



**Works Approval Number** W6132/2018/1

**Works Approval Holder** Wodgina Lithium Pty Ltd

**ACN** 611 488 932

**File Number:** DER2017/001949

**Premises**  
Wodgina Operations  
Mining tenements M45/50, M45/381, M45/382,  
M45/383, M45/886, M45/887, M45/923, M45/925 and  
M45/1252  
  
MARBLE BAR WA 6760

**Date of Amendment** 08/04/2019

## Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Works Approval in accordance with section 59 of the *Environmental Protection Act 1986* (EP Act) 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.

Danielle Eyre

Senior Manager, Resource Industries

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

## Definitions

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

**Table 1: Definitions**

Term	Definition
ACN	Australian Company Number
ANZECC/ARMCANZ	Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 1. National Water Quality Management Strategy
Amendment Notice	refers to this document
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
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 10, Joondalup DC WA 6919 <a href="mailto:info@dwer.wa.gov.au">info@dwer.wa.gov.au</a>
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.
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
TSF	Tailings Storage Facility
Works Approval Holder	Wodgina Lithium Pty Ltd

## Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Works Approval 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: Decision Making* (February 2017)
- *Guidance Statement: Risk Assessment* (February 2017)

## Amendment description

The Works Approval Holder, Wodgina Lithium Pty Ltd (WLPL), submitted compliance documentation on 1 March 2019 for the TSF 3 Expansion (TSF3E) and Beneficiation Plant Train 1.

During the assessment of the compliance documentation, DWER Regulatory Services identified changes in the TSF3E and Beneficiation Plant construction as compared to the design authorised by Works Approval W6132/2018/1.

On 18 March 2019 DWER Officers inspected the Wodgina Lithium Mine site to verify compliance against the conditions of Works Approval W6132/2018/1. At the inspection close out meeting, DWER requested WLPL to submit outstanding engineering construction reports, as built drawings and quality assurance and quality control (QA/QC) documents for the TSF3E and Beneficiation Plant – Train 1.

On 21 March 2019, WLPL submitted a TSF3E construction report, QA/QC for the bituminous liner and the as built drawings for the TSF 3 Expansion. The documents confirm that the TSF as constructed had variations to the approved TSF 3 Expansion design. The main changes are:

- The footprint of the TSF3E extends into M45/1252;
- The starter stage was removed and construction was completed to meet the final stage embankment height;
- Compacted clayey mine waste zone with a permeability of  $1 \times 10^{-8}$  m/s or less was replaced with an elastomeric modified BM geomembrane (ES1);
- The method of tailings deposition has changed from deposition via multiple spigots to a single spigot;
- The seepage recovery system and associated infrastructure was not installed; and
- Decant pump: installation of a skid mounted system instead of a pontoon mounted system.

DWER considers that a period of up to 90 days to commission the Beneficiation Plant Train 1 with ore, and to deposit tailings into the TSF3E, is adequate.

The Licence Holder acknowledged that the final TSF3E design varied from the initial design submitted with the Works Approval, as a result of changes required during construction which were approved by WLPL's geotechnical engineer. These changes were not submitted to DWER to enable an environmental risk assessment.

The key changes to the initial design of the TSF3E are:

- Embankment construction;
- Removal of the seepage recovery trench; and
- Use of bituminous liner with geotextile instead of a clay liner.

This amendment is drafted to account for the changes in construction that have occurred against the design assessed and authorised by the original Works Approval W6132/2018/1. Table 2 of W6132/2016/1 set out the requirements that the infrastructure/ equipment was required to meet according to conditions 1 and 2 of the W6132/2018/1.

Condition 2 stated that departures from the requirements in Table 2 must not occur except where such departures do not increase the risks to public health, public amenity or the environment and that all conditions would still be met.

An assessment of the Beneficiation Plant Compliance report and TSF3E compliance report and construction report was compared against the requirements specified in Table 2 (infrastructure and equipment requirement table) of W6132/2018/1. The findings are presented in Table 2 as shown following.

**Table 2: List of requirements specified in Conditions 1 and 2 Table 2 of W6132/2018/1 versus constructed.**

Infrastructure/ Equipment	Requirements (design and construction)	Compliant	Constructed (MRL compliance documentation)
<b>TSF3 Expansion</b>	TSF3 Expansion constructed within M45/923.	No	"A small 0.51Ha section of the <u>TSF3 Expansion extends into M45/1252</u> . This was covered by Mining Proposal Reg ID: 71172 (approved 16/3/18) and is shown in Schedule 1 disturbance maps of WLPL's Works Approval W6132/2018/1."
	<b>Starter stage (current embankment height of RL 260m:</b> <ul style="list-style-type: none"> <li>Storage capacity of 1.1 Mt (0.73 Mm<sup>3</sup>) of tailings material.</li> <li>Storage area of 8.4 hectares.</li> </ul>	No	Construction was completed to meet the final stage.
	<ul style="list-style-type: none"> <li>Construction of a compacted clayey mine waste zone with a permeability of <math>1 \times 10^{-8}</math> m/s or less and 6 m wide to be constructed along the eastern side of the TSF3 Expansion at the site of the waste dump to reduce seepage into the dump.</li> </ul>	Partial	The "compacted clayey mine waste zone" was removed from the wall design due to the availability of clay material on site. The TSF3 Expansion engineers suggested that the wall be lined with an elastomeric modified BM geomembrane ( <b>ES1</b> ). The datasheet for the ES1 specifies a permeability of $1 \times 6.1^{-14}$ . This provides a less permeable and uniform seepage control measure for reduction of seepage from the TSF3 Expansion, therefore reducing the potential risk for environmental harm."
	<ul style="list-style-type: none"> <li>Construction of a pipe bench along the eastern side of TSF3 Expansion.</li> </ul>	No	This was not constructed due to the terrain and constructability issues. A pipe bench was no longer required for the single spigot discharge that was installed in lieu of the multiple spigot design.
	<ul style="list-style-type: none"> <li>Constructed to provide a minimum 1 metre total freeboard (including an allowance for the 1% AEP 72 hour event of 383 mm) above the normal operating pond.</li> </ul>	Yes	Provision of a minimum of 1m total freeboard, plus an allowance for the 1% AEP 72-hour event of 383mm has been allowed above the normal decant pond.
	<ul style="list-style-type: none"> <li>Constructed with a compacted clay liner with a hydraulic conductivity of <math>1 \times 10^{-8}</math> m/s or less.</li> </ul>	Partial	"Prior to CMWs arrival on site the works that had been undertaken were as follows: <ul style="list-style-type: none"> <li>- Clear and grub of TSF floor, embankment footings and accessible hills;</li> <li>- Stockpiling of stripped topsoil;</li> <li>- Foundation preparation of embankment footprint adjacent to existing embankment;</li> <li>- Foundation preparation of TSF floor, placement and compaction of clay liner.</li> </ul> An area of the TSF floor was not clay lined, this section was subsequently marked and clay lined. Permeability over the floor has not yet been

Infrastructure/ Equipment	Requirements (design and construction)	Compliant	Constructed (MRL compliance documentation)
	<ul style="list-style-type: none"> <li>Constructed with a seepage recovery system comprising a recovery trench, sump pump and flowmeter established immediately downstream of the main embankment of the TSF3 Expansion.</li> </ul>	No	<p>demonstrated.</p> <p>“Due to the installation of the BM liner (ES1) on the upstream face of the embankment, the seepage recovery system and associated infrastructure was not required. The lining system was installed to reduce the seepage loss from the TSF3 Expansion. In conjunction with the reduction in seepage, and the revised hydrogeological modelling showing that any seepage from the TSF3 Expansion would preferentially report to the Cassiterite pit in the first instance, the omission of the seepage recovery system does not increase the environmental risk on this occasion.”</p>
	<p><b>Construction of Final Stage (of TSF3 Expansion):</b></p> <ul style="list-style-type: none"> <li>Storage capacity of 2.4 Mt (1.59 Mm3)</li> <li>Storage area of 12.8 hectares.</li> <li>Downstream raising of the main embankment (existing TSF3 southern embankment) to RL 275 m.</li> <li>Raising of the clayey mine waste zone with a permeability of <math>1 \times 10^{-8}</math> m/s or less constructed adjacent to the waste dump on the eastern side of the TSF3 Expansion.</li> <li>Embankment sections constructed as per Figure 3 in Schedule 2.</li> </ul>	Partial	<p>Change in the design.</p> <p>Construction was completed to meet the final stage. Storage capacity of 3 Mt and area of 12.8 ha, Embankment to RL 275m</p>
<b>Decant infrastructure</b>	Installation of a pontoon mounted floating decant pump.	No	“There was a change in decant return pump from a floating to a skid mounted system. This in part was due to the fact that there would be no supernatant water in the facility for at least three months. The skid mounted system would also be easier to maintain.”
	<p>Starter stage:</p> <ul style="list-style-type: none"> <li>Decant pump installed near the main embankment area.</li> </ul>	Yes	A 102 m <sup>3</sup> /hr @ 100m Total Dynamic Head (TDH) decant pump that was installed at the main embankment area, on the decant ramp.
	<p>Final Stage:</p> <ul style="list-style-type: none"> <li>Raising of the decant pump near the main embankment of the Expansion area.</li> </ul>	Partial	Not applicable as MRL constructed to final stage

Infrastructure/ Equipment	Requirements (design and construction)	Compliant	Constructed (MRL compliance documentation)
Tailings deposition infrastructure	End of pipe (fixed) multiple spigots.	No	<p>“The discharge point was not constructed with multiple spigots due to this discharge mechanism is not appropriate for this facility. There are no pipe benches surrounding the facility with a central decant and early in the design it was decided, in conjunction with our consultant tailings dam design team that constructing pipe benches around the facility was impractical.”</p> <p><b>Note</b> This is contrary to the TSF Design Report (revised): The design of the TSF3 Expansion at Wodgina has been aimed at:</p> <ul style="list-style-type: none"> <li>• Providing optimum removal of water from the facility and return to the plant for re-use in processing.</li> <li>• <b>Optimising tailings storage capacity by maximising tailings density (i.e. undertaking cyclic tailings deposition between groups of spigots).</b></li> <li>• Reducing environmental impact (i.e. due to seepage).</li> </ul>
	Tailings infrastructure installed in locations so that discharges occur in the locations specified for Stage 1 and Final Stage.	No	“Note that there was a change in route for the tailings line due to constructability issues.”
Pipeline corridor	Pipeline corridor to be constructed in the location specified in Schedule 2: Figure 5.	No	“There was a change in alignment for the tails line to utilise the existing haul road corridor and avoid a heritage area adjacent to TSF3 Extension. The heritage area did not allow for the construction of the 6m wide pipe bench due to the terrain and material type. The alignment was revised back around the haul road, using pre-existing disturbance and entering into the facility from the south. The decant line remained within the existing corridor as described in W6132/2018/1.”
	Pipeline corridor graded so that spillage from the pipelines is directed towards the TSF3 Expansion	No	“The pipeline corridor is preferentially graded to either discharge into the TSF3 extension area where possible or back into one of the scour pits in the event of a pipeline failure.”
Tailings delivery pipelines (2) from Beneficiation Plant to TSF3 Expansion	Pipelines constructed in the location specified in Schedule 2: Figure 5.	No	“There was a change in alignment for the tails line to utilise the existing haul road corridor and avoid heritage area adjacent to TSF3 Extension.”
	All pipelines to have a total length of 2915 m.	No	“The total length of pipeline is 3166m. This was increased due to the realignment of the tailings line as discussed previously.”
	Tailings pipelines to be constructed with 250 NB and 200 NB carbon steel pipelines from chainage 0 m through to chainage 2358 m.	No	“Due to the realignment, there is now 2646m of carbon steel pipework (chainage 2853m).”

Infrastructure/ Equipment	Requirements (design and construction)	Compliant	Constructed (MRL compliance documentation)
<b>Return water pipeline (1) from TSF3 Expansion to Process Water Pond</b>	Carbon steel piping to be supported above ground on precast concrete supports place on constructed access	Yes	
	Mining hose used at changes in horizontal and vertical alignment.	Yes	
	Tailings pipelines to be constructed with DN250 and DN225 PN HDPE pipe from chainage 2358 m to chainage 2915 m.	No	"The line was constructed with DN280 and DN225 PN HDPE line from chainage 2853m through to the end of the line at chainage 3166m (some 520m in length)."
	Decant return pipeline to be constructed with DN160 HDPE PN10.	Yes	
	All pipelines located above ground.	Yes	
	Earthen bunds are to be located on each side of the pipelines to contain spills and leaks in the event of pipeline failure.	Yes	
	Catch pits to be installed at chainage 850 m, 950 m, 1650 m and 2220 m with a capacity to store a minimum of 225 m3 of tailings material in the event of pipeline failure.	Yes (with changes)	"Scour pits have been constructed at chainages 705m, 1565m, 2009m and 2272m. The capacity of each of these pits has been designed to hold 255m <sup>3</sup> which is above the required design requirement."
	Pipeline to be installed with instrumentation consisting of electromagnetic flow meters and pressure transmitter installed downstream of pump station and upstream of single point discharge providing constant monitoring of operation parameters of the tailings pipeline, and to provide shutdown of the system in the event of pipeline failure.	Partially	"Two electromagnetic flow meters have been installed in each tails line". The pressure transmitters were not installed.
<b>TSF3 Expansion</b>	Final siting of monitoring wells determined by specified action in Condition 7 of the Works Approval.	Yes	Meeting 07/02/2019 – MRL /Golder/ DWER – hydrogeological report discussion. The hydrogeological report indicates that the seepage will flow towards the Cassiterite pit. No further bores required - DWER agreed.



Infrastructure/ Equipment	Requirements (design and construction)	Compliant	Constructed (MRL compliance documentation)
<b>monitoring bores</b>	Final siting of monitoring wells to be determined under advice by an experienced hydrogeologist.	N/A	As above
	Well installation and construction (including preparation of well construction logs) in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure 1999 – Schedule B, Section 8.2.	N/A	
	To be installed with three metre long screens placed across the top of the groundwater table.	N/A	
	To be surveyed to allow the top of the bore casing and ground level to (Australian Height Datum) at each location to be accurately determined.	N/A	
<b>Beneficiation Plant</b>	Design capacity of 4.6 mtpa.	Unknown	Unable to assess – it will require construction report and as built drawings
	Installation of 3 parallel trains consisting of new: <ul style="list-style-type: none"> <li>• grinding circuits (ball mills), each with a nominal feed rate of 231 dry t/h.</li> <li>• iron removal circuits consisting of low intensity magnetic separators followed by wet high intensity magnetic separators.</li> <li>• tantalum recovery circuits.</li> <li>• de-slime hydro cyclone circuits.</li> <li>• sulfide pre-flotation circuits consisting of pre-flotation roughers and cleaner cells.</li> <li>• flotation circuits consisting of rougher, scavenger, first cleaner, second cleaner</li> </ul>	Partially	<ul style="list-style-type: none"> <li>- Beneficiation Plant trains 2 and 3 are still under construction.</li> <li>- Tantalum recovery circuits (Trains 1, 2 and 3) are still under construction.</li> </ul>

Infrastructure/ Equipment	Requirements (design and construction)	Compliant	Constructed (MRL compliance documentation)
	<p>and third cleaner stages to recover spodumene.</p> <ul style="list-style-type: none"> <li>Spodumene concentrate dewatering circuits consisting of a concentrate thickener, concentrate storage tank and a belt filter.</li> </ul>		
<b>Beneficiation Plant</b>	The 3 parallel trains to be installed within a raised concrete, impervious hardstand compound with all spills and drainage directed to concrete lined sumps. Sump pumps to be installed to reinject water/spills from the 3 parallel trains back into the process water stream.	Unknown	Unable to assess – it will require construction report and as built drawings. Beneficiation compliance document (1 March 2019) states ‘area will be asphalted – area around the three trains when they are completed in June 2019 and drains installed as part of this process’.
	Concrete bund kerbs to be constructed to direct stormwater towards the retention sump for recycling back to the process circuit.	No	“There is a sump in the north east corner of the plant which will <u>pump directly to the pit</u> while the sediment pond is under construction. This will control surface water flow for the meantime.”
	Tantalum and spodumene product to be stored in purpose built sheds.	No	UNDER CONSTRUCTION “The spodumene concentrate will be stored in an enclosed purpose built shed...” “The tantalum will be stored on a purpose built, bunded concrete pad ...”
<b>Process water pond</b>	The process water pond must be constructed with a 2.5 mm HDPE lining system with a permeability of $1 \times 10^{-9}$ m/s or less.	Yes	
	Process water pond to be constructed with a minimum storage capacity of 5000 m <sup>3</sup> .	Yes	
	The process water pond must be adequately sized to maintain a minimum operational freeboard of 300 mm.	Yes	
	The process water pond must be adequately sized so that there will be no overflow except in the event of a greater than 1% AEP 72 hour storm.	Partially	Unable to determine capacity – it will require construction report and as built drawings

## Amendment history

Table 3 provides the amendment history for W6132/2018/1.

**Table 3:** Works approval amendments

Instrument	Issued	Amendment
W6132/2018/1	19/09/2018	Amendment Notice 1 - amendment to extend the submission date for Specified Conditions 7 and 9
W6132/2018/1	13/02/2019	Amendment Notice 2 - amendment to extend the submission date for Specified Condition 9, include commissioning definition
W6132/2018/1	08/04/2019	Amendment Notice 3 - amendment to allow the TSF 3 Expansion with total tailings for 90 days and commissioning with ore of the Beneficiation Plant Train 1

## Location and receptors

### TSF3 Expansion

TSF3 is an historic tailings facility used for the disposal of mine waste from tantalite mining (Figure 1). TSF3 was constructed via an east to west embankment dam across a north trending valley. The west and east sides of the valley contained natural topographic abutments. An upstream southern embankment was constructed to enclose the TSF.

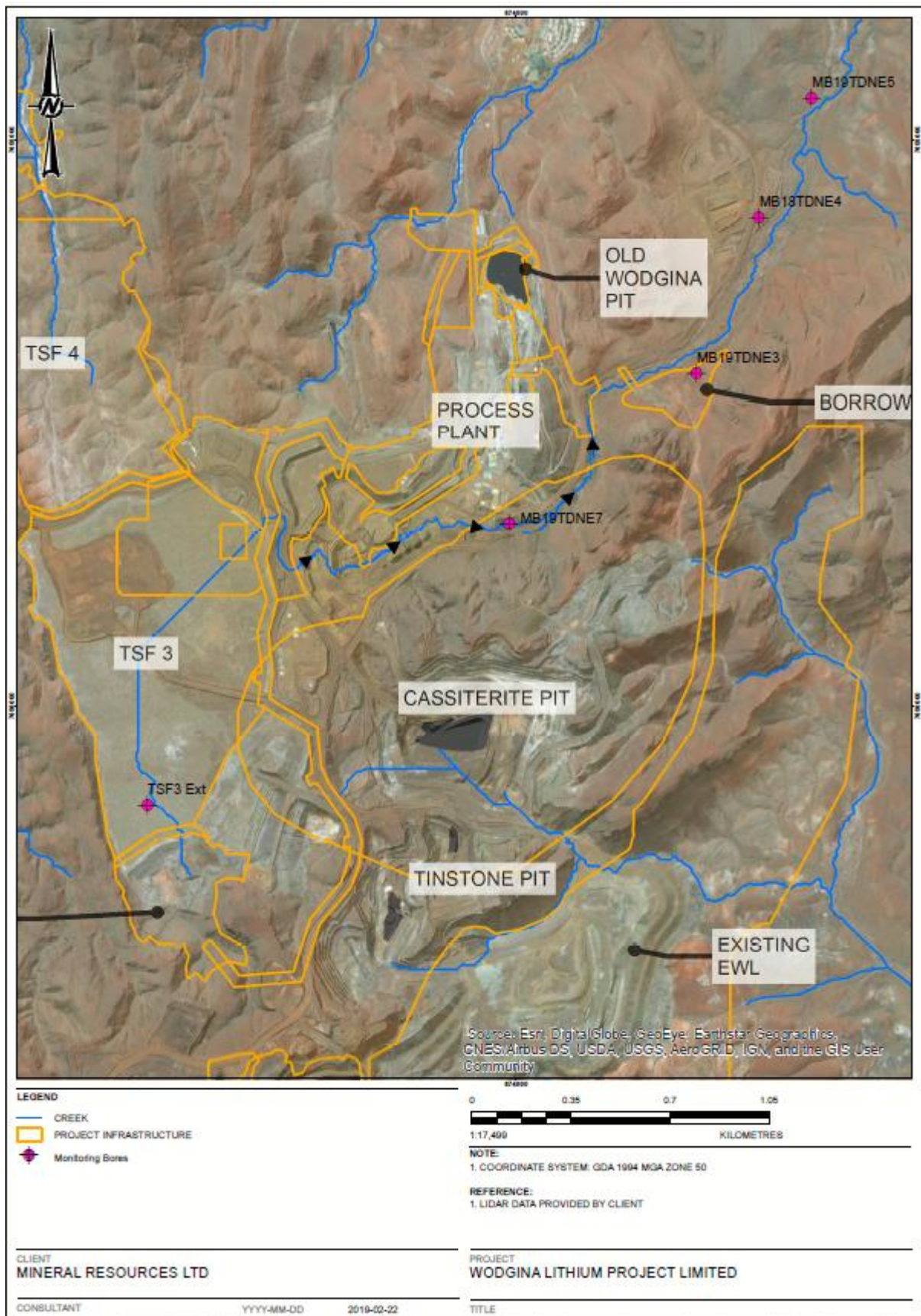
The hydrogeology is typical of a fractured rock environment, with generally very low primary permeability and porosity, although occasional higher yielding fracture zones associated with brittle rock types present. The hydraulic gradient around Wodgina is influenced by the Wodgina Greenstone belt expressed by a groundwater mound between the Yule and Turner Rivers. Two main anthropogenic activities have impacted the local hydraulic gradients, mining and sump dewatering of the Cassiterite pit, and deposition of tailings at TSF3.

TSF3, when in operation, had wet tails deposited in the valley and as a consequence there is an inferred groundwater mound centred around TSF3. This is supported by the TSF3 Expansion monitoring bore drilled towards the southern end of TSF3 (Figure 2) through the tailings to intersect the natural surface at around 210 m RL. The potentiometric level in the borehole is elevated at around 230 m RL, the highest recorded groundwater elevation around the Site.

The Cassiterite pit was mined down to ~140 m RL, with a sump located at the bottom of the pit for collecting water (a combination of groundwater and surface water run-off). This sump elevation is approximately 40 to 60 m below the postulated pre-mining groundwater level. The pit represents a groundwater sink directly adjacent to TSF3 with steep hydraulic gradients ( $10^{-2}$ ) towards the pit sump.

As such the principal direction for groundwater flow from TSF3 will be towards Cassiterite pit. The proposed TSF3 Extension represents an upstream facility above TSF3. The facility will fill the current surface drainage that was cut off from its flow path by TSF3. TSF3 Extension comprises a new embankment on top of the existing TSF3 southern embankment and will raise the potential tailings storage elevation in TSF3 extension to just below 275 m RL. The expected flow paths for surface water and groundwater as a consequence of the TSF3 Extension are expected to be the same as those described above for TSF3. The historic TSF3 tailings also represent a source of lithium and will be mined as part of the Project ore reserve, which will remove the majority of the source material responsible for the high dissolved lithium and high

alkalinity of groundwater along the surface water flow path.



**Figure 1: Wodgina Lithium Mine – TSF 3 and TSF3 Expansion location.**

CLIENT: Mineral Resources Limited  
 PROJECT: MRL Wodgina  
 LOCATION: Wodgina  
 JOB NO: 18110980

COORDS: 672697 m E 7655648 m N MGA94 50  
 SURFACE RL: DATUM: AHD  
 INCLINATION: -90°  
 HOLE DIA: 140/150 mm HOLE DEPTH: 48.00 m

SHEET: 1 OF 1  
 DRILL RIG: EDR03  
 CONTRACTOR: Egan Drilling  
 LOGGED: MK DATE: 21/1/19  
 CHECKED: WD DATE: 14/3/19

Drilling		Sampling		Field Material Description and Instrumentation				
METHOD	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	SOIL/ROCK MATERIAL DESCRIPTION	AIRLIFT YIELD (L/s)	CONSTRUCTION
		0	1.00			Silty Sandy GRAVEL fine to medium grained, to 40 mm, gap graded, dark orange/brown, fine to medium sand		
		5				Silty SAND fine to medium grained, brown to grey/brown, TAILINGS		0 - 5m bgt: Cement grout seal
		10						5 - 6m bgt: Bentonite pellet seal
		15						6 - 23 m bgt: Gravel pack (1.6-3.2mm graded)
		20						0-40.8m: Blank 50mm pvc (Class 12)
		25	25.00			fine sand		
		28.00						
		29.00				fine to coarse grained, black, TAILINGS		Natural fill (sump)
		30				fine to coarse grained, pale brown, TAILINGS		
		32.00				grey/brown silty fine sand		
		34.00				some oxidized chips (1-10mm) of basalt		
		35	35.00			fine silty sand		
		36.00				fine to medium silty sand with chips (~15mm) of oxidized basalt		
		40	40.00			Basalt, black, angular to subangular chips (1-15mm) of basalt		40.8-46.8m bgt: 1mm slotted 50mm pvc (Class 12)
		45						Natural fill (sump)
		48.00						
		50				END OF BOREHOLE @ 48.00 m TARGET DEPTH PIEZOMETER INSTALLED		

**Figure 2: Wodgina TSF3 Monitoring Bore 1**

## Risk assessment

Tables 4 and 5 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 4: Identification of emissions, pathway and receptors for the deviations to constructed infrastructure, from the original assessment and approval in Works Approval W6132/2018/1**

Risk Events					Consequence Rating	Likelihood	Risk	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
Change in alignment for the tails line to utilise the existing haul road corridor and avoid a heritage area adjacent to TSF3 Extension.	Tailings slurry /tailings supernatant Return water	Localised soils and groundwater	Rupture of pipeline causing tailings discharge to land	Soil contamination through release of liquors with brackish salinity, low levels of radioactivity, elevated levels of contaminants including fluoride, aluminium, boron and thallium.	Minor	Rare	Low	Changes in the pipeline route did not increase the environmental impact previously assessed in the Works Approval.  No further assessment required.
TSF3 Expansion extends into M45/1252	Tailings seepage	Underlying soils and groundwater Ephemeral surface water systems and pools	Infiltration through underlying soils to groundwater. Potential hydraulic interactions between groundwater and surface water systems.	Contamination of groundwater capable of beneficial use Impacts to surface water quality and aquatic fauna	Minor	Rare	Low	The extension of a 0.51Ha section into M45/1252 did not increase the environmental impact previously assessed in the Works Approval.  No further assessment required
Starter stage not constructed. Construction was completed to meet the final stage.	Tailings seepage	Underlying soils and groundwater Ephemeral surface water systems and pools	Infiltration through underlying soils to groundwater. Potential hydraulic interactions between groundwater and surface water systems.	Contamination of groundwater. Impacts to surface water quality and aquatic fauna	Minor	Rare	Low	The elimination of stage one and straight construction to final stage did not increase the environmental impact previously assessed in the Works Approval.  No further assessment required
Changes in the construction design - Installation of a Bituminous Membrane liner (ES1) on the upstream face of the embankment	Tailings seepage	Underlying soils and groundwater Ephemeral surface water systems and heritage site pools	Infiltration through underlying soils to groundwater. Potential hydraulic interactions between groundwater and surface water systems.	Contamination of groundwater. Impacts to surface water quality and aquatic fauna	Moderate	Possible	Medium	The bituminous membrane (BM) liner was installed due to the lack of clay waste meeting the required specifications for use as a clay liner. The permeability of the BM liner is anticipated to be lower than the originally designed clay liner. TSF 3 Expansion was constructed to reduce the seepage from the floor/through the embankments and hence the TSF may hold a higher volume of water than originally anticipated.

Risk Events					Consequence Rating	Likelihood	Risk	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
Seepage recovery system and associated infrastructure were not installed	Tailings seepage	Underlying soils and groundwater Ephemeral surface water systems and heritage site pools	Infiltration through underlying soils to groundwater. Potential hydraulic interactions between groundwater and surface water systems.	Contamination of groundwater. Impacts to surface water quality and aquatic fauna	Moderate	Possible	Medium	An adjustment from a multi-spigot point to a single discharge point has the potential to change the beach profile with the potential for the decant water pond to be located against the BM lined embankment. It is likely to take longer for the tailings to consolidate and the decant pond location and size will have to be managed effectively. Confirmation of seepage performance for the TSF should be provided.
Change in decant return pump from a floating to a skid mounted system	Tailings seepage	Underlying soils and groundwater Ephemeral surface water systems and heritage site pools	Infiltration through underlying soils to groundwater. Potential hydraulic interactions between TSF3 Expansion and TSF 3	Contamination of groundwater.  Increase phreatic surface in TSF 3.	Moderate	Possible	Medium	The design change to single discharge will impact on the tailings consolidation and decant pond size. The decant pond location and size will have to be managed effectively.  The impacts of the decant pond forming near/against the decant pump if the trailer mounted pump is to be steadily moved up the ramp with rising tailings and water levels is unknown. Removal/ replacement of the skid mounted decant pump may also be problematic.
Discharge point was not constructed with multiple spigots. A single tailings discharge point was installed.	Tailings seepage	Underlying soils and groundwater Ephemeral surface water systems and pools	Infiltration through underlying soils to groundwater. Potential hydraulic interactions between TSF3 Expansion and TSF 3.	Contamination of groundwater. Impacts to surface water quality and aquatic fauna	Moderate	Possible	Medium	The design change from a multi-spigot point to a single discharge point will impact on the tailings consolidation and decant pond size.
Pipeline to be installed with instrumentation consisting of electromagnetic flow meters and pressure transmitter.	Tailings slurry /tailings supernatant Return water	Localised soils and groundwater	Rupture of pipeline causing tailings discharge to land	Soil contamination through release of liquors with brackish salinity, low levels of radioactivity, elevated levels of contaminants	Moderate	Possible	Medium	The Licensee has installed a Programmable Logic Control system (PLC) that will be used for monitoring the flow and pressure meters. However the pressure transmitters were not installed.



Risk Events					Consequence Rating	Likelihood	Risk	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
				including fluoride, aluminium, boron and thallium.				Monitoring of both pressure and flow will lead to a more effective system of leak control.
Stormwater will be temporarily directed towards the sump in the north east corner of the plant which will pump directly to the pit while the sediment pond is under construction.	Leaks and spills of process liquors and slurries Leaks and spills of chemical reagents.	Groundwater systems Wildlife	Direct discharge to the Old Wodgina pit. Infiltration through to groundwater. Soil contamination.	Reduction in groundwater quality impacting upon dependent vegetation. Use of contaminated water for dust suppression.	Moderate	Possible	Medium	The Old Wodgina pit is used as a bore water storage facility. The water stored in the pit is used for dust suppression and to feed the Beneficiation Plant. Water contaminated with liquors from the process and slurries should not be used for dust suppression.

## Decision

The Construction Report for the TSF 3 Expansion and the Commissioning Reports for TSF 3 Expansion and the Beneficiation Plant have been reviewed. Based on these documents, it has been identified that changes have occurred during construction as compared to the W6132/2018/1 approved design, particularly for the TSF 3 Expansion.

WLPL advised the design changes were made following advice from WLPL's consultant geotechnical engineer. These changes were not referred to DWER or an amendment to the Works Approval sought to enable an environmental assessment. The first design change was reflected on the Mining Proposal: "Intent to Revise Construction Design of TSF3 Embankment Wall on M45/923 – Amendment to Mining Proposal REGID 71172" in June 2018 and further revised in November 2018.

The risks associated with the constructed TSF3E changes in the permeability of the northern embankment, tailings deposition and tailings recovery system are considered Medium. It is therefore considered necessary that further conditions/controls be added to this Amendment to minimize the risk and enable time limited commissioning with ore of the Beneficiation Plant Train 1 and commissioning of the TSF 3 Expansion with total tailings.

During the site inspection conducted by DWER on 18 March 2019, it was noted that the tantalum circuit, and Beneficiation Plant Trains 2 and 3 were under construction. Hence, the commissioning of the tantalum circuit, and Beneficiation Plant Trains 2 and 3 are not authorised at this time.

## Works Approval Amendment

The Works Approval has been updated to allow TSF 3 Expansion commissioning with tailings and Beneficiation Plant commissioning with ore for 90 days. No other aspects of the Works Approval have been changed.

## Works Approval Holder's comments

The Works Approval Holder was provided with the Draft Amendment Notice on 4 April 2019. The Licence Holder responded on 5 April 2019 waiving the remaining comment period. No comments were submitted on the draft Amendment Notice 3.

## Amendment

1. Definitions of the Works Approval are amended by the insertion of the bold text shown in underline below:

**Table 1: Definitions**

<b>Term</b>	<b>Definition</b>
AEP	Annual Exceedance Probability
ANZECC/ARMCANZ 2000	Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Volume 1. National Water Quality Management Strategy
Books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 JOONDALUP DC WA 6919 <a href="mailto:info@dwer.wa.gov.au">info@dwer.wa.gov.au</a>

<b><u>Commissioning</u></b>	<p>For the purpose of this works approval, commissioning is only defined as:</p> <p>Lithium Beneficiation Plant</p> <ol style="list-style-type: none"> <li>1. Pre- commissioning (PC) – comprising static checks on unpowered equipment to confirm that the infrastructure has been built to specification.</li> <li>2. Dry commissioning (DC) – comprising test operation of ‘empty’ but energised equipment and facilities without the addition of fuel, reagents, ore, water or air.</li> <li>3. Wet commissioning: Stage 1 (SW1) – comprising test operation of equipment and facilities with water.</li> <li>4. <b><u>Wet commissioning: Stage 2(WCS2) – comprising test operation of equipment and facilities with reagents, ore and water.</u></b></li> </ol> <p>TSF3 Expansion</p> <ol style="list-style-type: none"> <li>1. Pre-commissioning – comprising static checks on unpowered equipment to confirm that the infrastructure has been built according to specification and construction verification of the embankment.</li> <li>2. Wet commissioning – comprising test operation of equipment and facilities with water. This includes leak testing all lines, checking operation of instrumentation, meters and cut off valves.</li> <li>3. <b><u>Tails commissioning – comprising test operation of equipment and facilities with tailings.</u></b></li> </ol>
Condition	means a condition to which this Works Approval is subject under s.62 of the EP Act.

2. Condition 6 of the Works Approval is amended by the insertion of the text shown in bold and underline below as Specified Emissions in Table 3.

### Emissions

6. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for specified Emissions and general Emissions described in Column 1 of Table 3, subject to the exclusions, limitations or requirements specified in Column 2, of Table 3.

**Table 2: Authorised Emissions table**

Column 1	Column 2
Emission type	Exclusions/Limitations/Requirements
<b>Specified Emissions</b>	
Commissioning of the Lithium Beneficiation Plant and TSF3 Expansion	Subject to Conditions 1, 2, 3 and 5 <b><u>TSF 3 Expansion commissioning with total tailings<sup>1</sup> is limited to a period of 90 days.</u></b> <b><u>Deposition of fine/wet tailings alone is not permitted.<sup>1</sup></u></b>
<b>General Emissions (excluding Specified Emissions)</b>	

Column 1	Column 2
Emission type	Exclusions/Limitations/Requirements
Emissions which arise from undertaking the Works set out in Schedule 2.	<p>Emissions excluded from General Emissions are:</p> <ul style="list-style-type: none"> <li>• Unreasonable Emissions; or</li> <li>• Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or</li> <li>• Discharges of Waste in circumstances likely to cause Pollution; or</li> <li>• Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access; or</li> <li>• Emissions or Discharges which do not comply with an Approved Policy; or</li> <li>• Emissions or Discharges which do not comply with prescribed standard; or</li> <li>• Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or</li> <li>• Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the Environmental Protection (<i>Unauthorised Discharges</i>) Regulations 2004.</li> </ul>

**Note 1** Total tailings and Fine tailings are as defined by CMW Geosciences Tailings Storage Facility 3 Expansion – Wodgina Mine – Design Report Ref. PER2017-0428AE Rev5

3. Record Keeping Conditions of the Works Approval are amended by the insertion of the Conditions 14 to 18 as shown in bold.

14. **The Works Approval Holder must record in the Tails Operators shift log or equivalent document the spigot deposition location on a drawing of the TSF3 Expansion, for each working shift.**
15. **The Works Approval Holder must record monthly readings of piezometers including a reading recorded prior to the deposition of tailings.**
16. **The Works Approval Holder must record monthly readings of monitoring bore TSF3 Expansion including a reading recorded prior to the deposition of tailings.**
17. **The Works Approval Holder must record monthly the water balance for TSF 3 Expansion including: volume deposited, water recovery, evaporation, rainfall and seepage.**
18. **Within 74 days of the commencement of commissioning, the Works Approval Holder must provide to the CEO an Interim commissioning report including all data recorded by conditions 14 to 17.**

4. Conditions 19 to 20 of the Works Approval are amended by the insertion of the text

shown in bold.

19. **Within 60 days of the commencement of commissioning, the Works Approval Holder must collect 26 individual tails samples for geochemical analysis.**
20. **The Works Approval Holder shall not use water from Wodgina Pit for dust suppression until the remaining stormwater works for Beneficiation Plant Train 1 are completed.**

## Appendix 1: Key documents

	Document title	In text ref	Availability
1	Works Approval W6132/2018/1	W6132/2018/1	Accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
2	Works Approval W6132/2018/1 – Amendment Notice 2		Accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
3	Golder Associates, November 2018 Wodgina Lithium Project Hydrogeological Characterization of Wodgina Mine Site Ref. PER2017-0428AS Rev 0		DWER records (A1745289)
4	Golder Associates, 1 March 2019 Response to DWER request for further information in relation to Condition 7 – Specified Actions for Works Approval W6132/2018/1 Reference No. 18110972-003-L-Rev0		DWER records (A1772257)
5	Mineral Resources, 1 March 2019 Tailings Storage Facility 3 Extension Compliance Report – Wodgina Lithium Project – Works Approval (W6132/2018/1)		DWER records (A1778159)
6	CMW Geosciences, 26 February 2019 Tailings Storage Facility 3 Expansion – Wodgina Mine – Design Report Ref. PER2017-0428AE Rev5	CMW Geosciences, Tailings Storage Facility 3 Expansion – Wodgina Mine – Design Report Ref. PER2017- 0428AE Rev5	DWER records (A1778160)
7	Mineral Resources, 1 March 2019 Beneficiation Plant (Train 1)/Pipeline Compliance Report – Wodgina Lithium Project – Works Approval (W6132/2018/1)		DWER records (A1778160)
8	CMW Geosciences, 20 March 2019. Tailings Storage Facility 3 Expansion Project – Wodgina Mine, WA – Construction Report Ref. PER2017-0428AS Rev 0	Construction Report	DWER records (A1774407)
9	Construction Completion Letter, 3 April 2019 signed by DRA Pacific Pty Ltd		DWER records (A1779503)
10	Mineral Resources, 5 April 2019 Beneficiation Plant (Train 1)/Pipeline Compliance Report – Wodgina Lithium Project – Works Approval (W6132/2018/1) – Revision 2		DWER records (A1779504)
11	DER, July 2015. <i>Guidance Statement: Regulatory principles</i> . Department of Environment Regulation, Perth.	DER 2015a	accessed at <a href="http://www.dwer.wa.gov.au">www.dwer.wa.gov.au</a>
12	DER, November 2016. <i>Guidance</i>	DER 2016b	

	<i>Statement: Risk Assessments.</i> Department of Environment Regulation, Perth.		
13	DER, November 2016. <i>Guidance Statement: Decision Making.</i> Department of Environment Regulation, Perth.	DER 2016c	