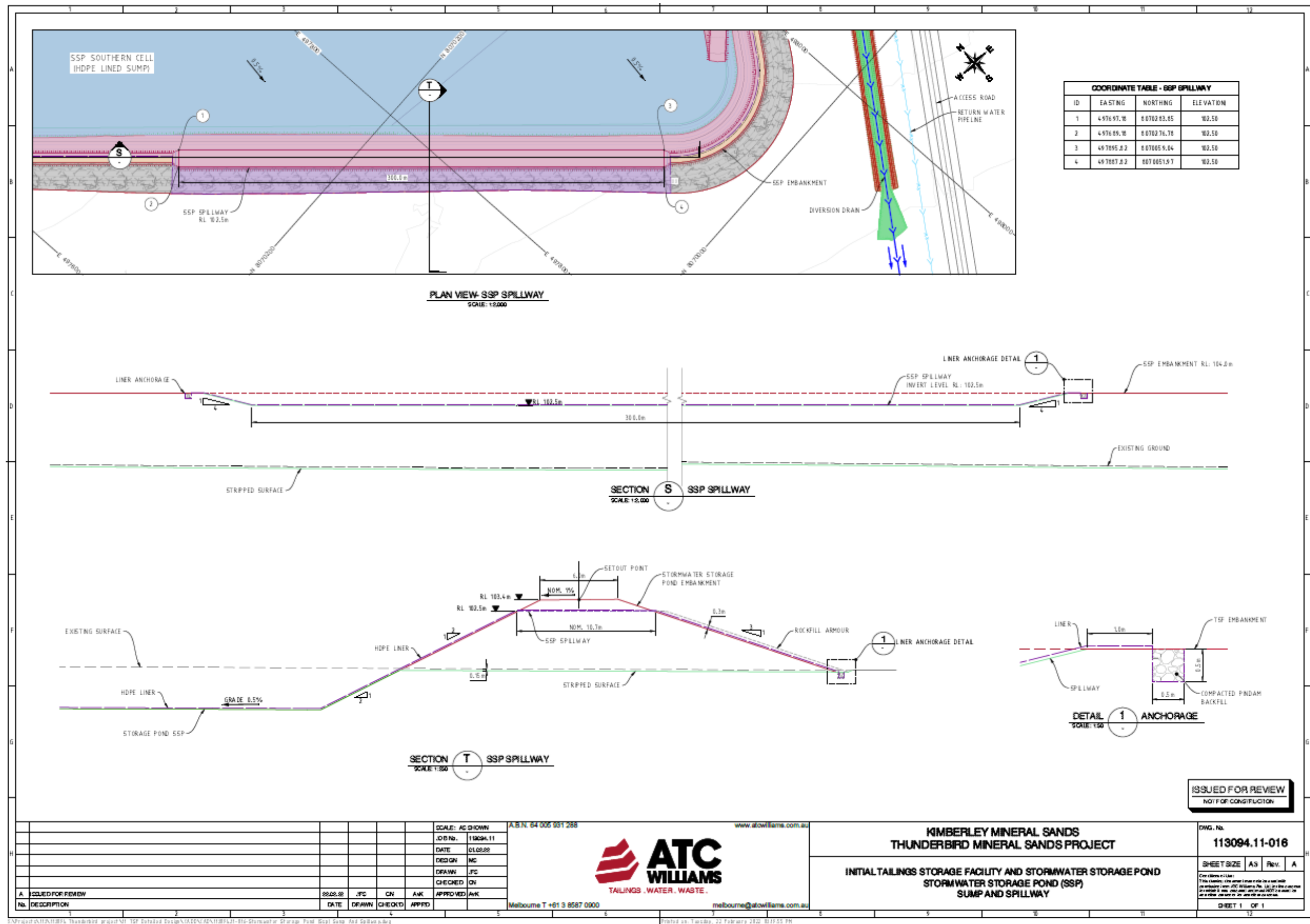


Figure 23: Drawing – Initial TSF and SPP, sump and spillway

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IR-T05 Works approval template (v4.0) (December 2019)

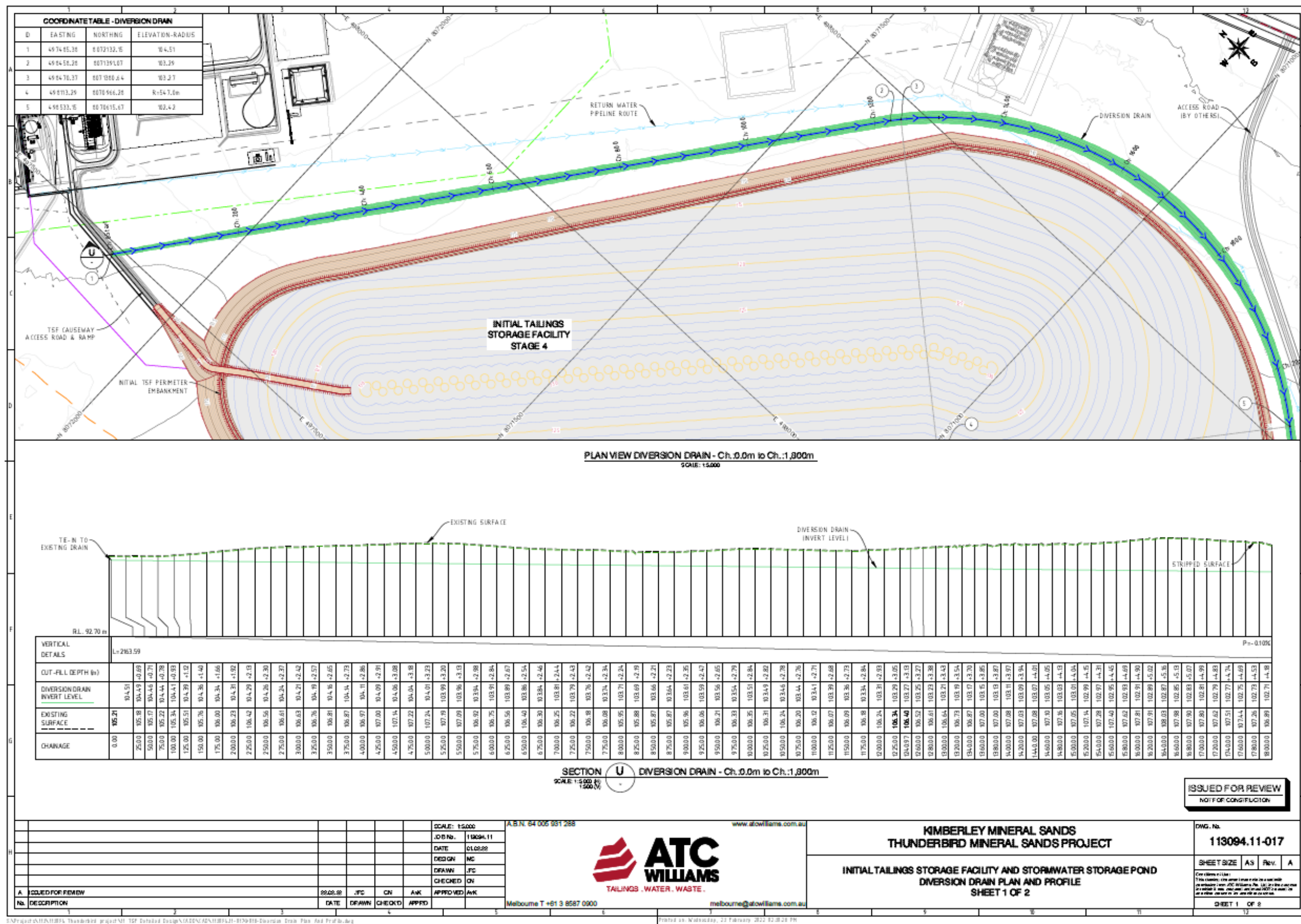


Figure 24: Drawing – Initial TSF and SPP, diversion drain plan and profile (1)

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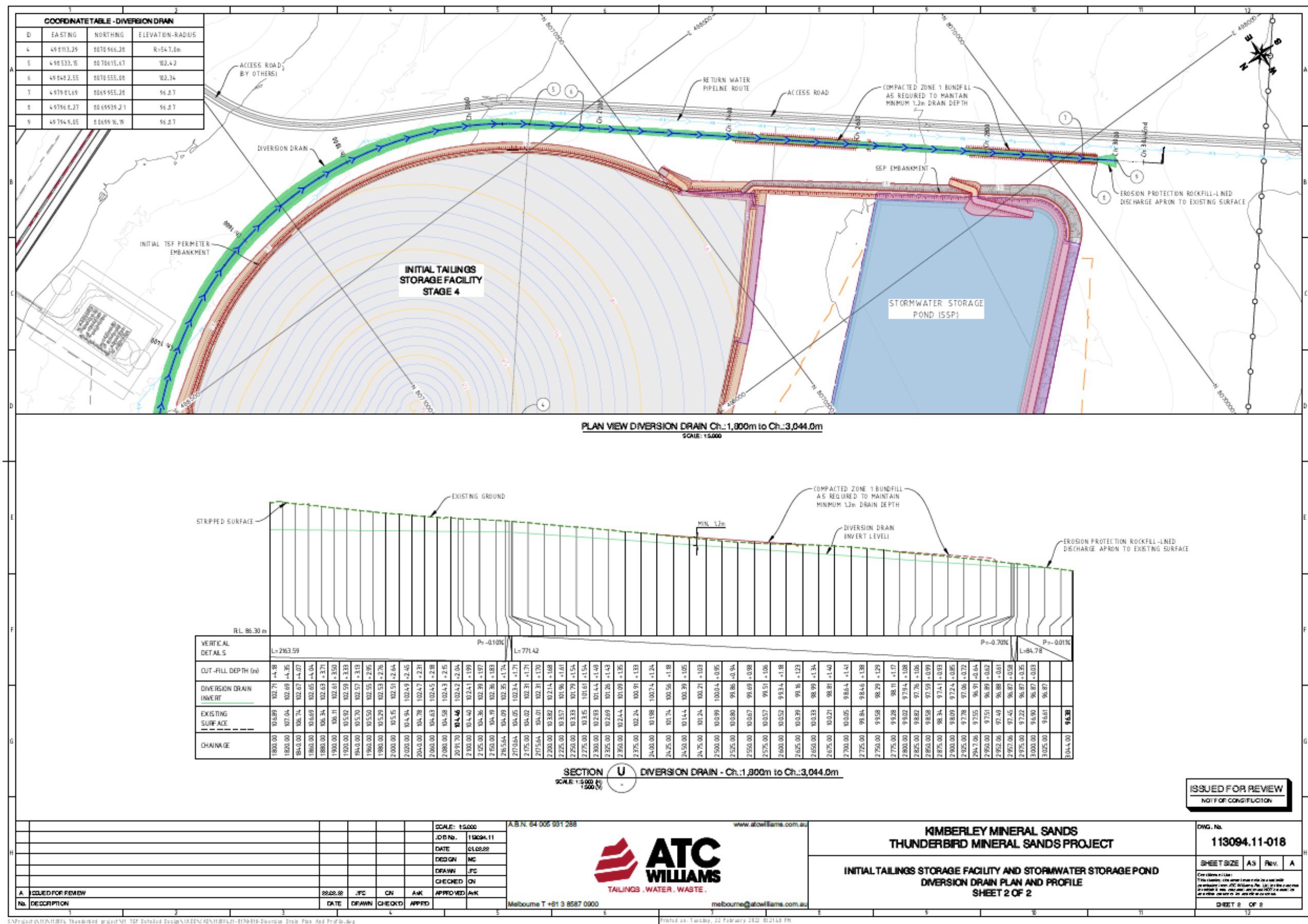


Figure 25: Drawing – Initial TSF and SPP, diversion drain plan and profile (2)

Works approval: W6088/2017/1

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