



## Application for Works Approval

### Part V Division 3 of the *Environmental Protection Act 1986*

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**Works Approval Number** W6558/2021/1

**Applicant** Doral Mineral Sands Pty Ltd

**ACN** 096 342 451

**File number** DER2021/000318

**Premises** Yalyalup Mineral Sands Mine  
South of Princefield Road;  
West of Ludlow-Hithergeen Road;  
North of Yalyalup road; and  
East of Wonnerup South Road  
YALYALUP WA  
Legal description -  
Tenement M70/1400

**Date of report** 7 October 2021

**Decision** Works approval granted

**A/MANAGER, RESOURCE INDUSTRIES  
REGULATORY SERVICES**

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

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## 1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the construction and operation of the premises. As a result of this assessment, works approval W6558/2021/1 has been granted.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

### 2.2 Application summary and overview of premises

On 21 May 2021, Doral Mineral Sands Pty Ltd (the applicant) submitted an application for a works approval to the department under section 54 of the *Environmental Protection Act 1986* (EP Act).

The application is to undertake construction works relating to mineral sands mining and processing at Yalyalup Mineral Sands Mine (the premises). The premises is approximately 11 km south-east of Busselton.

The premises relates to the categories and assessed production capacity under Schedule 1 of the Environmental Protection Regulations 1987 (EP Regulations) which are defined in works approval W6558/2021/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in works approval W6558/2021/1.

#### 2.2.1 Land access

The applicant holds mining tenement M70/1400 which constitutes this premises, so the Delegated Officer is satisfied that a works approval may be granted over this premises. It is noted though that freehold land overlies this tenement. Some lots are owned by the applicant, and some covered by mining agreements by which the landholder(s) have granted physical access for purposes of mining. On some lots, physical access may not yet be established. This works approval authorises activities under Part V of the EP Act, but in no way removes the requirement for the applicant to negotiate physical land access with the land holder. If access cannot be negotiated for a given lot, the applicant has no legal right to undertake activities on this lot but approvals for the remainder of the premises remain valid. For the purposes of assessment, it is assumed that all residential receptors currently occupied will remain so for the duration of operations, unless otherwise stated.

#### 2.2.2 Overview of proposed operations

##### Dewatering to allow for mining of ore

Pits will be mined on a slight incline from the deepest point and then moving up-gradient. Pit water will accumulate within a sump at the deepest point on the pit floor. Mine pit dewater is pumped from the sump to the process water dam (PWD), via the drop-out dam (DOD) for reuse.

##### Mineral sands mining and Feed Prep (oversize removal)

There are two types of ore identified at Yalyalup, for which different mining methods are proposed. In both cases, the first step is stripping and stockpiling of topsoil and (where present) subsoil. Overburden (where present) is then stripped and stockpiled for future use or backfilled

into mined voids. Handling and treatment of overburden identified as acid sulfate soils will be in accordance with the premises' acid sulfate soils management plan.

The shallow 1-4m 'windblown ore' reserves will be mined using a front end loader and fed into the mobile in-pit hopper. The ore will be screened and slurried using a mobile in-pit mining / screening unit and pumped to the trommel at the Feed Preparation plant (Feed Prep) for removal of material greater than 3 mm.

The deeper ore areas will be mined using a traditional excavator and truck combinations (dayshift only) and trucked to a central stockpile at the Feed Prep plant and processed in campaigns as required and during the evening and night periods when mining does not occur.

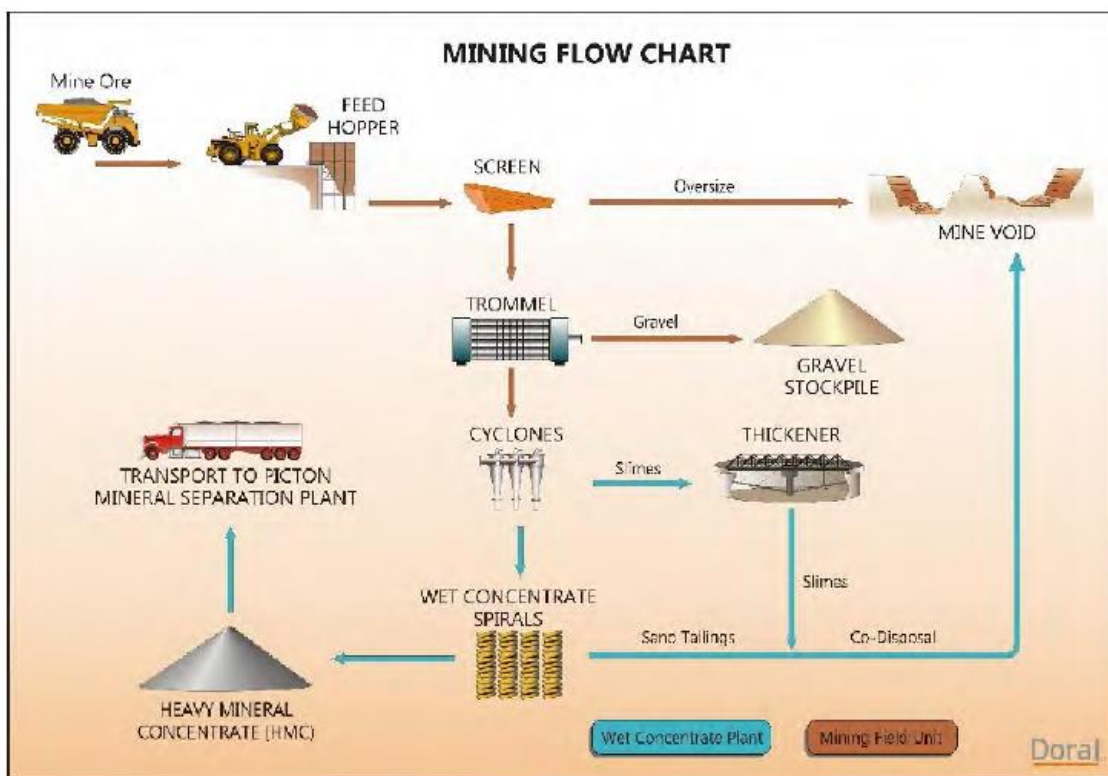
#### Mineral Sands Processing - Wet Concentrator Plant (WCP)

From the Feed Prep, the ore will be pumped through pipes to the WCP. It is anticipated the WCP will operate at a nominal throughput rate of 400 tonnes per hour (TPH) to produce approximately 380,000 tonnes of heavy mineral concentrate (HMC) over the life of mining the operation. Processing of ore results in three streams of material - HMC, clay fines and sand tails. The three streams are then dealt with as follows:

- HMC are stockpiled on limestone pad(s) and stored on-site until transport to Doral's Picton dry processing plant for further processing;
- Sand tails are hydraulically returned into pit voids (including as co-disposal); and
- Clay fines are directed to the thickening circuit (thickener), where flocculent agglomerates clay fines, producing clay tails. The clay tails are either hydraulically co-disposed with sand tails into pit voids or directed to solar evaporation ponds (SEPs) to allow settlement and drying for future disposal into mine voids.

Available water will be decanted from the SEPs and tails voids and fed back to the PWD for use as process water.

A flow chart of mining operations is provided in Figure 1.



**Figure 1: Flow chart of mining and processing operations at Yalyallup**

## Water management

An unlined mine void will become the drop out dam (DOD), which will act as the central water point to receive all runoff from operational areas, tailings return water (from mine voids and solar evaporation ponds) and dewater from the site. It will act as a settling pond to settle out suspended solids from water prior to it entering the adjacent process water dam (PWD), also a mine void. The DOD and PWD have proposed storage capacities of 20,000 m<sup>3</sup> and 40,000 m<sup>3</sup>, respectively.

The PWD supplies all process water for the wet concentrator plant and for dust control. Where the above sources are exhausted, the applicant anticipates supplementing with bore water from the Yarragadee aquifer. They are in the process of seeking approval for this under the *Rights in Water and Irrigation Act 1914* (RIWI Act). Pumping from the Yarragadee bore will only occur if the total storage volume in the site storage ponds drop below the equivalent of 2 days of supply (nominally 10,000m<sup>3</sup>).

The site water balance indicates that at times during winter, significant rainfall events are likely to fill all water storages (primarily the DOD and PWD) to capacity. When this occurs, the applicant proposes to discharge off-site to the 'licence discharge point' in the northeast corner or the premises, as shown in Schedule 1, Figure 1 of W6558/2021/1. The water discharged would be a mixture of mine dewater, tails return and collected rainfall. Discharge volumes will be measured by a V-notch flow metering gauge. Discharged water will move through the on-site drainage network into the Princefield Road drain flowing west into Woddidup Creek/drain, before reaching the Lower Sabina River northwest of the mine.

During extreme rainfall events, excess water may be discharged from intermediate sumps to one of the "Emergency Discharge Points", shown in Schedule 1, Figure 2 of W6558/2021/1. The discharged water will be connected to the existing drain network shown in that Figure. Emergency Discharge points will be enacted by pump as a last resort only, so pump flow data will enable records of discharge volume.

All runoff from upstream will be diverted around mining operations and discharged to a downstream water course. Bunding and drainage shall be installed to ensure up-gradient stormwater does not flow into the mining area. A Surface Water Management Plan had been developed for the premises.

## Construction activities assessed under this works approval

Pre-mine establishment activities will be undertaken between the hours of 7am to 7pm Monday to Saturday and from 9am to 6pm on Sundays and public holidays. These are expected to take four to six months. Works covered by this works approval include:

- Stripping of subsoil (topsoil stripping does not fall within the scope of Category 8);
- Construction of the Drop Out Dam (DOD) and Process Water Dam (PWD) (including pre-mining of ore to create the voids);
- Construction of solar evaporation ponds (SEPs);
- Installation of process water, ore and tails pipelines; and
- Construction of feed prep, wet concentration plant and associated infrastructure.

## Other supporting infrastructure

The application mentions offices, roads, carparks, workshops, fencing, a contractors go-bay and a production bore into the Yarragadee aquifer. These are outside the scope of this assessment for a works approval under Part V of the EP Act. Approval for the production bore will be required under the *Rights in Water and Irrigation Act 1914*, as the premises is within the Busselton-Capel Groundwater Area.

## Environmental Commissioning

The Delegated Officer considers that assessment of a separate environmental commissioning phase is not required. Commissioning of slurried ore and tailings pipelines will involve running water through all pipelines to their designed flow and/or maximum pumping capacity, and testing pipeline integrity. As the water is of good quality, this does not pose significant environmental risks.

Dry commissioning of the processing plant will involve testing of individual parts, which is considered part of the construction process. Any operational (wet) commissioning has the same environmental risks as full operations and is therefore considered to fall within the operations phase for the purposes of this assessment and works approval.

## Time limited operations

The applicant has requested approval for time limited operations following the submission of the Environmental Compliance Report

Mining activities in the pit are proposed to be day shift only (7pm-7am), 7 days per week. Ore processing at the Feed Prep and WCP will remain in operation operate 24 hours a day, 7 days a week.

## **2.3 Other key approvals**

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

Ministerial Statement 1168 (MS 1168) was issued on 17th May 2021. This included approval for some clearing of native vegetation, and management and outcomes based conditions for the protection of flora and fauna, including Threatened Ecological Communities.

MS 1168 also contains conditions relating to managing the potential for acid sulfate soils, including the requirement to develop an Acid Sulfate Soils Management Plan.

### **2.3.2 Mining Act 1987**

Mining Proposal and Mine Closure Plan have been submitted to the Department of Mines, Industry Regulation and Safety.

### **2.3.3 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)**

The Proposal was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* and was assessed by an accredited process under the EP Act.

### **3. Risk assessment**

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

To establish a risk event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

#### **3.1 Source-pathways and receptors**

##### **3.1.1 Emissions and controls**

The key emissions and associated actual or likely pathway during premises construction, commissioning and operation which have been considered in this decision report are detailed in Table 1 below. Table 1 also details the proposed control measures the applicant has proposed to assist in controlling these emissions, where necessary.



**Table 1: Proposed applicant controls**

Emission	Sources	Potential pathways	Proposed controls
<b>Construction</b>			
Dust	Construction of new processing plant and associated infrastructure, earthworks, vehicle movements	Air / windborne pathway	<ul style="list-style-type: none"> <li>• Short duration - estimated up to 10 working days during 4 month construction period</li> <li>• Dust suppression by water cart</li> <li>• Speed limits</li> <li>• Avoid soil disturbance during high wind</li> <li>• Implement Dust Management Plan</li> </ul>
Noise			<ul style="list-style-type: none"> <li>• Earthmoving construction activities will occur daytime Monday to Saturday only</li> <li>• Use of quietest practical equipment</li> <li>• Implement Noise Management Plan</li> </ul>
<b>Operation</b>			
Dust	Mining and earthworks, vehicle movements, lift-off from stockpiles or unsealed areas, processing of ore	Air / windborne pathway	<ul style="list-style-type: none"> <li>• Real time dust monitoring for TSP and PM<sub>10</sub></li> <li>• Minimising disturbed area at any given time</li> <li>• Staff training</li> <li>• Stripping operations to be suspended under particularly high wind conditions, if management controls are inadequate</li> <li>• Use of water carts on high traffic and haulage areas</li> <li>• Spreading stockpiles, noise control bunds and pond embankments with fine clay solution or PVA sealant</li> <li>• Minimising the number and size of stockpiles, by the direct use of overburden as backfill and the direct replacement of topsoil wherever possible;</li> <li>• Encouraging vegetative cover on stockpiles, especially the topsoil stockpiles. Many of these vegetative species generate from stored seed.</li> <li>• Spraying HMC stockpiles at the mine with water if they dry to the extent dust generation occurs. HMC stockpiles generally have a moisture content of between 5-9%</li> <li>• Co-disposal of sand tails and clay tails into pit backfill areas. This homogenous mixing increases the average particle size and reduces the potential for dust generation</li> <li>• No mining or stockpiles within 300m of a residence occupied by a member of the public, without an amenity agreement.</li> </ul> <p>Note that amenity agreements are also in place with some neighbours.</p>
Noise		Air / windborne pathway	<ul style="list-style-type: none"> <li>• Use the quietest equipment reasonably available;</li> <li>• Install silencers where practicable to reduce exhaust noise of machines;</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
			<ul style="list-style-type: none"> <li>• Restrict the operation of machinery to include no mining earthworks at evening or night time;</li> <li>• Restrict the operation of machinery, particularly the operation of bulldozers, relative to worst case weather conditions on Sundays and Public holidays to minimise potential noise impacts;</li> <li>• Restrict the operation of ancillary machinery (water cart and grader) to operate during day time only;</li> <li>• Monitor earthworks machines for evaluation of suitability with regards to the noise model;</li> <li>• Establish preventative maintenance schedules for all vehicles, fixed plant and mobile equipment to maintain performance and therefore low noise emission;</li> <li>• Utilise broad band reversing (squawkers) as opposed to reversing beepers;</li> <li>• Educate employees and contractors on the importance and requirements for noise management prior to commencing work on the mine;</li> <li>• Seek to establish amenity agreements with adjacent landowners, where impacts are likely to be greatest;</li> <li>• Build a 6m L-shaped noise bund and a 6m ore stockpile at the Feed Prep;</li> <li>• Lower the Feed Prep floor 2m below the natural ground surface;</li> <li>• Modify the in pit mining unit / screener including the change from diesel powered to electric plus a silencer on the exhaust outlet;</li> <li>• Silence the pit generator;</li> <li>• Insulate or partly enclose the apron feeder, scalping and double-deck screens;</li> <li>• Locate the concentrator and Feed Prep plant as far as reasonably possible to any of the most affected residences;</li> <li>• Install noise insulating drapes as a minimum at the ground level of the concentrator;</li> <li>• An administrative control may be implemented to prioritise the schedule of mining activities of scenarios 3, 4, 6 and 7 on Monday to Saturday (noise modelling scenarios discussed further in section 3.3).</li> </ul> <p>Note that amenity agreements are also in place with some neighbours.</p>
Potentially contaminated surface water runoff	Incident rainfall on disturbed areas	Direct runoff	<ul style="list-style-type: none"> <li>• Upstream flows diverted around active areas, avoiding contamination</li> <li>• All stormwater from contaminated areas directed to the drop out dam to settle out particulates and for use in the process. Discharged only after high rainfall (addressed below under 'process water').</li> </ul>
Ore or tailings	Spill from pipeline during transport	Direct discharge	<ul style="list-style-type: none"> <li>• Daily visual inspections</li> <li>• Pumps and pipelines controlled by CITECT systems management and fitted with</li> </ul>

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Emission	Sources	Potential pathways	Proposed controls
			alarms and trend analysis <ul style="list-style-type: none"> <li>• Pipelines located in banded corridors</li> <li>• Pipelines within mining area</li> </ul>
Sand and clay tailings; and tails water	Direct discharge to mine voids	Seepage to groundwater	<ul style="list-style-type: none"> <li>• Acid sulfate soil management plan (prepared and approved in accordance with Ministerial Statement 1168)</li> <li>• Tailings water will be recovered from low points in the mine voids and returned to the drop out dam for reuse.</li> <li>• Hydrocarbon Management Procedure to minimise the risk of hydrocarbon contamination in the process water.</li> </ul>
	Seepage or overtopping of solar evaporation ponds (SEPs)	Seepage to groundwater, or overtopping to surface water	<ul style="list-style-type: none"> <li>• SEPs construct as per Geotechnical Design Report (provided), and in accordance with Tailings Storage Facilities in Western Australia – code of practice (DMP, 2013)</li> <li>• Maintain minimum 500mm freeboard.</li> <li>• Groundwater monitoring in accordance with the Groundwater operating strategy (GWOS) associated with the licence to take water under the <i>Rights in Water and Irrigation Act 1914</i>.</li> </ul>
Process water	Seepage or overtopping of process water dam (PWD) or drop-out dam (DOD)	Seepage to groundwater or direct discharge from overtopping	<ul style="list-style-type: none"> <li>• PWD and DOD constructed in mine voids</li> <li>• Designed to withstand 1:100yr 72hr rainfall event.</li> <li>• Maintain 500mm freeboard.</li> <li>• Daily visual inspection.</li> <li>• Groundwater and process water quality monitored in accordance with the GWOS</li> <li>• Discharge water quality will be monitored, and volume calculated</li> </ul>
	Discharge off site following high rainfall (mixed process water/tails return/stormwater)	Direct discharge (via Licence or Emergency discharge points) to roadside drain on Princefield drain prior to flowing into Lower Sabina River.	Volume of maximum modelled discharge, represents ~1.44% increase to annual flows of Lower Sabina River.
Acid or metalliferous discharge	Resulting from the oxidation of Potentially acid sulfate soils (PASS) due to excavation and dewatering	Run off to surface water or seepage to groundwater	Implement the ASS Management Plan required by Ministerial Statement 1168 Condition 9

Emission	Sources	Potential pathways	Proposed controls
Light emissions	Safety and operational lighting	Direct emission	<ul style="list-style-type: none"> <li>• Light associated with night time mobile plant activities will occur below ground level, where a front-end loader will deliver ore to the in-pit hopper.</li> <li>• Light towers used to ensure safe night operation for fixed plant will be aligned to minimise impacts of neighbours, public and forested areas.</li> <li>• Controls detailed in Australian Standard AS 428-1997 Control of Obtrusive Effects of outdoor lighting will be utilised to reduce potential effects from artificial lighting.</li> </ul>

### 3.1.2 Receptors

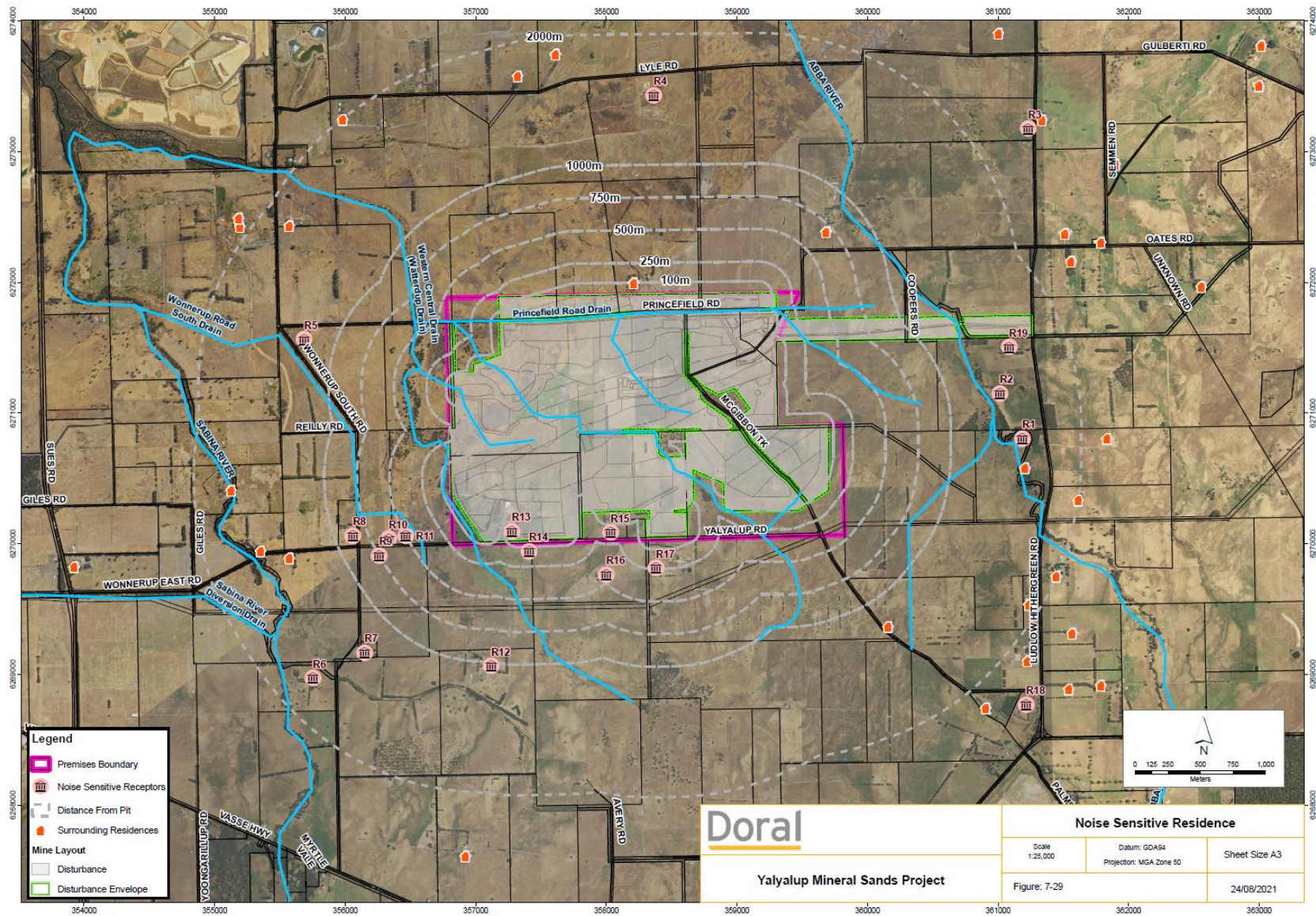
In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the applicant's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 2 and Figure 2 below provide a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental Siting* (DWER 2020)).

**Table 2: Sensitive human and environmental receptors and distance from prescribed premises**

Human receptors	Distance from prescribed activity
<p>Residential receptors –</p> <p>Note 1: The houses immediately to the north and the northeast of the premises will be tenanted only by employees or contractors of the applicant, and so are excluded as receptors for this assessment.</p> <p>Note 2: The closest receptors are along Yalyalup Road, to the south of the Premises. It is expected that some of these will be purchased by Doral and used to accommodate employees and contractors. In that event they will cease to be receptors.</p>	<p>Many between 100m and 1km of the premises boundary (Shown in Figure 2).</p>
Environmental receptors	Distance from prescribed activity
Underlying fresh groundwater	Underlying premises
<p>Threatened ecological communities:</p> <ul style="list-style-type: none"> <li>SWAFCT01b – Southern <i>Corymbia calophylla</i> woodlands on heavy soils</li> <li>SWAFCT02 - Southern wet shrublands</li> </ul> <p>SWAFCT10b - Shrublands on southern Swan Coastal Plain Ironstones (Busselton area)</p>	<p>Within premises boundary – Protections provided under Part IV of EP Act (MS 1168)</p>
<p>Threatened and/or priority fauna</p> <ul style="list-style-type: none"> <li>Western Ringtail Possum (<i>Pseudocheirus occidentalis</i>)</li> <li>Carnaby's Black-Cockatoo (<i>Calyptorhynchus latirostris</i>)</li> <li>Baudin's Black-Cockatoo (<i>Calyptorhynchus baudinii</i>)</li> </ul> <p>Forest Redtailed Black-Cockatoo (<i>Calyptorhynchus banksia naso</i>)</p>	<p>Within premises boundary – Protections provided under Part IV of EP Act (MS 1168)</p>
<p>Threatened and/or priority flora</p> <ul style="list-style-type: none"> <li><i>Banksia squarrosa</i> subsp. <i>Argillacea</i> (Whicher Range banksia) (T)</li> <li><i>Verticordia plumosa</i> var. <i>vassensis</i> (Vasse Featherflower) (T)</li> <li><i>Loxocarya magna</i> (P3)</li> <li><i>Calothamnus quadrifidus</i> subsp. <i>Teretifolius</i> (P4)</li> <li><i>Grevillea brachystylis</i> subsp. <i>Brachystylis</i> (P3)</li> </ul>	<p>Various. From within the premises to within 600m of the boundary. Protections provided under Part IV of EP Act (MS 1168)</p>

Acacia flagelliformis (P4)	
Aboriginal and other heritage sites	Within premises - Section 18 consent has been provided under the <i>Aboriginal Heritage Act</i> .
Lower Sabina River (very minor tributary to Vasse-Wonnerup wetlands)	1km to the west, downstream of premises
Abba River (major tributary to the Vasse-Wonnerup wetlands)	Approximately 750m from premises boundary
Vasse-Wonnerup wetland (wetland of International importance under the Ramsar Convention)	4.6km northwest, downstream of premises boundary
Potentially acid sulfate soils	Within premises – Acid sulfate soils management plan required by MS 1168.



**Figure 2: Distance to sensitive receptors. Note that houses labelled with an R are receptors considered in the noise modelling.**

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### 3.1.3 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the applicant has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the delegated officer considers the applicant's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the works approval as regulatory controls.

Additional regulatory controls may be imposed where the applicant's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 3.

Works approval W6558/2021/1 that accompanies this decision report authorises construction, commissioning and time-limited operations. The conditions in the issued works approval, as outlined in Table 3 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

A licence is required following the time-limited operational phase authorised under the works approval to authorise emissions associated with the ongoing operation of the premises i.e. Category 6 and 8 prescribed activities. A risk assessment for the operational phase has been included in this decision report, however licence conditions will not be finalised until the department assesses the licence application.



**Table 3: Risk assessment of potential emissions and discharges from the premises during construction and operation**

Risk events					Risk rating <sup>1</sup>	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification of risk rating, or additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls	C = consequence L = likelihood			
<b>Construction</b>								
Construction of new processing plant and associated infrastructure, earthworks, vehicle movements	Dust	Air / windborne pathway causing impacts to health and amenity	Residences, primarily to the south and southwest.	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b> Refer to section 3.2	N	<b>Condition 16 – meteorological monitoring</b> <b>Condition 17 – ambient dust monitoring</b> Condition 27 – dust management controls conditioned	Refer to section 3.2
	Noise				Refer to Section 3.1		C = Minor L = Possible <b>Medium Risk</b> Refer to section 3.3	
<b>Operation (including time-limited-operations operations)</b>								
Shallow ore: mining of ore with front end loader and in-pit screening of ore Deep ore: mining with excavator and trucking of ore to feed prep plant Vehicle movements Processing of ore Lift-off from stockpiles or unsealed areas	Dust	Air / windborne pathway causing impacts to health and amenity	Residences, primarily to the south and southwest	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b> Refer to section 3.2	N	<b>Condition 16 – meteorological monitoring</b> <b>Condition 17 – ambient dust monitoring</b> Condition 27 – dust management controls conditioned	Refer to section 3.2
	Noise				Refer to Section 3.1		C = Minor L = Possible <b>Medium Risk</b>	

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification of risk rating, or additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
					Refer to section 3.3		applicant controls conditioned except that <b>'night time operations'</b> times aligned to those specified in the Noise Regulations.	Sundays, to align with the Noise Regulations.
	Potentially contaminated surface water runoff	Incident rainfall on disturbed areas, causing ecosystem damage to waterways after discharge	Waterways	Refer to Section 3.1	C = Minor L = Rare <b>Low Risk</b>	Y	NA	N/A
Transport of slurried ore to the feed prep plant via pipeline; transport between the plants and transport of tailings from the concentrator to disposal points	Rupture of pipeline causing slurry or process water discharge to land	Direct discharge leading to smothering of vegetation and/or soil and groundwater contamination	Soil, groundwater.	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 1, row 10 of Table 1 – requirements for pipeline construction Condition 6, row 1 of Table 2 – operational requirements for pipelines	
Operation of processing plant (feed prep plant and concentrator)	Dust	Air/windborne pathway causing impacts to health and amenity	Residences	Refer to Section 3.1	C = Minor L = Possible <b>Medium Risk</b>	Y	Condition 1 – requirements for construction Condition 26 – noise management controls conditioned	Residences more than 1km from feed prep and WCP.
	Noise				C = Minor L = Possible <b>Medium Risk</b> Refer to section 3.3			

Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification of risk rating, or additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Deposition of process water into the drop out dam and process water dam, and tailings to mine voids	Seepage of process water	Seepage to groundwater leading to mounding or waterlogging	Remnant native and planted vegetation	Refer to Section 3.1	C = Minor L = Rare <b>Low Risk</b> Refer to section 3.4	Y	Condition 24 – ambient groundwater monitoring	Dams and voids are unlined, so monitoring is required to measure impacts to groundwater
		Seepage to groundwater leading to contamination	Local groundwater – high quality	Refer to Section 3.1	C = Moderate L = Unlikely <b>Medium Risk</b> Refer to section 3.5	N	Condition 24 – ambient groundwater monitoring applicant controls conditioned except that <b>Total metals</b> are required, not dissolved metals.	Water is sourced from local runoff and the underlying superficial and Yarragadee aquifers. Flocculent added in concentrator poses no significant environmental risk (MSDS provided). Greatest risk is associated with acidification of groundwater and consequently process water, but this risk is regulated under Ministerial Statement 1168.
Deposition of clay tailings to solar evaporation pond (SEP)	Seepage of process water	Seepage to groundwater leading to contamination				C = Moderate L = Unlikely <b>Medium Risk</b>	N	Condition 1 – requirements for construction of SEPs Condition 24 – ambient groundwater monitoring - applicant controls conditioned except that <b>Total metals</b> are required, not dissolved metals.
		Seepage to groundwater leading to mounding			C = Slight L = Rare <b>Medium Risk</b>	Y	Condition 1 – requirements for construction of SEPs Condition 24 – ambient groundwater monitoring -	Seepage from SEPs will be less than mine voids as they are constructed and compacted facilities. They are also located at least 200m from premises boundary, so off-site impacts are very unlikely.

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Risk events					Risk rating <sup>1</sup> C = consequence L = likelihood	Applicant controls sufficient?	Conditions <sup>2</sup> of works approval	Justification of risk rating, or additional regulatory controls
Sources / activities	Potential emission	Potential pathways and impact	Receptors	Applicant controls				
Dewatering	Disposal of excess mine process water to drains leading to the Lower Sabina River	Changes to stream flow rates in waterways	Lower Sabina River and its tributaries, ultimately reporting to the Vasse-Wonnerup wetland system	Refer to Section 3.1	C = Slight L = Possible <b>Low Risk</b>	Y	Condition 14 – measuring rate of discharge off site	Expected discharge is less than 2% of flows in the Lower Sabina, and only occurs after high rainfall. This also offsets reduced runoff as incident rainfall in the operating area is contained on site.
		Reduction in water quality in waterways			C = Moderate L = Possible <b>Medium Risk</b> See section 3.6			

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Proposed applicant controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

## 3.2 Detailed risk assessment for dust emissions during construction and operations

There is potential for generation of dust from mineral sands mining, screening and associated earthworks, as well as from exposed cleared areas. Dust impacts to vegetation are likely to be minimal given the short term nature of mineral sands operations and the relatively high local rainfall. Amenity and health impacts to residential receptors need careful management, as there are a significant number of rural residences within 1km of the Premises

The applicant has experience managing dust emissions from mineral sands mines close to residential receptors at their Yoongarillup and Dardanup mines. DWER has not received any dust complaints relating to these facilities.

Taking into account the applicant's controls summarised in Table 1, the Delegated Officer considers that public health criteria are likely to be met, and there is a chance of low-level impact to amenity at some time during the proposed operations. The likelihood of this risk event is therefore **Possible**, and the likely impact is **Minor**. This results in a risk rating of **Medium**.

The applicant's key dust management commitments will be conditioned in the works approval, and dust monitoring required.

### 3.2.1 Suitability of proposed dust monitoring program

The applicant proposes a dust monitoring program for PM<sub>10</sub> (particulate matter 10 micrometres or less in diameter) and Total Suspended Particulates (TSP) for the period 1 October – 31 May each year as shown in Figure 3. The monitoring site locations are shown in Schedule 1, Figure 1 of W6558/2021/1

Monitoring point reference	Parameter	Units	Frequency	Sampling duration	Method
AQ1-AQ3	TSP	ug/m3	3 days per Month <sup>1,2</sup>	Continuous logging with 15 minute averages	None Specified
AQ1-AQ3	PM10	ug/m3	3 days per Month <sup>1,2</sup>	Continuous logging with 15 minute averages	None Specified

Note 1. During the period 1 October and ending 31 May the following year  
 2. During period outside of 3d/mth monitoring to continue at location closest to mining activities

**Figure 3: Applicant's proposed dust monitoring program**

The timeframe of October to May is considered suitable for this area, as wet winter conditions make dust impacts outside of these months unlikely.

Technical advice from DWERs Air Quality Services branch is that dust monitoring should be considered in two parts. Receptor monitoring aims to quantify dust received by (and therefore the likely level of impact to) receptors. Receptor monitoring should be continuous when in close proximity to residences, and use standard methods to allow valid comparison with applicable standards. Boundary monitoring may utilise non-standard methods, and can be non-continuous to allow flexibility to investigate areas where impacts are most likely. It was advised that even if boundary and receptor monitoring are spatially very close together, the separate functions should be considered separately.

For receptor monitoring, PM<sub>10</sub> is suitable as an indicator of human health impact. The Delegated Officer considers that given the very close proximity of receptors to premises to the south, near continuous monitoring is required at AQ2. Snapshot monitoring of 3 days per month is acceptable at this stage for AQ1 and AQ3 to give an indication of impacts to

receptors to the west and east. It is noted that dust impacts from the haul road are outside the scope of this works approval, but still need to be considered by the applicant. The Delegated Officer considers that in the case of a dust complaint from a nearby resident, additional monitoring may be required. Note 5 in condition 17, Table 8 of the works approval provides for this. This applies at existing monitoring points outside their usual period of monitoring, or to the north of the premises. The Delegated Officer notes that southerly winds are common at the premises in summer, but that the nearest residence to the north that is occupied by parties other than an employee or contractor of the applicant, is approximately 1.5km away. Therefore, no regular monitoring is required at this stage.

Deposited dust (not TSP) is the appropriate metric for the assessment of amenity impacts to receptors. Sampling for deposited dust should be done in accordance with the Australian Standard for deposited dust monitoring, *AS/NZS 3580.10.1:2003 (R2014) - Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method*. The applicable deposited dust criteria are those specified in the NSW EPA guideline, *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2016) of 4g/m<sup>2</sup>/month and 2g/m<sup>2</sup>/month above background.

It is not considered practical to find an ongoing background site that is not impacted by the operation, due to significant variability in farm management practices and the impacts of neighbouring mining operations. Dust deposition monitoring will be required from the commencement of this works approval, which will be considered in setting deposited dust targets for the subsequent licence. For the works approval including time limited operations, a target of 4g/m<sup>2</sup>/month will be used, in the absence of background data.

Boundary monitoring for TSP is a useful time-sensitive indicator of likely deposited dust levels, which allows for management actions to prevent exceedances. Standard methods are not required, and the Delegated Officer notes that real time monitors are most useful. Internal TSP targets should be set by the applicant and adjusted if required to prevent exceedance of deposited dust limits. No target for TSP will be imposed on this works approval, as it is up to the applicant to manage emission such that limits at receptors are not met.

Technical advice also noted that the potential significance of dust composition for this operation has not been assessed. Compositional analysis of some form is recommended for metals. As High-Volume Air Samplers are used for radiation sampling (outside the scope of this works approval), the Delegated Officer considers that analysis of one of these filters during time limited operations will be suitable as a screening method to identify any components of potential concern for further investigation. A full standard laboratory suite for metals has therefore been conditioned in the works approval (condition 17).

Wind speed and direction monitoring is also required to assess the likely cause of dust emissions, which enables efficient management decisions to reduce dust.

### **3.3 Detailed risk assessment for noise emissions during construction and operations**

An Environmental Noise Impact Assessment (ENIA) was provided for the proposed operations (Acoustic Engineering Solutions 2021). DWER's Environmental Noise Branch (ENB) has reviewed previous versions of this ENIA and provided input during its assessment under Part IV of the EP Act. Advice provided by ENB for this works approval assessment is that the latest version provided in the works approval application is acceptable. The methodology of the noise modelling, including the inputs, assumptions, scenarios seem appropriate and correct. The modelled noise levels also seem reasonable and reliable.

The ENIA results indicate that the assigned noise levels in the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) are likely to be met for all modelled mining and weather condition scenarios for night time operations (no active mining) and day time operations Monday-Saturday. However, given that the assigned noise levels for Sundays and public

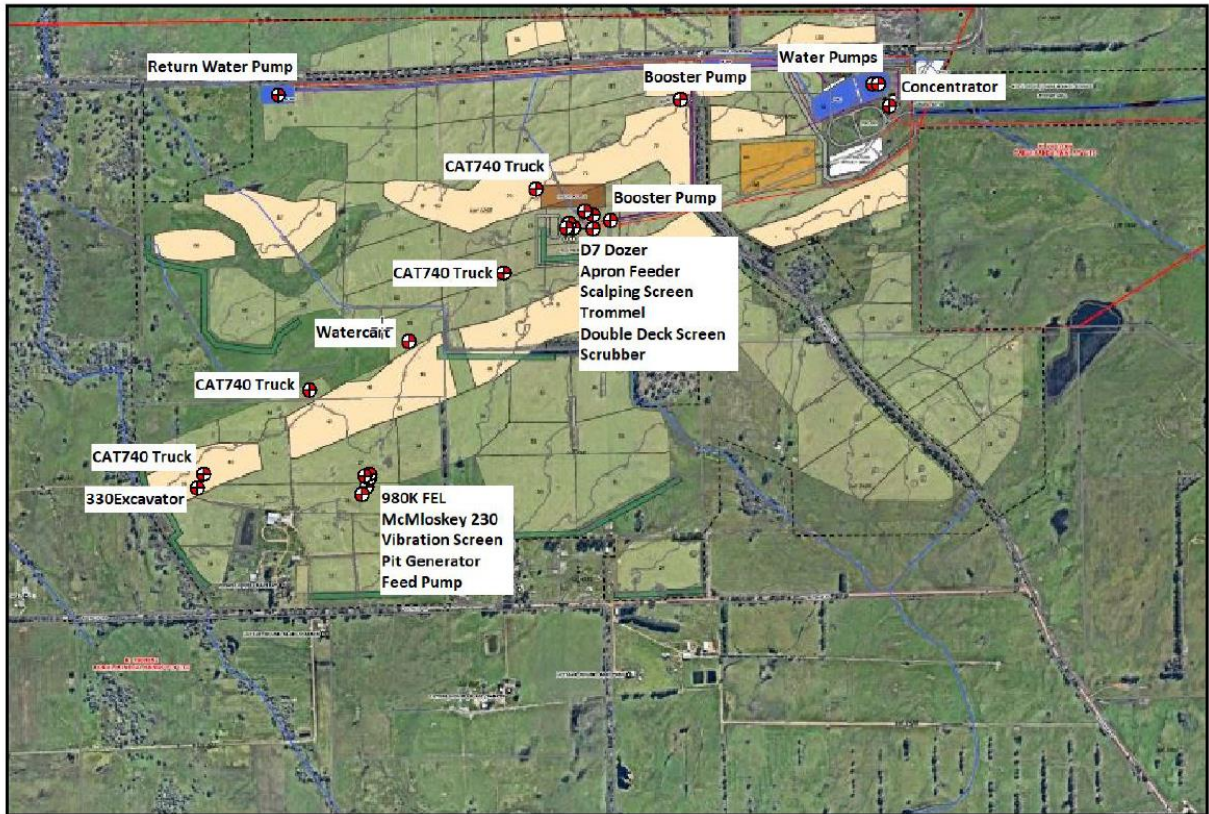
holidays are lower than weekdays and active mining is proposed, modelling predicts that exceedances could occur at a number of neighbouring residences during certain operation scenarios and weather conditions. Several engineering and management controls are proposed to ensure compliance, and ENB considers these appropriate and likely to be effective. These controls are captured in Table 1 of this decision report.

The application defines daytime hours as 7am-7pm, 7 days per week. However, given the Noise Regulations define day time hours as 0700 - 1900 hours Monday to Saturday; and 0900-1900 hours on Sunday and public holidays, the Delegated Officer will require the proposed night time controls (including no active mining operations) outside these times. On a Sunday morning, this means night time conditions extend 2 hours later than applied for.

Figure 4 shows modelled potential exceedances of the assigned noise levels, with various wind directions for the various mining stages. The greatest impact is likely to be in scenario 6, when mining is occurring in the southwest corner closest to receptors (Figure 5). The Delegated Officer notes that the modelled scenario closest to the receptors to the south does not assume any machinery right on the southern boundary, but approximately 250m north (Figure 5). The applicant has committed to not mining within 300m of a residence occupied by a member of the public (excepting employees or contractors of the applicant) unless there is an amenity agreement in place. Amenity agreements are in place for receptors R8, R9, R10 and R11. An agreement has been drafted with the owner of R14, R16 and R17, which is awaiting signing. No agreement has yet been reached with the owner of R13 and R15.

Closest Residences	Assigned Levels L <sub>A10</sub> in dB(A)	Noise Level Exceedance & Non-compliant Wind Directions									
		S2	S3	S4	S5	S6	S7	S8	S9	S10	
R8	40					0.1-0.7 N-SE	☞				
R9	40					0.3-1.8 N-SE					
R10	40					2.6-3.4 N-SE					
R11	40					0.1-4.6 N-SE					
R13	44			0.5-1.5 NW-NE		0.3-4.1 W-E	2-3.3 NW-E				
R14	42			0.7-2.2 NW-E		1.6-3.5 NW-E	2.7-3.9 NW-E				
R15	42		0.2-0.5 NW-NE	1.2-3.6 W-NE		1.0-1.7 W-N	0.3-2.3 NW-E				
R16	40			2.2-2.5 NW-NE		0.4 NW-N					
R17	41										
Others	40										

**Figure 4: Compliance assessment for day time mining operations on Sundays**



**Figure 5: Assumed noise source locations for scenario 6 – Day mining February 2024**

The Delated Officer notes that the Noise Regulations apply to mining operations. Monitoring is required to both inform operational decisions regarding noise, and measure compliance with these regulations. The proposed monitoring is assessed in section 3.3.1.

The Delegated Officer considers that given the management measures in place to prevent noise impacts, it is **Possible** that there may be a low-level impact to amenity resulting in a consequence rating of **Minor**. The Risk rating is therefore **Medium**. It is noted however that many of the controls proposed are critical in minimising the risk and therefore the applicants proposed controls will be placed as conditions on the works approval.

### 3.3.1 Suitability of proposed noise monitoring program

The applicant proposes a noise monitoring program as shown in Table 4, with monitoring points as shown in Schedule 1 of the Works Approval.

**Table 4: Noise monitoring proposed by applicant**

Monitoring Point	Parameter	Sound measuring equipment	Units	Sampling Duration	Frequency
AN1-AN3	L <sub>AS</sub> 90, 30min	Non-directional system	dB	Continuous <sup>1</sup> logging with 30-minute averages	3 days per month <sup>2,3</sup>
	L <sub>AS</sub> 10, 30min				
	L <sub>Aeq</sub> (20Hz-500Hz), 30min				

Note 1: Availability ≥90% of the measurement intervals on a monthly basis.

Note 2: During period outside of 3d/month continuous monitoring to continue at monitoring point location closest to mining activities.

Note 3: Continuous monitoring is required within 7 days, if requested by the CEO in response to a noise complaint from a member of the public. To continue until issue is resolved and approval given by the CEO

Ambient noise monitoring site AN1 is located near residence R9 for reasons of access, and



gives a reasonable indication of noise received at receptors R8-R11. It is noted that Figure 4 shows modelled noise levels at R10 and R11 of between 1 and 3dB higher than R9. This should be considered if noise levels at AN1 approach the assigned levels, which could lead to exceedance of the assigned noise levels at the closer receptors. The Delegated Officer notes that amenity agreements have been signed by these landholders. The siting of AN1 is considered appropriate.

AN2 is located close to R14. R13 and R15 are slightly closer to the proposed mining areas, but mining will only occur within 300m of these residences while tenanted if an amenity agreement is in place. Comments in the previous paragraph regarding the possibility of exceedances at closer residences if assigned levels are approached still apply, though the modelled noise level difference between R14 and its neighbours is less.

AN3 is indicative of noise at residences to the east, including impacts from the haul road which is outside the scope of this assessment but still required to meet the Noise Regulations.

The Delegated Officer is satisfied with the selection of the three noise monitoring locations, relative to the operation and residential receptors.

The Delegated Officer agrees that near-continuous monitoring in the area where impact is most likely, with a monthly snapshot at other monitoring locations is a reasonable approach given that a commitment is made (note 3 of condition 18 in the works approval) to commence continuous monitoring within 7 days if requested by DWER in response to a noise complaint. However rather than the near-continuous monitoring occurring at the monitoring point closest to mining activities, it is more appropriate for it to occur at the point where mining activities most closely approach residential receptors.

### **3.4 Detailed risk assessment for seepage of process water from drop out dam, process water dam and deposited tailings, leading to mounding or waterlogging and consequent damage to vegetation**

Sand and clay/silt tailings from the concentrator will be co-disposed into unlined mine voids. Tailings water will be recovered from low points in the mine voids and returned to the drop out dam for reuse. There will however be some evaporation and some downward seepage of tailings water. The drop out dam and process water dam are also unlined mine voids.

The process water is of generally good initial quality, sourced from local runoff and the underlying superficial (from passive dewatering) and Yarragadee aquifers. The chemistry and potential changes are discussed in section 3.6. Figure 6 provides a summary of the project's stratigraphy and hydrogeology, copied from the application. The underlying sands are expected to be fairly free draining, although the Guilford formation forms a local aquiclude a few meters below the surface. There is therefore some risk of a locally raised water table leading to increased waterlogging.

AGE	FORMATION	STRATIGRAPHY	THICKNESS (m)	LITHOLOGY	HYDROGEOLOGY
Quaternary - late Tertiary	Superficial	Bassendean Sand	0.5-3	Fine to medium sub-rounded quartz sand	Superficial aquifer
		Guildford Formation	2-5	Clay and sandy clay with occasional discontinuous sand lenses	Local aquiclude
		Yoganup Formation	2-5	Leached and ferruginized beach sand conglomerate and clay. Local laterite.	Superficial aquifer
UNCONFORMITY					
Cretaceous	Leederville	Mowen Member	1-10	Clay and silty clay, with thin interbedded silt, clayey sand and fine grained sand	Regional aquitard; local Leederville aquifer (when significant sand is present)
		Vasse Member	50-100	Fine to medium grained quartz sandstone and interbedded shale.	Leederville aquifer
UNCONFORMITY					
Mid-late Jurassic	Yarragadee	Unit 1	0-50	Medium to coarse grained, weakly consolidated sandstone, minor siltstone and shales	Yarragadee aquifer
		Unit 2	0-250		
		Unit 3	200-500		
		Unit 4	0-100		

**Figure 6: A summary of underlying stratigraphy and hydrogeology**

Deposition in each area will be localised and short term, and so it is expected that any mounding will be as well. It is therefore unlikely that there will be any significant effects to remnant vegetation due to groundwater mounding leading to waterlogging, and any effects to adjacent pasture will be minimal and short term. The greater risk (outside the scope of this assessment) is that decreased water levels due to dewatering drawdown could impact on groundwater dependent ecosystems. Ministerial statement 1168 provides conditions regulating this. Although acting at different times, deposition of tailings acts to counteract the previous effect of dewatering drawdown.

The Delegated Officer considers that in **Rare** circumstances seepage from tailings may lead to groundwater mounding that significantly impacts vegetation. If this were to occur, it is anticipated that impacts would be **Minor**. Groundwater mounding from tailings water seepage is therefore a **Low** risk.

### 3.5 Detailed risk assessment for seepage of process water from drop out dam, process water dam and deposited tailings, leading to groundwater contamination

Process water is sourced from rainfall runoff within the operational area, the underlying superficial aquifer (through dewatering) and Yarragadee aquifer (from production bores). The superficial aquifer ranges from fresh (<500 mg/L TDS) to brackish (up to 3,000 mg/L TDS). Process water is also recycled through the tails reclaim systems. Recycling may increase salinity but is otherwise not expected to significantly alter the chemistry. The only chemicals added in mineral processing are a flocculent used in the concentrator, and lime used in treating acid sulphate soils in accordance with the Acid Sulphate Soils Management Plan. A material

safety data sheet has been provided for the flocculent, and the Delegated Officer is satisfied that it poses no significant environmental risk. Elevated particulates may be present, though this is minimised through the use of a drop out dam. There is a risk of contamination from spills of hydrocarbons such as fuel or oil from mobile plant or from workshops. Doral has a Hydrocarbon Management Procedure in place which the Delegated Officer considers appropriate to minimise the risk of hydrocarbon contamination in the process water.

An additional risk is acidification or metalliferous components released from acid sulfate soils due to dewatering. The risk of acidification of groundwater is satisfactorily regulated under Part IV of the EP Act. Ministerial Statement 1168 requires the development of an Acid Sulfate Soils Management Plan (ASSMP), which has been reviewed by the department including technical input from the Contaminates Sites Branch. Monitoring of groundwater and dewatering is included in this plan. The management of acid sulfate soils and groundwater will therefore not be considered in this works approval assessment under Part V of the EPA Act.

Monitoring conditions and limits will however be required to verify that the chemistry of the process water discharged in tailings does not pose an unacceptable risk to groundwater, and subsequent uses such as direct access by groundwater dependent ecosystems or stock water.

Given the proposed controls, and existing regulation under Part IV of the EP Act, the Delegated Officer considers it **Possible** that discharge of process water in tailings could result in low level off-site impacts on a local scale, and mid-level on site impacts, resulting in a consequence rating of **Moderate**. Discharge of process water deposition in tailings is therefore a **medium** risk.

### 3.5.1 Suitability of proposed monitoring of ambient groundwater

The applicant proposes to monitor a network of existing groundwater bores for standing water level and water quality. An additional suite of bores is proposed to be monitored for standing water level only. The locations of these bores are shown in the Groundwater Operating Strategy. The Delegated Officer notes that although the full suite is useful for monitoring groundwater drawdown, that is outside the scope of this works approval assessment. The bores proposed to be monitored for groundwater chemistry will give sufficient groundwater data on standing water level to regulate the risks of groundwater contamination and mounding due to tailings deposition. Hence only monitoring of these bores will be conditioned on the works approval. Monthly monitoring of standing water level and a basic suite of parameters is proposed for all bores, which is appropriate. A more extensive suite including metals and radioactive isotopes is proposed on a six-monthly basis, at selected monitoring bores. These monitoring bores were selected for proximity to the water dams, which is appropriate as these receive process water on a longer term basis than individual mine voids. The dams have been moved slightly north since the selection of these bores, but the Delegated Officer expects that they will provide adequate data to identify any concerning trends. If the applicant wishes to change which bores are monitored for the full suite, this can be considered during the licence assessment. While a frequency of six monthly is appropriate, the Delegated Officer considers that total metals rather than dissolved metals is required.

## 3.6 Detailed risk assessment for direct discharge adversely impacting the water quality in the Lower Sabina River, and Vasse-Wonnerup wetland system

The discharge of surplus process water has the potential to adversely affect water quality in the Lower Sabina River, and subsequently the Vasse-Wonnerup wetland system. Section 3.5 discusses the chemistry of the process water. It is noted though that discharge will only be after significant rains, predominantly during winter. It is therefore likely to contain a high proportion of rainwater and minimal Yarragadee water which is only used where other sources are inadequate.

Discharge point monitoring conditions and limits, and upstream/downstream ambient monitoring

will be required to verify that the chemistry of the surplus process water discharged does not pose an unacceptable risk, or significant changes to water chemistry.

Given the proposed controls, and existing regulation under Part IV of the EP Act, the Delegated Officer considers it **Possible** that discharge of process water could result in low level off-site impacts on a local scale, and minimal wider scale impacts, resulting in a consequence rating of **Moderate**. Discharge of process water is therefore a **medium** risk.

### 3.6.1 Suitability of proposed monitoring for discharged process water

#### Discharge point

In their Groundwater Operating Strategy, the applicant proposes spot sampling as follows:

- field monitoring from each discharge point for pH, Electrical conductivity (EC), total titratable acidity (TTA) and total suspended solids (TSS); on the first day of discharge then 3 times per week; and
- Laboratory testing at each discharge point on the first day of discharge then monthly during discharge. Proposed analysis suite is pH, EC, TSS, TDS, total acidity, total alkalinity, sodium, chloride, sulphate, iron (dissolved), manganese (dissolved) and aluminium (dissolved). If dissolved Al > 1 mg/L then additional analyses are proposed for Zn, Cr, Cu, Mg, Ni, Cd, Se, As, Pb and Hg.

The proposed frequencies are considered suitable. Depending on results in the first 12 months of operation, consideration could be given to reducing the field sampling to weekly.

The Delegated Officer considers that total alkalinity and total dissolved solids should be added to the field monitoring suite. If total acidity exceeds total alkalinity, weekly laboratory analysis for total metals will also be required.

The Delegated Officer considers that while dissolved metals analysis is useful in providing a picture of the water chemistry, a standard total metals suite for discharge to the environment is most appropriate in this context.

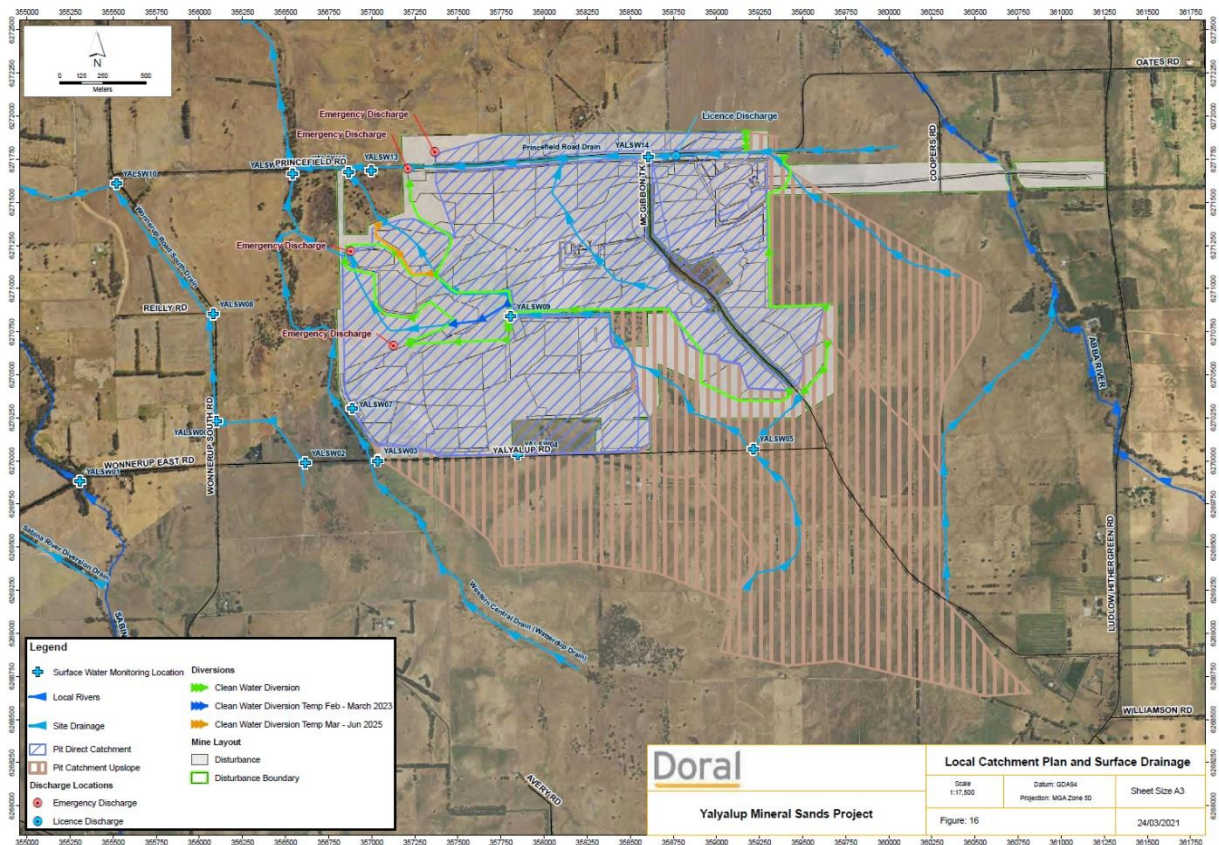
Total recoverable hydrocarbons will be added to the laboratory suite, to validate the effectiveness of hydrocarbon management practices.

Discharge limits are set for consistency with similar existing operations.

Monitoring of the PWD under the Groundwater Operating Strategy will allow proactive management to ensure discharge meets licence limits. However this is not a condition on the works approval, as it is up to the applicant to determine what monitoring is performed to ensure that discharge water is within the limits of condition 8.

#### Ambient surface water

The applicant has been undertaking surface water monitoring at surface water monitoring points denoted YALSW01 to YALSW14. These are shown in Figure 7. This suite of data is valuable for ongoing management of surface water throughout the operation. For the purposes of this works approval, the Delegated Officer considers that the critical points for monitoring environmental impact are upstream of the licence discharge point and mining/tails deposition areas, and downstream of these. YALSW03 and YALSW05 are suitable upstream points. As there is no existing monitoring point upstream of the licence discharge point to provide background water quality, the Delegated Officer will require a new monitoring point YALSW15 upstream of the licence discharge point. YALSW11, YALSW12 and YALSW13 are suitable downstream monitoring points. Parameters and limits will be set for consistency with similar operations with similar receptors.



**Figure 7: Local surface water flow and existing surface water monitoring points**

## 4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

**Table 5: Consultation**

Consultation method	Comments received	Department response
Application advertised on the department's website on 28 June 2021	None received	N/A
Local Government Authority advised of proposal on 22 June 2021	The City of Busselton replied on 13/07/2021 stating that they have no comments to make on the proposed works.	N/A
Department of Mines, Industry Regulation and Safety (DMIRS) advised of proposal on 22 June 2021	None received	N/A
Landholders within 1km of the premises advised of proposal by email on 22 June 2021. Those for who email addresses weren't	A response from one landholder on 22 June 2021 expressed no objection, and stated that Doral has been very upfront in their communications.	

Consultation method	Comments received	Department response
provided were posted on this date.	A response from another landholder on 13 July 2021 raised concerns about land access and omitted receptors if plans to purchase particular properties do not eventuate. Detailed discussion in Appendix 1.	Discussed further in Appendix 1
Applicant was provided with draft documents on 23 September 2021	Refer to Appendix 1	Refer to Appendix 1

## 5. Conclusion

Based on the assessment in this decision report, the delegated officer has determined that a works approval will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

## References

Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.

1. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
2. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
3. Acoustic Engineering Solutions 2021, Environmental Noise Assessment of Yalyalup Mine for Doral Mineral Sands Pty Ltd, Western Australia (in DWER Document A2016495)

## Appendix 1: Summary of submission from concerned neighbour, dated 13 July 2021

Section of application form	Comment	DWER Response
2.8, 3.4	Doral do not own or have a mining agreement for our land (lots identified in submission).	Proof of mining tenure provided. A works approval does not grant physical land access. Refer to section 2.2.1.
4.13-4.19	No mention of clearing trees on our northern boundary	No vegetation clearing is applied for in this works approval application. Some clearing of vegetation within the development area was authorised under Ministerial Statement 1168. The importance of specific trees may also be raised by the landholder in negotiation of mining agreements, if applicable.
Other concerns (A)	Concerns around the effects of dewatering drawdown on perennial pastures and trees	Extraction of water is regulated under the <i>Rights in Water and Irrigation Act 1914</i> . A works approval cannot authorise extraction of water. Only the discharge of mine dewater to the environment is considered in this assessment under Part V of the <i>Environmental Protection Act 1986</i> .
Other concerns (B)	Concerns that lowering the water table may affect acid sulfate soils on their property.	
Other concerns (C)	Effect of changes in surface drainage of the winter water logging or the potential for inundation on their property.	DWER has reviewed the Surface Water Management Plan included with the application. This outlines how upstream flows will be diverted around the operational area into the existing network of roadside drains. The Delegated Officer considers that there is no significant risk of such diversions leading to waterlogging of adjacent paddocks.
Other concerns (D)	There is no mention of flood water discharge if the mined area does not include our properties.	It is noted that the primary water discharge is in the northeast corner of the premises, while the properties in question are in the southwest corner. One of several emergency discharge points are located on one of the lots in question. The Delegated Officer emphasises that a works approval cannot grant access to land. If the applicant does not purchase or successfully negotiate with the landholder to access to these properties, the activities authorised by this works approval under Part V of the EP Act (including mining and discharge) cannot take place. If mining does not occur on the properties in question, it is expected that there will be no need for a

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Section of application form	Comment	DWER Response
		discharge point at this location. If an alternative discharge is required, the applicant will need to apply for an amendment to this works approval or highlight an additional proposed discharge in their licence application.
7.8	States that 'consultation' has only occurred in the context of purchasing property, which is now looking unlikely.	DWER does not regulate consultation but recommends that the applicant engage with their neighbours.
9.1	No consideration of residences on our property (identified in submission) as receptors (noise, dust, wastewater discharge, or seepage) due to assumed purchase or mining agreement.	The residences on the property in question are identified as potential receptors in the application and in this assessment.



## Appendix 2: Summary of applicant’s comments on risk assessment and draft conditions

Condition	Summary of applicant’s comment	Department’s response
1	<p>Table 1 (page 3) Point 1 and 6 should include the ‘Other supporting infrastructure’ which has been dropped off the simplified maps requested by DWER. I did not pick up on it before submission. It was included in the original application. Doral have included updated maps for Schedule 1 and Schedule 2. Can we please include “Other supporting infrastructure in the wording of Points 1 and 6.</p> <p>Point 11 – Please change from McKloskey to generic ‘In pit Mining Unit’</p>	<p>Wording in column 3 (infrastructure location) for row 1 and 6 changed to: Within the areas listed as ‘orebody’ or ‘orebody deep strand’ or ‘other supporting infrastructure’ in Schedule 1</p> <p>Updated map inserted to Figures 1 and 3</p> <p>Change made as requested</p>
1	<p>Table 1 Point 3 – Surface water will not be prevented from entering site however, will be diverted to not mix with mine water.</p> <p>Suggested wording ‘surface water entering site from upstream of the premise boundary will be diverted so it does not mix with operational site water’</p>	<p>Change made as requested</p>
14	<p>Table 6 (page 7)</p> <p>Parameter –</p> <p>As Aluminium is a Trigger metal for ASS Soils Suggested wording ‘If Aluminium’ is &gt;1mg/L also test arsenic, chromium, copper, nickel, cobalt, selenium, zinc, uranium.</p> <p>Frequency (for metals)</p> <p>Total Acidity should read Total Alkalinity</p>	<p>Discharge monitoring suite is based on internal advice from DWER’s hydrogeologist. In situations where acidity is found to exceed alkalinity, additional sampling for total metal analysis was recommended for aluminium, arsenic, chromium, copper, nickel, cobalt, selenium zinc, uranium.</p> <p>Wider suite of total metals recommended for analysis because even where metals in the discharge water are not truly dissolved (i.e. they are adsorbed on suspended particles), they potentially could be released into the water column by geochemical changes on discharge.</p> <p>Sampling parameters and frequency can be reviewed and possibly reduced if the discharge is found to have stable water quality conditions in the coming years.</p> <p>Noted and change made</p>
16	<p>Table 7 (page 8)</p> <p>Monitoring location will be as per dust monitoring locations and the</p>	<p>Noted - monitoring locations updated to AQ1, AQ2, AQ3</p>

Condition	Summary of applicant's comment	Department's response
	anemometer is on a 4.5m mast. As dust is 15 minute averages and the anemometer is attached to the dust trailer, suggest 15 minute averages for wind speed as well.	Noted and change made
26	Table 11 (page 10/11). There is a duplication of the 'no mining within 300m' statement	Duplication removed
Decision Report Section 2.2.2 (page 2)	Change McCloskey to generic 'In Pit Mining Unit'	Change made as requested
Decision Report Section 3 - Page numbers revert back to page 1 after page 5	-	Page numbering error corrected
Decision Report Table 1 (page 2)	Minor typo (schedule of mining) last dot point	Typo corrected
Decision Report Page number reverts back to page 1 at section 3.1.2	-	Page numbering error corrected
Decision Report Section 3.1.2 Table 2 – Human receptors	Should read 'to the north and north east' not 'north west'	Noted and corrected
Decision Report Section 3.2 (page 10)	Dust composition methodology accepted as we have never undertaken this before	Noted
Decision Report Section 3.2 (page 11)	Confirmation of status of amenity agreements with neighbours. All amenity agreements are in place except for R14 and R16. The status on these has not changed due to FIFO workers being out of town. They will be signed before operating withing 300m of the residence as conditioned in the Works Approval.	Noted and updated in Decision Report
Decision Report Section 3.3.1 (page 13)		

## Appendix 3: Application validation summary

SECTION 1: APPLICATION SUMMARY		
<b>Application type</b>		
Works approval	<input checked="" type="checkbox"/>	W6558/2021/1
Date application received	21/5/21	
<b>Applicant and Premises details</b>		
Applicant name/s (full legal name/s)	Doral Mineral Sands Pty Ltd (096 342 451) – confirmed registered address on extract	
Premises name	Yalyalup Mineral Sands Mine	
Premises location	Mining Tenement M70/1400 – see A2015018	
Local Government Authority	City of Busselton	
<b>Application documents</b>		
HPCM file reference number:	DER2021/000318	
Key application documents (additional to application form):	Detailed overall supporting document Noise modelling	
<b>Scope of application/assessment</b>		
Summary of proposed activities or changes to existing operations.	Works approval for the initial stages of a new mineral sands mine and processing plant, including mine dewatering infrastructure.	
<b>Category number/s (activities that cause the premises to become prescribed premises)</b>		
<b>Table 1: Prescribed premises categories</b>		
<b>Prescribed premises category and description</b>	<b>Proposed production or design capacity</b>	
Category 6: Mine dewatering	3,500,000 tonnes per year	
Category 12: Mineral sands mining and processing	750,000 tonnes per year (0.75GL/year) dewatering	
<b>Legislative context and other approvals</b>		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Existing MS 1168
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Ministerial statement No: MS 1168 EPA Report No: Report 1695
Has the proposal been referred and/or assessed under the EPBC Act?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Reference No: 2017/8094

Has the applicant demonstrated occupancy (proof of occupier status)?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Mining lease M70/1400 confirmed by LO via Mineral Titles Online (screen shot at end of this checklist)
Has the applicant obtained all relevant planning approvals?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	If N/A explain why? Mining tenure
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Assessed under Part IV of EP Act
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Application reference No: N/A Licence/permit No: N/A
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Intend to apply.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises subject to any other Acts or subsidiary regulations (e.g. <i>Dangerous Goods Safety Act 2004</i> , Environmental Protection (Controlled Waste) Regulations 2004, <i>State Agreement Act xxxx</i> )	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Mining Act
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises subject to any EPP requirements?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Is the Premises a known or suspected contaminated site under the <i>Contaminated Sites Act 2003</i> ?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	