



Licence Number	L4247/1991/13
Licence Holder	Talison Lithium Australia Pty Ltd
ACN	139 401 308
Registered business address	Level 4 37 St Georges Terrace PERTH WA 6000
File Number	2012/007164
Premises	Talison Lithium Mine Mining Tenements M01/3, M01/6, M01/7 General Purpose Tenements G01/1 and G01/02 GREENBUSHES WA 6254
Date of Amendment	30 August 2017

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 30 August 2017

Tim Gentle

Manager Licensing (Resource Industries)

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

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CENRM	Centre for Excellence in Natural Resource Management
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 33 Cloisters Square PERTH WA 6850 info-der@dwer.wa.gov.au
CG	Chemical Grade
CS Act	<i>Contaminated Sites Act 2003 (WA)</i>
Delegated Officer	an officer under section 20 of the EP Act
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DER	(The former) Department of Environment Regulation
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Licence Holder	Talison Lithium Australia Pty Ltd

m ³	cubic metres
mtpa	million tonnes per annum
NEPM	National Environment Protection Measure
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Noise Sensitive Premises	has the same meaning given to that term under the Noise Regulations.
Noise Sensitive Purpose	has the same meaning given to that term under the Noise Regulations.
Occupier	has the same meaning given to that term under the EP Act.
PM	Particulate Matter
PM ₁₀	used to describe particulate matter that is smaller than 10 microns (µm) in diameter.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Notice applies, as specified on the front page of this Notice.
Risk Event	as described in <i>Guidance Statement: Risk Assessment</i>
TG	Technical Grade
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
UWA	University of Western Australia
Works	refers to the Works described in Table 2 of this Amendment Notice 2.

1. Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Licence issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

The following guidance statements have informed the decision made on this amendment:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Licence Duration (August 2016)*
- *Guidance Statement: Decision Making (November 2016)*
- *Guidance Statement: Risk Assessment (November 2016)*

1.1 Amendment description

On 15 December 2016, Talison Lithium Australia submitted an application to amend their Licence L4247/1991/13 to authorise the installation and operation of an additional crusher and chemical grade lithium plant, with a capacity of 2.4 million tonnes per year. The crusher and plant would be located to the south of the existing processing plant, on a former tailings storage facility. An additional product storage bund (also referred to as the concentrate stockpile) will also be constructed to the east of the existing plant. Refer to Figure 1 for the proposed location of the new plant.

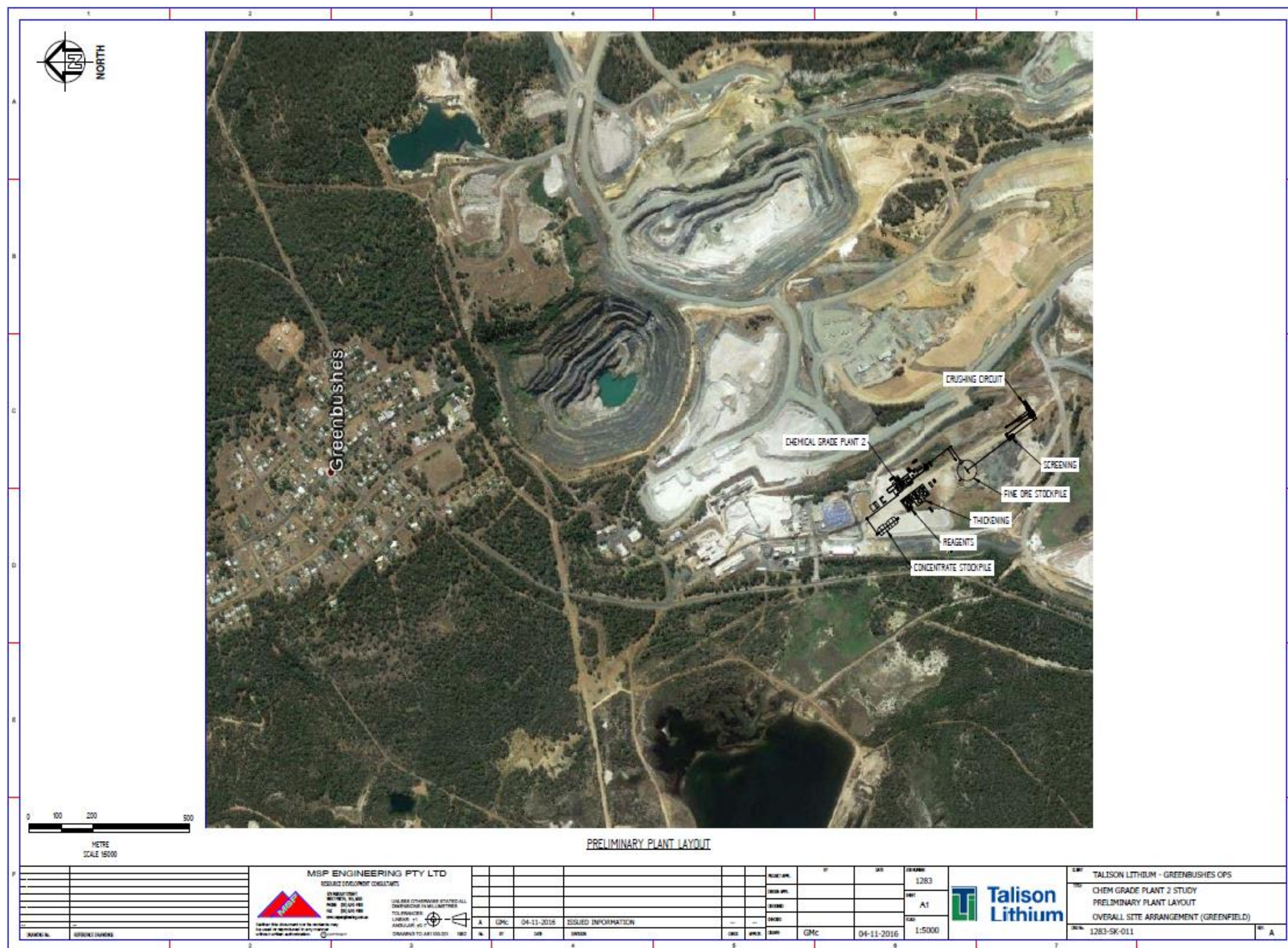


Figure 1: Indicative location of new crusher and processing plant

1.1.1 Proposed Infrastructure – Crusher and Chemical Grade Lithium Processing Plant

The proposed infrastructure to be installed is detailed in Table 2 below.

Table 2: New Chemical Grade (CG) Processing Plant Proposed Infrastructure

	Infrastructure	Site Plan Reference
	Prescribed Activity Category 5	
Three Stage Crusher		
1	New ROM pad	Not shown
2	Crusher and screening	As denoted by 'Crushing circuit' and 'screening circuit' in Figure 1.
3	Conveyor to Fine Ore Stockpile (fitted with telescopic chute at the discharge to reduce dusting)	Depicted by the line connecting the screening circuit and fine ore stockpile in Figure 1.
4	Fine Ore Stockpile (including sprinklers to reduce dusting)	As denoted by "Fine Ore Stockpile" in Figure 1.
CG Processing Plant Reagents Area		
5	Storage for grinding media (delivered in 1000 kg bulk bags)	Within the area denoted 'Reagents' in Figure 1.
6	Soda ash storage area (received in powdered form and then dissolved in process water in purpose built facility)	
7	Tall oil fatty acid tank (delivered in 26 000L ISO tankers)	
8	Frother holding tank (delivered in 1 000L Intermediate Bulk Containers (IBCs))	
9	Flocculent liquid holding tank (delivered in 10 000L batches and dosed directly into the tank)	
10	Hardstand Filter aid storage (delivered in IBCs and dosed directly into the plant)	
11	Hardstand coagulant storage area (delivered in IBCs and dosed directly into the plant as required)	
12	Ferrosilicon (delivered in 1 000kg bulk bags).	
Chemical Grade Processing Plant		
13	Milling circuit	Within the area denoted by 'Chemical Grade Plant 2' in Figure 1.
14	Heavy media separation circuit	
15	Classification circuit	
16	Coarse and fine flotation circuits	

	Infrastructure	Site Plan Reference
17	Wet high intensity magnet (WHIMs) and tantalum recovery circuit	
18	Filtration and lithium concentrate (product) stockpile	Within the area denoted by 'Chemical Grade Plant 2' and 'Concentrate Stockpile' in Figure 1.
19	Process Water Tank, Raw Water Tank, Thickener. All installed with level alarms to manage flow. Level alarms linked to process control instrumentation.	Within the area denoted by 'Thickening' in Figure 1.
Tailings discharge		
20	Pipeline to transfer tailings from thickener to TSF2	Not shown on Figure 1.
Stormwater infrastructure		
21	Siltation sump. Capacity of 500m ³ . Sump Pump to return stormwater to the Process Water Tank. Fitted with alarm to record overflows	Denoted as 'Wedge Pit' in Figure 2.
22	Subsurface drainage system under the new chemical grade processing plant and stockpiles	As shown in Figure 2.
23	Pipeline from subsurface drainage system to Austins Dam.	Indicative location shown in Figure 3.

The lithium oxide product is dewatered via filtration prior to discharge onto the new product stockpile and the recovered water recycled to the thickener.

A new tailings line will be installed to discharge tailings to the existing TSF2. No tailings discharge to TSF1 is proposed until a future date at which time both TSF1 and TSF 2 will be amalgamated into a single cell TSF.

To support the new processing plant an additional reagents storage area will be installed. None of these reagents are classed dangerous goods, and are therefore not covered by a Dangerous Goods Licence.

No changes are proposed to existing power or water supplies.

Table 3 below outlines the proposed changes to the Licence:

Table 3: Proposed throughput capacity changes

Category	Current throughput capacity	Proposed throughput capacity	Description of proposed amendment
5	2,300,000 tonnes beneficiated per annual period 5,000,000 tonnes of tailings deposited per annum	4,700,000 tonnes beneficiated per annual period 5,000,000 tonnes of tailings deposited per annum (no change)	Installation and operation of second crusher and chemical grade lithium processing plant, including additional product storage stockpile.

1.1.2 Proposed Infrastructure: New Processing Plant Stormwater Management

All ring roads and areas within the plant will be concrete or bitumised. The crusher, individual plant areas and reagent areas will be bunded with sumps recovering water to the process water tank.

Surplus water at the final products (concentrate) stockpile will be recovered to the process

water tank or thickener.

The new reagents area will be bunded to contain 110% capacity of the largest tank within the bund.

Areas surrounding the crushing and processing plants including the final stockpile areas will be hardstand and all water in these areas will be directed to the Thickener circuit.

Any emergency overflows from the bunds (for example due to sump/pump blockages or failures) and any other stormwater within the new plant will be directed to a final solids silt sump. The sump is sized at 500m³ which will capture a 3 hour 1% AEP (annual exceedance probability) rainfall event (~58mm over 3 hours). The sump is able to be pumped back to the thickener and process water tank. Refer to Figure 2 following and the drains shown in red which will direct the stormwater to the final silt sump (referred to as 'wedge pit' on the diagram).

Any rainfall events in excess of 58mm in 3 hours will overflow the sump and discharge using gravity to flow to Austins Dam via a pipeline, which will replace the existing overland drainage (refer to Figure 3 following for the pipeline location). According to Talison's records, over the past 15 years only two rainfall events have occurred that have exceeded 58 mm over a 24 hour period (TLA 2017). The sump will be fitted with an overflow alarm and a system for measuring discharge events to the Austins Dam.

Sub-surface drains will be installed to reduce pooling of water, which may affect the plant's foundations. These drains are shown in blue in Figure 2 following, and direct sub-surface stormwater flow to the pipeline to Austins Dam.

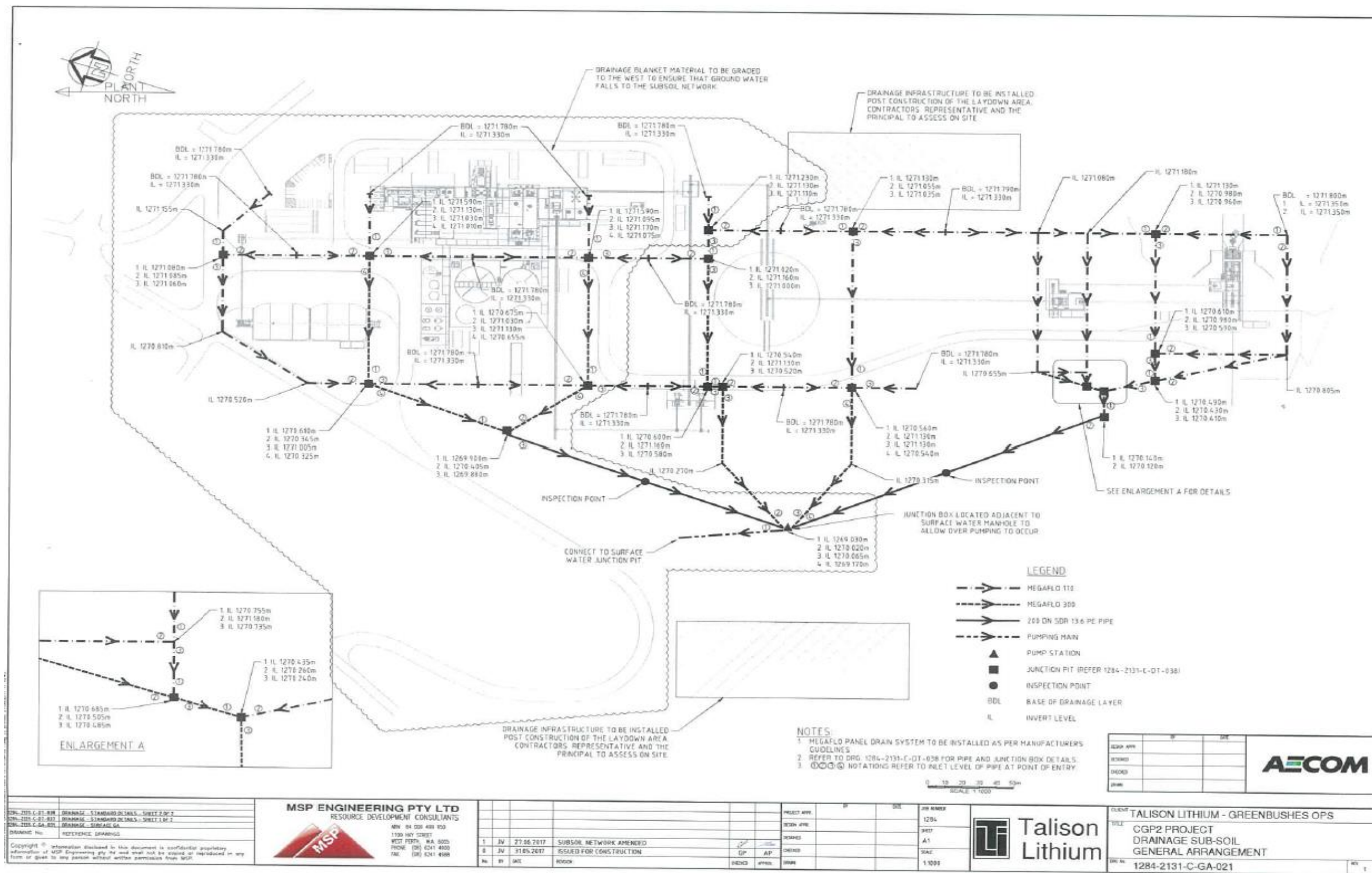


Figure 2: Subsurface stormwater drainage plan - Chemical Grade Processing Plant

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IR-T08 Amendment Notice (Major) template v2.0 (July 2017)

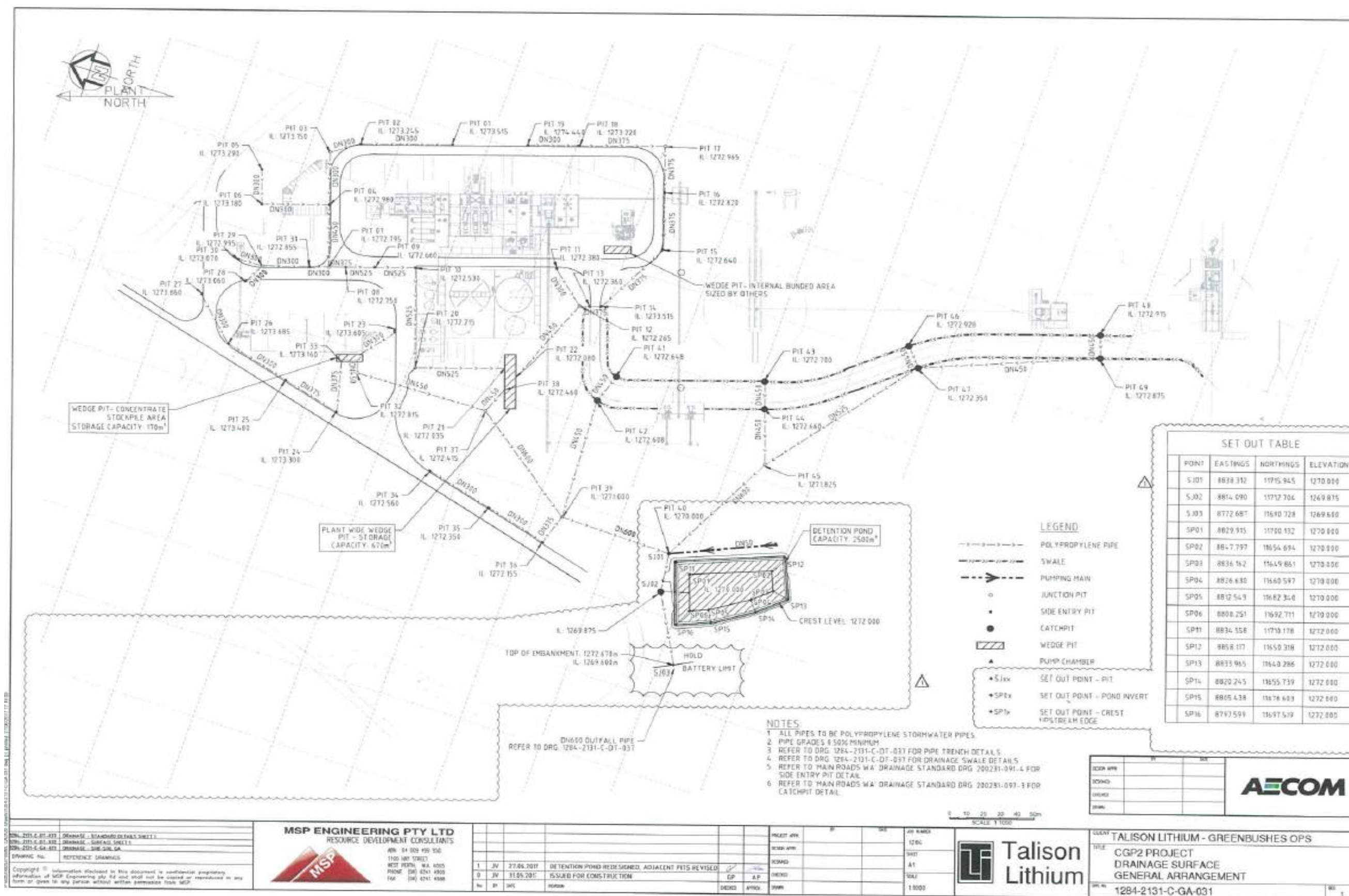


Figure 3: Surface stormwater drainage plan - Chemical Grade Processing Plant (note flows from the wedge pits bypass the detention pond).

1.1.3 Change to notation and location of groundwater bores

On 27 June 2017, Talison notified DWER that following drilling of the groundwater bores in 2017 they wished to change the notation for the new groundwater bores, remove proposed bores where no surface aquifer was present and also make corrections to listing of existing bores. Accordingly Talison requests Table 3.4.3 and Figure 3 of Schedule 1 of the current Licence to be updated.

1.1.4 Note in relation to previous Licence improvement conditions IR5, IR6, IR7

At the time of the previous Amendment Notice 1, dated 5 May 2017, DWER stated that the regulatory controls arising from the submissions made by Talison for improvement conditions IR5 – IR7 would be addressed in this Amendment Notice 2. Given the developments in response to management of lithium enriched surface water flows and commitments made by Talison (refer to section 1.5.5 for further detail) assessment of controls in relation to these improvement requirements will be addressed at the forthcoming amendment application (expected to be received in September 2017) to install the water treatment plant and new clear water pond.

1.2 Amendment history

Table 4 provides the amendment history for L4247/1991/13.

Table 4: Licence amendments

Instrument	Issued	Amendment
L4247/1991/13	15 July 2016	Amendment to authorise embankment raise to TSF2 to RL 1280 m. New groundwater monitoring program required by Condition 3.4.1. Ambient surface water quality limits set for receptor downstream dam, Norilup Dam. Improvement condition 4.1.1 added to the Licence with 7 improvement requirements to improve monitoring and management of contaminants discharged to ambient surface water.
L4247/1991/13	5 May 2017	Amendment Notice 1 Amendment to convert IR1 – IR7 requirements to conditions where appropriate, following receipt of Licensee submissions. Amendments also made to existing conditions 1.3.7, 2.2.1, 5.2.1 and 5.2.3. Additional change made to condition 5.3.1 following comments made by the Department of Parks and Wildlife on the 23 December 2016 draft amendment notice. DER administrative change made to condition 5.1.2 following publication of new template for AACRs.
L4247/1991/13	30 August 2017	Amendment Notice 2 Amendment to authorise construction of an additional chemical grade lithium processing plant, including ROM pad and crusher.

1.3 Location and receptors

Table 5 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Town of Greenbushes	Located on the northern boundary of the Premises (approximately 1 km to the north of the proposed processing plant).

Table 6 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which are receptors relevant to the proposed amendment.

Table 6: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
Cowan Brook, Cowan Brook Dam and sub-catchment	At the western edge of the Premises boundary. (The brook connects Cowan Brook Dam located within the Premises and Norilup Dam). Refer to Figure 4 following for approximate location.
Spring Gully, Swenkies Dam and Mt Jones sub-catchment	At the northwestern edge of the Premises boundary. Refer to Figure 4.
Greenbushes State Forest	Located within the western side of the Premises and surrounding the western half of the Premises boundary.
Norilup Brook including Norilup Dam and sub-catchment	Approximately 2km to the west south-west of the Premises. The location of Norilup Dam is shown in Figure 4.

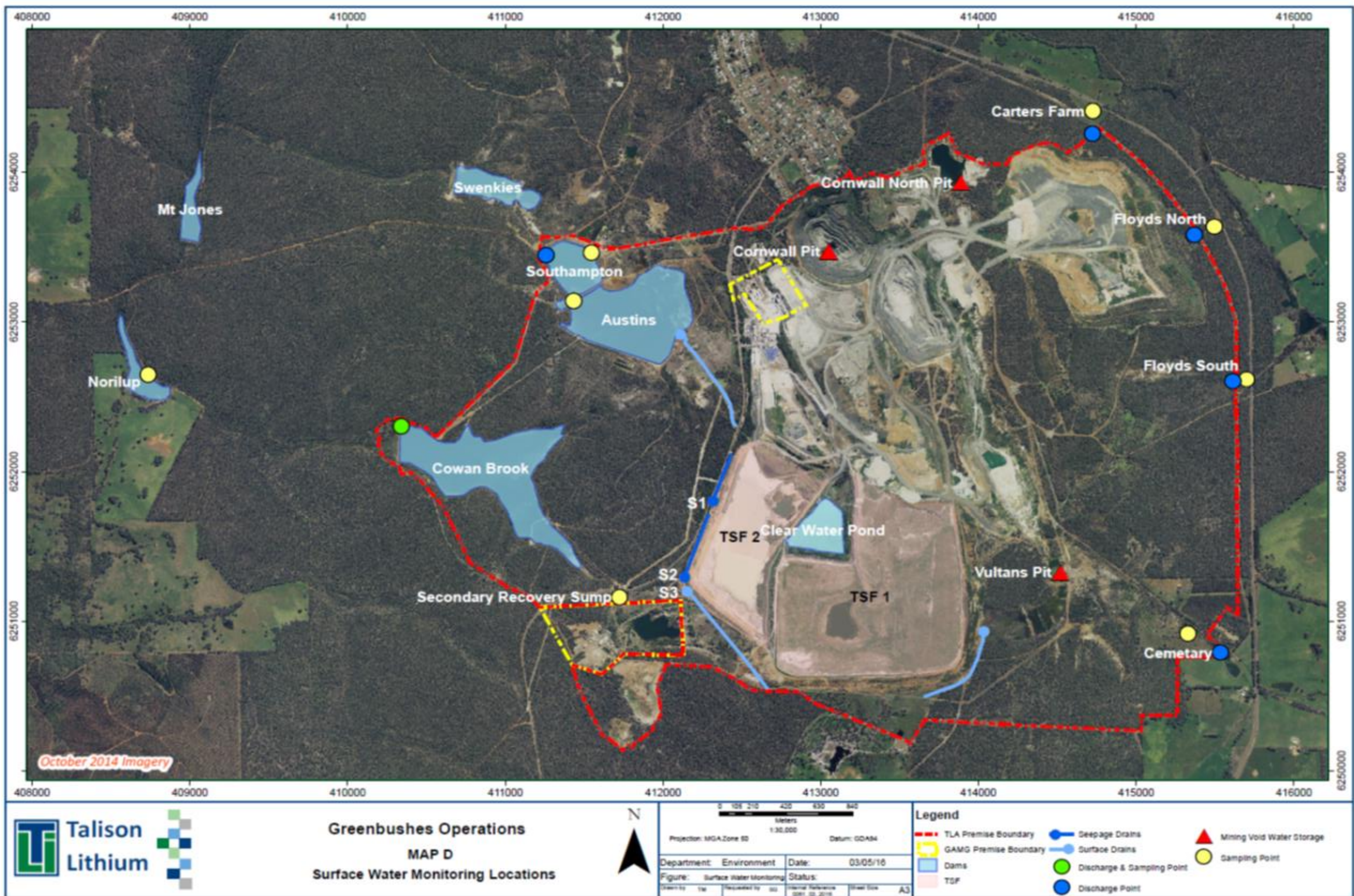


Figure 4: Location of Premises Boundary (in red) with respect to surrounding land use and water storages

1.4 Criteria for Assessment

1.4.1 Noise

Talison operates under an existing Regulation 17 exemption to the Noise Regulations: Environmental Protection (Talison Lithium Australia Greenbushes Operations Noise Emissions) Approval 2015. The Regulation 17 exemption specifies the noise levels allowed to be emitted from the mine site from activities other than blasting, as well as prescribing the noise emissions permitted for blasting. The noise emissions for other than blasting are detailed in Table 7 below.

Table 7: Talison Regulation 17 permitted noise emissions (other than blasting)

Type of premises receiving noise	Time of day	L _{A10} approved level (dB)	L _{Amax} approved level (dB)
A highly sensitive area (being that area (if any) of noise sensitive premises comprising a building, or part of a building, on the premises that is used for a noise sensitive purpose; and any other part of the premises within 15 metres of that building or that part of the building)	0700 to 1900 hours all days	53	71
	1900 to 2200 hours all days	51	69
	2200 to 0700 hours all days	50	68
A noise sensitive premises other than a highly sensitive area	All hours	60	80
Commercial premises	All hours	60	80
Industrial and utility premises	All hours	65	90

1.4.2 Surface Water

No trigger values for lithium are listed within the national ANZECC guidelines for protection of freshwater ecosystems. Site-specific eco-toxicity testing of the effluent (tailings seepage/decant/ process water) on three fish species obtained from Norilup Brook was conducted for Talison in 2013 by the Centre of Excellence in Natural Resource Management at UWA, Albany to derive a trigger value of 0.42 mg/L.

This value was based on a concentration of 41.9mg/L lithium, at which 50% of one of the three species (Pygmy Perch) experienced adverse effects (in this case immobility) after exposure to the effluent over 96 hours (96 h EC₅₀) (CERNM 2013).

DWER (formerly DER) reviewed the methodology used for derivation of the trigger value and found it was consistent with the methodology prescribed in Schedule B5b of the *National Environment Protection (Assessment of Site Contamination) Measure 1999* for deriving Ecological Investigation levels for potential contaminants, noting that the attenuation factor of 100 applied was derived using an Assessment Factor method, consistent with section 3.2.3 of the NEPM Schedule B5b (DER 2016d). It was noted that the value of 0.42mg/L was a conservative value in relation to acute toxicity effects from lithium; however it was considered appropriate in the absence of literature on potential chronic effects of lithium on freshwater

species (for example on reproductive function, or on the long-term consequences of elevated lithium on ecosystem function (DER 2016d)).

1.5 Risk assessment

1.5.1 Risk Assessment Methodology

The risk assessment utilises the risk rating matrix as shown in Table 8, recently updated in accord with the Department's *Guidance Statement: Risk Assessments (November 2016)*. The risk criteria used in the matrix below are further defined in Table 9.

Table 8: Risk Rating Matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 9 below.

Table 9: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	<ul style="list-style-type: none"> onsite impacts: catastrophic offsite impacts local scale: high level or above offsite impacts wider scale: mid-level or above Mid to long-term or permanent impact to an area of high conservation value or special significance^ Specific Consequence Criteria (for environment) are significantly exceeded 	<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	<ul style="list-style-type: none"> onsite impacts: high level offsite impacts local scale: mid-level offsite impacts wider scale: low level Short-term impact to an area of high conservation value or special significance^ Specific Consequence Criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific Consequence Criteria (for public health) are exceeded Local scale impacts: high level impact to amenity

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Possible	The risk event could occur at some time	Moderate	<ul style="list-style-type: none"> onsite impacts: mid-level offsite impacts local scale: low level offsite impacts wider scale: minimal Specific Consequence Criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific Consequence Criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific Consequence Criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting*.

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines*.

"onsite" means within the Prescribed Premises boundary.

1.5.2 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 10 below:

Table 10: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

Table 11 and Table 12 below describe the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

Table 11: Risk assessment for construction of an additional chemical grade lithium processing plant

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
Category 5 Processing or beneficiation of metallic or non-metallic ore	Construction of additional lithium chemical grade plant	Dust: associated with construction activities	Town of Greenbushes	Air/Wind	Health and amenity impacts	Slight	Unlikely	Low	The location of the construction works is shielded from the town by mining activities and is also below the surrounding mine stockpiles. No specific regulatory controls required.
		Noise	Town of Greenbushes	Air/Wind	Health and amenity impacts	N/A	N/A	N/A	Refer to section 1.5.3 below.
		Stormwater	Austins Dam	Overland gravity discharge from construction site	Increased suspended solids and turbidity in Austins Dam	Minor	Possible	Medium	The drainage at the construction site directs stormwater flow to the south west corner of the site and to Austin’s Dam. Austins Dam has a large capacity, so any sediment contribution from stormwater should be captured within the Dam or otherwise diluted. A stormwater storage detention pond of 2500m ³ capacity will also be installed in the south west location of the new lithium processing plant as shown in Figure 3, providing additional contingency

									storage in the event of a spill or rainfall event. Condition 1.3.12 has been added to the Licence to ensure that the capacity of drains within the construction site is maintained.
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Table 12: Risk assessment for operation of an additional chemical grade lithium processing plant including cumulative impacts

Risk Event						Consequence rating	Likelihood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
Category 5 Processing or beneficiation of metallic or non-metallic ore	Operate additional crusher and lithium chemical grade processing plant	Dust: associated with crushing operations in chemical grade plant	Town of Greenbushes	Air/Wind	Health and amenity impacts	Minor	Unlikely	Medium	The additional ROM pad, crusher and processing plant are shielded from the town by mining activities and are also located below the town. Whilst dust will be generated in the vicinity of the ROM pad and crusher, it is not expected to result in additional particulate emissions reaching the town. Condition 3.4.1 of Licence L4247 currently requires continuous monitoring of particulates in ambient air at the Premises boundary, adjacent to the town. The new crusher will be installed with a wet scrubber dust extraction system and the fine ore stockpile will have a sprinkler system

									installed. These controls, in addition to existing site controls (water carts, shielding of product stockpiles and use of a chute to mitigate dust emissions) are deemed sufficient to manage the risk from dust. The proposed controls for the crusher will be required by Licence condition and no further regulatory controls are required.
		Noise	Town of Greenbushes	Air/Wind	Health and amenity impacts	N/A	N/A	N/A	Assessment detailed in section 1.5.3 following.
		Contaminated stormwater	On Premises surface water storages: Cowan Brook Dam and Austins/Southampton Dam. Off Premises surface water receptors: including Cowan Brook, Norilup Dam, Swenkies Dam, and Mt Jones Reservoir.	Surficial shallow seepage flows via groundwater and above ground flows to Premises' surface water dams; overflows from Premises' dams and seepage from Premises' dams to downstream surface water bodies	Impacts to freshwater aquatic species abundance and diversity within onsite and offsite surface water receptors; reduced ecological function of those receptors.	Minor	Unlikely	Medium	Assessment detailed in section 1.5.4 following
		Lithium and metals/metalloids (arsenic, manganese, nickel) released via	On Premises surface water storages: Cowan Brook Dam and	Surficial shallow seepage flows via groundwater	Impacts to freshwater aquatic species abundance	Major (off-site impacts local scale: mid – level)	Possible	High	Assessment detailed in section 1.5.5 following.

		tailings seepage / contaminated process water releases (tailings decant)	Austins/ Southampton Dam. Off Premises surface water receptors, including aquatic ecosystems associated with each receptor: Cowan Brook, Norilup Dam, Swenkies Dam, and Mt Jones Reservoir.	and above ground flows to Premises' surface water dams; overflows from Premises' dams and seepage from Premises' dams to downstream surface water bodies	and diversity within onsite and offsite surface water receptors; reduced ecological function of those receptors. Potential third party impacts to recreational fishers consuming fish/crayfish from affected streams/ dams.				
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1.5.3 Operations Risk Assessment: Noise

Herring Storer Acoustics completed a model of the expected noise emissions from the new ROM pad operation, crusher and chemical grade lithium processing plant and determined that the operation of the new plant together with the existing operations, would meet the requirements of the Regulation 17 approval (HSA 2016). DWER has reviewed the model and found the methodology acceptable, the sound power levels and selection of assessment locations to be reliable (DER 2017). The existing Regulation 17 approval requires that there should be no increased noise emissions beyond the existing permitted limit. The Licence Holder will therefore be required to complete a post-construction noise verification study to confirm that the operation of the new plant will not cause an exceedance of the permitted noise level.

1.5.4 Operations Risk Assessment: Contaminated Stormwater Release

Given that bunding will be provided to all the processing plant areas and roadways will be bitumised, and that the water surrounding the stockpiles is contained and returned to the thickener circuit, in addition to the capacity to contain a 58mm rainfall event in the final silt sump, it is considered that the likelihood of overflowing this sump is **Unlikely**. The consequence is considered **Minor**, as it is expected that most flows will be collected in sumps within the individual process plant bunds and returned to either the process water tank or thickener circuit, thereby not entering the final silt sump at all, reducing the risk of contaminated spills being piped via gravity to Austins Dam. The overall risk of contaminated stormwater releases impacting on downstream freshwater ecosystems is considered **Medium**.

Contingency controls in the form of level controls on the thickener, process water tank and raw water tank, shall ensure that process control records are able to be generated for any spills to ground from these tanks. It is noted that these tanks are also contained within bunds, reducing the risk of spills flowing to the silt sump where the spill volume may be released to Austins Dam. The overflow alarm on the silt sump provides a lag indicator of overall performance, as the goal of the stormwater management system is to reduce overflows of contaminated stormwater from this sump. To this end, Table 3.3.1 of current Licence condition 3.3.1, for recording process water overflows and spills, will be amended to require recording of overflows from the new silt sump.

A new Licence condition will require the Licence Holder to implement the stormwater management controls as proposed. Following completion of the works, the Licence Holder will be required to submit a construction compliance document.

1.5.5 Operations Risk Assessment: Releases of Tailings Seepage and Process Water

As discussed in the current Licence and Decision Document (amendment dated 15 July 2016 and Amendment Notice 1 dated 5 May 2017), tailings seepage and tailings decant are flows that contribute to the off Premises surface water discharges. In winter the Premises experiences a net positive surface water balance, with excess surface water released via overflows of the Cowan Brook Dam to Cowan Brook. These discharges, in addition to previous overflows and dam seepage flows from Southampton Dam has resulted in elevated lithium, arsenic and other metals/metalloids concentrations in Cowan Brook, Norilup Dam and Norilup Brook downstream of the mine.

In order to address the potential impact from the increase in contaminants downstream, the amendment dated 15 July 2016 imposed decreasing limits on surface water lithium concentrations at Norilup Dam over the life of the Licence. Additionally the Licence Holder was required to implement improvements to process and tailings seepage water management to reduce lithium and metal/metalloid concentrations in the process water circuit and/or reduce discharges from the Premises.

Not all improvements have been implemented by the time of this Licence amendment application. In particular IR5, to treat and/or store surface water so as to not discharge lithium contaminated water is still at the planning stage.

The most recent 2016 results from ecological monitoring program of Norilup Brook, upstream (not likely to be affected by mine surface water discharges) and downstream (affected by discharges) of Norilup Dam, recorded higher concentrations in lithium, uranium, zinc, nitrates, cadmium and arsenic in surface water downstream and slightly higher sediment concentrations of lithium, arsenic, potassium, copper and iron downstream. Lithium concentrations in sediments from upstream sites were between 0.9 – 7.7mg/kg versus 7.6 mg/kg - 39 mg/kg for downstream sites. The maximum concentration of lithium in surface water downstream was ~0.25 mg/L, as compared to the maximum upstream value of 0.005 mg/L.

Abundance and diversity of invertebrates did not vary significantly between upstream and downstream sites. Fish and crayfish collected did not differ significantly in species richness or numbers between upstream and downstream sites. This data suggests that to date there has been no significant impact due to increasing contaminants concentrations, however this assertion may only be confirmed once bioaccumulation studies are completed (to be completed in 2017 and then annually) (CNERM 2017).

The proposed increase in the capacity of the lithium processing from 2,300,000 tpa to 4,700,000 tpa without implementation of the water treatment proposal would potentially result in increasing tailings seepage and tailings decant flows, increasing the soluble lithium concentrations in the surface water circuit. Any overflows from the Premises following operation of the new Chemical Grade Processing Plant would increase the loading of lithium and other soluble metals/metalloids downstream. Operating the new and existing processing plants and increasing contaminants downstream may result in chronic impacts to the freshwater ecosystem or to human health from consuming local aquatic species. This consequence has therefore been rated as **Major**.

As noted, the literature is not definitive on chronic effects from lithium on aquatic freshwater species. There has been an acute toxicity effect determined, however, and a recommended trigger value of 0.42 mg/L derived from that testing (CNERM 2013). The likelihood of an impact on the freshwater ecosystem downstream or on human health from consuming local aquatic species has been determined as **Possible**. The overall risk is **High**.

The Licence Holder has provided DWER with scopes of work in progress to implement a water treatment system using reverse osmosis to reduce the lithium concentrations in the process water circuit (GHD 2017a, VWT 2017). DWER notes that the Licence Holder has made a commitment to not increase ore processing levels until the water treatment system has been constructed and commissioned (GHD 2017b).

1.6 Decision

Given the high risk associated with increasing the tailings flow to TSF2 without an operational water treatment plant to reduce onsite surface water lithium concentrations, the permitted processing rate remains unchanged at the current authorised category 5 rate of 2,300,000 tonnes per annum.

Approval to install the new processing plant infrastructure is granted, however, with consideration to the commitments made by the Licence Holder to construct and commission a new Clear Water Pond and reverse osmosis plant following the work of pilot plant testing that has indicated the reverse osmosis plant would be capable to achieve lithium concentrations of ~0.5mg/L (VWT 2017, GHD2017a, GHD 2017b).

Controls proposed by the Licence Holder for the construction of the works will be conditioned on the Licence to ensure that potential risks to air quality and surface water from dust and stormwater emissions are managed. A new condition 1.3.11, specifies the infrastructure and

required controls to be constructed. Condition 3.4.1, Table 3.4.1 currently on the Licence regulates operational dust emissions arising from lithium processing and this does not require amendment. Condition 3.3.1, Table 3.3.1 has been amended to include recording of overflow events and flows from the new silt sump.

1.7 Licence Holder's comments

The Licence Holder was provided with the draft Amendment Notice on 31 July 2017. Comments received from the Licence Holder have been considered by the Delegated Officer as shown in Appendix 2.

2. Amendment

- Definitions of the Licence are amended by the deletion of the text shown in strikethrough below and the insertion of the red text shown in underline below:

'CEO' means the Chief Executive Officer of the Department of ~~Water and Environmental~~ Regulation

'DWER' means the Department of Water and Environmental Regulation

- Table 1.3.1 of the Licence is amended by the insertion of the red text shown in underline below:

Table 1.3.1: Containment infrastructure		
Containment cell or dam number(s)	Material	Infrastructure requirements
TSF1	Emergency tailings deposition of up to a depth of 300mm for a period not exceeding 6 months	<ul style="list-style-type: none"> Embankment height at RL 1282m Working decant system
TSF2	Tailings	<ul style="list-style-type: none"> Buttress Two seepage collection trenches and pipelines Seepage collection sump pumps at sump 01, 02
Clear Water Pond	Tailings decant, seepage, mine dewater, contaminated stormwater	Arsenic remediation units to treat water within the circuit
Austins Dam	Process water (seepage return and decant), site runoff, overflows from Lithium Processing Plant siltation trap and stormwater	None specified
Southampton Dam	Process water from Austins Dam	None specified
Cowan Brook Dam	Contaminated and clean stormwater; emergency overflows from Austins Dam; current overflows from southern seepage recovery sump and forecast emergency overflows from the seepage trench sump 02 post completion of the embankment raise to RL 1265 m.	None specified
Cornwall North Pit	Mine dewater, stormwater, <u>process water</u>	None specified
Cornwall Pit	Mine dewater, stormwater, process water	None specified
Vultans Pit	Mine dewater, stormwater	None specified

- Table 3.3.1 of the Licence is amended by the insertion of the red text shown in underline below:

Table 3.3.1: Process monitoring

Monitoring point reference	Process description	Parameter	Units	Frequency	Method
Clear Water Pond	Overflow from the Clear Water Pond to Austins Dam	Flow	m ³	Continuous	None specified
Austins Dam	Overflow from Austins Dam to Cowan Brook Dam	Flow	m ³	Total m ³ per event	None specified
Lithium TG Raw Water Tank	Overflows to ground	Frequency	-	Number of events	None specified
Secondary seepage recovery sump	Overflow to Cowan Brook Dam	Flow	m ³	Total m ³ per event	None specified
Lithium CG Processing Plant 1 Siltation Trap	Overflow from siltation trap to Austins Dam	Frequency and duration	Hrs	Number of events	Visual observation
<u>Lithium CG Processing Plant 2 – Plant Wide Wedge Pit¹</u>	<u>Overflow from new wedge pit (siltation sump) to Austins Dam</u>	<u>Frequency and duration</u>	<u>Hrs</u>	<u>Number of events</u>	<u>Recorded events</u>

Note 1: Monitoring required to commence following commissioning of the Lithium CG Processing Plant 2.

4. Table 3.4.3 of the Licence is replaced by the Table 3.4.3 in italics shown below:

Table 3.4.3: Monitoring of ambient groundwater quality¹

Monitoring point reference	Parameter	Units	Averaging period	Frequency
Shallow bores				
MB17/01S MB17/02S MB17/05S MB17/06S MB17/07S MB17 /08S	Standing water level	m(AHD) & mbgl	Spot sample	Quarterly
	pH	-		
	Total dissolved solids	mg/L		
	Chloride	mg/L		
	Nitrate			
	Magnesium			
	Sodium			
	Sulfate			
	Arsenic			
	Cobalt			
	Copper			
	Iron			
	Lithium			
	Manganese			
Nickel				
Uranium				
Thorium				
Radium 226	Bq/L	Six monthly		
Radium 228				
Intermediate bores				
MB17/01I MB17/02I MB17/03I MB17/04I MB17/05I MB17/06I	Standing water level	m(AHD) & mbgl	Spot sample	Quarterly
	pH	-		
	Total dissolved solids	mg/L		
	Chloride	mg/L		
	Nitrate			
	Magnesium			
Sodium				

<i>Milling circuit</i>	<i>Bunding to contain 110% of the largest vessel (tank) in the compound; collection sump within bund</i>
<i>Heavy media separation circuit</i>	<i>Bunding to contain 110% of the largest vessel (tank) in the compound; collection sump within bund</i>
<i>Classification circuit</i>	<i>Bunding to contain 110% of the largest vessel (tank) in the compound; collection sump within bund</i>
<i>Coarse and fine flotation circuits</i>	<i>Bunding to contain 110% of the largest vessel (tank) in the compound; collection sump within bund</i>
<i>Wet high intensity magnet (WHIMs) and tantalum recovery circuit</i>	<i>Bunding to contain 110% of the largest vessel (tank) in the compound; collection sump within bund</i>
<i>Process Water Tank, Raw Water Tank, Thickener</i>	<ul style="list-style-type: none"> <i>Bunding to contain 110% of the largest vessel (tank) in the compound; collection sump within bund</i> <i>All installed with level alarms. Level alarms linked to process control instrumentation to allow recording of overflows.</i>
<i>Product stockpiles</i>	<i>Located on banded hardstand</i>
<i>New Tailings Line</i>	<i>Located within bunding with capacity to contain volume of the pipeline</i>
<i>Concentrate Storage Area Wedge Pit</i>	<ul style="list-style-type: none"> <i>Capacity of 170m³</i> <i>Fitted with sump pump to return flow to Thickener</i>
<i>Plant Wide Wedge Pit</i>	<ul style="list-style-type: none"> <i>Capacity of 670m³</i> <i>Fitted with overflow alarm linked to process control instrumentation to record duration of overflows.</i> <i>Fitted with sump pump to return flow to Thickener</i>
<i>CG Processing Plant area</i>	<i>Subsurface drainage system</i>

6. The Licence is amended by the insertion of the following Condition 1.3.12:

1.3.12 During construction of the works listed in Table 1.3.7, the Licence Holder must maintain the capacity of construction site drains so as to ensure that stormwater flows to either the Concentrate Storage Area Wedge Pit, Plant Wide Wedge Pit or interim catchment pits, with the exception of stormwater during extreme rainfall events.

7. The Licence is amended by the insertion of the following Condition 1.3.13:

1.3.13 Following commissioning of the Works listed in Table 1.3.7, the Licence Holder must complete daily inspections of the following infrastructure:

(a) integrity of the new tailings pipeline from the CG Plant 2 to TSF2;

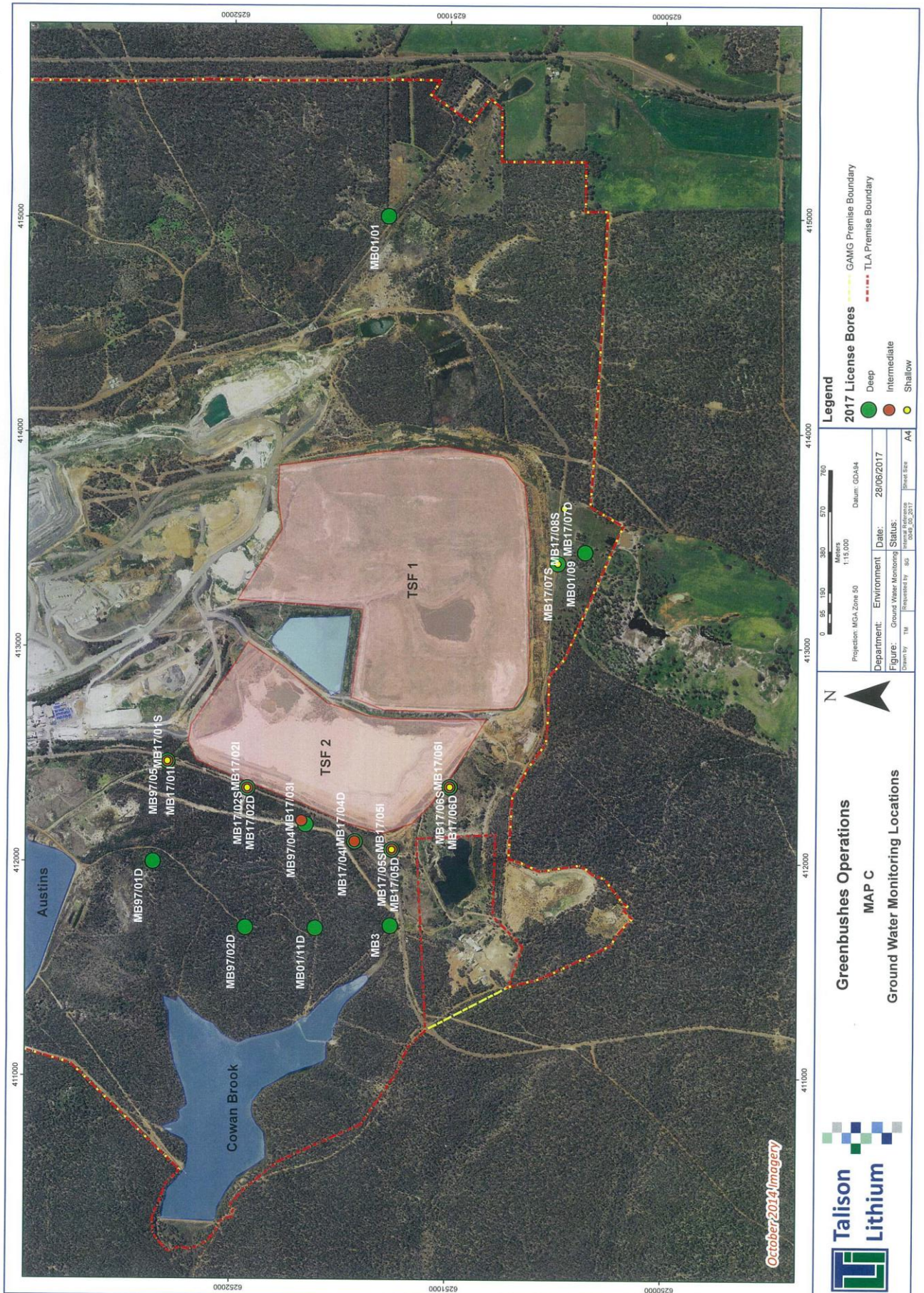
(b) capacity of the wedge pits and south west detention pond as shown in Figure 5 of Schedule 1.

The Licence Holder shall maintain a record of all inspections, with each record signed by the person responsible. Where deficiencies are identified they shall be remedied as soon as possible, but no later than one week after the inspection.

8. The Licence is amended by the insertion of the following Condition 5.2.6:

5.2.6 Within 60 days of the completion of the Works, The Licence Holder must provide to the CEO a compliance document from a qualified engineer confirming each item of infrastructure or component of infrastructure specified in Column 1 of Table 1.3.7 has been constructed to the requirements specified in Column 2.

9. Figure 3 of Schedule 1 of the Licence is replaced by the Figure below:



10. Schedule 1 of the Licence is amended by the insertion of Figure 5 shown below:

Stormwater Drainage Plan –Chemical Grade Lithium Processing Plant 2

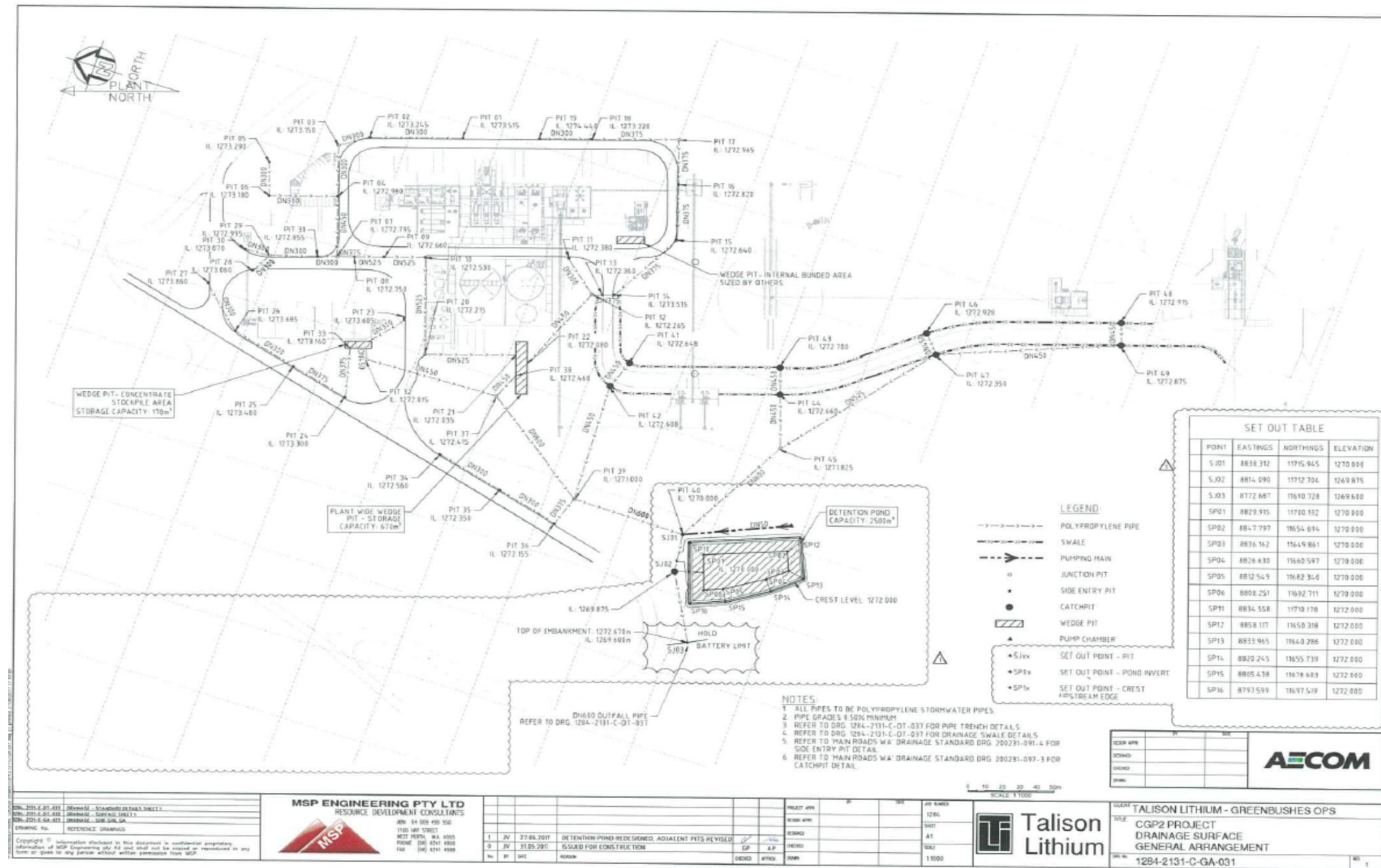


Figure 5: Surface stormwater drainage plan - Chemical Grade Processing Plant

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IR-T08 Amendment Notice (Major) template v2.0 (July 2017)

Appendix 1: Key documents

	Document title	In text ref	Availability
1	TLA (2016) <u>Application to Amend Licence L4247/1991/13</u> , signed 15 December 2016	TLA 2016	DWER internal record (A1343895)
2	Centre for Excellence in Natural Resource Management (2013) , <i>Ecotoxicology of Lithium</i> , unpublished report for Talison Lithium, Greenbushes, August 2013.	CENRM 2013	DWER internal record (A998376)
3	Centre for Excellence in Natural Resource Management (2017) <i>Ecological assessment program for Norilup Brook in relation to expansion of a tails dam at the Talison Lithium Mine, Greenbushes, Western Australia</i> , unpublished report for Talison Lithium, Greenbushes, February 2017.	CENRM 2017	DWER internal record (A1495307)
4	DER (2015) <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth, July 2015.	DER 2015a	accessed at www.dwer.wa.gov.au
5	DER (2015). <i>Guidance Statement: Setting conditions</i> . Department of Environment Regulation, Perth, October 2015.	DER 2015b	
6	DER (2016). <i>Guidance Statement: Licence duration</i> . Department of Environment Regulation, Perth August 2016.	DER 2016a	
7	DER (2016) <i>Guidance Statement: Risk Assessments</i> . Department of Environment Regulation, Perth November 2016.	DER 2016b	
8	DER (2016) <i>Guidance Statement: Decision Making</i> . Department of Environment Regulation, Perth, November 2016.	DER 2016c	
9	DER (2016) Memorandum from B. Richmond to L. Lavery 'Talison Lithium – new groundwater monitoring network and proposed lithium water quality targets', 1 February 2016	DER 2016d	DWER internal record (A1101888)
10	DER (2017) Memorandum from J. Guo to T. Gentle 'Noise – DER Licence L4247/1991/13 – A Lithium	DER 2017	DWER internal record (zA107257)

	Mine and Processing Plant, Talison Lithium Australia, Greenbushes – Advice’, 24 January 2017		
11	Letter from GHD to DER, <u>Talison Lithium GHD Current Scope of Works</u> , dated 16 May 2017	GHD 2017a	DWER internal record (A1437151)
12	Letter from GHD to DER, <u>Talison Lithium Pty Ltd Construction and Approvals Timeline</u> , dated 19 May 2017	GHD 2017b	DWER internal record (A1437150)
13	Herring Storer Acoustics (2016) <i>Talison Lithium Ltd. Proposed New Lithium Plant Greenbushes Acoustic Assessment</i> , report no: 21195-2-16256, December 2016	HSA 2016	DWER internal record (Appendix to A1343926)
14	Letter from TLA to DER, <u>Application to amend Licence L4247/1991/13 under the <i>Environmental Protection Act 1986</i></u> , dated 19 January 2017	TLA 2017a	DWER internal record (A1374575)
15	Veolia Water Technologies (2017) Memorandum from VWT to Talison Lithium, <u>Talison Lithium – Water Treatment Plant (WTP) Summary</u> , dated 11 May 2017	VWT 2017	DWER internal record (A1437151)

Appendix 2: Summary of Licence Holder comments

The Licence Holder was provided with the draft Amendment Notice on 31 July 2017 for review and comment. The Licence Holder responded on 9 August 2017.

Amendment / Condition	Summary of Licence Holder comment	DWER response
Amendment, Figures 1 and 2	Updated figures supplied.	Included in amendment
Amendment, Table 11 (Risk Assessment) New Condition 1.3.12	Advised that general drainage from plant area is now directed to the wedge pits and the south west corner of the site and not to the TSF2.	Updated
Amendment, Section 1.5.5	Edit suggested to replace 'doubling' of seepage and decant flows with 'increasing' and a further edit to the sentence to remove 'increasing the' soluble lithium.	Accepted in part
Condition 1.3.1, Table 1.3.1	Request to include process water in the material authorised to be contained by Cornwall North Pit.	Accepted
Condition 3.3.1, Table 3.3.1	Request to add a footnote to clarify when monitoring is required of overflows from new siltation trap	Accepted
New Condition 1.3.11, Table 1.3.7	Edits required to the controls on the TSF pipeline; noted that the flow from the siltation trap (wedge pits) is gravity flow so valving and flow meters will not be installed; and that the overflow volume from the wedge pit would not be able to be recorded as it would be as gravity flow – an overflow alarm would be able to be installed.	Updated for pipelines, overflow alarm for wedge pit retained.