Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice #2

Licence Number	L8621/2011/1
Licensee	Roy Hill Iron Ore Pty Ltd
ACN	123 722 038
Registered business address	5 Whitham Road PERTH AIRPORT WA 6105
Date of amendment	16 November 2017
Prescribed Premises	Category 5 – Processing or beneficiation of metallic or non-metallic ore Category 6 – Mine dewatering Category 12 – Screening, etc. of material Category 54 – Sewage Facility Category 57 – Used tyre storage (general) Category 64 – Class II putrescible landfill site Category 73 – Bulk storage of chemicals, etc.
Premises	Roy Hill Iron Ore Mine M46/518 and M46/519 NEWMAN WA 6753

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.

Date signed 16 November 2017

Alana Kidd

Manager Licensing, Regulatory Services – Environment

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
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info-der@dwer.wa.gov.au
CS Act	*Contaminated Sites Act 2003* (WA)
Delegated Officer	an officer under section 20 of the EP Act
DMIRS	Department of Mines, Industry Regulation and Safety As of 1 July 2017, the Department of Mines and Petroleum and Department of Commerce amalgamated to form the Department of Mines, Industry Regulation and Safety (DMIRS).
DWER	Department of Water and Environmental Regulation. As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation.

EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986 (WA)*
EP Regulations	*Environmental Protection Regulations 1987 (WA)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999 (Cth)*
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
GL/a	Gigalitres per annum
km	kilometers
Licensee	Roy Hill Iron Ore Pty Ltd (RHIO)
m^3	cubic metres
mbgl	metres below ground level
mRL	metres Reduced Level
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mtpa	million tonnes per annum
OEPA	Office of the Environmental Protection Authority
TDS	Total Dissolved Solids
TSF	Tailings Storage Facility
WWTP	Wastewater Treatment Plant

Amendment Notice

This Notice is issued under 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.

This Notice is limited to an amendment for an increase in the height of the Stage 2 raise of the tailings storage facility (TSF), requirement to monitor groundwater monitoring bores located near the TSF and removal of condition 1.2.1 following decommissioning of the Samsung C&T Wastewater Treatment Plant (WWTP).

The following Guidance Statements have informed the decision made on this amendment:

- *Guidance Statement: Setting Conditions* (October 2015)
- *Guidance Statement: Decision Making* (February 2017)
- *Guidance Statement: Risk Assessments* (February 2017)
- *Guidance Statement: Environmental Siting* (November 2016)

Amendment Description

Roy Hill Iron Ore Pty Ltd (RHIO) submitted an application on 25 January 2017 to DWER for an amendment to EP Act Licence L8621/2011/1 for the Roy Hill Iron Ore Mine (Premises). The amendment was requested to include changes to the design and construction of the Stage 2 raise of the TSF and administrative removal of Condition 1.2.1; the Samsung C&T WWTP and Spray Field Exclusion Area from L8621/2011/1. Supporting documentation was updated by RHIO (to Revision 2) on 19 May 2017.

In an application received by DWER on 7 October 2016, RHIO applied for an amendment to allow the use of saline (dewatering) effluent for dust suppression purposes within the premises. There is no amendment required to the licence for this request and this has been discussed further below.

Stage 2 TSF Raise

Tailings are generated as part of the iron ore beneficiation in the mine processing plant. The construction of the TSF was approved through EP Act Works Approval W5067/2011/1 in June 2012 and amended in October 2013 to allow for the construction of two cells (instead of one) and movement of the TSF further south within the prescribed premise boundary than previously approved.

The TSF comprises two cells formed by the construction of a perimeter embankment around the entire facility and an embankment in the centre of the facility. Stage 1 of the TSF was completed in 2015 and the Licence was amended in November 2016 to include the operation of the TSF.

The original design concept for the TSF, as outlined in the October 2013 W5067/2011/1 amendment, was to construct eight 3 metre downstream lifts through 8 stages to a final crest height (of 456 metres Reduced Level (mRL)). The construction for Stage 2 of the TSF will now be increased by a 6 metre lift, taking the revised Stage 2 lift to 442mRL due to the availability of a larger mining fleet. Both cells at the TSF will be lifted by 6 metres with the deposition of tailings into the alternate cell (i.e. into

Cell 2, when Cell 1 is being raised) continuing during construction. The final maximum height (Stage 8) of the TSF remains unchanged at 456 metres Reduced Level (mRL) however this final level is not yet approved for construction. Additional pipework is also required to be installed to enable tailings distribution.

This current amendment assesses a further 6m lift. Stage 2 raise does not require modification of the installed underdrainage system or changes to the seepage management system.

The existing tailings pipework in TSF Cell 1 and Cell 2 will be removed and then reinstalled once the raise has been completed. The tailings pipework around the top of the dam wall will be P12 DN450 High Density Polyethylene with a pressure rating to 1500kPa. The tailings pipework from the Booster station to the dam wall will be C12 DN450 Carbon Steel Pipe with a design pressure to 5,000kPa, of a diameter appropriate to prevent sanding or over-pressure during operation. No leak detection is installed on the tailings pipework from the Booster station to the dam wall.

Twice daily inspections will be undertaken on the integrity of all tailings pipework.

Removal of Condition 1.2.1 and the Samsung C&T WWTP and Spray Field Exclusion Area

In December 2014, RHIO requested an area to be excluded from the prescribed premise of L8621/2011/1 for the Samsung C&T owned and operated WWTP and spray irrigation field. The WWTP was established to service the additional accommodation facilities and installed during the peak of construction of the mine. With completion of initial construction of the mine and support infrastructure, the WWTP was decommissioned by Samsung C&T in February 2016. RHIO has requested the removal of condition 1.2.1 and the Schedule 1 Exclusion map as the facility is no longer on the premise.

Mine Dewatering and Dust Suppression

In an application received by DWER on 7 October 2016, RHIO applied for an amendment to operate constructed evaporators at the existing TSF facility and to allow the use of saline (dewatering) effluent for dust suppression purposes within the premises. The amendment for the operation of the evaporators was assessed and authorised by the Delegated Officer in January 2017.

The assessment and authorisation of saline water for dust suppression purposes is not included in this Part V (EP Act) assessment due to:

- The use of saline water for dust suppression at the Mine was approved by the EPA on 11 February 2016 under s45C of MS 824 and MS 829;
- The use of saline water for dust suppression was sought from the DMP under Mining Proposal C Rev 2 (Reg ID 59183) to satisfy tenement condition 18 of M46/518 and condition 16 of M46/519. The conditions state:

  '*Where saline water is used for dust suppression, all reasonable measures being taken to avoid any detrimental effects to surrounding vegetation and topsoil stockpiles, to the satisfaction of an Environmental Officer, DMP'*.
- Part V of the EP Act does not consider the use of water for dust suppression as a primary activity under Schedule 1 of the EP Regulations, and it is not

considered a discharge to the environment.

Other Amendments

The Delegated Officer has included in Table 3.6.1 of Condition 3.6.1 of the licence, the requirement for the monitoring of groundwater monitoring bores located at the TSF. These groundwater monitoring bores are already identified in Schedule 1 'Map of monitoring locations' and Schedule 2 'Monitoring of ambient groundwater quality' recording form AGW1 of the licence however, were previously excluded from the requirement to monitor in condition 3.6.1. The provision of this as part of the Annual Environmental Report will allow DWER to monitor groundwater level data and functionality of containment infrastructure.

Other Approvals

Department of Mine, Industry Regulation and Safety (DMIRS)

From a safety and structural integrity perspective, the RHIO mine is regulated by the DMIRS under the *Mines Safety and Inspection Act 1994*.

'RHIO Mining Proposal C Addendum M46/518 M46/519 Part 1' Reg ID 63965 was approved by the Department of Mines and Petroleum (now DMIRS) on 21 February 2017. This Mining Proposal approved the following activities that are relevant to this Part V EP Act amendment:

- Amendment to the design and construction methodology of the TSF;
- Utilisation of geoweb on surface water structures during operations;
- Ability for RHIO to undertake groundwater re-injection trials as part of managed aquifer recharge scheme; and
- Minor amendments to service infrastructure.

The Environmental Protection Authority (EPA)

The Environmental Protection Authority (EPA) assessed the Roy Hill Iron Ore Mining Project (Stages 1 and 2).The Proposal was approved by Ministerial Statement (MS) 824 for Stage 1 on 23 December 2009 and MS 829 for Stage 2 on 31 March 2010.

The Stage 1 proposal comprised mining 'iron ore from the Stage 1 project area on the southern slopes of the Chichester Range and 'develop associated mining infrastructure for the project (i.e., ROM pads, waste dumps, waste fines storage facilities, evaporation pond etc), realignment of Marble Bar Road, construction of an airfield, rail loop and conveyor, and access roads'. Mine dewatering was included in the approved proposal, as was saline water disposal to a 400 ha evaporation pond.

The Stage 2 proposal comprised mining 'iron ore from the Stage 2 project area on the southern slopes of the Chichester Range and develop a remote borefield and pipeline' and 'construction and operation of a remote borefield, water pipeline and associated infrastructure (pump stations, power and water pipelines)'. Mine dewatering was included in the approved proposal, as was saline water disposal to an evaporation pond.

Both MS 824 and 829 were last updated via s45C on 11 February 2016 with identical amendments to the key characteristics regarding water supply volumes and disposal of saline groundwater to evaporation ponds and for on-site dust suppression. This

being:

- up to 198 GL (total) within Stage 1 and Stage 2 for the disposal of dewatered saline groundwater to evaporation ponds; and
- up to 3.7 GL/a within Stage 1 and Stage 2 for the disposal of dewatered saline groundwater as dust suppression.

Condition 8 of MS 824 and condition 10 of MS 829 require monitoring and reporting of the groundwater quality and levels surrounding the TSF. Monitoring is required to ensure operation of the TSF does… '*not cause the quality of surface water or groundwater within or leaving the proposal area to exceed ANZECC/ARMCANZ* trigger values for a slightly to moderately disturbed ecosystem, taking into consideration natural background water quality, so that existing and potential uses, including ecosystem maintenance, are protected.*'

Review of the *'Groundwater and Surface Water Monitoring Assessment 2016 – Report'* for MS 824 and MS 829 produced by RHIO to address Conditions 8 (MS 824) and 10 (MS 829) has indicated that the trigger level for monitoring bores TSFMW04-08 has been exceeded since deposition into the TSF commenced. This indicates groundwater rises have occurred across those bores of approx. 1 – 2.5m. The trigger level has been set with EPA at 0.5m of mounding/ height increase and data demonstrates that this has been exceeded by 0.41 – 2.07m. Compliance with these trigger levels are managed under Part IV of the EP Act.

Water level monitoring around the TSF is also required on a monthly basis as per the requirements of Mining Proposal C (*Mining Act 1978*), with groundwater quality required to be monitored quarterly.

* *Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand 2000, Australian Water Quality Guidelines for Fresh and Marine Waters and its updates.*

Groundwater Licences

RHIO has the following 'Licence to Take Groundwater (s5C)' licences in accordance with the *Rights in Water and Irrigation Act 1914:*

GWL155272(1), GWL155272(2), GWL155272(3), GWL155272(4), GWL155272(5), GWL158412(1), GWL158412(2), GWL158412(3), GWL158412(4), GWL158412(5), GWL159658(2), GWL159658(3), GWL159658(4), GWL159658(5), GWL176004(1), GWL172197(1), GWL172642(1), GWL172642(2) and GWL179224(1).

Amendment History

Instrument	Issued	Amendment
L8621/2011/1	30/05/2013	Amended to include category 89 landfill (putrescible landfill)
L8621/2011/1	19/09/2013	Amendment to include category 12 (screening of material) and upgrade from category 85 to category 54 (sewage facility)
L8621/2011/1	8/05/2014	Amendment to include the landfill expansion (category 89)

L8621/2011/1	05/02/2015	Amendment to add category 57 (used tyre storage), increase category 64 landfill design capacity and excise land for a small sewage facility
L8621/2011/1	09/04/2015	Administrative amendment
L8621/2011/1	5/11/2015	Amendment to include the MSA WWTP constructed under W5718/2014/1 and update template to version 2.9
L8621/2011/1	7/04/2016	Amendment to include category 6 (dewatering) and 73 (bulk storage of chemicals), construction of the northern recharge basin and southern and northern discharge locations to No-Name Creek, administrative changes and removal of the Mankarlyikkakurra Exploration Camp. Expiry date from previous amendment notice was also updated at this time (to 25/03/2034).
L8621/2011/1	24/11/2016	Amendment to include category 5 for the operation of the ore processing plant (Process Plant), and the tailings storage facility (TSF) constructed under W5067/2011/1, the operation of the Mine Process Plant WWTP constructed under W5732/2014/1, operation of the northern and southern recharge basin, and the construction of a new class II landfill. The design capacity for Category 6 amended by removing the volumes of dewatering effluent discharged to No Name Creek via the southern and northern discharge basins due to expiry of EPA approval for the discharge of dewatering effluent to No Name Creek via the southern and northern discharge locations.
L8621/2011/1	13/01/2017	Amendment Notice # 1 Licence amendment to include: • Conditions relating to commissioning and operation of TSF evaporators.
L8621/2011/1	16/11/2017	Amendment Notice # 2 (this notice) Licence amendment to include: • change to the design and construction of the Stage 2 raise of the tailings storage facility (TSF); • requirement for the monitoring of groundwater monitoring bores located at the TSF; and • Administrative removal of condition 1.2.1 following decommissioning and removal of the Samsung C&T WWTP from the mine site in February 2016.

Location, environmental siting and potential receptors

Table 2 lists the relevant human receptors in the vicinity of the prescribed premises.

Table 2: Human Receptors

Residential and Sensitive Premises	Distance from Prescribed Premises Boundary
Town of Nullagine	More than 60 km to the north.
Roy Hill Homestead	About 10 km away to the south
Chichester Metals Pty Ltd's Christmas Creek mining operation accommodation village	About 26 km to the west
Ethel Creek homestead	About 38 km to the south-southeast
Noreena Downs Station	About 41 km to the north east

Table 3 below lists the relevant environmental receptors in the vicinity of the prescribed premises.

Table 3: Environmental Receptors

Environmental receptor	Distance from Prescribed Premises Boundary
Fortescue River and Marsh – Priority 1 ecological community	The Fortescue River and Marsh are located more than 2km southwest of the Project infrastructure (at the nearest point in the south of the Premises boundary) and more than 6km from the Stage 1 Mining area and TSF. The Kulbee Creek passes through the centre of the Premises, with the Kulkinbah Creek located to the southeast and No Name Creek to the northwest. These ephemeral creeks flow in a southwest direction towards the Fortescue River and Marsh. The Kulbee, Kulkinbah and No Name Creek catchments combined represent less than 0.5% of the Fortescue catchment. There are no permanent creeks, surface water pools or wetlands within the mine area.
Vegetation	Groundwater dependent and surface water vegetation communities have been identified within the boundaries of the Premises. No threatened or priority ecosystems have been identified. No DRF were located at the Premises.
Groundwater	17 to 20 metres below ground level (mbgl) at the TSF. Alkaline with salinity brackish (1,000 to 3,000 mg/L TDS).
Groundwater bores	Fortescue Metals Group Pty Ltd – About 4 km to the northwest.

Risk Assessment

Table 4: Identification of emissions, pathway and receptors during construction and operation

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
Increase in the TSF Stage 2 lift height	Dust from construction and operational activities	No nearby residences or other sensitive receptors (closest residence is 17 km to the south) Vegetation adjacent to TSF	Air/wind dispersion	Amenity impacts Potential suppression of photosynthetic and respiratory functions of vegetation due to smothering	Slight	Rare	Low	The Delegated Officer considers that impacts from dust generated during the construction and operation of the TSF raise are not expected. Water trucks will be used during construction to minimise dust emissions and on as-needs basis during operations. The Premises is isolated with the nearest sensitive premises located 17 km away with the next closest sensitive premises 30 km away. The vegetation surrounding the TSF is sparse and degraded from the current mining activities and historical pastoral use. The Delegated Officer considers the impacts from dust during construction and operation will be **slight** as the TSF is located onsite (so offsite impacts are not expected) and impacts would be expected to be minimal due to the remote location. The Delegated Officer considers the likelihood of an occurrence to be **rare**. The risk rating for dust is therefore **low**.
	Noise from construction and operational activities	No nearby residences or other sensitive receptors (closest residence is 17 km to the south)	Air	Amenity impacts	N/A	N/A	N/A	The Delegated Officer considers noise emissions are not expected to impact sensitive premises as the Premises is isolated with the nearest sensitive premises 17 km away. The Licence Holder has an ongoing legislative requirement to comply with the Prescribed standard for noise emissions, as set out in regulation 7 of the *Environmental Protection (Noise) Regulation 1997*.

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
	Increased risk of seepage from the TSF	Groundwater dependent ecosystems Surrounding vegetation Groundwater Neighbouring mine operations	Infiltration through soil profile to groundwater	Contamination of groundwater which may affect downstream groundwater users. Impacts on groundwater dependent vegetation due to an increase in the water table level and/or salinity	Minor	Possible	Medium	Data reported in RHIO's '*Groundwater and Surface Water Monitoring Assessment 2016 – Report*' to the OEPA for MS 824 and MS 829 indicated that groundwater mounding as a result of TSF seepage is occurring within the perimeter bores (TSFMW04-08) located along the western perimeter of the TSF. Water quality data from these bores also provided within this report has indicated no adverse impacts to groundwater quality within these monitoring bores. Salinity of current tailings is low (1,500 mg/L TDS as at October 2016) however, chloride levels/ salt concentrations in solution are anticipated to increase over time to 1,097 ppm Cl (Process Water) and 25,634 ppm Cl (TSF Decant Water) in 2022. This has potential to result in seepage of higher salinity. <u>TSF initial construction</u> Impacts from the construction and operation of the TSF were originally assessed in the Part IV (EP Act) PER formal assessment process in 2009 and conditioned under MS 824 (23/12/2009). Subsequent to Part IV assessment and approval, impacts from the construction and operation of the TSF were Part V assessed in the October 2013 amendment to W5067/2011/1. At the time of this assessment, management mechanisms were the only controls deemed appropriate to control potential seepage as the risk to public health or the environment were deemed to be low. Sampling of the tailings material in October 2016 indicates it consists of fine sands, silts and clays and is not considered to be acid

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								generating. Salinity is low to date (1,500 mg/L TDS) with a majority of the samples slightly basic. <u>Stage 2 TSF lift</u> The amended design of the Stage 2 lift should not result in any change to the management mechanisms in place for the tailings or the geochemical and physical properties. The existing TSF embankments (Stage 1) include a low permeability zone (permeability 7.0 x 10^{-8} m/s to 1.0 x 10^{-8}) and foundation cut-offs to reduce the phreatic line and control seepage. An existing underdrainage system consists of drainage pipes, drainage outlet pipes and seepage collection wells at the downstream toe of the TSF. It is intended that seepage collected in the wells is pumped back into the TSF. An amendment in January 2017 endorsed the use of evaporators to further aid evaporation of water from the TSF. Natural groundwater depth ranges from 17 to 20 metres below ground level (mbgl) and levels around the TSF have been reported (MS824/829 '*Groundwater and Surface Water Monitoring Assessment 2016 Report*') to have risen approx. 0.9 – 2.5m (including after groundwater drawdown is also occurring more widely from dewatering) with mounding occurring in the TSF monitoring bores (TSFMW04 to TSFMW09) located west southwest of the TSF. This report also outlines that the water table in the vicinity of the TSF is at an elevation between 407-412 m RL (Table 19) which is 2 m higher than the previous

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								(2015) MS824/829 reporting period. RHIO indicated that increased groundwater levels occurred during commissioning of the Process Plant which resulted in higher than anticipated water disposal to the TSF and increased infiltration ahead of tailings beaching. The vegetation condition as indicated in information provided by RHIO (DER Record A1555903) for the monitoring site (EP09, dominant species *Acacia anuera [mulga] and Acacia rhodophloia*) located ~250m south of the TSF Cell 2 was recorded in November 2016 as being in 'Very Good' condition. 'Riparian and Groundwater Dependent Vegetation' site (named 134), located ~800m east south east of the TSF was recorded in November 2016 as being in 'Poor' condition (general observations of cattle activity, aggressive weeds and erosion evident). This condition rating had not altered from the previous years' monitoring results. The vegetation condition as indicated in information provided by RHIO in November 2017 (DER Record A1555903) is 'Good' (Very Good) in the monitoring site (~1km) to the south outside the premise boundary (named RGVD3) and site 101N located ~750m east southeast of the TSF both comprising 'Sheet flow mulga vegetation'. The nearest downstream groundwater user is located about 7 km away. The Fortescue River and Marsh are located more than 6km away. Existing groundwater monitoring bores are located downstream of the TSF. Condition 3.6.1 (Table 3.6.1) has been updated within

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								this amendment notice to include the requirement for monitoring of points TSFMW01 - TSFMW08. This will enable detection of any changes to groundwater that may be attributable to TSF seepage. RHIO has reported that 8,360m^3 of seepage (to date, during 2017) has been recovered from the TSF seepage recovery trench (from both Cells 1 and 2) and returned to the Process Water Dam. The Delegated Officer considers the impacts from seepage due to Stage 2 of the TSF will be **minor** as the TSF is located onsite (so offsite impacts are not expected) and impacts would be expected to be minimal due to the depth to groundwater, distance to the nearest groundwater user and relatively benign tailings material. The Delegated Officer considers the likelihood of an occurrence to be **possible.** The risk rating for seepage at the TSF is therefore **medium**. The Delegated Officer notes MS824 and MS829 regulate compliance for groundwater quality impacts from the TSF, however Part V regulates the groundwater level to monitor for seepage.
	Overtopping of TSF stage 2 embankments	Surrounding vegetation Surface water, ephemeral creeks (Fortescue River and Marsh, including draining lines	Land through sheet flow	Impacts to vegetation by contamination of surrounding soils Contamination of surface waters flowing to the Fortescue	Moderate	Rare	Low	Impacts from the construction and operation of the TSF were originally assessed in the October 2013 amendment to W5067/2011/1. At the time of this assessment, and in subsequent licence amendments, management mechanisms were deemed appropriate to control potential overtopping as the risk to public health or the environment were deemed to be low. Sampling of the tailings material in October

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
		feeding Fortescue River and Marsh)		Marsh				2016 indicates it consists of fine sands, silts and clays and is not considered to be acid generating. Salinity to date is low (1,500 mg/L TDS) with a majority of the samples slightly basic. The vegetation surrounding the TSF is sparse and degraded from the current mining activities and historical pastoral use. The nearest surface water is the Fortescue River which is more than 6 km away. Licence condition 1.3.11 requires the Licensee to maintain a minimum freeboard of 1,200 mm at the TSF (which is in excess of the 1 m freeboard recommended in GHD, 2016) and the supernatant pond is minimised as far as possible. Zero non-compliances with this condition have been reported to DWER at the time of this assessment. Licence condition 1.3.12 requires the Licensee to conduct daily visual inspections of the freeboard and to take corrective actions where an appropriate level of environmental protection is not being maintained. As reported in the L8621 Annual Environmental Report and Annual Audit Compliance Report for the 2016 calendar year, inspections of the embankment freeboard were carried out daily. The Delegated Officer considers the impacts from overtopping at the TSF due to Stage 2 will be **moderate** given the potential for downstream siltation and deposition on vegetation**.** The TSF is located onsite (so offsite impacts are not expected) and impacts would be expected to be minimal, due to the distance to the nearest surface water and the composition of the tailings material. The

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								Delegated Officer considers the likelihood of an occurrence to be **rare**. This is because the geometry and dimensions of the storage area of the raise design are similar to the existing facility and the location is identical, the assumptions and results of the previous freeboard assessment were considered to be valid (GHD, 2016). The risk rating for overtopping at the TSF is therefore **low**.
	Discharge of tailings due to pipeline rupture or joint failure	Surrounding vegetation Surface water, creeks leading to Fortescue River and Marsh	Release to land	Impacts to vegetation by contamination of surrounding soils Contamination of surface waters	Minor	Likely	Medium	The vegetation surrounding the TSF is sparse and degraded from the current mining activities and historical pastoral use. No threatened or priority ecosystems have been identified. No DRF were located at the Premises. Sampling of the tailings material in October 2016 indicated the tailings consisted of fine sands, silts and clays and is not considered to be acid generating. Salinity of current tailings is low (1,500 mg/L TDS as at October 2016) however, chloride levels/ salt concentrations in solution are anticipated to increase over time to 1,097 ppm Cl (Process Water) and 25,634 ppm Cl (TSF Decant Water) in 2022. A majority of the samples tested were slightly basic. No chemicals are added during the processing of the ore. No Name Creek is less than 1km from the TSF and process plant and the TSF inflow pipeline crosses No Name Creek. The Fortescue River and Marsh are more than 6 km away. Removed tailings pipelines will be replaced and located within bunds to contain any spills.

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								Pipelines located around the top of the dam wall will be constructed of P12 DN450 HDPE and pipelines constructed from the Booster Station to the inflow area on the dam wall, constructed of C12 DN450 Carbon Steel Pipe. Scour basins outside the TSF will be designed to contain 2 times the volume of the tailings pipeline. Licence condition 1.3.10 requires the Licensee to ensure the tailings delivery pipelines are equipped with automatic cut-outs in the event of a pipe failure (resulting in spillage) or having secondary containment sufficient to contain any spill for a period equal to the time between routine inspections. The Delegated Officer has considered the known future increase of tailings salinity that may impact the environment, should a pipeline rupture occur. Licence condition 1.3.12 requires the Licensee to conduct daily visual inspections of the tailings pipelines and to take corrective actions where an appropriate level of environmental protection is not being maintained. The Delegated Officer considers the impacts from tailings discharged from ruptured pipelines or pipeline join failure will be **minor** as the TSF pipelines will be located onsite (so offsite impacts are not expected) and impacts would be expected to be minimal due to the composition of the tailings material. The Delegated Officer considers the likelihood of an occurrence to be **likely**, given the s72 (EP Act) reported tailings pipeline spillage incidents that have occurred between 25/2/2017 and 14/7/17. The risk rating for tailings discharged due to pipeline rupture or joint failure is therefore **medium**.

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								As reported in the 2016 RHIO L8621/2011/1 AER/AACR, RHIO were not compliant to the Condition 1.3.10 due to TSF delivery pipework not being constructed as required by the Operating Licence. It is understood by the Delegated Officer that bursting discs have been present within the tailings pipeline infrastructure prior to September 2016. These bursting discs are designed to send an alarm and trigger an automatic shut down when overpressure has been detected and a burst of the protection devices is subsequently triggered. This system now adds an additional layer of management where previously RHIO operational staff relied only on inspections to notify of a failure or pipeline spill but now the system is further automated and a shutdown, triggered. In addition to the burst discs which are a secondary form of pipeline spill management, it is understood that there are controls on the tailings delivery line in the event of high pressure build up. The controls on the tailings delivery line include valves that are installed at the start of the tailings line to control the pump speed to reduce pressure in the pipeline in the event of high pressure in the line. If high pressure is detected a pressure alarm message is sent to the Remote Operations Centre Controller who activates a “fast stop” which flushes the tailings line pumps for 3 minutes and then deactivates the pumps. RHIO has also advised that inspections are carried out on the TSF at least 2 times per shift and that a flow meter has now been installed at the TSF end of the delivery pipeline. The end-of-pipeline flow meter is linked in to the logic

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								control and the existing flow meter at the start of the tailings delivery pipeline. RHIO has advised that differential in the flow readings will result in an automatic fast stop that will stop the tailings pipeline pumps.
	Discharge of return process water (decant water) with increasing salinity due to pipeline rupture or joint failure	Surrounding vegetation Surface water, creeks leading to Fortescue River and Marsh	Release to land	Impacts to vegetation by contamination of surrounding soils Contamination of surface waters	Minor	Unlikely	Medium	Salinity of current tailings is low (1,500 mg/L TDS as at October 2016) however, chloride levels/ salt concentrations in solution are anticipated to increase over time to 1,097 ppm Cl (Process Water) and 25,634 ppm Cl (TSF Decant Water) in 2022. The TSF also has evaporators installed to further aid removal of water from the TSF surface (which also results in increased salinity for the water remaining). A majority of the samples tested were slightly basic. No chemicals are added during the processing of the ore. No Name Creek is less than 1km from the TSF and Process Plant. The Fortescue River and Marsh are more than 6 km away. The TSF decant return line crosses over No Name Creek. The water then goes to the Process Water dam (lined) where it is mixed with dewatering effluent and used in the Processing Plant (if at specification – as high chloride water cannot be used). Excess water from the Process Water dam can be discharged under certain conditions (such as unplanned shutdowns of the Processing Plant) (Part IV approval in place) to No Name Creek however salinity cannot exceed 6,000mg/L TDS. Decant water is tested quarterly for quality and heavy metals and as salinity increases, reuse of decant water in the processing plant is less

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								likely. Licence condition 1.3.10 requires the Licensee to ensure the tailings (delivery and) return pipelines are equipped with automatic cut-outs in the event of a pipe failure (resulting in spillage) or having secondary containment sufficient to contain any spill for a period equal to the time between routine inspections. The Delegated Officer has considered the known future increase of tailings and tailings decant salinity that may impact the environment, should a pipeline rupture occur. Licence condition 1.3.12 requires the Licensee to conduct daily visual inspections of the tailings pipelines and to take corrective actions where an appropriate level of environmental protection is not being maintained. The Delegated Officer considers the impacts from decant water discharged from ruptures or joint failure of the pipelines will be **minor** as the process water (decant) return lines will be located onsite (so offsite impacts are not expected and inspection of the lines as under condition 1.3.12 is required daily. Should decant return line incidents occur, DWER may consider reviewing the condition and implement additional conditions such as the installation of pressure-differential devices to detect seepage or spillages from the TSF decant line. The Delegated Officer considers the likelihood of an occurrence to be **possible**. The risk rating for process water (decant) discharged due to pipeline rupture or joint failure is therefore **medium**. As reported in the 2016 RHIO L8621/2011/1

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								AER/AACR, RHIO are currently not compliant to the Condition 1.3.10 due to TSF return (decant) pipework not being constructed as required by the Operating Licence. The Delegated Officer has conditioned to ensure the risk is mitigated, however, should incidents occur, further controls may be conditioned to manage the likelihood of the risk occurring.
Saline water from mine dewatering for dust suppression	-	-	-	-	-	-	-	The Delegated Officer considers that there is sufficient assessment and approval for this activity and to avoid duplication of EP Act approvals and conditions has not assessed this activity. The reasons for this are provided as follows: • The use of saline water for dust suppression at the Mine was approved by the EPA on 11 February 2016 under s45C of MS 824 and MS 829 • The use of saline water for dust suppression was sought (by RHIO) from the DMP under Mining Proposal C Rev 2 (Reg ID 59183) (*under the Mining Act 1978*) to satisfy tenement condition 18 of M46/518 and condition 16 of M46/519. The conditions state: *'Where saline water is used for dust suppression, all reasonable measures being taken to avoid any detrimental effects to surrounding vegetation and topsoil stockpiles, to the satisfaction of an Environmental Officer, DMP'*. • Part V of the EP Act does not consider the use of waster for dust suppression as a primary activity under Schedule 1 of the EP Regulations, and not a discharge to the environment.

Risk Event					Consequence rating	Likelihood rating	Risk	Reasoning
Source/ Activities	**Potential emissions**	**Potential receptors**	**Potential pathway**	**Potential adverse impacts**				
								Therefore, the assessment and approval of this aspect of RHIO's application is not deemed to be required.

Decision

TSF raise

The Delegated Officer has determined that the key emissions associated with increasing the Stage 2 TSF raise height at the Premises includes a potential for increased risk of seepage to groundwater, dust emissions during construction, and discharges to land by pipeline failure and overtopping.

These risks have been previously assessed and the change to the incremental height of the TSF walls does not represent a variation to the risk profile that has already been assessed. As such, the requested amendment is approved. The Delegated officer notes that compliance of water quality and seepage impacts from the TSF are managed under MS824 and MS829.

The Delegated Officer has amended the existing work specification condition in the licence to include the construction requirements for the increase to the Stage 2 TSF lift from threes metres to six metres. Conditions for the operation of the TSF are already included in the licence.

WWTP

The Delegated Officer considers the request for removal of Condition 1.2.1 and Schedule 1, 'Map of licence exclusion', appropriate. The removal of these is demonstrated in the following amendment information.

Amendment

1. Condition 1.1.2 of the licence is amended by the insertion of the bold text shown in underline below.

   '**DER' Department of Environment Regulation (former) (from 1 July 2017 DER is part of the Department of Water and Environmental Regulation – see https://publicsector.wa.gov.au/public-administration/machinery-government/2017-machinery-government-changes for further details)**

   'OEPA' Office of the Environmental Protection Authority (former) (from 1 July 2017 the Office of the EPA is part of the Department of Water and Environmental Regulation – see https://publicsector.wa.gov.au/public-administration/machinery-government/2017-machinery-government-changes for further details)

2. Condition 1.2.1 of the licence is amended by the deletion of all text shown in strikethrough below. The condition is removed.

   ~~The Licensee shall maintain permanent markers along the boundary of the Samsung C&T WWTP and Irrigation Area as depicted in the Schedule 1 Licence exclusion map so it can be identified on the ground as excised from the Premises.~~

3. Condition 1.3.10 of the licence is amended by the insertion of the bold text as shown in underline below and deletion of all text shown in strikethrough.

The Licensee shall ensure that ~~all tailings delivery and tailings return pipelines are~~:
(a) ***all tailings delivery pipelines are*** equipped with automatic cut-outs in the event of a pipe failure; ~~or~~
(b) ***all tailings delivery pipelines are*** provided with secondary containment sufficient to contain any spill for a period equal to the time between routine inspections***; and***
(c) Twice daily inspections are undertaken on the integrity of all the tailings delivery and tailings decant pipelines.

4. Condition 1.3.14, Table 1.3.6 of the licence is amended by the insertion of the bold text shown in underline below.

Table 1.3.6:	**Works specifications**
Column 1	**Column 2**
Stage 2 TSF raise	***1. Phased removal of relevant Cell (1 or 2) tailings delivery pipelines, decant pipework and associated infrastructure;*** ***2. Phased bulk earthworks construction of embankment lifts of relevant Cell (1 or 2) including raising of decant structure, to a design level of 442mRL;*** ***3. Re-installation of tailings delivery pipelines, decant pipework and associated infrastructure at relevant Cell prior to commencement of raise on subsequent Cell; and*** ***4. Pipelines located around the top of the dam wall are to be constructed of P12 DN450 HDPE and pipelines constructed from the Booster Station to the inflow area on the dam wall, constructed of C12 DN450 Carbon Steel Pipe.***
Landfill 2 (See Schedule 1: Maps)	The Licensee must ensure that the Landfill 2: 1. has a 1.8 metre security fence and gate erected around the perimeter of the landfill; 2. has appropriate signage which specifies what types of wastes are accepted at the landfill and where they are to be deposited; 3. is contained within the Premises boundary; 4. has a firebreak of 3 metres around the boundary of the landfill; 5. has a stormwater diversion levee north east of the landfill which is designed to prevent any stormwater from entering the landfill from outside; 6. a minimum distance of 3 metres is maintained between the base of each trench and the highest level of the water table aquifer; 7. is designed so all contaminated stormwater is retained within the landfill area; 8. has sufficient soil, which has been excavated from the creation of trenches at the landfill, stockpiled adjacent to the open trenches and enough to cover the tipping area at least twice; 9. has water used for dust suppression during excavation and backfilling of each trench; and 10. has two groundwater monitoring bores located hydraulically up and down gradient of the landfill, and baseline groundwater monitoring is conducted prior to disposal of any waste into the landfill.

5. Condition 3.5.1, Table 3.5.1 of the licence is amended by the insertion of the bold text shown in underline below.

Table 3.5.1: Process monitoring					
Monitoring reference point	**Process description**	**Parameter**	**Units**	**Frequency**	**Method**
Tailings Storage Facility	-	Volume of tailings deposited	m^3	Continuous	None specified
Tailings Storage Facility	-	Volume of water recovered	m^3	Continuous	None specified
Tailings Storage Facility	***-***	***Volume of seepage recovered***	***m^3***	***Continuous***	***None specified***

6. Condition 3.6.1, Table 3.6.1 of the licence is amended by the insertion of the bold text shown in underline below.

Table 3.6.1: Monitoring of ambient groundwater quality				
Monitoring point reference as depicted in Schedule 1	**Parameter**	**Units**	**Averaging period**	**Frequency**
RHPZ0026S and RHPZ0034 Landfill2: 2 bores as shown in Landfill 2 map, following construction and prior to operation.	Standing Water Level[1]	m(AHD)	Spot sample	Quarterly
	pH[1]	pH units		
	Electrical Conductivity	µS/cm		
	Total Dissolved Solids	mg/L		
	Total Hardness			
	Aluminium (Al), Arsenic (As), Barium (Ba), Boron (B), Cadmium (Cd), Chloride (Cl), Chromium (Cr), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Silver (Ag), Sodium (Na) and Zinc (Zn)			
RHZ0026S, RHPZ0034 and RHPZ0035	Total Recoverable Hydrocarbons	mg/L		
TSFMW01, TSFMW02, TSFMW03, TSFMW04, TSFMW05, TSFMW06, TSFMW07, and TSFMW08	***Standing Water Level[1]***	***m(AHD)***	***Spot sample***	***Monthly***

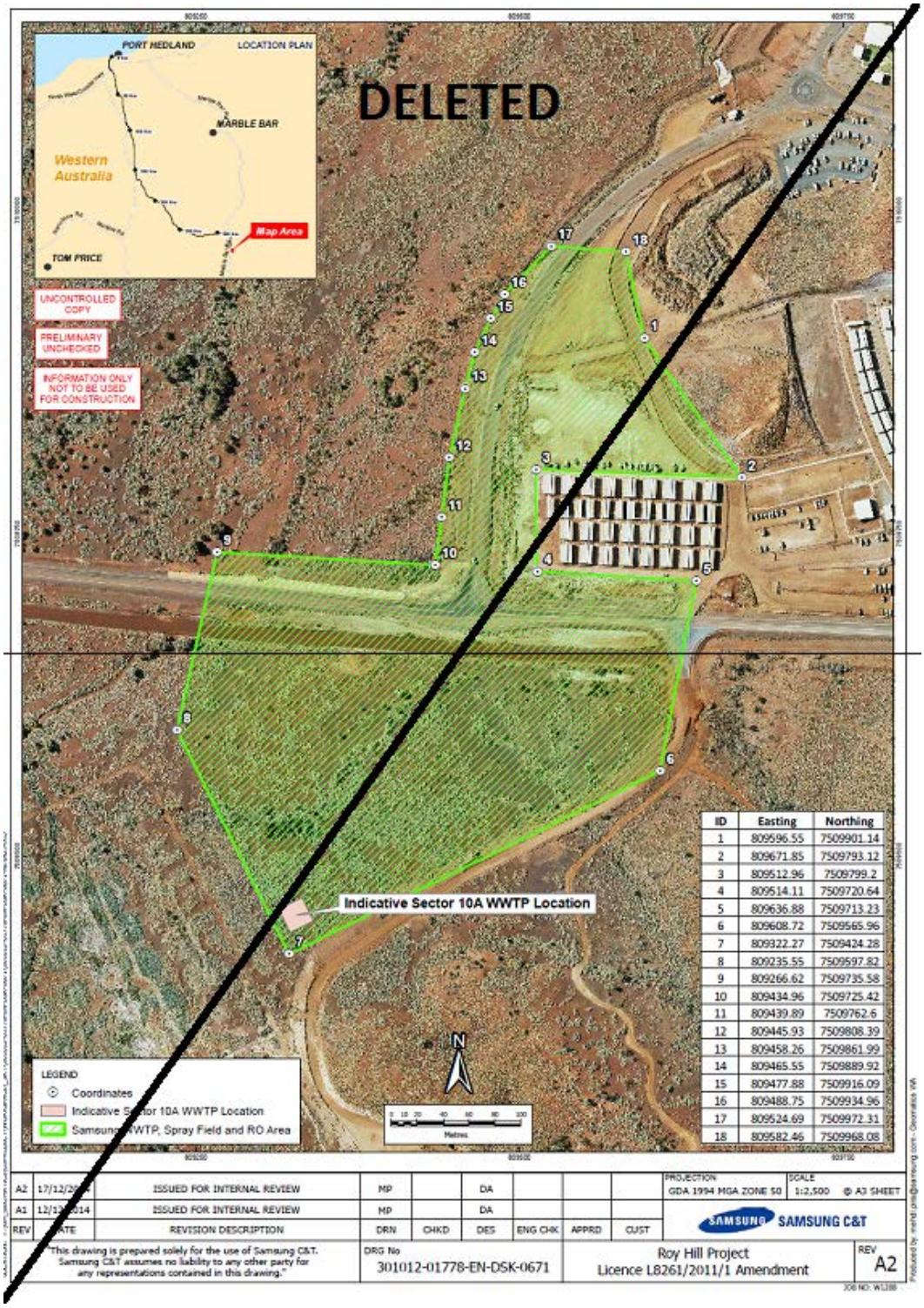
Note 1: In field non-NATA accredited analysis permitted

7. The Licence is amended by the insertion of two new rows as shown in bold italics below, to (Condition 4.2 Reporting) Table 4.2.1 regarding condition 1.3.12 and inclusion of compliance to Table 4.2.1.

Table 4.2.1: Annual Environmental Report		
Condition or Table (if relevant)	**Parameter**	**Format or Form[1]**
-	Summary of any failure or malfunction of any pollution control equipment and any environmental incidents that have occurred during the annual period and any action taken	None specified
Tables 1.3.1 and 1.3.7	Actual throughput for the reporting period for approved categories under Schedule 1 of the *Environmental Protection Regulations 1987*	None specified
Condition 1.3.12	Summary of any failure or malfunction of any infrastructure listed in Table 1.3.5 and any action taken post inspection.	None specified
Table 2.3.1	An updated description of the irrigation area(s) reporting any decline in health, against previous years, and corrective actions	None specified
Table 2.4.1	Compliance	TSF Cell 1 evaporator use Vs wind direction annual data
Table 3.2.1	Volumetric flow rate, Duration of discharge, Electrical Conductivity, Total Dissolved Solids	GR1
Table 3.3.1	Monthly records and cumulative volume for each WWTP	None specified
	Biochemical Oxygen Demand, Total Suspended Solids, pH, Total Nitrogen, Total Phosphorus, *E.coli*, Total Dissolved Solids, Total Recoverable Hydrocarbons	LR1
Table 3.5.1	~~Process monitoring~~ ***Tailings Storage Facility: volume (m^3) of tailings deposited and volume (m^3) of water recovered***	~~None specified~~ ***Volumes recorded each month and a comparison against previous records***
	Seepage recovery volumes (m^3)	***Table format: volumes recorded each month and a comparison against previous records***
Condition 3.5.2	Annual water balance of TSF	None specified
Table 3.6.1	Groundwater quality parameters: Standing Water Level, pH, Electrical Conductivity, Total Dissolved Solids, Aluminium (Al), Arsenic (As), Barium (Ba), Boron (B), Cadmium (Cd, Chromium (Cr), Chloride (Cl), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Silver (Ag), Sodium (Na), Zinc (Zn), and Total Recoverable Hydrocarbons	AGW1

	TSFMW01, TSFMW02, TSFMW03, TSFMW04, TSFMW05, TSFMW06, TSFMW07 and TSFMW08 standing water level data	***Table format providing: monthly Standing water level data***
Condition 4.1.2	Compliance	None Specified
Condition 4.1.3	Complaints summary	None specified
Condition 4.1.4	Records of waste types and quantities received at the site and disposed of at the site	None specified

8. Schedule 1: Maps, Map of licence exclusion. This map has been deleted from the licence.


DELETED
PORT HEDLAND
LOCATION PLAN
MARBLE BAR
Western Australia
Map Area
TOM PRICE
UNCONTROLLED COPY
PRELIMINARY UNCHECKED
INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION
Indicative Sector 10A WWTP Location
LEGEND
Coordinates
Indicative Sector 10A WWTP Location
Samsung WWTP, Spray Field and RO Area
N
Metres
ID Easting Northing
1 809596.55 7509901.14
2 809671.85 7509793.12
3 809512.96 7509799.2
4 809514.11 7509720.64
5 809636.88 7509713.23
6 809608.72 7509565.96
7 809322.27 7509424.28
8 809235.55 7509597.82
9 809266.62 7509735.58
10 809434.96 7509725.42
11 809439.89 7509762.6
12 809445.93 7509808.39
13 809458.26 7509861.99
14 809465.55 7509889.92
15 809477.88 7509916.09
16 809488.75 7509934.96
17 809524.69 7509972.31
18 809582.46 7509968.08
A2 17/12/2014 ISSUED FOR INTERNAL REVIEW MP DA
A1 12/12/2014 ISSUED FOR INTERNAL REVIEW MP DA
REV DATE REVISION DESCRIPTION DRN CHKD DES ENG CHK APPRD CUST
PROJECTION GDA 1994 MGA ZONE 50
SCALE 1:2,500 @ A3 SHEET
SAMSUNG C&T
"This drawing is prepared solely for the use of Samsung C&T. Samsung C&T assumes no liability to any other party for any representations contained in this drawing."
DRG No 301012-01778-EN-DSK-0671
Roy Hill Project
Licence L8261/2011/1 Amendment
REV A2

Appendix 1: Key Documents/References

	Document Title	Availability
1	DER Guidance Statement on Licence duration, August 2016	Accessed at https://www.dwer.wa.gov.au/environmental-regulation
2	DER Guidance Statement on Decision Making, February 2017	
3	DER Guidance Statement on Environmental Siting, November 2016	
4	DER Guidance Statement on Risk Assessments, February 2017	
5	DER Guidance Statement on Setting Conditions, November 2015	
6	Roy Hill Document: Mine Operating Licence Amendment – Evaporators. Environment (OP-APP-00022)	DER record A1349694
7	Licence amendment application received 25/1/2017 (Rev 1 issue date 3/1/17) and revised May 2017 (Rev 2 issue date 19/5/17): Mine Operating Licence Amendment - TSF Stage 2 Raise and Managed Recharge Trails (OP-APP-00036)	DER record A1365056
8	Licence amendment acceptance letter and invoice dated 6/2/2017	DER record A1370322
9	Licence amendment updated supporting information for DER record A1365056: RHIO L8621 Amendment TSF Stage 2 Raise and MAR Trials – additional information (Note The supporting information 'OP-APP-00036' was updated 19/5/2017, RHIO Transmittal: OP-TRN-00001)	DER record A1435304
10	Roy Hill Iron Ore Pty Ltd TSF Raise Detailed Design Detailed Design Report Rev 1 November 2016 (GHD, 2016)	DER record A1351233
11	W5067/2011/1 Roy Hill Iron Ore Pty Ltd - Works Approval Amended October 2013	DER record A689950
12	Groundwater and Surface Water Monitoring Assessment 2016 – Report to the OEPA for MS 824 and MS 829, OP-REP-00431 dated 27 March 2017.	DER record A1514892
13	RHIO address of 'RE: TSF Stage 2 raise - pipework information query'. Email dated 1 September 2017	DER record A1517662
14	RHIO address of condition 1.3.10 TSF delivery and return pipelines query. Email dated 17 August 2017	DER record A1517665
15	DER notification of proposed amendment dated 8 September 2017	DER record A116370
16	RHIO comments on draft 21 day amendment notice received 22 September 2017	DER record A1528211
17	RHIO comment on queries regarding freeboard-recording technology to be adopted at the RHIO mine TSF received 11 October 2017	DER record A1547133
18	RHIO response to additional queries regarding TSF operation and infrastructure. Email includes RHIO Mine Monitoring Manual Environment – Rev 3 dated 19 December 2016	DER Record A1555903
19	RHIO waiver on second issue of draft 21 day amendment notice received 15 November 2017	DER record A1562436

Appendix 2: Summary of Licence Holder Comments

Comments received	Environmental risk	DER consideration of risk
Risk Assessment Table 4: *'Increased risk of seepage from the TSF'* RHIO noted that water quality impacts from TSF seepage had not been previously conditioned, however a new condition had been added to the licence to monitor TSF groundwater bores	Nil – as this was a note only	Nil
Risk Assessment Table 4: *'Overtopping of TSF stage 2 embankments'* RHIO commented that since submission of the application for this amendment, RHIO have adopted new survey technology that is used in lieu of gauge boards at the TSF.	Potential increased risk has been identified	Further clarification of the proposed survey technology was requested of RHIO. Potential increased risk of overtopping at the TSF has been identified as the proposed use of the new technology is suggested by RHIO to be quarterly instead of daily as per the licence. RHIO provided additional information on the use of an additional measurement mechanism, an 'engineered jig' to confirm freeboard on a daily basis. This is to be used in addition to the new survey technology. DWER consider that daily inspections of the TSF including the use of the installed gauge boards is to continue on the licence as it is unclear if the engineered jig has been proven to accurately record the freeboard measurement. There is no change to condition 1.3.11, Table 1.3.4 with regards to the minimum top of embankment freeboard of 1,200 mm is maintained (being the sum of: operational freeboard of 300mm, beach freeboard of 200mm and 10,000 year requirement of 700mm).
Risk Assessment Table 4: *'Discharge of tailings due to pipeline rupture or joint failure'* RHIO commented that there are no new tailings pipelines, rather existing pipelines will be removed and replaced.	Nil	Nil
Risk Assessment Table 4: *'Discharge of tailings due to pipeline rupture or joint failure'* RHIO commented that 'Scour basins are already installed - they are sufficient to contain a spill for a period equal to the time between routine inspections.'	Nil	Nil
Amendment Section, Condition 1.3.10. Request to amend condition to read:	Potential	It is noted that only the tailings delivery pipelines are provided with secondary containment, not the tailings decant

Comments received	Environmental risk	DER consideration of risk
The Licensee shall ensure that: *a) all tailings delivery pipelines have burst discs installed to protect from catastrophic failure and overpressure. These burst discs are to provide automatic overpressure protection in the tailings lines and will alarm and trigger an automatic shut down when overpressure has been detected and a burst of the protection devices occurs.* *b) All of the residue system* (tailings delivery system only) *is automated and fully controlled by PLC (programmable logic controller) and can be remotely and automatically shut down by the control operator, if required, if and when deviation from normal is detected.* *c) All tailings delivery pipelines are provided with secondary containment at the burst disc locations sufficient to contain any spill for a period equal to the time between routine inspections.*		pipelines. It is noted that only the tailings delivery pipelines are provided with burst disc capability, not the tailings decant pipelines. RHIO do not believe this is an issue as there is less pressure through the decant pipelines than the tailings lines and RHIO consider that the decant is water as opposed to tailings being contained within the decant return pipelines that are directed to the Process (Plant) water dam. It is understood that RHIO will only send decant water from the TSF to the Process (Plant) water dam when water quality (particularly chloride values; less than <5,000mg/L TDS) meets product specification so as to not effect shippable ore quality. The potential risk is that there are no spills-controls on the TSF decant system which also crosses a section of No Name Creek. It is noted that over time, the water passing through the tailings and decant system is likely to become more saline, potentially impacting areas where the saline spills occur, to a greater degree than if the spill comprised freshwater. Regarding the functionality of the PLC system, on 14 July 2017 a leak was recorded in the tailings line 20m past the tailings booster station due to gasket failure, spilling approximately 6,000L of tailings onto the surrounding soil. It is unclear whether the PLC is capable of automatically detecting leaks as this spill was only identified during a morning inspection. Regarding the functionality of existing secondary containment, a spill was recorded outside the secondary containment system after it had been filled during an earlier pipeline failure (March 2017, ICMS 44226). Given the limited potential for spills from the decant system, the limited potential for tailings spills to impact the environment outside the premise boundary and the general existing poor quality of exiting vegetation in the area surrounding the TSF pipelines; the consequence is considered to be **minor**, yet the likelihood, **possible**. Therefore,

Comments received	Environmental risk	DER consideration of risk
		the risk is considered to be **medium**.
Condition 1.3.14, Table 1.3.6; *'Since submission of the application in January, RHIO have been required to build the lift on cell 1 prior to cell 2.'* Can this be amended to read: *TSF Stage 2 raise to be conducted one cell at a time as follows:* *1. Phased removal of tailings delivery pipelines, decant pipework and associated infrastructure;* *2. Phased bulk earthworks construction of embankment lifts of relevant Cell;* *3. Detailed earthworks of relevant Cell including raising of decant structure;* *4. Reinstallation of relevant cell tailings delivery pipelines, decant pipework and associated infrastructure; prior to commencement of raise on subsequent Cell…..*	Potential	The Delegated Officer considers that there is no risk to the environment by changing the order of which TSF Cell is raised first. The removal of the design level (442mRL), as proposed by RHIO, is not deemed acceptable as this amendment is to allow for a maximum lift for each Cell to 442mRL.
Draft point 7 (Table 1.3.6) has been addressed by condition 1.3.10 (regarding automatic cut outs in the event of a pipe failure). RHIO suggested to remove draft point 7 as it may be a duplication.	Potential	The Delegated Officer has considered this request and amended the point accordingly.
Suggestion to amend proposed point 8 of Table 1.3.6, Stage 2 TSF Raise to: *Pipelines around the top of the TSF wall and from the booster station to the TSF will be constructed by material, and of diameter appropriate, to prevent sanding or over-pressure during operation. Typically this may be P12 DN450 HDPE or C12 DN450 Carbon Steel pipe, however will be determined by engineering assessment.*	Nil	The piping information specified in point 8, Table 1.3.6 was provided to DWER as additional information (DER record A1517662) by RHIO on 1 September 2017. The wording of the point 8 has been reviewed with additional information included regarding sanding and over-pressure.
Draft point 9 (Table 1.3.6) has been addressed by condition 1.3.10 (regarding scour basins/ secondary containment). RHIO suggested to remove draft point 9 as it may be a duplication.	Nil	The Delegated Officer has considered this request and amended the point accordingly.
Table 3.6.1 regarding the inclusion of the 8 TSF monitoring bores for the whole suite of water quality parameters. *'Monitoring of these bores is*	Potential	The management of the water quality is managed under MS 824 and MS 829, under Part IV of the EP Act. Seepage volumes and groundwater mounding is managed for this facility

Comments received	Environmental risk	DER consideration of risk
conducted to meet the requirements of Part IV approval. This becomes duplication with Part IV'		under Part V of the EP Act. As there is currently no reporting mechanism under Part V for information recorded at TSFMW01, TSFMW02, TSFMW03, TSFMW04, TSFMW05, TSFMW06, TSFMW07, and TSFMW08 the Delegated Officer considers that the monitoring and annual reporting of standing water levels to assess seepage and mounding impacts is required to determine if the TSF is being managed appropriately. DWER will assess that water mounding is not increasing further above that which was initially predicted, and that there are no impacts to receptors.
RHIO consider that this draft condition (1.3.14, Table 1.3.6) is a duplication of existing condition 1.3.16 and should be removed. RHIO would like ensure that in whatever condition remains, that it is clear that each Cell will be submitted separately so we can continue to operate one cell whilst the next Cell is being raised.	Nil	DWER consider the request to include the text '*of each cell'* to be acceptable in relation to compliance reporting requirements and of no increased risk to the environment. DWER has updated to 'relevant cell'.
Request to insert the wording of 'Condition' within Table 4.3.1 to avoid confusion as to whether it is a condition or a table that is being referred to.	Nil	Nil – administrative change only
Insertion *'of each Cell'* into the notification requirements (Table 4.3.1) for the completion of construction of each TSF Stage 2 raise	Nil	Addressed above to capture 'relevant cell'.
Additional comments following correspondence (3 November 2017)		
Freeboard measurement tool of gauge boards were never installed during initial construction of the TSF and decant causeway. *'. It was determined at a management level during the final construction stages of the TSF that gauge boards were not going to be installed*.' '*The measurement of the daily freeboard is being recorded. A standardised jig is being manufactured to increase the speed of measurement. Dedicated TSF operators are in the meantime using a tape measure to record the actual wall height to spigot disposal. Evidence of how they are recording it in the logbook is attached* (See DER Record	Potential	It is understood that the freeboard measurement methodology differs from what was originally prescribed for installation. However, the Delegated Officer considers the interim freeboard calculation measures ('*Dedicated TSF operators are in the meantime using a tape measure to record the actual wall height to spigot disposal'*) in addition to the engineered standardized jig and unmanned aerial vehicle (UAV) to capture aerial imagery of the TSF cells to calculate the volumes of material in the TSF, and remaining capacity of the TSF is deemed appropriate to limit the likelihood of overtopping events at the TSF.

Comments received	Environmental risk	DER consideration of risk
A1555903). *Based on a freeboard of 300mm the heights on the attached sheet have to correlate to greater than 650mm to account for the wall slope for the freeboard requirement*.'		
'8,360m^3 of Seepage water returned (from the TSF Seepage recovery trench) for 2017* (this includes both cell 1 and 2).'	Nil	Nil. *DWER note that this value is not for the full 2017 calendar year and is current only at the time of this amendment.
'*Decant flow is being recorded both manually in the logbooks and the SCADA system with a historian. Flow is 6,240m^3/d, 43,680m^3/week returning to the process plant*.'	Nil	Nil