



# Decision Document

## *Environmental Protection Act 1986, Part V*

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**Proponent:** Mineral Resources Limited

**Licence:** L8859/2014/1

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**Registered office:** 1 Sleat Road  
APPLECROSS WA 6153

**ACN:** 118 549 910

**Premises address:** Iron Valley Iron Ore Project  
Mining Tenement M47/1439 and Miscellaneous Licence L47/757  
NEWMAN WA 6753

**Issue date:** Thursday, 18 December 2014

**Commencement date:** Monday, 22 December 2014

**Expiry date:** Sunday, 21 December 2036

### Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue an amended licence. DER considers that in reaching this decision, it has taken into account all relevant considerations.

Decision Document prepared by: Sonya Poor  
Licensing Officer

Decision Document authorised by: Alana Kidd  
Delegated Officer



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## 1 Purpose of this Document

This decision document explains how DER has assessed and determined the application and provides a record of DER’s decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER’s assessment and decision making under Part V of the *Environmental Protection Act 1986*. Other approvals may be required for the proposal, and it is the proponent’s responsibility to ensure they have all relevant approvals for their Premises.

## 2 Administrative summary

Administrative details		
Application type	Works Approval <input type="checkbox"/>	
	New Licence <input type="checkbox"/>	
	Licence amendment <input checked="" type="checkbox"/>	
	Works Approval amendment <input type="checkbox"/>	
Activities that cause the premises to become prescribed premises	<b>Category number(s)</b>	<b>Assessed design capacity</b>
	5	10,000,000 tonnes per annual period
	6	17,000,000 tonnes per annual period
	89	750 tonnes per annual period
Application verified	Date: 29/08/2016	
Application fee paid	Date: 2/09/2016	
Works Approval has been complied with	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> N/A <input type="checkbox"/>
Compliance Certificate received	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> N/A <input type="checkbox"/>
Commercial-in-confidence claim	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Commercial-in-confidence claim outcome	N/A	
Is the proposal a Major Resource Project?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Was the proposal referred to the Environmental	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/> Referral decision No:



Protection Authority (EPA) under Part IV of the <i>Environmental Protection Act 1986</i> ?		Managed under Part V <input type="checkbox"/> Assessed under Part IV <input checked="" type="checkbox"/>
Is the proposal subject to Ministerial Conditions?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No:1044 EPA Report No: 1585
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the <i>Environmental Protection Act 1986</i> )?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Department of Water consulted Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Is the Premises within an Environmental Protection Policy (EPP) Area Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, include details here, eg Site is subject to SO <sub>2</sub> requirements of Kwinana EPP.		

### 3 Executive summary of proposal and assessment

Mineral Resources Limited (Licensee) operates the Iron Valley Iron Ore Mine (the Project) on behalf of BC Pilbara Iron Ore Pty Ltd (BCP) which is located approximately 90 kilometres (km) north-west of Newman and 150km east of Tom Price in the East Pilbara region of Western Australia.

The Project is located within the BCP (previously Iron Ore Holdings Ltd) mining lease M47/1439 and Miscellaneous Licence L47/757. The Project coexists with the Marillana Pastoral Station, which has historically been used for pastoral use and more recently mining (MRL, 2016a).

The Licensee has held Licence (L8859/2014/1) under the *Environmental Protection Act 1986* (EP Act) for the Project since it was issued on 18 December 2014. The Licence relates to category 5, 6, 57 and 89 activities under Schedule 1 of the *Environmental Protection Regulations 1987*. A licence amendment application was submitted by the Licensee on 22 August 2016 for the following:

- Increase in capacity for category 6 (mine dewatering) to allow for the discharge of up to 17 gegalitres (GL) per year (GL/year) of mine dewatering water to be discharged to the Weeli Wolli Creek system from the Project;
- Approval to accept and dispose of Special Waste Type 1 (asbestos) and Inert Waste Type 2 (plastics) at the Landfill;
- Update of the Inert Waste Type 2 acceptance criteria so that rubber can be disposed of at the Tyre Disposal Area; and
- Expansion of the Tyre Disposal Area.

#### Infrastructure

##### Category 5

The Project involves the below water table (BWT) blast and hydraulic shovel open pit mining of 10 million tonnes (Mt) per annum (Mtpa) of iron ore. Ministerial Statement 1044 was signed by the Minister for Environment (the Minister) on 8 December 2016 granting approval for BCP to progress mining at the Project BWT. Refer to section titled "Part IV of the EP Act".

For the BWT mining operation at the Project ore is mined from multiple pits (Central, North, East and South) through multiple stages. Ore is sent to the Run of Mine (ROM) pad where it is blended to achieve the required grade. Ore is then crushed and screened at one of the two ore processing plants before being sold at the mine gate. Ore processing consists of dry crushing and screening of the ore



to produce lump and fines product. The ore processing does not generate any waste products or tailings.

The key features of the ore processing plants include:

- A ROM pad of ore stockpiles feeding jaw crusher using front end loaders;
- Jaw crusher and secondary cone crusher;
- Sizing screen with changeable matts producing fines and lumps;
- Belt conveyors to transfer ore throughout the processing plant and equipped with guarding and dust suppression sprays; and
- Two fixed stackers.

#### Category 6

Water may be pumped from the mine pit as a contingency when periods of high rainfall require the discharge of excess water from the mine pit into an ephemeral watercourse, which feeds the Weeli Wolli Creek system; a regionally significant watercourse located approximately 200m east of the north east corner of the mining tenement.

Dewatering of up to 23GL/year from the underlying aquifer is required for safe, dry pit excavation. Dewatering will occur via a combination of up to 30 bores across the lifetime of the Project. Discharge of up to 17GL/year of groundwater extracted through dewatering operations are discharged on an annual basis via three on tenure discharge locations (DDL1, DDL4 and DDL5) to the Weeli Wolli Creek system. The balance of dewatering (up to 6GL/year) is utilised by the Project for purposes such as mineral processing, dust suppression, potable water supply and wash down facilities (MRL, 2016).

Ministerial Statement 1044 allows for the discharge of up to 17GL/year of surplus dewater into Weeli Wolli Creek via three separate on-site dewater discharge locations (DDL1, DDL4 and DDL5).

#### Category 57

A used tyre storage facility use to be located at the Project. During this amendment category 57 will be removed from the Licence as the Licensee has stated that due to space constraints there is no designated storage area for tyres. As soon as tyres are brought to site, they are taken to the waste dump (Tyre Disposal Area) where they are buried (MRL, 2016b).

#### Category 89

The Licensee currently operates a putrescible landfill, which accepts up to 750 tonnes per annum (tpa) of Inert Waste Type 1, Putrescible Waste and Clean Fill in accordance with the *Landfill Waste Classification and Waste Definitions 1996*.

During this amendment, the Licensee has requested that Inert Waste Type 2 (plastics) and Special Waste Type 1 (asbestos) be added to the acceptance criteria for the Landfill (MRL, 2016).

Inert Waste Type 2 (tyres) are currently accepted at the Project under the category 89 capacity (750tpa). Used tyres are not disposed of at the Landfill, they are disposed of within the Tyre Disposal Area. The Licensee is requesting that rubber be added to the acceptance criteria for the Tyre Disposal Area and that the area be expanded (MRL, 2016).

#### Other activities

The Project also includes three Aerobic Treatment Units (ATU) with a cumulative capacity of 6,000 litres per day (6m<sup>3</sup> per day), which is below the category threshold under Schedule 1 of the *Environmental Protection Regulations 1987* and is not included in the scope of this assessment.



## Location and siting

### Siting Context

The Project is located approximately 90km north-west of Newman and 150km east of Tom Price. The nearest operating mines include the Yandicoogina Iron Ore Mine and Hope Downs Operations (both operated by Rio Tinto Iron Ore (RTIO)) 5km to the west and 35km to the south-west respectively and the Yandi Operation (operated by BHP Billiton Iron Ore Pty Ltd (BHPBIO)) 35km to the west.

### Sensitive Land Uses

The workforce for the Yandicoogina Operations (RTIO) are accommodated at the Yandicoogina Village which is approximately 7km west of the Project. The workforce for the Project are housed at the Phil's Creek Accommodation Village which is approximately 12km west of the Project. As the Phil's Creek Accommodation Village is operated by the Licensee, it will not be considered a sensitive land use or receptor.

The Marillana Pastoral Station homestead is approximately 12km north-east of the Project.

The application states that the Project is located within the Niyiyaparli Native Title Claim. Consultation remains ongoing with the Aboriginal heritage groups. Disturbance associated with the BWT Project will impact Aboriginal heritage sites. BCP have prepared an application under section 18 of the *Aboriginal Heritage Act 1972* in consultation with the Niyiyaparli People. No European heritage sites were identified within the Project area (MRL, 2016a).

### Specified Ecosystems

The Project exists within the Department of Water (DoW) Proclaimed Pilbara Groundwater and Pilbara Surface Water Area under the *Rights in Water and Irrigation Act 1914* (RiWI Act).

The nearest significant surface water feature to the Project is Weeli Wolli Creek, situated 200m east of the north-east corner of the Premises boundary. Weeli Wolli Creek is a major Pilbara drainage line which flows into the Fortescue Marsh.

The Fortescue Marsh a Priority Ecological Community (PEC) and nationally important wetland is located approximately 30km to the north-east of the Project. The Fortescue Marsh is the final receptor for all surface water flows generated in the Upper Fortescue Basin.

A Priority 3 PEC (Vegetation of sand dunes of the Hamersley Range/Fortescue Valley) previously known as the Fortescue Valley Sand Dunes (Parks and Wildlife, 2016) is located approximately 2km north of the dewatering discharge location. There are no Declared Rare Flora (DRF) within the Project area. *Lepidium catapycnon* (previously a DRF), now a Priority 4 Flora is located within the Project area.

The Project is not located within any tenure managed by the Department of Parks and Wildlife and the Newman Water Reserve a Priority 1 Public Drinking Water Source Area (PDWSA) is 60km to the south-east of the Project.

### Topography

The Project is located towards the mid-eastern area of the Hamersley ranges with rocky hills, small gorges, ephemeral watercourse and gravely loam valleys. At the Project the elevation ranges from approximately 500 to 600m Australian Height Datum (AHD). The basic topographic units are dominated by sand plains, outwash plains, valley plains and flood-out zones. Most of the extensive valley plains comprise earthy clays together with cracking clays, shallow loams and hard red soils (MRL, 2016a).



### Groundwater and water sources

Regionally, groundwater in the Project area flows to the north and discharges to the Fortescue Marsh. Groundwater levels are typically controlled by topographic elevation with the lowest levels locally, occurring at the lower lying areas adjacent to surface water features (Weeli Wolli Creek, Marillana Creek and Fortescue Marsh). Onsite, the regional groundwater pattern is interrupted by the Dolerite Dyke, which forms a hydraulic barrier to groundwater flow.

Static water levels beneath the Project have been measured as ranging from 26 to 43m below ground level (mbgl) in the north of the Dolerite Dyke, to 6 to 18m below surface level south of the Dyke. The groundwater is currently recharged from rainfall events and surface water flows during cyclonic events (MRL, 2016a). Groundwater salinity (total dissolved solids (TDS)) is 500-1,000mg/L, which is considered marginal (DoW, Salinity status classification).

Stream flow in the Pilbara is typically ephemeral, being directly related to intense rainfall events usually associated with cyclonic activity or localised thunderstorms. The Weeli Wolli Creek system drains the Hamersley and Hancock Ranges with the majority of waters flowing northward towards the creek's discharge point at the Fortescue Marsh. The Hamersley Plateau is crossed by Mouse Creek, Marillana Creek and Yandicoogina Creek, which are all major tributaries of Weeli Wolli Creek. Weeli Wolli Creek contributes on average approximately 11% of total inflows to the Fortescue Marsh, making it the second largest contributor.

Natural perennial flows in Weeli Wolli Creek only occur at Weeli Wolli Springs (located approximately 25km upstream of the Project). Artificial perennial flows occur at various locations within the Marillana and Weeli Wolli Catchments as a result of established mine dewatering and/or discharge operations (i.e. Hope Downs 1 (RTIO) and Area C (BHPBIO) mines adjacent to Weeli Wolli Creek; and Yandicoogina (RTIO) and Yandi (BHPBIO) on Marillana Creek). These operations have resulted in permanent surface water flows from Weeli Wolli Springs to the confluence of Weeli Wolli Creek with Marillana Creek and semi-permanent/permanent surface water flows extending approximately 6-7km downstream from the confluence of Marillana Creek and Weeli Wolli Creek.

### Meteorology

The region experiences an arid climate, consisting of hot summers and mild winters. Rainfall in the region is infrequent and generally results from scattered thunderstorms and tropical cloud bands which produce heavy localised falls over short periods of time. The evaporation rate in the region greatly exceeds the average annual rainfall, which contributes to the arid environment in the area.

### **Part IV of the EP Act**

Iron Ore Holdings Ltd previously held Ministerial Statement 933 for the Iron Valley Above Watertable Mining Project.

The revised proposal includes the development of a new mine pit, with mining operations extending below the water table, and the dewatering of the underlying aquifer. BCP referred the Project's BWT proposal to the Environmental Protection Authority (EPA) on 14 March 2016. The level of assessment was set by the EPA at Assessment of Proponent Information – Category A (API – A). The API document was reviewed by the EPA and the Report and Recommendations of the EPA (EPA Report 1585) were released to the Minister on 12 October 2016. Ministerial Statement 1044 granting approval for the BWT proposal to be implemented was signed by the Minister on 8 December 2016. Ministerial Statement 933 has been incorporated into Ministerial Statement 1044.

### Report Number 1585

The Minister's decision that the BWT proposal may be implemented subject to conditions was informed by an EPA assessment (Assessment Number 2082), which produced EPA Report 1585. In its assessment the EPA determined that the following were key environmental factors relating to the proposal:





- **Flora and Vegetation** – direct impacts from the additional clearing of 314 hectares (ha) of flora and vegetation and indirect impacts to riparian and groundwater dependent vegetation from changes to the hydrological regime from mine site dewatering and the discharge of surplus dewater into Weeli Wolli Creek.
- **Hydrological Processes and Inland Waters Environmental Quality** – changes to the hydrogeology and water quality of the aquifer in the area, and the hydrological regime and the water quality of Weeli Wolli Creek from mine site dewatering, the discharge of surplus dewater, and run-off and/or seepage from waste material landforms and other disturbed areas.

The EPA also identified the following integrating factors:

- **Rehabilitation and Decommissioning** – potential impacts from pit lakes that will form after the cessation of mining and dewatering activities.
- **Offsets** – to counterbalance the significant residual impacts to native vegetation in 'Good to Excellent' condition.

EPA Report 1585 (page 15) states "The construction and operation of the tailings storage facilities integrated into the waste rock landforms will be administered by the DER via a Works Approval under Part V of the *Environmental Protection Act 1986*". No tailings storage facilities have been assessed by DER under any Works Approvals or this Licence to date.

#### Ministerial Statement 1044

EPA Report 1585 recommended conditions relating to flora and vegetation, hydrological processes and inland waters environmental quality, rehabilitation and decommissioning and offsets.

The Project's revised proposal involves the open cut mining below the water table and includes groundwater abstraction and discharge of surplus dewater, the development of an additional mine pit and associated infrastructure, a beneficiation plant, a gas turbine power supply, and water management infrastructure for groundwater abstraction and discharge of surplus dewater. The proposal also includes an increase in the area and depth of existing mine pits and the size and number of waste rock landforms, and the integration of tailings storage facility cells into the waste rock landforms.

Ministerial Statement 1044 was signed by the Minister on 8 December 2016 and has conditions relating to the following:

- Condition 5 requires BCP to prepare, submit and implement a management plan to minimise impacts on:
  - The environmental values of Weeli Wolli Creek;
  - Aboriginal heritage values linked to the physical and/or biological surroundings of Weeli Wolli Creek; and
  - The health or cover of riparian and groundwater dependent vegetation.
- Condition 6 requires BCP to prepare and implement a Mine Closure Plan and to review and revise this plan every three years during operations. This is due to the proximity of the pit lakes to Weeli Wolli Creek.
- Condition 7 requires BCP to provide an offset to counterbalance the significant residual impact of the additional clearing of up to 314ha of 'Good to Excellent' native vegetation within the Hamersley and Fortescue Interim Biogeographic Regionalisation for Australia (IBRA) subregions plus the 674ha of clearing previously approved under Ministerial Statement 933 (total of 988ha).



### **Other Approvals**

#### Department of Mines and Petroleum (DMP)

The application states that a BWT Mining Proposal and Mine Closure Plan was submitted to DMP per the *Mining Act 1978* in mid-August 2016 (MRL, 2016a).

#### DoW

The application states that relevant approvals to construct water bores and abstract water from those bores will be sought under the RiWI Act (MRL, 2016a).

#### Clearing

An additional 314ha of land disturbance at the Project is required to facilitate the BWT expansion. This clearing has been authorised under Ministerial Statement 1044.

### **This amendment – December 2016**

During this amendment the following changes have been made to the Licence:

- Inclusion of miscellaneous licence L47/757 in the premises address;
- Increase in design capacity for category 6;
- Removal of category 57;
- Definitions updated in line with the Licence;
- Previous conditions 1.2.2, 1.2.3 and 1.2.8 have been removed;
- Previous conditions 1.2.5 and 1.2.9 have been removed and incorporated into condition 1.2.2;
- Condition 1.2.2 updated so that Inert Waste Type 2 (plastics) and Special Waste Type 1 (asbestos) can be accepted and disposed of at the Landfill;
- Condition 1.2.2 updated so that Inert Waste Type 2 (rubber) can be accepted and disposed of in the Tyre Disposal Area;
- Previous conditions 1.2.10 to 1.2.15 have been removed;
- Inclusion of conditions 1.2.6, 1.2.7 and 1.2.8 for infrastructure construction requirements;
- Inclusion of condition 1.2.9 for the design capacity limits;
- Removal of “W1 – Discharge of dewatering effluent. Discharge point from Sedimentation Pond to natural creek line” in previous condition 2.2.1;
- Inclusion of emission points DDL1, DDL4 and DDL5 in conditions 2.1.1 and 3.2.1;
- Inclusion of Special Waste Type 1 in condition 3.3.1 for the monitoring of inputs and outputs;
- Removal of previous conditions 3.4.1 and 4.1.1;
- Removal of previous Table 3.5.1;
- Condition 4.2.1 changed to reflect updated Licence and what is required within the Annual Environmental Report;
- Condition 4.3.1 updated to include the submission of a construction compliance document for condition 1.2.6 and list of departures associated with condition 1.2.7;
- Premises boundary map has been updated to include the new Tyre Disposal Area;
- Additional emission map provided showing the location of DDL1, DDL4 and DDL5; and
- Schedule 2 has been updated to remove the Annual Audit Compliance Report and a section under the N1 Part A notifications.

At the time of this amendment, DER has also implemented changes to ensure that conditions are valid, enforceable and/or risk based. Accordingly, conditions that are not valid, enforceable and/or risk based have been removed from the Licence. DER's assessment and decision making are described in section 4 of this document.





## 4 Decision table

All applications are assessed in line with the EP Act, the *Environmental Protection Regulations 1987*, DER's Guidance Statement: *Decision Making*, DER's Guidance Statement: *Risk Assessments* and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L = Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
General conditions	L1.1.1 – L1.1.4.	<p>In line with recent administrative changes implemented within the Department, the definition for 'Annual Period' and 'CEO' has been updated; and new definitions for 'Anniversary Date', 'Annual Audit Compliance Report' and 'Department' included in this section.</p> <p>Other definitions have been added or removed in accordance with changes made to the Licence during this amendment.</p> <p><u>Emission Description</u> <i>Emission:</i> Stormwater contaminated by heavy sediment loads, hydrocarbon and other chemicals.</p> <p><i>Impact:</i> Contamination of surrounding land and surface water drainage systems. Hydrocarbon and chemicals have the potential to impact the health of flora and fauna. High sediment loads and turbidity may impact water quality and other downstream water users.</p> <p><i>Controls:</i> Bulk fuel is stored in self bunded tanks which comply with Australian Standard, 1940 – 2004 <i>The Storage and Handling of Flammable and Combustible Liquids</i>. Vehicles are only refuelled in the designated bunded refuelling bay. Fuel is pumped and not gravity feed with shut off devices incorporated. Spill kits are available and regularly maintained. A number of sediment basins are located within the premises to reduce sediment loads and turbidity in stormwater.</p>	<p>General provisions of the EP Act.</p> <p><i>Environmental Protection (Unauthorised Discharges) Regulations 2004.</i></p> <p>AS1940-2004.</p> <p><i>Dangerous Goods Safety Act 2004.</i></p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Risk Assessment</u>  <i>Consequence:</i> The Delegated Officer has determined that potentially contaminated stormwater or minor leaks and spills of hydrocarbons will have minimal on-site impact. Therefore, the Delegated Officer considers the consequence to be slight.</p> <p><i>Likelihood:</i> The Delegated officer has determined that adverse impacts to the environment from contaminated stormwater and leaks and spills of hydrocarbons from the Project will not occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be unlikely.</p> <p><i>Overall Risk:</i> The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Rating Matrix (Table 1) and determined the overall rating of risk for contaminated stormwater and leaks and spills of hydrocarbons during operation to be <b>low</b>.</p> <p><u>Regulatory Controls</u>            The risk associated with potentially contaminated stormwater and minor leaks and spills of hydrocarbons at the Project has been assessed as posing a low environmental risk. The risk has been determined based on the following:</p> <ul style="list-style-type: none"> <li>• Licensee controls (as detailed above);</li> <li>• The location of the premises in an arid environment where the evaporation rate greatly exceeds the average annual rainfall; and</li> <li>• Depth to groundwater.</li> </ul> <p>The general provisions of the EP Act with respect to the causing of pollution and environmental harm apply, as does subsidiary legislation including the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>.</p> <p>The storage of environmentally hazardous chemicals is adequately regulated by the</p>	



<b>DECISION TABLE</b>			
<b>Works Approval / Licence section</b>	<b>Condition number W = Works Approval L= Licence</b>	<b>Justification (including risk description &amp; decision methodology where relevant)</b>	<b>Reference documents</b>
		<i>Dangerous Goods Safety Act 2004</i> and associated Regulations.	
<b>Premises operation</b>	L1.2.1 – L1.2.9.	DER's assessment and decision making are detailed in Appendix A.	General provisions of the EP Act.
<b>Emissions general</b>	L2.1.1.	A numerical limit is defined in condition 2.2.2. Condition 2.1.1 requires the Licensee to investigate if there is an exceedance of this limit.	N/A.
<b>Point source emissions to air including monitoring</b>	N/A.	There are no point source emissions to air or the monitoring of this emission associated with the operation of the Project.	General provisions of the EP Act.  MRL, 2016a.
<b>Point source emissions to surface water including monitoring</b>	L2.2.1, L2.2.2 and L3.2.1.	DER's assessment and decision making are detailed in Appendix B.	General provisions of the EP Act.  MRL, 2016a.
<b>Point source emissions to groundwater including monitoring</b>	N/A.	There are no point source emissions to groundwater or the monitoring of this emission associated with the operation of the Project.	General provisions of the EP Act.
<b>Emissions to land including monitoring</b>	N/A.	There are no emissions to land or the monitoring of this emission associated with the operation of the Project. The operation of the Landfill is covered in Appendix A premises operation under "Landfill".	General provisions of the EP Act.
<b>Fugitive emissions</b>	N/A.	<u>Emission Description</u> <i>Emission:</i> Dust emissions are generated from the processing of ore through crushing and screening. Dust is also produced from vehicle transport and other ancillary infrastructure at the site.	General provisions of the EP Act.  <i>Environmental</i>



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		<p><i>Impact:</i> Dust containing particles of less than 10 micrometres in diameter have been associated with diminishing lung function and dust in high volumes does interfere with comfort and amenity for the public. Dust also has the potential to smother and impact the health of flora and vegetation. The nearest sensitive user is the transient workforce located at the Yandicoogina Village (RTIO) 7km away and nearest sensitive premises is the Marillana homestead located in excess of 10km away.</p> <p><i>Controls:</i> Dust suppression techniques utilised by the Licensee to minimise dust include:</p> <ul style="list-style-type: none"> <li>• Fogging and surface wetting sprays at material transfer points on conveyors, bins, crushers and screens;</li> <li>• Maintaining moisture content to 8%;</li> <li>• Dust suppression by water trucks to stockpile areas and access roads;</li> <li>• Progressive rehabilitation of areas no longer used,</li> <li>• Restricted speed limits; and</li> <li>• Visual dust monitoring to confirm effectiveness of controls or implement management action.</li> </ul> <p><u>Risk Assessment</u>  <i>Consequence:</i> The Delegated Officer has determined that fugitive dust emissions will have minimal onsite impacts at a local scale. Even in areas most impacted by dust it is likely that the natural dust tolerance of Pilbara vegetation species will prevent widespread vegetation impacts. Therefore, the Delegated Officer considers the consequence to be slight.</p> <p><i>Likelihood:</i> The Delegated officer has determined that adverse impacts to the environment from fugitive dust emissions will not occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be unlikely.</p> <p><i>Overall Risk:</i> The Delegated Officer has compared the consequence and likelihood</p>	<p><i>Protection (Unauthorised Discharges) Regulations 2004.</i></p>



DECISION TABLE			
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p>ratings described above through the Risk Rating Matrix (Table 1) and determined the overall rating of risk of fugitive dust emission on potential receptors during operation to be <b>low</b>.</p> <p><u>Regulatory Controls</u> Fugitive dust emissions are considered a low risk for the Project given the location of the premises (nearest sensitive user is the transient workforce located at the Yandicoogina Village (RTIO) 7km) and there are no PEC, TEC or DRF within the Project or near the ore processing plants. Fugitive emissions can be sufficiently regulated under section 49 of the EP Act.</p>	
<b>Odour</b>	N/A.	No odour emissions will be generated at the Project and as such no conditions are required on the Licence.	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004.</i>
<b>Noise</b>	N/A.	<p><u>Emission Description</u> <i>Emission:</i> Noise emissions are generated at the Project from vehicular movement and the ore processing plants (crushing and screening activities).</p> <p><i>Impact:</i> Significant noise interferes with the comfort and amenity of the public. The nearest sensitive user is the transient workforce located at the Yandicoogina Village (RTIO) 7km.</p> <p><i>Controls:</i> The Licensee implements the following controls to reduce noise emissions:</p> <ul style="list-style-type: none"> <li>• Using equipment, machines and vehicles that would be the quietest reasonably available which are regularly maintained; and</li> <li>• Register and investigate any noise-related complaints and take necessary corrective action.</li> </ul>	<p><i>Environmental Protection (Noise) Regulations 1997.</i></p> <p>General provisions of the EP Act.</p>



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Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents
		<p><u>Risk Assessment</u>  <i>Consequence:</i> The Delegated Officer has determined that there should be minimal impacts to health and amenity from noise emissions. Therefore, the Delegated Officer considers the consequence to be slight.</p> <p><i>Likelihood:</i> The Delegated officer has determined that health and amenity impacts from noise emissions will not occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be unlikely.</p> <p><i>Overall Risk:</i> The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Rating Matrix (Table 1) and determined the overall rating of risk of noise emission on the health and amenity of receptors during operation to be <b>low</b>.</p> <p><u>Regulatory Controls</u>            Noise emissions at the Project are to comply with the <i>Environmental Protection (Noise) Regulations 1997</i>.</p>	
<b>Monitoring general</b>	L3.1.1 – L3.1.4.	The Licence includes surface water monitoring and ambient groundwater monitoring. Conditions on the Licence therefore include standards for the collection of samples, laboratory analysis to be undertaken by a NATA accredited laboratory and that monitoring equipment is appropriately maintained and calibrated.	N/A.
<b>Monitoring of inputs and outputs</b>	L3.3.1.	Monitoring of inputs and outputs from the Landfill are necessary to ensure the efficient operation of the Landfill and to ensure that the Landfill is operating in accordance with the design capacity. During this amendment Special Waste Type 1 has been added to the waste inputs.	N/A.
<b>Process monitoring</b>	N/A.	During this amendment previous condition 3.4.1 relating to the sampling point from the oily water separator has been removed. Refer to Appendix A (Previous conditions 1.2.2	N/A.





DECISION TABLE																														
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)				Reference documents																								
		<p>and 3.4.1 – Process water re-use). The volumetric flow rate requirement for the dewatering pipeline to sedimentation pond has also been removed as this is now covered under condition 3.2.1.</p> <p>Previous condition 3.4.1 specified: <i>The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table.</i></p> <table border="1"> <thead> <tr> <th colspan="6"><b>Table 3.4.1: Process monitoring</b></th> </tr> <tr> <th>Monitoring point reference</th> <th>Monitoring point location</th> <th>Parameter</th> <th>Units</th> <th>Averaging Period</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>L1</td> <td>Sampling point from Oily Water Separator (post treatment)</td> <td>Total Recoverable Hydrocarbons (TRH)</td> <td>mg/L</td> <td>Spot sample</td> <td>Quarterly</td> </tr> <tr> <td>Established under improvement reference IR2</td> <td>Dewatering pipeline to Sedimentation Pond</td> <td>Volumetric flow rate (cumulative)<sup>1</sup></td> <td>ML/day</td> <td>Monthly</td> <td>Continuous when discharging (once installed in accordance with IR2)</td> </tr> </tbody> </table>				<b>Table 3.4.1: Process monitoring</b>						Monitoring point reference	Monitoring point location	Parameter	Units	Averaging Period	Frequency	L1	Sampling point from Oily Water Separator (post treatment)	Total Recoverable Hydrocarbons (TRH)	mg/L	Spot sample	Quarterly	Established under improvement reference IR2	Dewatering pipeline to Sedimentation Pond	Volumetric flow rate (cumulative) <sup>1</sup>	ML/day	Monthly	Continuous when discharging (once installed in accordance with IR2)	
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Ambient quality monitoring	L3.4.1.	<p>During this amendment, previous Table 3.5.1 has been removed in accordance with DER's Guidance Statement: <i>Setting Conditions</i>. The monitoring of ambient surface water quality is regulated by Ministerial Statement 1044 condition 5 (5-1 to 5-7). The hydrological processes, inland waters environmental quality, and flora and vegetation – dewatering, discharge of surplus dewater, riparian and groundwater</p>				<p>Ministerial Statement 1044.</p> <p>General provisions of the</p>																								



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		dependent vegetation can be sufficiently regulated under Part IV Ministerial Statement 1044.  Previous Table 3.5.1 specified: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="5"><b>Table 3.5.1: Monitoring of ambient surface water quality</b></th> </tr> <tr> <th>Monitoring point reference</th> <th>Location and description</th> <th>Parameter and units</th> <th>Averaging period</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>SW1</td> <td>C16 North – upstream</td> <td>pH<sup>1</sup></td> <td rowspan="8">Spot Sample</td> <td rowspan="8">Monthly when flowing</td> </tr> <tr> <td>SW2</td> <td>C16 North – downstream</td> <td>Electrical conductivity<sup>1</sup> (µS/cm)</td> </tr> <tr> <td>SW3</td> <td>C16 South – upstream</td> <td>Total Dissolved Solids (mg/L)</td> </tr> <tr> <td>SW4</td> <td>C16 South – downstream</td> <td>Total Suspended Solids (mg/L)</td> </tr> <tr> <td>SW5</td> <td>C16 South – downstream</td> <td>Ionic balance (mg/L)</td> </tr> <tr> <td>SW6</td> <td>C15 Dam and overflow (upstream)</td> <td>Total Alkalinity (mg/L)</td> </tr> <tr> <td>SW7</td> <td>C14 – upstream</td> <td>Calcium (mg/L)</td> </tr> <tr> <td>SW8</td> <td>C14 – downstream</td> <td>Magnesium (mg/L)</td> </tr> <tr> <td></td> <td></td> <td>Sodium (mg/L)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Potassium (mg/L)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Chlorine (mg/L)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Sulphate (mg/L)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Fluorine (mg/L)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Aluminium (mg/L)</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>Arsenic (mg/L)</td> <td></td> <td></td> </tr> </tbody> </table>			<b>Table 3.5.1: Monitoring of ambient surface water quality</b>					Monitoring point reference	Location and description	Parameter and units	Averaging period	Frequency	SW1	C16 North – upstream	pH <sup>1</sup>	Spot Sample	Monthly when flowing	SW2	C16 North – downstream	Electrical conductivity <sup>1</sup> (µS/cm)	SW3	C16 South – upstream	Total Dissolved Solids (mg/L)	SW4	C16 South – downstream	Total Suspended Solids (mg/L)	SW5	C16 South – downstream	Ionic balance (mg/L)	SW6	C15 Dam and overflow (upstream)	Total Alkalinity (mg/L)	SW7	C14 – upstream	Calcium (mg/L)	SW8	C14 – downstream	Magnesium (mg/L)			Sodium (mg/L)					Potassium (mg/L)					Chlorine (mg/L)					Sulphate (mg/L)					Fluorine (mg/L)					Aluminium (mg/L)					Arsenic (mg/L)			EP Act.  <i>Environmental Protection (Unauthorised Discharges) Regulations 2004.</i>
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DECISION TABLE				
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)		Reference documents
			<p>Boron (mg/L) Cadmium (mg/L) Chromium (mg/L) Copper (mg/L) Iron (mg/L) Manganese (mg/L) Nickel (mg/L) Lead (mg/L) Antimony (mg/L) Selenium (mg/L) Zinc (mg/L) Mercury (mg/L)</p> <p><i>Note 1: In-field non-NATA accredited analysis permitted.</i> <i>Note 2: ANZECC &amp; ARMCANZ (2000), Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i></p> <p>A groundwater monitoring program has been developed for the Landfill. The groundwater bores monitored are:</p> <ul style="list-style-type: none"> <li>• PB02 located up gradient of the Landfill;</li> <li>• LMB1 and LMB2 located 100-200m from the boundary of the Landfill; and</li> <li>• MBD and MBK located down gradient of the Landfill.</li> </ul> <p>The parameters are monitored on a six monthly basis and include standing water level, pH, electrical conductivity, metals and nutrients.</p> <p>The Delegated Officer considers that the number and location of the bores together with the parameters and frequency detailed are sufficient to monitor potential impacts from leachate generated at the Landfill to groundwater, Weeli Wolli Creek and four small tributaries which drain into the Weeli Wolli Creek system.</p>	



DECISION TABLE				
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)	Reference documents	
Meteorological monitoring	N/A.	Monitoring of meteorological conditions is not required to adequately manage emissions from the Project and are therefore not required on the Licence.	N/A.	
Improvements	N/A.	During this amendment previous condition 4.1.1 IR1, IR2 and IR3 have been removed, which specified:  <i>The Licensee shall complete the improvements in Table 4.1.1 by the date of completion in that table.</i>	Ministerial Statement 1044.  MRL, 2016c.	
		<b>Table 4.1.1: Improvement program</b>		
		<b>Improvement reference</b>		<b>Improvement</b>
	IR1	<i>The Licensee shall submit to the CEO a report providing the establishment of site specific triggers for surface water monitoring undertaken as part of this licence. The report should include but is not limited to:</i>  <i>(a) The rationale and methodology for the establishment of triggers based on the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC &amp; ARMCANZ 2000) and/or National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM).</i>  <i>(b) Detail of any trends or observations which have occurred since the operation of the site and the undertaking of surface water monitoring.</i>  <i>(c) Include sufficient monitoring data with an Appendix containing all original laboratory reports.</i>	18/12/2016	



DECISION TABLE				
Works Approval / Licence section	Condition number W = Works Approval L= Licence	Justification (including risk description & decision methodology where relevant)		Reference documents
		IR2	<i>The Licensee shall install a flow meter(s) to ensure the continuous and accurate recording of the cumulative quantity of dewatering discharges to the Sedimentation Pond.</i>	<i>Prior to conducting dewatering activities</i>
		IR3	<i>The Licensee shall install a flow meter to ensure the continuous and accurate recording of the cumulative quantity of discharges from the contingency discharge pipeline to the sediment pond.</i>	<i>Prior to conducting dewatering activities</i>
		<p>Previous condition 4.1.1 for IR1 has been removed in accordance with DER's Guidance Statement: <i>Setting Conditions</i>. The monitoring of ambient surface water quality is regulated by Ministerial Statement 1044 condition 5 (5-1 to 5-7). The hydrological processes, inland waters environmental quality, and flora and vegetation – dewatering, discharge of surplus dewater, riparian and groundwater dependent vegetation can be sufficiently regulated under Part IV Ministerial Statement 1044.</p> <p>The Licensee stated in the compliance document for the dewatering infrastructure that a discharge flow meter has been installed on the pipework at chainage 1050 on the Main Collector Pipeline, which satisfies the requirements of condition 4.1.1 for IR2 and IR3 (MRL, 2016c).</p>		
<b>Information</b>	L4.1.1 – L4.1.4, L4.2.1, L4.2.2 and L4.3.1.	<p>Condition 4.1.2 relating to the Annual Audit Compliance Report has been updated to reflect administrative changes within the Department. Table 4.2.1 has also been updated in line with Licence conditions and to reflect the removal of the Annual Audit Compliance Report template from the Licence. The Licensee is required to access the form from the DER website.</p> <p>Condition 4.2.2 has been revised to remove 'any relevant process, production or operational data recorded under condition 3.1.3'. Condition 3.1.3 relates to ensuring</p>		N/A.



<b>DECISION TABLE</b>			
<b>Works Approval / Licence section</b>	<b>Condition number W = Works Approval L= Licence</b>	<b>Justification (including risk description &amp; decision methodology where relevant)</b>	<b>Reference documents</b>
		<p>that all monitoring equipment is calibrated in accordance with manufacturer's specifications and requirements of the Licence.</p> <p>Condition 4.3.1 notification requirements have been updated to include submission of the construction compliance document and a list of any departures and to ensure that where the requirements for calibration cannot be practicably met as described in condition 3.1.4, that a report is provided to the CEO.</p>	
<b>Licence Duration</b>	N/A.	DER's Guidance Statement: <i>Licence Duration</i> has been applied and the Licence expires on 21 December 2036.	N/A.





## 5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
3/11/2016	Application referred to DoW - direct interest	<p>The following comments were received from DoW on 6 December 2016.</p> <ul style="list-style-type: none"><li>• DoW has recently reviewed the proposed <i>Iron Valley Below Water Table Project</i> and provided comments to the Office of the EPA (OEPA) on potential impacts to Weeli Wolli Creek, local aquifers and groundwater dependent ecosystems as a result of surplus discharge. The DoW considers impacts as a result of increased discharge can be managed under the required Ministerial condition environmental management plan (CEMP) and Part V licence monitoring.;</li><li>• DoW considers proposed monitoring (as part of the discharge licence) should be robust enough to identify any surplus discharge impacts, in comparison to any baseline data previously collected; and</li><li>• DoW considers the impacts to groundwater due to dewatering can be managed under the RiWI Act licensing and through the groundwater operating strategy.</li></ul>	<p>Groundwater abstraction and/or surplus dewater discharge including the monitoring of riparian and groundwater dependent vegetation will be managed under Ministerial Statement 1044.</p> <p>Licence L8859/2014/1 sets a limit for mine dewatering at 17GL/year, stipulates the surface water emission points for the dewatering of the mine pits and requires the Licensee to report on the cumulative volumes discharged during dewatering in the Annual Environmental Report.</p> <p>DER notes the other comments made by DoW.</p>
13/12/2016	Proponent sent a copy of draft instrument	<p>A signed waiver form was received from the Licensee on 13 December 2016. The Licensee requested that "The Project involves the above water table, blast and hydraulic..." be changed to "The Project involves the below water table, blast and hydraulic..." for both the decision document and licence.</p>	<p>The decision document and licence were updated to "The Project involves the below water table, blast and hydraulic..."</p>



## 6 Risk Assessment

Note: This matrix is taken from the DER's Guidance Statement: Risk Assessments (November 2016)

Table 1: Risk Rating Matrix

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



## Appendix A

### Premises operation

#### Previous conditions 1.2.2 and 3.4.1 – Process water re-use

##### Emission Description

*Emission:* Wastewater from the wash down of both heavy and light vehicles is treated through a Cleanwater system and discharged to a turkey's nest and used for dust suppression on the premises.

*Impact:* Wastewater from the wash down facility may contain elevated levels of hydrocarbons which could contaminate waterbodies or terrestrial environments. Hydrocarbons have the potential to adversely impact flora and fauna.

##### *Controls:*

- Wastewater is treated through a Cleanwater system, which includes a sediment trap and de-emulsification basin;
- Only quick break detergents are used in the system (no solvents);
- System is maintained regularly;
- Waste products including oil and emulsifier is fully contained and dewatered for disposal at a licensed landfill facility off-site; and
- Validation testing is undertaken on a quarterly basis to ensure that treated wastewater is sufficiently free of hydrocarbons (less than 15 mg/L total petroleum hydrocarbons) in accordance with the *Water Quality Protection Note 68*.

##### Risk Assessment

*Consequence:* The Delegated Officer has determined that the impact of process water reused for dust suppression will have low level onsite impacts. Therefore, the Delegated Officer considers the consequence to be minor.

*Likelihood:* The Delegated officer has determined the likelihood of malfunctions to the process water treatment system to be rare, as this will only occur in exceptional circumstances where control measures fail. Therefore, the Delegated Officer considers the consequence to be rare.

*Overall Risk:* The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Rating Matrix (Table 1) and determined that the overall risk of process water reused for dust suppression on the premises to be **low**.

##### Regulatory Controls

Previous conditions 1.2.2 and 3.4.1 have been removed.

Previous condition 1.2.2 specified:

*The Licensee shall not cause or allow process limits greater than the limits listed in Table 1.2.1.*

**Table 1.2.1: Process limits**

<b>Monitoring point reference</b>	<b>Parameter</b>	<b>Limit (including units)</b>	<b>Averaging period</b>
L1 (Post treatment - Oily Water Separator)	Total Recoverable Hydrocarbons (TRH)	15mg/L	Spot sample

The risk associated with the re-use of process water for dust suppression on the premises has been assessed as posing a low environmental risk and as such the limit for total recoverable hydrocarbons has been removed. The risk has been determined based on the following:

- Licensee controls (as detailed above);



- The location of the premises in an arid environment where the evaporation rate greatly exceeds the average annual rainfall;
- The distance to specified ecosystems, significant waterways and other receptors (as detailed in “Location and siting”); and
- Depth to groundwater.

Previous condition 3.4.1 (excerpt) specified:

*The Licensee shall undertake the monitoring in Table 3.4.1 according to the specifications in that table.*

<b>Table 3.4.1: Process monitoring</b>					
<b>Monitoring point reference</b>	<b>Monitoring point location</b>	<b>Parameter</b>	<b>Units</b>	<b>Averaging Period</b>	<b>Frequency</b>
L1	Sampling point from Oily Water Separator (post treatment)	Total Recoverable Hydrocarbons (TRH)	mg/L	Spot sample	Quarterly

The general provisions of the *Environmental Protection Act 1986* with respect to the causing of pollution and environmental harm apply, as does subsidiary legislation including the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

**Landfill**

The Project has a landfill, which is licensed for the disposal of general domestic, Putrescible Waste (including wood) and Inert Waste Type 1 (such as plastic wrapping, polystyrene foam and other packaging and machinery parts) in accordance with the *Landfill Waste Classification and Waste Definitions 1996*.

The Landfill has the capacity of 10,500m<sup>3</sup> (750 tonnes annually), is configured to consist of five 30m long x 10m wide x 3m deep trenches and only one trench is operational at one time.

The Project has encountered naturally occurring fibrous minerals in waste rock in some of the pit areas. The waste rock containing fibrous minerals is managed in accordance with the Department of Mines and Petroleum guidelines. The Licensee is proposing to dispose of asbestos contaminated waste generated through support of mining activities such as contaminated personal protective equipment (coveralls, respirators, booties, gloves, etc.); air filters from heavy equipment and vehicles; and decontamination materials (rags or wipes etc.) at the Landfill.

During this amendment the Licensee has requested that Inert Waste Type 2 (plastics) and Special Waste Type 1 (asbestos) generated at the Project be added to the acceptance and burial criteria for the Landfill. Plastic waste generated at the Project includes packaging waste; food containers and cutlery; hoses, tubing and PVC pipes; empty storage bags and super sacks; storage containers/units; and core trays.

Emission Description

*Emission:* Disposal of waste to the Landfill.

*Impact:* Windblown waste and potential for contamination of surrounding environment if disposed of incorrectly.

*Controls:*

- The Landfill is located away from drainage lines and creek systems and is positioned such that the predominately easterly winds do not blow rubbish beyond the lease boundaries;
- The Landfill is fenced to discourage native and feral animals from entering the area;



- The depth to groundwater at the Landfill is greater than 5m; and
- There are three monitoring bores in the vicinity of the Landfill, which are monitored quarterly to ensure the Landfill does not have an impact on groundwater quality (refer to ambient groundwater quality).

#### Emission Description

*Emission:* Asbestos fibres released through processing and disposal of asbestos-contaminated waste.

*Impact:* Asbestos fibres are a known health hazard to people and animals that inhale or ingest the fibres. Asbestos fibres can readily become airborne and travel from the point of generation to other areas. Due to their small size they can remain airborne for long periods of time, and thus can remain a risk long after they have been released.

#### *Asbestos Controls:*

- Asbestos contaminated waste is segregated from other waste streams;
- Asbestos contaminated waste is bagged in heavy duty plastic bags, securely sealed and labelled;
- Asbestos contaminated waste is placed in a designated asbestos disposal area within the Landfill;
- The asbestos waste disposal area comprises a separate signposted trench within the Landfill;
- The trench is progressively covered by clean fill at least weekly or as soon as practicable after deposit;
- Asbestos contaminated waste is not compacted to eliminate the risk of breaking or puncturing disposal bags;
- Cover of at least 500mm of clean fill is placed over asbestos contaminated waste within the trench;
- Asbestos contaminated waste is not deposited within 2m of the final tipping surface of the landfill;
- The location of the asbestos waste disposal area is recorded on the Project's site plan;
- No works are carried out at the landfill which could potentially lead to the release of asbestos fibres; and
- Management of all asbestos contaminated material onsite complies with the following:
  - *Work Health and Safety Act 2011;*
  - *How to Manage and Control Asbestos in the Workplace;*
  - *How to Safely Remove Asbestos;* and
  - *Guidelines on Management of fibrous minerals in Western Australia mining operation.*

#### Risk Assessment

*Consequence:* The Delegated Officer has determined that health impacts from asbestos exposure will have adverse health effects. Therefore, the Delegated Officer considers the consequence to be severe.

*Likelihood:* Taking into consideration the Licensee controls and management, the Delegated Officer has determined that health impacts from asbestos exposure will only occur in exceptional circumstances. Therefore, the Delegated Officer considers the consequence to be rare.

*Risk Rating:* The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Rating Matrix (Table 1) and determined that the overall rating for the risk of asbestos exposure on sensitive receptors during operation to be **high**.



### Regulatory Controls

Conditions 1.2.2, 1.2.3, 1.2.4 and 1.2.5 detail the waste acceptance, processing, covering and burial criteria for the Landfill. During this amendment Table 1.2.1 has been updated to allow for the acceptance and burial of Special Waste Type 1 (asbestos) and Inert Waste Type 2 (plastics) at the Landfill.

Additional requirements for the acceptance and landfilling of controlled waste (asbestos) are set out in the *Environmental Protection (Controlled Waste) Regulations 2004*. The Licensee also has a responsibility to ensure the comfort of their workforce and in compliance with obligations under the occupational health and safety legislation.

During this amendment previous conditions 1.2.3 and 1.2.8 were removed.

Previous condition 1.2.3 specified:

*The Licensee shall only accept waste on to the Premises if:*

- (a) it is of a type listed in Table 1.2.2;*
- (b) the quantity accepted is below any quantity limit listed in Table 1.2.2; and*
- (c) it meets any specification listed in Table 1.2.2.*

Previous condition 1.2.8 specified:

*The Licensee shall implement the following security measures at the site:*

- (a) erect and maintain suitable fencing to prevent unauthorised access to the site;*
- (b) ensure that any entrance gates to the premises are securely locked when the premises are unattended; and*
- (c) undertake regular inspections of all security measures and repair damage as soon as practicable.*

Previous conditions 1.2.5 and 1.2.9 were integrated into Table 1.2.1 (previously Table 1.2.2).

Only the wastes listed in Table 1.2.1 can be accepted by the Licensee for burial at the Landfill. The waste acceptance and processing criteria and covering requirements are considered necessary as other waste types have not been considered in this risk assessment. Burial criteria are considered necessary to ensure the adequate covering of waste and to manage fire risks. The conditions ensure the burial of waste at the Landfill is adequately regulated.

### Residual Risk Rating

*Consequence:* Considering the nature of the waste material accepted for burial at the Landfill, the Delegated Officer has determined that the Landfill will have low level onsite impacts to the ecosystem. Therefore, the Delegated Officer considers the consequence to be minor.

*Likelihood:* Based upon the Licensee controls and the existing groundwater monitoring program (refer to ambient quality monitoring) in the vicinity of the Landfill, the Delegated Officer has determined an environmental impact from the Landfill will not occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be unlikely.

*Overall Risk Rating:* The Delegated Officer has determined that the overall rating for environmental risk from the Landfill during operation to be **medium** but acceptable, subject to multiple regulatory controls.

### **Type Disposal Area**

Used tyres are not disposed of within the Landfill, they are disposed of within the Tyre Disposal Area. The bulk of the tyres are road train tyres with a few heavy vehicle (trucks), light vehicle and earthmoving tyres (MRL, 2015).





During this amendment the Licensee has requested that Inert Waste Type 2 (rubber) generated at the Project be added to the waste acceptance criteria for disposal at the Tyre Disposal Area. Rubber waste generated at the Project includes conveyor belts and skirting, liners and capping.

The Tyre Disposal Area has also been expanded under this amendment to align with the final footprint of the waste rock landform.

**Regulatory Controls**

Tables 1.2.1 and 1.2.2 outline the waste acceptance and burial criteria for the Tyre Disposal Area. Tyre disposal and covering must be in accordance with Part 6 of the *Environmental Protection Regulations 1987* and additional requirements for the acceptance and landfilling of controlled waste (tyres) are set out in the *Environmental Protection (Controlled Waste) Regulations 2004*.

**Dewatering discharge infrastructure (from 17 June 2016 amendment)**

Previous conditions 1.2.10, 1.2.11 and 1.2.12 have been removed. DER received compliance documentation for the construction of the dewatering discharge infrastructure associated with these conditions on 30 June 2015 (MRL, 2016c).

Previous condition 1.2.10 specified:

*The Licensee shall construct dewatering infrastructure in accordance with the documentation listed in Table 1.2.5.*

<b>Table 1.2.5: Construction Requirements<sup>1</sup></b>		
<b>Document</b>	<b>Parts</b>	<b>Date of Document</b>
<i>Application form for Licence amendment</i>	<i>All</i>	<i>19 April 2016</i>
<i>BC PILBARA IRON ORE – CHANGE TO PROPOSAL IRON ORE HOLDINGS LIMITED IRON VALLEY PROJECT – Ministerial Statement 933 – Groundwater Disposal</i>	<i>Part 4 – content of proposed changes to proposal</i>	<i>April 2016</i>

*Note 1: Where the details and commitments of the documents listed in condition 1.2.10 are inconsistent with any other condition of this Licence, the conditions of this Licence shall prevail.*

Previous condition 1.2.11 specified:

*The Licensee shall submit a compliance document to the CEO, following the construction of the works outlined by condition 1.2.10 and prior to operation of the same.*

Previous condition 1.2.12 specified:

*The compliance document required by condition 1.2.11 shall:*

- (a) certify that the works were constructed in accordance with condition 1.2.10 of the Licence;*
- and*
- (b) be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company.*

**Ore processing plant**

**17 June 2016 amendment**

In October 2014, works approval W5454/2013/1 was amended to allow the construction of a second ore processing plant, capable of processing an additional 5Mtpa, bringing the total design capacity of category 5 ore processing operations at the Project to 10Mtpa. W5454/2013/1 had an expiry date of 25 August 2016.

During the June 2016 amendment conditions were added to the Licence from W5454/2013/1 to allow for the construction of Stage 1 (the second crushing plant and associated stockyard) and Stage 2 (reconfiguration of the stockyard and construction of luffing stackers and reclaimers) prior to W5454/2013/1 expiring.



A compliance report relating to the construction of Stage 1 was received by DER on 22 July 2016 (MRL, 2016d). Conditions pertaining to the submission of a compliance document for Stage 1 has been removed.

The Licensee also requested that the existing ore processing plant be modified by installing an additional screener. The modification is required as it is anticipated that ore mined from the saturated zone, although dewatered, may require additional screening to remove fine material which has adhered to the ore product during the crushing process as a result of the increase in moisture content of the ore (up to 10% moisture).

This amendment (December 2016)

Previous Table 1.2.6 has been removed as conditions must not reference applications or other documentation. The obligations of the application must be fully set out as conditions.

Previous condition 1.2.13 and Table 1.2.6 specified:

*The Licensee shall construct Stage 1 and Stage 2 in accordance with the documentation listed in Table 1.2.6.*

<b>Table 1.2.6: Construction Requirements<sup>1</sup></b>		
<b>Document</b>	<b>Parts</b>	<b>Date of Document</b>
<i>Works Approval Application Form</i>	<i>All</i>	<i>8 May 2013</i>
<i>Works approval application Supporting document – Iron Valley Project</i>	<i>All</i>	<i>7 May 2013</i>
<i>Email correspondence ‘Iron Ore Holdings Works Approval’ authored by Michael Klvac, Approvals and Land Access Manager Iron Ore Holdings Ltd.</i>	<i>All</i>	<i>22 May 2013</i>
<i>Email correspondence ‘FW: Iron Ore Holdings Works Approval’ authored by Michael Klvac, Approvals and Land Access Manager Iron Ore Holdings Ltd.</i>	<i>All</i>	<i>28 May 2013</i>
<i>Email correspondence ‘RE: Iron Ore Holdings Works Approval’ authored by Michael Klvac, Approvals and Land Access Manager Iron Ore Holdings Ltd.</i>	<i>All</i>	<i>30 May 2013</i>
<i>Email correspondence ‘RE: W5454/2013/1 Iron Valley Mine’ authored by Michael Klvac, Approvals and Land Access Manager Iron Ore Holdings Ltd.</i>	<i>All</i>	<i>24 June 2013</i>
<i>Email correspondence ‘Iron Ore Holdings – Bioremediation pad response’ authored by Michael Klvac, Approvals and Land Access Manager Iron Ore Holdings Ltd.</i>	<i>All</i>	<i>9 August 2013</i>
<i>Iron Valley Project, M47/1439. Works Approval Amendment Application Supporting Document, July 2014.</i>	<i>All</i>	<i>25 July 2014</i>
<i>Iron Valley Project Licence Amendment (L8859/2014/1) letter.</i>	<i>All</i>	<i>2 June 2016</i>

*Note 1: Where the details and commitments of the documents listed in condition 1.2.13 are inconsistent with any other condition of this Licence, the conditions of this Licence shall prevail.*

Previous conditions 1.2.14 and 1.2.15 have also been removed.

Previous condition 1.2.14 specified:

*The Licensee shall submit a compliance document to the CEO, following the construction of Stage 1 and Stage 2 and prior to operation of the same.*



Previous condition 1.2.15 specified:

*The compliance document shall:*

- (a) certify that the works were constructed in accordance with conditions 1.2.13 of the Licence;*
- and*
- (b) be signed by a person authorised to represent the Licensee and contain the printed name and position of that person within the company.*

The Licensee has stated that Stage 2 works and the additional screener are not required at this stage, but may be in future (MRL, 2016b). For this reason the infrastructure (Stage 2 and additional screener) has been retained in Table 1.2.3. Conditions relating to design and construction and departures have also been added to the Licence (conditions 1.2.6 and 1.2.7).

Condition 1.2.8 allows for the operation of Stage 2 and the additional screener following the submission of the compliance document required under condition 4.3.1.

### **Dewatering infrastructure network**

Specified infrastructure requirements for the construction of the dewatering infrastructure has been included on the Licence under Table 1.2.3. This condition is considered necessary based on the potential risk to the environment from erosion and scouring, waterlogging and pipeline ruptures and to ensure regulatory oversight. The specified infrastructure requirements have been derived from obligations of the application (MRL, 2016a) and have been set out as conditions.

Condition 1.2.7 has been added to the Licence to allow for minor deviations from the design and construction specifications where appropriate. The Licensee will also be required to submit a compliance document (condition 4.3.1) following the construction of the dewatering infrastructure, which will also ensure regulatory oversight.

Condition 1.2.8 allows for the operation of the dewatering infrastructure following the submission of the compliance document required under condition 4.3.1.

### **Process limits**

The recording and the establishment of limits for process throughputs has been included in the Licence through condition 1.2.9 – Production or design capacity limits. This has been included in the Licence to ensure the Licensee does not exceed the approved throughputs for category 5 and 6.



## Appendix B

### Point source emissions to surface water including monitoring

#### Contingency stormwater discharge

During the active mining phase, rainfall water and around 100ha worth of runoff enters the mine pits during storm events. Water may be pumped from the mine pit as a contingency when periods of high rainfall require the discharge of excess water from the mine pit into the environment. An ephemeral watercourse (C15) which could not be diverted, intersects the central mine pit. An engineered spillway and retention bund were constructed to allow for the controlled release of water from the watercourse into the mine pit. Normally the water is pumped via mobile pumps to the sedimentation pond for re-use, however, for periods of higher rainfall the pit water is pumped from the pit into an onsite diversion drain and discharged via "W1" (licenced surface water emission point). The diversion drain avoids site infrastructure and discharges water back to the natural drainage line (C15) at the premises boundary. The watercourse feeds the Weeli Wolli Creek system; a regionally significant watercourse located approximately 200m east of the north east corner of the mining tenement.

#### Emission Description

*Emission:* Pumping and discharge of water from the mine pit during storm events. Water from an ephemeral watercourse (C15) is directed into the pit and either pumped to the sedimentation pond or discharged into a diversion drain.

*Impact:* The diversion drain leads to the Weeli Wolli Creek. The pit water may contain elevated levels of suspended solids, hydrocarbons and metals. Hydrocarbons and heavy metals are known to adversely impact flora and fauna. High levels of turbidity and poor water quality may also impact other water users of the Weeli Wolli Creek.

*Controls:* The Licensee has outlined the following controls:

- Discharges to the diversion drain only takes place as a contingency measure during high rainfall events;
- The retention bund, dam and spill way reduce flow velocity;
- Rock armouring installed at various points along the diversion drain including discharge location prevents scouring;
- Pit water passes through a final sedimentation pond prior to discharge; and
- Sampling for a range of parameters including pH, electrical conductivity, Total Dissolved Solids, Total Suspended Solids, metals and Total Recoverable Hydrocarbons are undertaken monthly during discharge periods.

#### Risk Assessment

*Consequence:* The Delegated Officer has determined that the contingency discharge of water from the natural creek line will have low level off-site impacts on a local scale. Therefore, the Delegated Officer considers the consequence to be moderate.

*Likelihood:* The Delegated Officer has determined that an environmental impact from the contingency discharge of water could occur at some time. Therefore, the Delegated Officer considers the consequence to be possible.

*Risk Rating:* The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Rating Matrix (Table 1) and determined that the overall rating for the discharge of water to a natural creek line as a contingency option to be **medium**.



Regulatory Controls

Condition 2.2.1 allows for the contingency discharge of water from the mine pit into the sedimentation pond prior to discharge to a natural creek line.

Condition 2.2.2 sets a limit for Total Recoverable Hydrocarbons of 15mg/L from “W1”. This condition is considered necessary as the pit water may contain elevated levels of suspended solids, hydrocarbons and metals, which may adversely impact flora and fauna.

Condition 3.2.1 requires the Licensee to undertake monthly monitoring from the “W1” discharge point when discharging.

During this amendment “W1” Discharge of dewatering effluent - Discharge point from sedimentation pond to natural creek line has been removed from condition 2.1.1 as mine dewatering discharge will now be through emission points DDL1, DDL4 and DDL5 only (refer to dewatering discharge to Weeli Wolli Creek below).

Previous Table 2.2.1 (excerpt) specified:

<b>Table 2.2.1: Emission points to surface water</b>			
<b>Emission point reference</b>	<b>Location</b>	<b>Description</b>	<b>Source including abatement</b>
<i>W1</i>	<i>W1 – Sedimentation Pond discharge</i>	<i>Discharge of dewatering effluent. Discharge point from Sedimentation Pond to natural creek line</i>	<i>Water from dewatering of the mine pits.</i>

Residual Risk Rating

*Consequence:* The natural creek line feeds the Weeli Wolli Creek system; a regionally significant watercourse. Based on this, the Delegated Officer has determined that the contingency discharge of water will have low level off-site impacts on a local scale to a sensitive ecosystem. Therefore, the Delegated Officer considers the consequence to be moderate.

*Likelihood:* Based upon the Licensee controls and the surface water monitoring program at the “W1” discharge point, the Delegated Officer has determined that the likelihood of an environmental impact from the contingency discharge of water to the natural creek line will probably not occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be unlikely.

*Overall Risk Rating:* The Delegated Officer has determined that the overall rating for environmental risk from the discharge of water to the natural creek line as a contingency option to be **medium** but acceptable, subject to multiple regulatory controls.



### **Dewatering discharge to Weeli Wolli Creek**

Discharged water is expected to generate an extension of surface flow in the Weeli Wolli Creek system (wetting front), but will also contribute to groundwater recharge of the local aquifer. Hydrological modelling suggests that the wetting front from water discharges associated with the BWT Project are expected to present as surface flow for approximately 3km downstream from the location where water enters the Weeli Wolli Creek system after discharge from the Project's dewatering discharge locations.

The application states that the dewatering infrastructure network will include:

- Bore spur pipelines from production bores feeding the main collector pipeline for transfer of dewatering to discharge locations;
- Spur pipeline is Diameter Nominal (DN) 200 and the main collector pipeline is DN500. All pipework will be constructed of high density polyethylene (HDPE) PE100 PN8 with 80m head (800 kilopascal (kPa)) rating;
- All production bores will be equipped with flow meters at the headworks and the collector main pipeline is also equipped with a discharge flow meter approximately 800m from the discharge locations, to allow for continuous abstraction and discharge flow rate monitoring;
- Provisions has been made for isolation valves mainly at the headworks, the start and end of the bore pipeline (spur line) and at certain locations on the main collector pipeline;
- Bores and pipeline are located in previously disturbed areas where possible, and are placed close to existing operational structures;
- Dewatering infrastructure is run mostly by a gravity system and the operating pressure inside the pipe is 20m head (20kPa) max (safety factor of approximately 4x the operating pressure); and
- Isolation valves at various locations along the pipeline route.

Production bores and the dewatering pipeline network will deliver dewater to the discharge locations (DDL1, DDL4 and DDL5). Use of these discharge locations will be staged to align with the Project's mine plan. All groundwater dewatered from the Project will be pumped directly to the discharge locations and will not bypass any other infrastructure prior to discharge. Water required for use at the mine (i.e. potable water, process water requirements) will be diverted from the dewatering pipe network to a turkey's nests and other infrastructure for use.

EPA Report 1585 states that groundwater modelling predicts that dewatering will lower groundwater levels around the mine site and in parts of the Weeli Wolli Creek. However, there are areas where the disposal of surplus water into Weeli Wolli Creek will result in groundwater levels in the creek rising to above ground level. This will be influenced by the additional cumulative flow from existing upstream mining operations. The application states that over the life of the mine the greatest amount of predicted drawdown is predicted to occur in the immediate mine areas. Drawdown in the mine area is predicted to increase from 30m at the end of 2016 to between 150m and 200m by the end of 2025.

To ascertain current baseline surface water quality upstream of the Project, a series of surface water samples were collected (June – September 2016) and are presented in Table 2.

#### Emission description

*Emission:* Discharge of surplus dewater from DDL1, DDL4 and DDL5 into Weeli Wolli Creek.

*Impact:* Potential impact on riparian and groundwater dependent vegetation within the Weeli Wolli Creek from groundwater drawdown due to dewatering and the discharge of surplus dewater into the creek.

Calcite precipitation resulting in armouring of the creek bed and erosion of the creek embankment at the discharge points.





Changes to the hydrological regime and increases in dissolved ions and metals impacting on the surface water quality of Weeli Wolli Creek. Water quality data from production bores (PB1 and PB2) at the Project indicate that pH and electrical conductivity are in exceedance of ANZECC/ARMCANZ (2000) default guideline (protection of 95% of species in slightly-moderately disturbed systems). Levels of dissolved zinc concentrations have been recorded (PB2) in exceedance of the ANZECC/ARMCANZ (2000) guidelines (protection of 95% species). Increased zinc levels may impact on stream macroinvertebrates.

There is also the potential for failure of the dewatering infrastructure due to system malfunctions and damage to pipelines from mining equipment/vehicles.

*Controls:* The application states that the dewatering infrastructure has been designed to provide a number of control measures to minimise the risk of failure and monitor performance including:

- Bores located in close proximity to existing operation infrastructures;
- All production bores equipped with flow meters at the headworks. The collector main pipeline is also equipped with a discharge flow meter approximately 800m from discharge locations (DDL1, DDL4 and DDL5);
- The discharge outfall structure will:
  - Consist of DN710 pipe anchored by concrete headwall structure discharging into a rectangular channel;
  - Channel dimensions will be 15m long by 15m wide and 2m deep;
  - Channel constructed of mound earth on the sides and compacted ground at the bottom;
  - The sides and bottom of the channel lined with impervious geofabric material;
  - Channel floor topped up with angular rock spalls with sizes between 100 to 800mm; and
  - Rocks will be used to slow down the discharge velocity of the water and dissipate the discharge pressure.

#### Risk Assessment

*Consequence:* The Delegated Officer has determined that the discharge of excess dewater from DDL1, DDL4 and DDL5 to Weeli Wolli Creek will have low level off-site impacts on a local scale. Therefore, the Delegated Officer considers the consequence to be moderate.

*Likelihood:* The Delegated Officer has determined that an environmental impact from the discharge of excess dewater from DDL1, DDL4 and DDL5 to Weeli Wolli Creek could occur at some time. Therefore, the Delegated Officer considers the consequence to be possible.

*Risk Rating:* The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Rating Matrix (Table 1) and determined that the overall rating for the discharge of excess dewater from DDL1, DDL4 and DDL5 to Weeli Wolli Creek to be **medium**.

#### Regulatory Controls

Condition 2.2.1 allows for the discharge of excess mine dewater from DDL1, DDL4 and DDL5.

Condition 3.2.1 requires the Licensee to monitor the volumetric flow rate (cumulative) from DDL1, DDL4 and DDL5.

Ministerial Statement 1044 condition 5 (5-1 to 5-7) outlines the Licensee's requirements for hydrological processes, inland waters environmental quality, and flora and vegetation – dewatering, discharge of surplus dewater, riparian and groundwater dependent vegetation. Based on this, no conditions will be added to the Licence as the discharge of excess dewater from DDL1, DDL4 and DDL5 can be sufficiently regulated under Part IV Ministerial Statement 1044. Refer also to ambient quality monitoring.





Residual Risk Rating

*Consequence:* The discharge points of DDL1, DDL4 and DDL5 feed to the Weeli Wolli Creek system; a regionally significant watercourse. Based on this, the Delegated Officer has determined that the discharge of excess dewater from DDL1, DDL4 and DDL5 to Weeli Wolli Creek will have low level off-site impacts on a local scale to a sensitive ecosystem. Therefore, the Delegated Officer considers the consequence to be moderate.

*Likelihood:* Based upon the Licensee controls and Ministerial Statement 1044 requirements, the Delegated Officer has determined that the likelihood of an environmental impact from the discharge of excess dewater from DDL1, DDL4 and DDL5 to Weeli Wolli Creek will probably not occur in most circumstances. Therefore, the Delegated Officer considers the consequence to be unlikely.

*Overall Risk Rating:* The Delegated Officer has determined that the overall rating for environmental risk from the discharge of excess dewater from DDL1, DDL4 and DDL5 to Weeli Wolli Creek during operation to be **medium** but acceptable, subject to multiple regulatory controls.



**Table 2: Current (2016) baseline surface water quality of the Weeli Wollli Creek System, upstream of the Project**

Parameter	Trigger values (from ANZECC/ ARMCANZ, 2000)	Units	16/06/2016		05/07/2016		19/07/2016	
			WW4-1	WW4-4	WW4-1	WW4-4	WW4-1	WW4-4
Alkalinity, total	n/a	mg/L	294	295	296	292	300	293
CO <sub>3</sub>	n/a	mg/L	<1	<1	<1	<1	<1	<1
E Cond	20 – 250 <sup>^</sup>	µS/cm	9,370	9,310	9,190	9,170	9,170	9,120
Hardness	n/a	mg/L	350	370	310	320	300	290
HCO <sub>3</sub>	n/a	mg/L	358	360	361	356	366	358
N, NH <sub>3</sub>	0.3 <sup>#</sup>	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N, NO <sub>2</sub>	n/a	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
N, NO <sub>3</sub>	0.7 <sup>#</sup>	mg/L	0.41	0.22	0.2	0.25	0.13	0.19
N, NO <sub>x</sub>	0.01*	mg/L	0.41	0.23	0.21	0.25	0.14	0.2
N, total	0.2 – 0.3*	mg/L	0.4	0.24	0.19	0.24	0.16	0.21
OH	n/a	mg/L	<1	<1	<1	<1	<1	<1
P, total	0.01*	mg/L	0.011	<0.010	0.012	0.014	<0.010	<0.010
pH	6 – 8*	pH units	8.1	8.1	8.1	8.1	8.1	8.1
SO <sub>4</sub> , from S	n/a	mg/L	62.7	59.1	60	60.3	70.2	69.2
TDS, calc	n/a	mg/L	520	510	510	500	500	500
TSS	n/a	mg/L	2	6	<1	<1	<1	<1
Al	0.055 <sup>#</sup>	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
As	0.024 (As III) <sup>#</sup>	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
B	n/a	mg/L	0.27	0.27	0.28	0.28	0.29	0.29
Ba	n/a	mg/L	0.041	0.03	0.025	0.026	0.024	0.026
Ca	n/a	mg/L	55.2	58.9	37	38.8	46.2	45.4
Cd	0.0002 <sup>#</sup>	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cl	0.003 <sup>#</sup>	mg/L	86	91	89	90	90	92
Co	n/a	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cr	0.001 (CrVI) <sup>#</sup>	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cu	0.0014 <sup>#</sup>	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fe	n/a	mg/L	<0.005	<0.005	<0.005	<0.005	0.007	0.007
K	n/a	mg/L	8	8.4	8.5	8.4	6.5	6.3
Mg	n/a	mg/L	52	54.9	53.5	53.5	44.4	43.2
Mn	1.9 <sup>#</sup>	mg/L	0.003	<0.001	0.002	0.002	0.003	0.002



Parameter	Trigger values (from ANZECC/ARMCANZ, 2000)	Units	16/06/2016		05/07/2016		19/07/2016	
			WW4-1	WW4-4	WW4-1	WW4-4	WW4-1	WW4-4
Mo	n/a	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Na	n/a	mg/L	56.1	58.8	55.8	57.7	45.6	46.4
Ni	0.011 <sup>#</sup>	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Pb	3.4 <sup>#</sup>	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
S	n/a	mg/L	21	20	19	19	23	23
Se	0.011 <sup>#</sup>	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Sr	n/a	mg/L	0.13	0.12	0.11	0.12	0.11	0.11
U	n/a	mg/L	0.001	0.001	0.0009	0.0009	0.001	0.0011
V	n/a	mg/L	0.0019	0.0022	0.0018	0.0018	0.002	0.0021
Zn	0.008 <sup>#</sup>	mg/L	0.003	0.003	<0.001	<0.001	0.003	0.003

\*Default trigger values for physical and chemical stressors for tropical Australia (lowland river) for slightly disturbed ecosystems. No data for tropical WA estuaries or rivers. A precautionary approach should be adopted when applying default trigger values to these systems.

<sup>^</sup>Ranges of default trigger values for conductivity (EC, salinity), turbidity and suspended particulate matter (SPM) indicative of slightly disturbed ecosystems in tropical Australia.

<sup>#</sup>Trigger values for toxicants at 95% level of protection (% species) in freshwater.

n/a = not available in ANZECC/ARMCANZ (2000).

= exceeds ANZECC/ARMCANZ (2000) trigger values (where available).



## References

	Document Title	Availability
1	ANZECC/ARMCANZ (2000). National Water Quality Management Strategy, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand and Conservation Council and Agriculture and Resources Management Council of Australia and New Zealand, 2000	environment.gov.au
2	DER Guidance Statement on <i>Decision Making</i> (November 2016)	der.wa.gov.au
3	DER Guidance Statement on <i>Licence Duration</i> (November 2014)	
4	DER Guidance Statement on <i>Risk Assessments</i> (November 2016)	
5	DER Guidance Statement on <i>Setting Conditions</i> (October 2015)	
6	DoW, Salinity status classification. Understanding-salinity – Salinity status classifications, by total salt concentration table, Department of Water	water.wa.gov.au
7	EPA Report 1585	epa.wa.gov.au
8	Guidelines on Management of fibrous minerals in Western Australia Mining Operations. Second Edition, Department of Mines and Petroleum, 2015	dmp.wa.gov.au
9	How to Manage and Control Asbestos in the Work Place. Code of Practice, How to Manage and Control Asbestos in the Work Place, Safe Work Australia, February 2016	safeworkaustralia.gov.au
10	How to Safely Remove Asbestos. Code of Practice, How to Safely Remove Asbestos, Safe Work Australia, April 2016	
11	Landfill Waste Classification and Waste Definitions 1996. Department of Environment and Conservation, Landfill Waste Classification and Waste Definitions 1996 (As amended 2009)	der.wa.gov.au
12	Ministerial Statement 1044	epa.wa.gov.au
13	MRL, 2014. Iron Valley Project M47/1439. Works Approval Amendment Application Supporting Document, Mineral Resources Limited, July 2014	DER internal
14	MRL, 2015. Iron Valley Project M47/1439. Licence Application Supporting Document, Mineral Resources Limited, January 2015	
15	MRL, 2016a. Iron Valley Project M47/1439 Licence Amendment L8859/2014/1, Mineral Resources Limited, August 2016	
16	MRL, 2016b. Email correspondence titled “RE: Iron Valley Licence L8859 amendment” including attachments, received from James Hesford, dated 10 October 2016	



Document Title		Availability
17	MRL, 2016c. Iron Valley Iron Ore Project M47/1439. Compliance Report for L8859/2014/1 – Dewatering Infrastructure, Mineral Resources Limited, 29 June 2016	
18	MRL, 2016d. Iron Valley Iron Ore Project M47/1439. Compliance Report for Licence L8859/2014/1 – Stage 1: Second Crushing Plant and Associated Stockyard, Mineral Resources Limited, 22 July 2016	
19	Parks and Wildlife, 2016. Priority Ecological Communities for Western Australia Version 24, Department of Parks and Wildlife, Species and Communities Branch, 24 June 2016	<a href="http://dpaw.wa.gov.au">dpaw.wa.gov.au</a>
20	Water Quality Protection Note 68. Department of Water, Water Quality Protection Note 68: Mechanical Equipment Washdown, March 2006	<a href="http://water.wa.gov.au">water.wa.gov.au</a>
21	<i>Work Health and Safety Act 2011</i>	<a href="http://legislation.gov.au">legislation.gov.au</a>