Decision Report

Application for Works Approval

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

Works Approval Number	W6481/2020/1
Applicant	Comcen Pty Ltd
ACN	161 487 930
File Number	DER2018/001042
Premises	Ant Hill Manganese Project – Stage one Mining Tenement M46/238 EAST PILBARA WA 6758 As defined by the Premises maps attached to the issued works approval
Date of Report	24 May 2021
Decision	Works approval granted

Alana Kidd

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Date: 2021.05.24 12:30:17 +08'00'

Alana Kidd
Manager, Resource Industries
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 W6481/2020/1 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Decision Report, the department 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 27 October 2020, Comcen 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 ore processing facilities, settling ponds, co-disposal waste rock dump and a landfill at the Premises. The Premises is approximately 127 km south-east of Marble Bar.

The Premises relates to the categories and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in Works Approval W6481/2020/1. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guidance Statement: Risk Assessments* (DER 2017) are outlined in Works Approval W6481/2020/1.

Description of Operations

The Ant Hill Manganese Project (Premises) is located in the Shire of East Pilbara and is approximately 52 kilometres (km) to the east south-east of Nullagine.

The Premises contains a large resource of medium grade, high iron manganese oxide with the applicant proposing to use conventional surface open pit mining to produce direct shipping and beneficiated manganese ore. Infrastructure to support the operations include, crushing and processing facilities, waste rock dump, workshops, administration building, haul roads and access roads, borefield and water storage, accommodation village, landfill, power generation and fuel storage (see Figure 1).

A description of the prescribed categories 5 and 89 construction works to be undertaken as part of this application are set out in more detail below.

Figure 1: Premises layout

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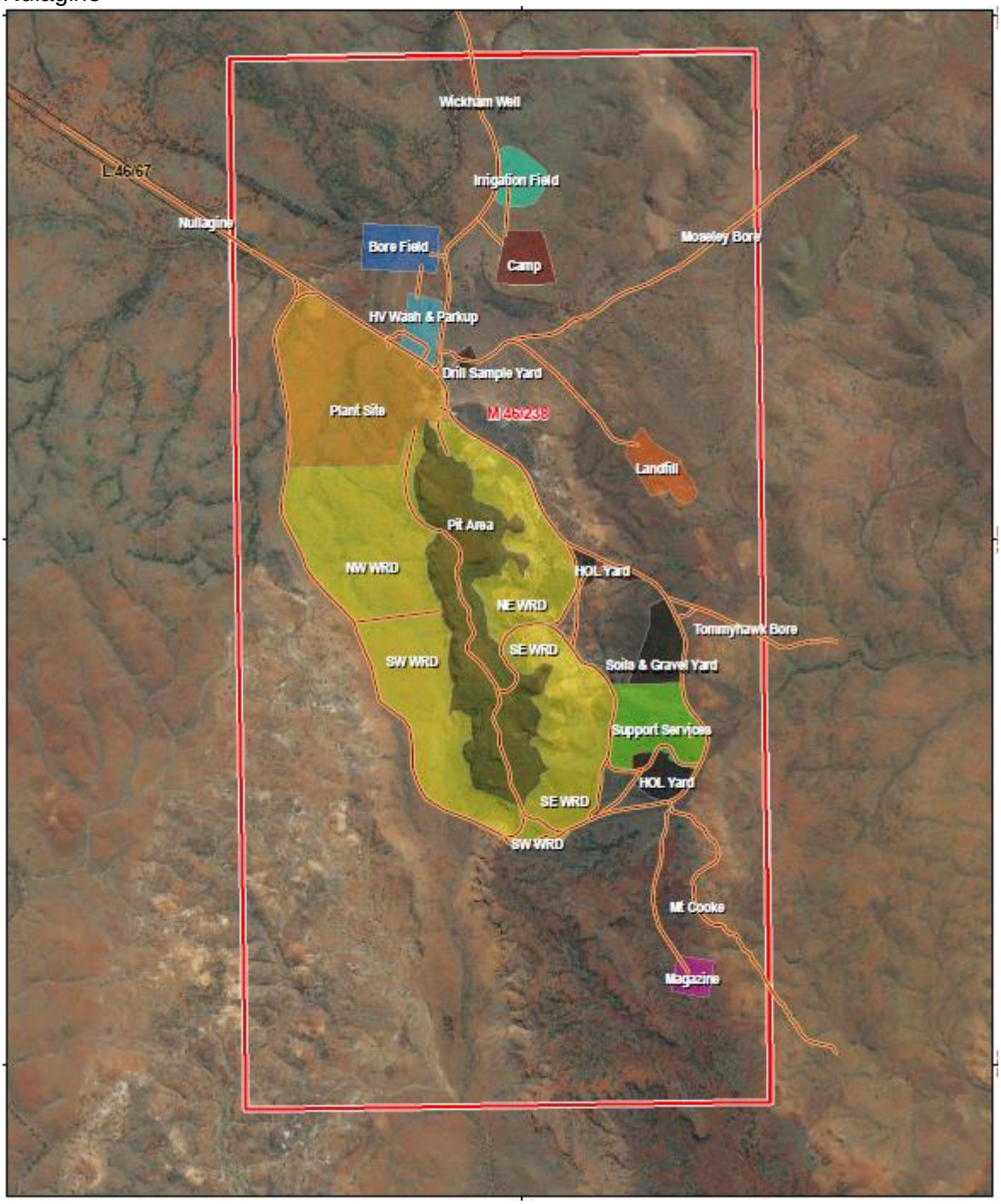
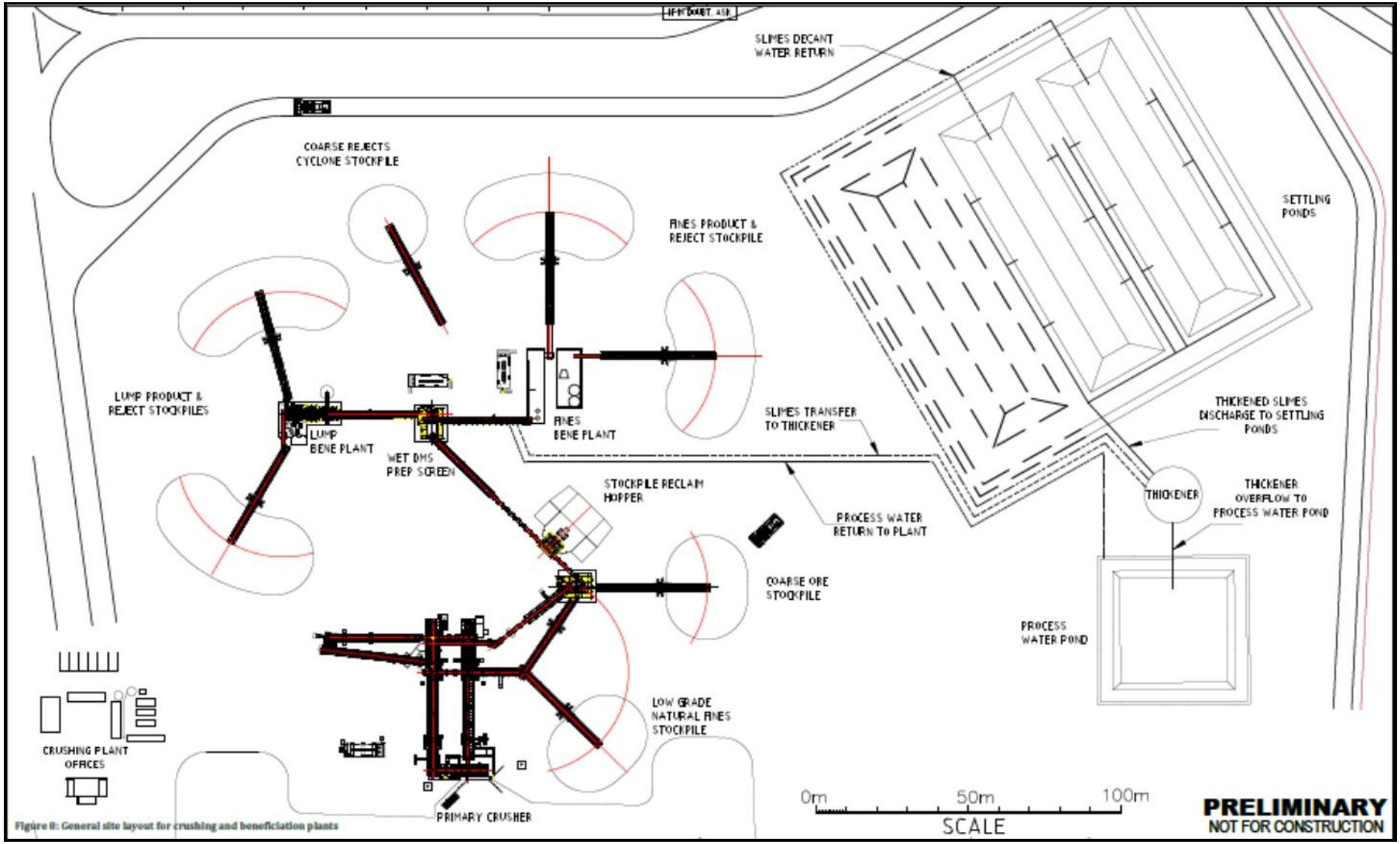


Ore processing facilities

A total of 3.0 million tonnes per annum (Mtpa) of ore will be mined by open cut methods at the Premises with1.5 Mtpa of that ore being transported to the process plant onsite where it will be crushed, screened and processed through a lump and fines dense media beneficiation circuit to produce approximately 600,000 tonnes per annum (tpa) of concentrated manganese product (Figure 2). The remaining 1.5 Mtpa of mined ore (waste rock) will be transported to the NE Waste Rock Dump (NE WRD) for disposal.

Figure 2: Crushing and beneficiation plants



The flow diagram shown in Figure 3 below illustrates the proposed ore processing that will occur at the Premises to produce the final product. Figure 4 below sets out the proposed waste stream from the processing of ore.

Figure 3: Ore processing flow diagram (product)

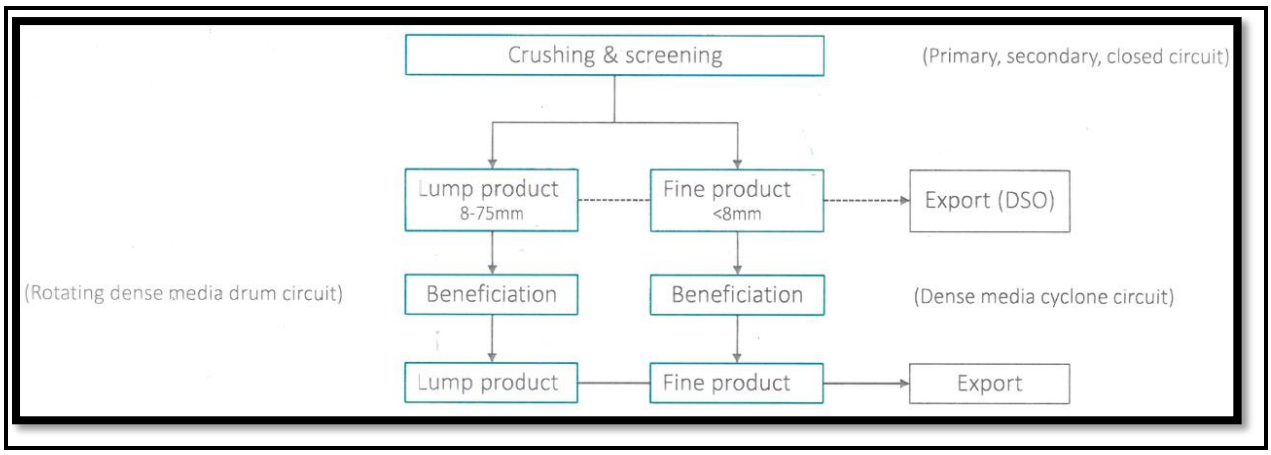
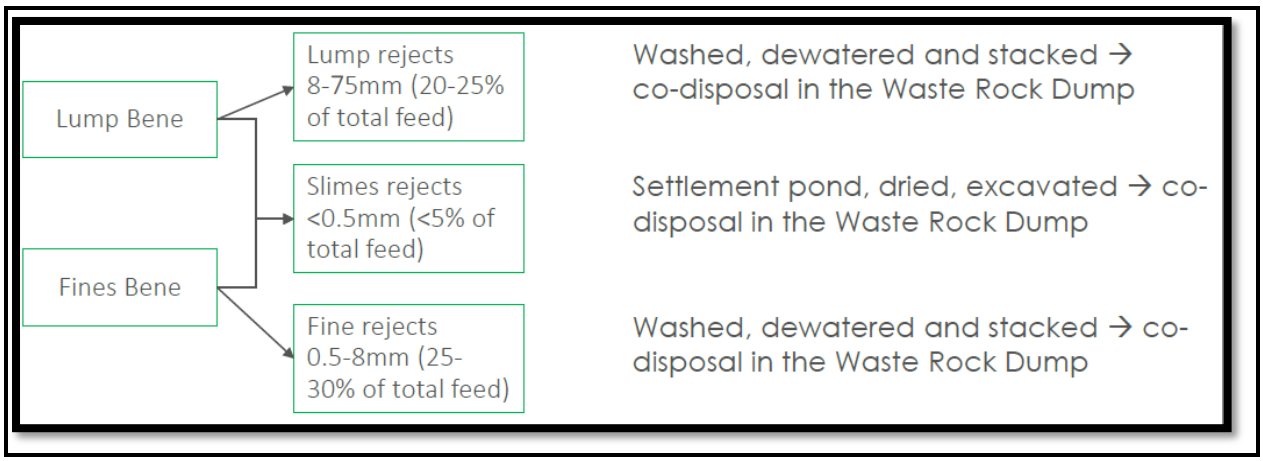


Figure 4: Ore processing flow diagram (waste)



A detailed description for the proposed processing ore at the Premises is provided in more detail below.

Crushing plant

The closed-circuit ore crushing and screening plant (crushing plant) consists of a primary jaw crusher, grizzly feeder, sizing screens, secondary cone crusher and associated infrastructure.

Crushed and screened ore will be transferred by conveyor to a beneficiation plant wash screen (wash screen) before the ore is fed into either the fines or lump beneficiation plants for further processing. Any excess ore from the crushing and screening circuit will be stacked by a radial stacker onto either a lump ore surge stockpile or a screened out natural fines and or crushed fines surge stockpile. The Applicant may also decide to combine the ore fines with the lump product. Product from the surge stockpiles will be re-fed by front end loader into a stockpile reclaim hopper (hopper) before being transferring to the wash screen.

The crushing plant is designed to allow for several different operation modes to suit different geological and metallurgical characteristics of the ore body and market conditions. The Applicant will have the option to stockpile screened out natural fines and/or crushed fines for later processing or co-disposal in the NE WRD (WRD). Alternatively, the Applicant may decide to produce direct shipping ore (lump or lump and fines) with no further beneficiation undertaken.

Dust controls will be implemented through the use of water sprays located at transfer points on

the plant, sprinklers for ground conditioning around the plant and through the use of water carts.

The crushing plant will be constructed on a compacted earth pad that will be levelled off using a cut and fill method. The plant will include surface water diversions at the southern end which will report to a sediment pond at the northwest corner to capture sedimentation and runoff from the ore processing facilities.

Beneficiation plants

Ore transferred via conveyor from either the crushing or screening circuit or the hopper will pass over a wash screen before the washed lump and fines ore are feed into the lump beneficiation plant and fines beneficiation plant respectively. The slimes waste from the wash screen will initially have the coarse sand removed by physical separation through a dewatering cyclone. The dewatered sands will then be transported by dump truck to the WRD for co-disposal. The remaining dilute slurry fines are then pumped to a thickener where a flocculant (Magnafloc 336) is used to increase the recovery of cleaner water which is then pumped to the process water pond for reuse in the beneficiation plant. The thickened underflow from the thickener will then be pumped to settling ponds (Figure 2).

Washed lump ore from the wash screen will pass through a single rotating dense media drum separator at the Lump Beneficiation Plant. A dense media slurry of ferrosilicon (ground steel) will be pumped into the drum separator with the lump ore creating an environment for ore and waste to separate based on densities.

Washed fines ore from the wash screen will pass through a dense media cyclone plant at the Fines Beneficiation Plant. A dense media slurry of ferrosilicon will be pumped with the fines into the cyclone plant creating an environment for ore and waste to separate based on densities.

Two output streams will occur from each of the Lump Beneficiation Plant and the Fines Beneficiation Plant. These streams will consist of a final product and rejects. To recover the dense media and dewater the product and reject material, both the final product and the reject material will pass through dewatering and washing screens before being stacked onto the ground by radial belt stackers. The dilute dense media slurry that will be recovered from the dewatering screens will go through a conditioning process for reuse back in the Lump Beneficiation Plant and the Fines Beneficiation Plants.

The final product from both the Lump Beneficiation Plant and the Fines Beneficiation Plant will be rehandled with front end loaders for stockpiling at the final product stockyard prior to transport off the Premises. The stacked reject material will then be loaded into dump trucks for transport to the WRD for co-disposal.

The beneficiation plants will be constructed on compacted earth pads that will be levelled off using a cut and fill method. The plants will include surface water diversions at the southern end which will report to a sediment pond at the northwest corner to capture sedimentation and runoff from the ore processing facilities.

Slimes treatment

Slimes washed out from the wash screen (pre beneficiation plants) will initially have the coarse sand removed through the use of a dewatering cyclone (physical separation). The dewatered sand will then be stacked on ground before being loaded by front end loader into a dump truck for transport and final co-disposal at the WRD.

The remaining dilute fines slurry will then be pumped via pipelines to a thickener located adjacent to the settling ponds (Figure 2). The Applicant then plans to add a non-toxic flocculant coagulant to the dilute fines slurry to create a thickened underflow, and a separate clear water stream which will be pumped to the process water pond for reuse at the beneficiation plants. The thickened underflow will be pumped to the settlement ponds.

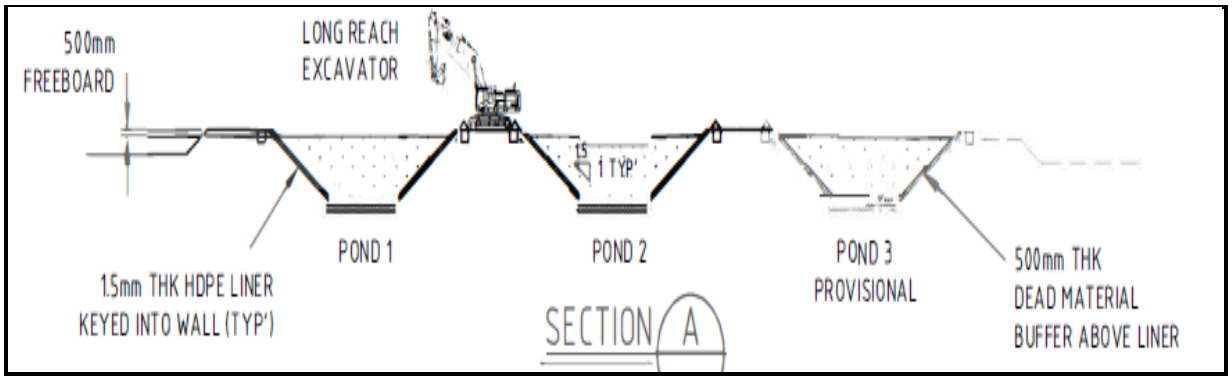
Settling Ponds

The settling ponds will consist of a series of three cells which will be designed in-ground with a partially elevated embankment. The embankment forms a windrow around the perimeter of each pond which prevents stormwater run-off from entering the ponds. The settling ponds will be lined with a 1.5 mm think HDPE liner to prevent seepage. The settling ponds are planned to be approximately 100 m long by 25 m wide to provide a live operating storage volume of 8,000 m^3 in each pond. The base of each pond will be constructed with a minor decline so a floating submersible pump can be located at one end to recover water. The thickened solids are deposited at the opposite end of the pond creating a beach. Once the pond has reached its capacity, inflow is diverted to the next pond. The slimes within the settling pond cell are then given time to dry before being excavated by a long reach excavator, placed into a dump truck and then transported to the WRD for co-disposal with mine waste rock, lump rejects and fines rejects. The integrity of the settling pond liners will be maintained by using a GPS guidance system fitted to the excavator, and a leaving a sacrificial slimes layer of 500 mm above the liner for protection.

The ponds will be constructed to allow an operational freeboard of 500 mm. The submersible pump will operate based upon the level measured in the Settling pond. During rainfall events, the pump will operate automatically whilst there is sufficient water. Should the pump fail, the 500 mm of freeboard will contain a 1 in 50-year rainfall event of 288 mm over 72 hours. Water balance calculations (Rockwater 2014) show a one in 100-year AEP rainfall event of 343 mm over 72 hours would result in 157 mm freeboard remaining.

A groundwater monitoring bore will be installed downgradient of the Settling ponds to monitor for any impacts.

Figure 5: Settling Ponds



NE WRD

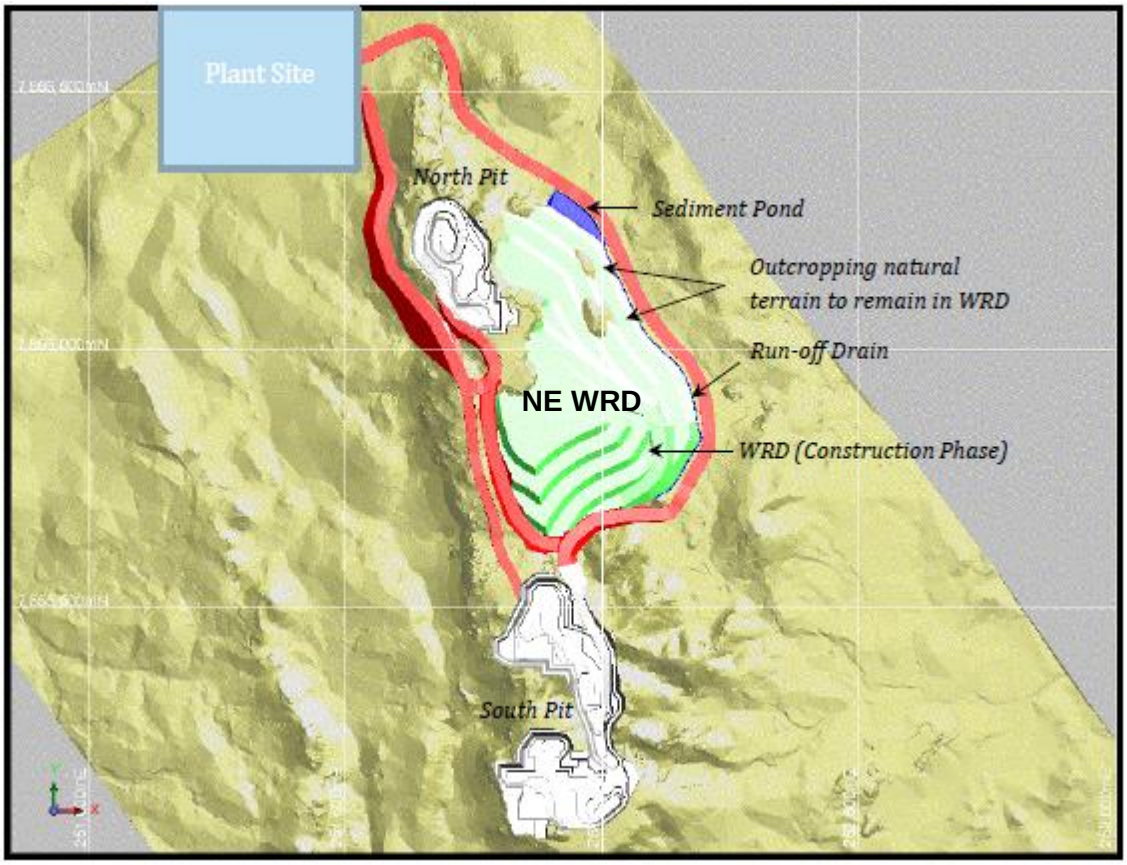
The Department of Mines, Industry Regulation and Safety (DMIRS) regulates the design, construction and operation of waste rock structures in Western Australia. The WRD for this Premises also includes co-disposal of tailings waste material generated from the processing of ore at the Premises. As there is the potential for emissions and discharges to the environment from the WRD, assessment under Part V of the EP Act is also required.

The WRD for Stage 1 of the project will be located on the eastern side of the mesa butting up to the natural slope of the side of the mesa (shown in Figure 6 below). This location allows for the final profile of the WRD to be blended into the current topography. The WRD's position will eliminate the potential of any flooding and is located away from major infrastructure. A sediment run-off drain will be constructed at the eastern toe of the WRD connecting to a sediment basin at the north eastern corner of the WRD.

The WRD will be constructed utilising mine waste from the Ant Hill south and north pits. Dewatered lump and fines reject materials, which make up most of the process waste materials, will be co-disposed with mine waste rock within the WRD. A small portion of the waste stream

consists of thickened slimes from the beneficiation plants which after a period of drying in the Settling ponds, will be excavated and co-disposed into the WRD also (see Figure 7). The applicant expects a total of 70,000 tonnes of dried slimes and 450,000 tonnes of fines and lump rejects will be co-disposed with 1,500,000 tonnes of mine waste rock per year.

Figure 6: NE WRD layout for Stage 1



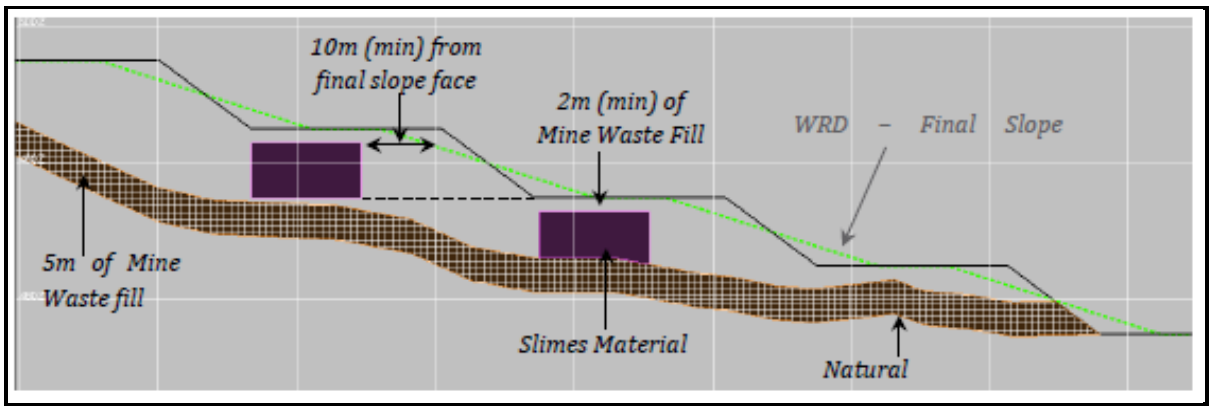
DMIRS approved the co-disposal WRD design in 2015 (MP45789). The approval remains current with the following criteria required for disposal of the tailing's material with waste rock:

- Tailings waste to be placed at the centre of the waste dump/s;
- Tailings waste not to be exposed at the surface of the WRD; and
- Located away from areas with potential for interaction with existing drainage lines.

Figure 7 below provides a cross section on the approved proposed method for disposal of tailings and waste rock at the WRD.

The management of sediment from stormwater run-off at the WRD for Stage 1 of the project and the plant area is shown in Figures 8 and 9 below. Sediment run-off basins will be used at the WRD and plant area to capture sediment laden stormwater for treatment prior to release to the environment. Figures 8 and 9 below shows the standard design of the sediment basins with the location of the sediment basins at the Premises shown in Figure 10.

Figure 7: NE WRD cross section



Pipelines

Pipelines at the Premises will be constructed of polyethylene and will be used for the transfer of tailings slimes to thickener, thickened slimes to settling ponds, thickener overflow, process water return to plant and slimes decant water return. The pipelines will be located above ground (where possible) within fully bunded V-drain corridors with sufficient capacity to contain the volume of the pipeline for a 12 hour period should a leak or rupture occur. Isolation points will be installed at regular intervals. The pipeline corridors will be inspected each 12 hour shift.

Landfill

The landfill which will be located east of the WRD as shown in Figure 1 above, is expected to receive up to 400 tonnes per year of putrescible waste generated at the Premises. Any waste not suitable for disposal at the landfill (i.e. waste oil) will be taken offsite for disposal at appropriately licensed premises. A storage area (temporary waste area) will be located within the landfill area to accept, store and sort waste prior to disposal.

The landfill will utilise a trench method for the disposal of waste with the excavated material later used to cover the waste at least once per month. Each trench will be approximately 5 metres (m) wide by 40 m in length and excavated to a depth of 3 m to allow for 2 m of waste and 1 m of soil cover. A total of 7 trenches are expected to be constructed over the 7 year life of mine.

A perimeter fence will be installed around the landfill which will be designed to prevent the entry of livestock and will assist in containing windblown waste.

A perimeter drainage channel will be installed upstream of the landfill to direct uncontaminated stormwater around the facility. A drainage pond will be constructed in the temporary waste area to capture any contaminated stormwater. It will be designed with a capacity to contain stormwater from a 1 in 20 year rainfall event. Any stormwater present within the operational trench would remain within the trench.

Wastewater Treatment Plant

A wastewater treatment plant (WWTP) will be installed for the treatment of sewage generated at the accommodation camp with wastewater discharged to a nearby irrigation field. An EP Act Part V approval is required for a sewage facility that has a capacity of greater than 20 m^3 per day. The proposed WWTP for this Premises will have a capacity to treat up to 16 m^3 of sewage per day. Therefore, EP Act Part V approval is not required for this proposed sewage facility. The applicant has applied to the Department of Health for approval for this facility.

Power Generation

Power will be generated at the Premises through the use of diesel generators with a total combined capacity of 4 megawatts (MW). This total combined power generation of 4 MW is below the threshold of 10 MW when an EP Act Part V approval would be required.

Figure 8: Sedimentation basin design - overview

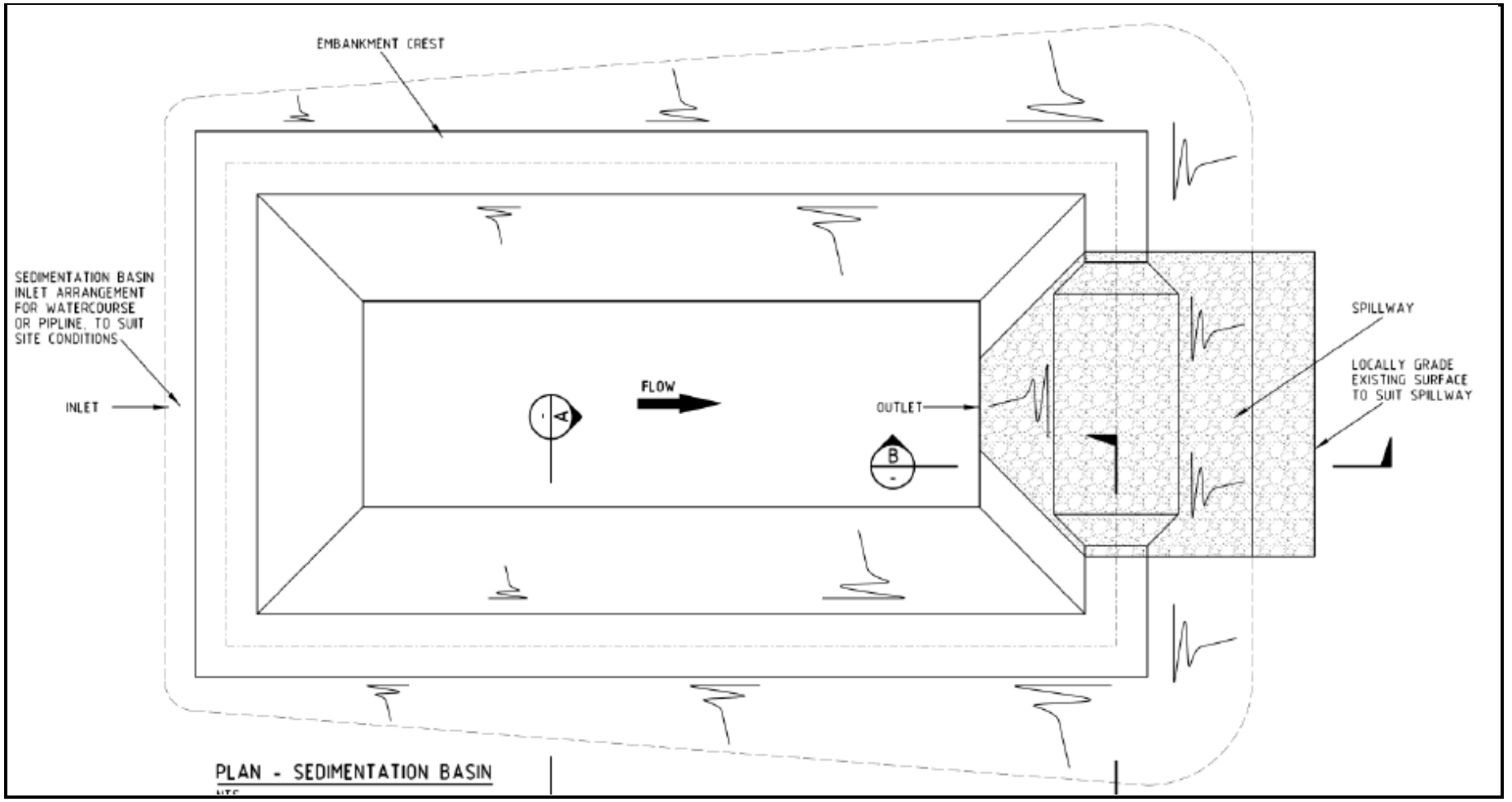
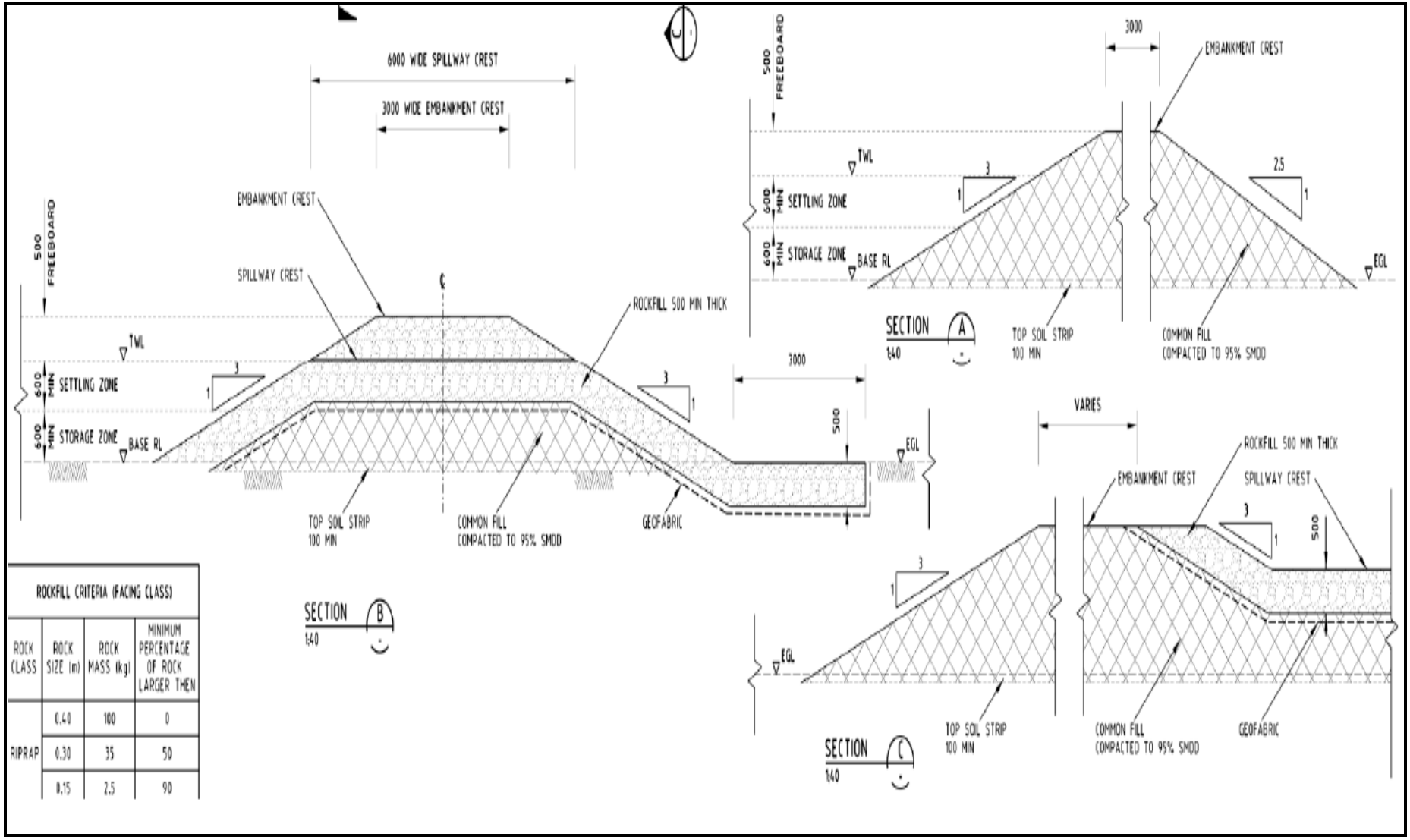
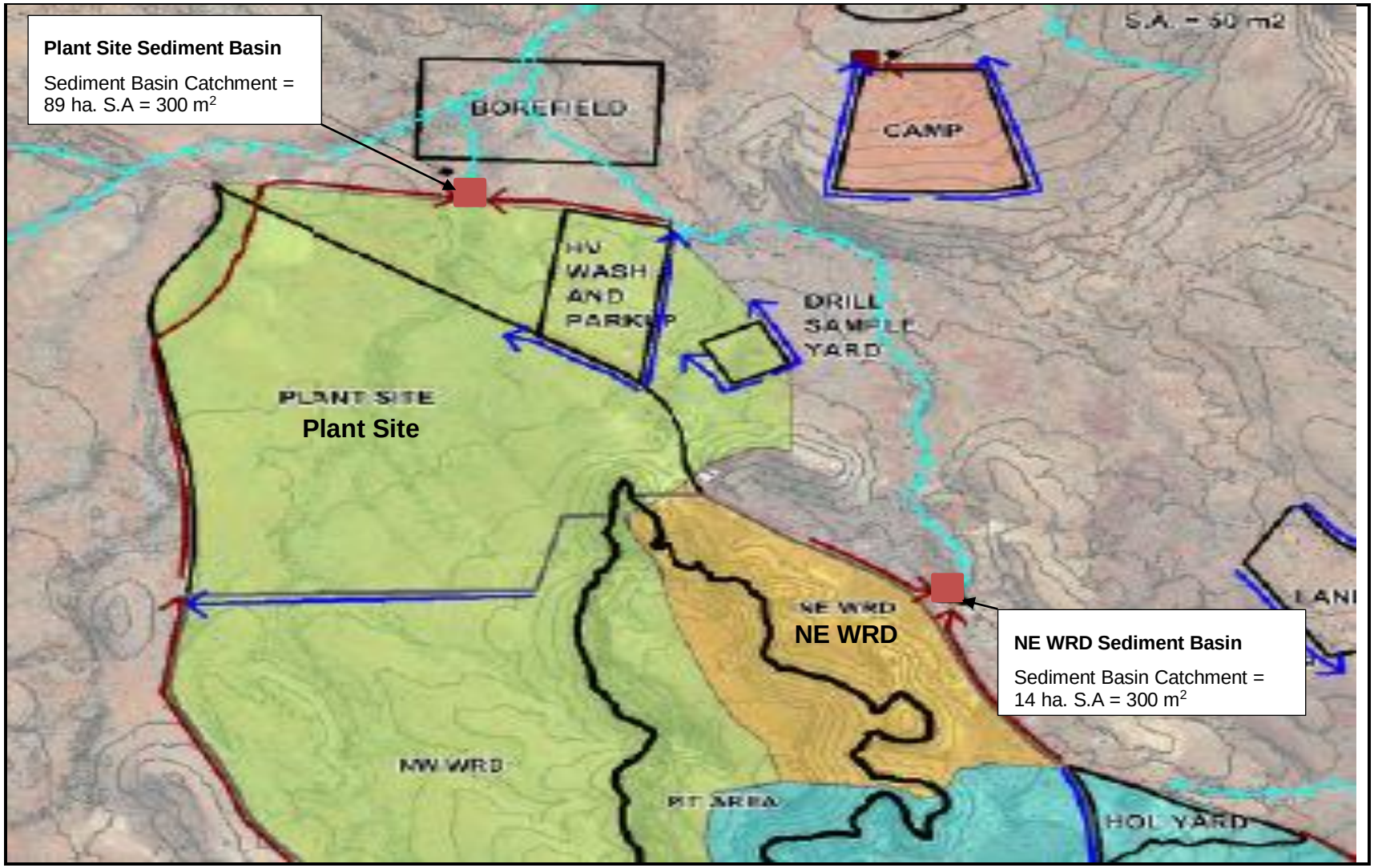


Figure 9: Sedimentation basin design – embankment and spillway



ROCKFILL CRITERIA (FACING CLASS)			
ROCK CLASS	ROCK SIZE (m)	ROCK MASS (kg)	MINIMUM PERCENTAGE OF ROCK LARGER THEN
RIPRAP	0.40	100	0
	0.30	35	50
	0.15	2.5	90

Figure 10: Sediment basin locations



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 *Guidance Statement: Risk Assessments* (DER 2017).

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 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
Construction			
Dust	Vehicle movement and earth works.	Air/windborne pathway	Water carts used on roads and open areas that pose a dust risk. Only clear areas as required. Speed restrictions on roads.
Commissioning and Operation			
Dust	Vehicle movement	Air/windborne pathway	Water cart used on roads and open areas that pose a dust risk. Speed restrictions on roads.
	Fugitive dust from stockpiles and WRD		Use of water cart as required.
	Crushing and stockpiling of ore at the crushing and screening plant Loading material onto trucks		Water sprays will be installed at strategic transfer points. Beneficiated product remains moist therefore dust generation not expected.
Seepage of process slimes	Settling ponds	Infiltration through soil profile	Ponds lined with a HDPE liner Maintain a sacrificial slimes layer over HDPE liner to protect the liner when excavating slimes. Excavation equipment fitted with GPS to control excavation depths in order to

Emission	Sources	Potential pathways	Proposed controls
			protect liner.
Discharge of tails to land from overtopping	Settling ponds	Direct discharge	Settling ponds designed to provide a minimum 500 mm total freeboard (including an allowance for a 1 in 50-year AEP 72 hour rain event) above the normal operating pond. Water balance calculations (Rockwater 2014) show a one in 100-year AEP rainfall event of 343 mm over 72 hours would result in a remaining 157 mm freeboard. Settling ponds fitted with submersible pumps with automatic level correction to maintain freeboard during operations and significant rainfall events. Settling ponds designed with crest embankment to prevent ingress off stormwater.
Accidental discharge of process waters and tailings	Operation of pipelines and or rupture/leakage	Direct discharge	Pipelines located above ground where possible and positioned within bunded v-drains designed to contain any accidental discharge. Areas signposted where pipelines are positioned below ground. Pipelines fitted with isolation valves at regular intervals. Use of non- toxic flocculant within the thickener.
Leachate from storage of tailings at the WRD	WRD	Direct discharge and infiltration through soil profile	Installation of earthen bunding around WRD to divert stormwater. Position tailings within the WRD so a suitable separation distance between the tailings and the base and walls of the WRD is provided. Direct potentially contaminated stormwater to sediment basins. Install recovery bores downgradient of the WRD if groundwater monitoring indicates impacts are occurring.
Contaminated stormwater runoff	Process plant areas, stockpiles and NE WRD	Direct discharge	Use of bunding to divert stormwater away from infrastructure. Location of facilities above flood plain where possible. Separate clean and contaminated stormwater where possible. Direct all potentially contaminated

Emission	Sources	Potential pathways	Proposed controls
			stormwater to sedimentation basins or sediment traps prior to release to the environment. Maintain sedimentation basins and sediment traps as required.
Windblown waste	Landfill	Air/windborne pathway	Waste covered at regularly intervals (at least once per month). Use of litter screens and controlling size of the tipping area. Routine collection of windblown waste. Secure fencing at the landfill to prevent unauthorised entry. Cells capped with one metre of fill when completed.
Contaminated stormwater runoff	Landfill	Direct discharge	Landfill located on flat ground where possible to minimise surface flows. Surface water diverted around landfill area. Contaminated stormwater retained within landfill cells. Contaminated stormwater from temporary waste storage area directed to storage pond. Pond designed to contain rainfall runoff from a 1 in 20 year storm event.

3.1.2 Receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the applicants 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 below provides 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 *(Guidance Statement: Environmental Siting* (DER 2016)).

Table 2: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
No nearby human receptors	Not applicable
Environmental receptors	**Distance from prescribed activity**
Groundwater Premises is situated within the proclaimed Pilbara Surface Water Area however not located within a public drinking water supply area.	Depth to groundwater varies across the Premises with depths recorded (July 2020) at 6.1 to 15.5 metres. Depth to groundwater at the Landfill – 18 metres.

Sampling of groundwater bores at the Premises and surrounding area in July 2020 recorded TDS concentrations from 27 to 2,300 mg/L. Groundwater is suitable for stockwatering purposes.	Depth to groundwater at the settling ponds – 7 metres. Depth to groundwater at the NE WRD – 17 metres.
Groundwater bores	Tommyhawk pastoral groundwater bore - located approximately 1.5 km from the Premises boundary (2.8 km south east of the WRD). Moseleys pastoral groundwater bore – located approximately 4.5 km east of the Premises boundary. Wickhams Well pastoral groundwater bore – located approximately 3 km north of the Premises boundary.
Flora - Priority 4 species *Acacia bromilowiana* No threatened flora	Detected during two separate flora and vegetation surveys (2009 & 2013) however this species was located across six sites and formed the dominant strata in two vegetation communities.
Fauna Four threatened fauna species potentially occurring at the Premises however have not been previously recorded during surveys (2009 & 2013).	- Pilbara Olive Python May occur at the Premises but more likely to occur at the nearby Sunday Hill. - Northern Quoll Likely to occur at the Premises however highly mobile. - Pilbara Leaf-nosed Bat Likely to occur - Ghost Bat Likely to occur
No permanent surface water systems are found on the Premises. The Premises is located between two large drainage systems, Coondoon Creek to the north and Davis River to the south. Both are part of the Oakover River drainage basin which drains towards the north coast however only flows during intermittent seasonal events. Onsite creeks (drainage channels) are dry for most of the year and only flow during periods of high rainfall events. The drainage pattern is away from the elevated mine area in either an east or west direction with some drainage towards the south. The flows are brief and eventually drain east to the major rivers and creeks located offsite. Premises is situated within the proclaimed Pilbara Surface Water Area however not located within a public drinking water supply area.	Coondoon Creek – Approximately 18 km to the northwest. **Distance considered too great for consideration as receptors.** Davis River – Approximately 46 km to the south east. **Distance considered too great for consideration as receptors.** Onsite creeks (drainage channels)

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) for each identified emission source and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are incomplete 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 W6481/2020/1 that accompanies this Decision Report authorises construction 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 operation of the Premises i.e. Category 5 and 89 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, commissioning and operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
Construction								
Construction of the ROM pad, processing plants, process water pond, settling ponds, pipelines, and haulroads.	Dust	Air/windborne pathway. Smothering of vegetation causing impacts to vegetation health.	Surrounding native vegetation	Refer to Section 3.1	C = Slight Minimal on-site impacts L = Unlikely The risk event will probably not occur in most circumstances **Low Risk**	Yes	Conditions 1 and 2	Construction and installation of infrastructure to be generally located as identified in the submitted application. No additional construction conditions for the management of dust required. The general provisions of the EP Act apply.
Commissioning and time-limited-operations								
Time Limited Operations of the Processing Plant (crushing and screening)	Dust	Air/windborne pathway. Smothering of vegetation causing impacts to vegetation health.	Surrounding native vegetation	Refer to Section 3.1.1	C = Slight Minimal on-site impacts L = Unlikely The risk event will probably not occur in most circumstances **Low Risk**	Yes	Conditions 1**, 5, 6, 12, 15, 16, 20, 21, 22, 23 and 24**	Applicant controls conditioned for the management of dust at the crushing and screening circuit. Standard administration and reporting requirements.
	Sediment laden stormwater run-off from stockpiles and infrastructure area	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	Onsite creeks (drainage channels).	Refer to Section 3.1.1	C = Minor Low level on-site impacts with minimal off-site local scale impacts	Yes	Conditions 1, **5, 6, 15, 16, 20, 21, 23 and 24**	Applicant controls conditioned for the management of sediment laden stormwater run-off and diversion of clean stormwater. Routine monitoring of treated water prior to discharge.

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
					L = Possible The risk event could occur at some time **Medium Risk**			Monitoring parameters to include TRH, TSS, TDS, TN and metals. Standard administration and reporting requirements.
Commissioning and Time Limited Operations of the wet processing plant and pipelines	Accidental discharge of product and tailings (slimes) to land	Direct discharge Increased concentration of certain elements (including manganese) in soils causing disruption of normal ecosystem function. Smothering of vegetation with tailings slurry.	Soils Native vegetation Onsite creeks (drainage channels).	Refer to Section 3.1.1	C = Minor Low level on-site impacts with minimal off-site local scale impacts L = Possible The risk event could occur at some time **Medium Risk**	Yes	Conditions 1, **5, 6, 9,** 11, **12**, **13, 14, 15, 16, 18, 19, 20, 21, 23 and 24**	Applicant controls conditioned for pipeline construction and inspection requirements. Standard administration and reporting requirements.
	Contaminated stormwater from stockpiling of lump and fine product and reject material	Direct discharge Increased concentration of certain elements (including manganese) in soils causing disruption of normal ecosystem function.	Soils Surrounding native vegetation Onsite creeks (drainage channels).	Refer to Section 3.1.1	C = Minor Low level on-site impacts with minimal off-site local scale impacts L = Possible The risk event could occur at some time **Medium Risk**	Yes	Conditions 1, **5, 6, 9,** 11, **12**, **13, 14, 15, 16, 18, 19, 20, 21, 23 and 24**	Applicant controls conditioned for the management of sediment laden stormwater run-off and diversion of clean stormwater. Standard administration and reporting requirements.
Discharge of tailings (slimes) to settling ponds	Overtopping of the pond embankments	Direct discharge Increased concentration of	Soils Surrounding native	Refer to Section 3.1.1	C = Minor Low level on-site impacts with	Yes	Conditions 2, **3, 4, 7, 8, 10, 12**, **13, 14, 15, 16, 17, 19, 20, 21, 23 and 24**	Applicant controls conditioned for the maintaining of sufficient freeboard, operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		certain elements (including manganese) in soils and onsite creeks causing disruption of normal ecosystem function. Detrimental effects on vegetation due to erosion and inundation.	vegetation Onsite creeks (drainage channels).		minimal off-site local scale impacts L = Possible The risk event could occur at some time **Medium Risk**			of automated pumps, conducting routine inspections and maintaining diversion bunds. Standard administration and reporting requirements.
	Seepage from settling ponds due to damage of the pond liner	Seepage through embankment walls and base resulting in a change in the groundwater chemistry. Localised surface expression causing detrimental effects on native vegetation. Increased concentration of certain elements (including manganese) in soils causing disruption of normal ecosystem function.	Groundwater Soils Surrounding native vegetation	Refer to Section 3.1.1	C =Moderate Mid level on-site impacts with low level off-site local scale impacts L = Possible The risk event could occur at some time **Medium Risk**	Yes	Conditions 2, **3, 4, 7, 8, 10, 12**, **13, 14, 15, 16, 17, 18, 19, 20, 21, 23 and 24**	Applicant controls conditioned for the construction of the settling ponds including the maintaining of a sacrificial protection layer in the pond, and excavation equipment fitted with GPS to protect the HDPE liner. Additional conditions imposed for groundwater monitoring bore construction requirements to ensure the bores are appropriately positioned to monitor for potential impacts. Standard administration and reporting requirements
Storage of return water in the Process Water pond	Overtopping of the pond embankment	Direct discharge Increased	Soils Surrounding	Refer to Section 3.1.1	C = Slight On-site impacts	Yes	Conditions 1, **5, 6, 9,** 11, **12**, **13, 14, 15, 16, 19, 20,**	Applicant controls conditioned for the maintaining of sufficient freeboard and daily

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
		concentration of certain elements in surrounding soils causing disruption of normal ecosystem function. Detrimental effects on vegetation due to erosion and inundation.	native vegetation		minimal. L = Unlikely The risk event will probably not occur in most circumstances **Low Risk**		**<u>21, 23 and 24</u>**	inspections of the Process Water Pond to ensure the required freeboard is being maintained. Standard administration and reporting requirements.
Disposal of lump and fine reject and dried tailings (slimes) to the NE WRD	Leachate	Seepage through embankment walls and base resulting in a change in the groundwater chemistry and/or impacts to onsite creeks.	Groundwater Onsite creeks	Refer to Section 3.1.1	C = Moderate Mid-level onsite impacts with low level local scale off-site impacts L = Unlikely The risk event will probably not occur in most circumstances **Medium Risk**	No	Conditions 2, **3, 4, <u>7, 8, 10, 12</u>, <u>13, 14, 15, 16, 17, 18, 20, 21, 23 and 24</u>**	Refer to Section 3.3 for detailed risk assessment
	Dust	Air/windborne pathway. Smothering of vegetation causing impacts to vegetation health.	Surrounding native vegetation	Refer to Section 3.1.1	C = Slight Minimal on-site impacts L = Unlikely The risk event will probably not occur in most circumstances as the waste streams remains moist following	Yes	Not applicable	No conditions required for the management of dust. The reject wastes and dried slimes remain moist during disposal at the WRD. The general provisions of the EP Act apply.

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
					processing. **Low Risk**			
	Sediment laden stormwater run-off from the NE WRD	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	Onsite creeks (drainage channels).	Refer to Section 3.1.1	C = Minor Low level on-site impacts with minimal off-site local scale impacts L = Possible The risk event could occur at some time **Medium Risk**	Yes	Conditions 2**, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23 and 24**	Applicant controls conditioned for the management of sediment laden stormwater run-off and diversion of clean stormwater. Additional condition included requiring routine monitoring of treated water prior to discharge to the environment. Monitoring parameters to include TRH, TSS, TDS and metals. Standard administration and reporting requirements.
Disposal of putrescible waste at the Landfill	Windblown waste	Air/windborne pathway causing amenity impacts and detrimental effects to local fauna.	Native flora and fauna	Refer to Section 3.1.1	C = Slight Minimal on-site impacts L = Possible The risk event could occur at some time **Low Risk**	Yes	Conditions 1, **5, 6, 15, 16, 20, 21, 23 and 24**	Applicant controls conditioned for the management of windblown waste. Standard administration and reporting requirements.
	Leachate	Seepage through soil profile potentially contaminating good quality groundwater.	Groundwater	Refer to Section 3.1.1	C = Slight Minimal on-site impacts L = Rare The risk event may only occur in	Yes	Conditions 1, **5, 6, 15, 16, 20, 21, 23 and 24**	Applicant controls conditioned requiring the landfill is located so a minimum distance of 3 m is maintained between base of landfill and groundwater. Depth to groundwater is 18 m at the landfill. Applicant controls also

Risk Event					Risk rating[1] C = consequence L = likelihood	Applicant controls sufficient?	Conditions[2] of works approval	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Applicant controls**				
					exceptional circumstances. **Low Risk**			conditioned requiring restricting the disposal of liquids or hazardous materials, wastes covered on a regular basis, diversion of clean stormwater and cells capped and rehabilitated on completion. Standard administration and reporting requirements.
	Contaminated stormwater run-off	Overland runoff potentially causing ecosystem disturbance or impacting surface water quality	On-site creeks Soils Surrounding native vegetation	Refer to Section 3.1.1	C = Slight Minimal on-site impacts L = Rare The risk event may only occur in exceptional circumstances. **Low Risk**	Yes	Conditions 1, **5, 6, 15, 16, 20, 21, 23 and 24**	Any contaminated stormwater would remain within the landfill trench. Applicant controls conditioned for the ongoing maintaining of the upstream drainage channel so uncontaminated stormwater is diverted away from the landfill. Standard administration and reporting requirements.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guidance Statement: Risk Assessments* (DER 2017).

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

3.3 Risk event – Leachate to surface water and/or groundwater from the NE WRD

Deposition of process waste streams (lump rejects, fines rejects and dried tailings slimes) into the NE WRD can result in seepage impacting the groundwater, which is considered suitable for stock watering purposes, and onsite creek lines.

3.3.1 Identification and general characterisation

A majority of the process waste will consist of dewatered lump and fines reject materials which will be co-disposed with mine waste rock at the NE WRD. A smaller portion of the waste stream will consist of thickened tailings slimes from the beneficiation plants. The thickened tailings slimes go through a process of drying in settling ponds before being excavated and then also co-disposed at the NE WRD.

As a result of the proposed beneficiation process, the mineralogy of the process wastes and the non-beneficiated waste rock are essentially the same. The key change is the particle size distribution rather than geochemical characteristics.

During 2014, previous owners of this proposed mine undertook materials characterisation test work of the process waste from trial mining, low grade material and waste rock samples which were representative of waste materials to report to the NE WRD for disposal. The results from the test work are presented in tables set out below.

The Table 4 test results show all samples were slightly acidic however were above pH 5.0 when materials are typically net acid generating. The EC results are believed to be typical of values recorded within natural groundwater at the Premises.

Table 4: pH and EC results

Sample ID	pH	EC (dS/m)
ROM Camp Process V	6.38	0.036
1511 Silica Breccia	5.62	0.009
1153 Mn Breccia	6.37	2.047
1155 Mudstone	6.21	1.135
1156 Sandstone	6.08	1.401

The Total Sulfur and Net Acid Generation test results shown in Table 5 below indicate the samples are classified as Non-Acid Forming (NAF).

Table 5: Total Sulfur and Net Acid Generation Test Results

Sample ID	Total Sulfur (%)	NAG pH	NAG pH 4.5 (kg H_2SO_4/tonne)	NAG pH 7.0 (kg H_2SO_4/tonne)
ROM Camp Process V	0.015	7.4	<0.5	<0.5
1511 Silica Breccia	0.018	7.8	<0.5	<0.5
1153 Mn Breccia	0.010	8.0	<0.5	<0.5
1155 Mudstone	0.015	7.8	<0.5	<0.5
1156 Sandstone	0.024	7.0	<0.5	<0.5

The test work for determining metal leaching from the samples was undertaken using the ALSP method. The results of the test work are shown in Table 6 below. The results showed the pH of leachate water remained neutral to slightly alkaline or slightly acidic. The results also showed the concentration of all major metals were below the laboratory limit of reporting (LOR). As a result, it was therefore considered that the elemental metals within the waste material are likely

to be highly stable and unlikely to be susceptible to leaching.

Table 6: Metal Leaching Results

Sample ID	Final pH of leachate	Arsenic (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L	Zinc (mg/L)
ROM Camp Process V	6.6	<0.05	<0.01	<0.01	<0.01	<0.03	<0.00005	<0.02	<0.02
1511 Silica Breccia	7.1	<0.05	<0.01	<0.01	<0.01	<0.03	<0.00005	<0.02	<0.02
1153 Mn Breccia	6.25	<0.05	<0.01	<0.01	<0.01	<0.03	<0.00005	<0.02	<0.02
1155 Mudstone	6.4	<0.05	<0.01	<0.01	<0.01	<0.03	<0.00005	<0.02	<0.02
1156 Sandstone	8.1	<0.05	<0.01	<0.01	<0.01	<0.03	<0.00005	<0.02	<0.02

In 2020, a review of the previous materials characterisation work as well as an assessment of the exploration assay database (greater than 10,000 assays) was undertaken by MBS Environmental (MBS). MBS concluded the following:

- The waste materials have a low risk of generating AMD;

- The waste materials have a low risk of generating saline, acidic or metalliferous seepage; and

- Dispersion and erosion risks have been assessed and as a result have been addressed in the waste rock design.

3.3.2 Description of potential adverse impact from the emission

Seepage from the NE WRD may alter the quality of the groundwater in this area which is considered good quality. Depth to groundwater at the NE WRD has been measured at 17 mbgl. Sampling of two existing groundwater bores at the Premises and two in the surrounding area during July 2020 show TDS concentrations ranging from 27 to 2,300 mg/L which is considered suitable for drinking water (potable water) when concentrations are found to be below 500 mg/L, and stockwatering purposes. A summary of groundwater sampling results is presented in Table 7 below.

Table 7: Groundwater sampling results (2020)

Parameter	Units	Results
pH	pH units	5.7 – 7.2
Electrical Conductivity	µS/cm	44 – 3,700
Total Dissolved Solids	mg/L	27 - 2,300
Total Suspended Solids		40 – 200
Total Nitrogen		1 – 11
Total Phosphorous		0.06 – 0.74
Calcium – Dissolved		2.9 – 94
Potassium – Dissolved		2 – 7.4
Magnesium – Dissolved		2.7 – 150
Sodium – Dissolved		6.1 – 410
Total Alkalinity as $CaCO^3$		9 – 730
Chloride		4 - 680
Sulphate		2 - 250

Seepage from the NE WRD could also result in discharge to onsite creek lines which could

cause ecosystem disturbance or impact surface water quality in downstream areas.

Any seepage from the NE WRD is expected to be low in salinity as a result of the low saline water used in the process (process water sourced at the Premises), the waste materials generated, and also contain very low/insoluble concentrations for environmentally significant metals and metalloids.

3.3.3 Criteria for assessment

Sampling of existing groundwater bores at the Premises and at two nearby bores indicates the groundwater is of good quality (see Table 7 above). The groundwater is likely to be found suitable for public drinking water purposes, however the Premises is not located within a proclaimed public drinking water source area. Therefore, once the groundwater quality is determined at the groundwater monitoring bores to be constructed at the NE WRD and settling ponds, prior to commissioning commencing, these background results will be used to establish trigger levels and limits in the operational licence.

3.3.4 Applicant controls

Emission	Sources	Potential pathways	Proposed controls
Commissioning and Operation			
Seepage from storage of tailings at the NE WRD	NE WRD	Direct discharge and infiltration through soil profile	Installation of earthen bunding around NE WRD to divert clean stormwater. Constructed with infrastructure for the collection and treatment of contaminated (sediment) stormwater prior to discharge to the environment. Opportunistic sampling of runoff following significant rainfall events. Position tailings within the NE WRD so a suitable separation distance between the tailings and the base (5 m) and walls (2 m) of the NE WRD is provided. Proposed installation of recovery bores downgradient of NE WRD if groundwater monitoring indicates impacts are occurring.

3.3.5 Consequence

Seepage resulting in groundwater impacts

If seepage is able to migrate to groundwater at the Premises, then the impacts may result in low level onsite impacts due to seepage water quality expected to be of similar quality to the groundwater at the Premises, and is expected to contain very low/insoluble concentrations for environmentally significant metals and metalloids. Therefore, the Delegated Officer considers the consequence to be **Minor**.

Seepage resulting in impacts to onsite creeks lines

If seepage is able to discharge into creek lines at the Premises, then the impacts are expected to be low level onsite impacts due to seepage water expected to be of reasonable quality with low salinity levels and contain very low/insoluble concentrations for environmentally significant metals and metalloids, the creek lines are mainly dry for most of the year and final discharge to a major creek system is located 18 km away. Therefore, the Delegated Officer considers the consequence to be **Minor**.

3.3.6 Likelihood of Risk Event

The waste material characterisation test work previously undertaken in 2014 is assumed to represent the waste material for this proposal. Therefore, in the absence of up to date site-specific waste material characterisation test work, the Delegated Officer considers the likelihood of impacts to groundwater and to onsite creek lines from seepage as **possible.**

3.3.7 Overall rating of seepage from the NE WRD

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix detailed in the Guidance Statement: Risk Assessments (DER 2017) and determined that the overall rating for the risks from seepage at the NE WRD as **Medium**.

4. Regulatory Controls

4.1 Works Approval controls

4.1.1 Construction infrastructure and equipment requirements, commissioning, and time limited operational requirements

Design requirements have been included for the Crushing and screening plant, Beneficiation Plants, Sedimentation basins, Thickener, Settling Ponds, Process Water Pond, NE WRD, groundwater monitoring bores, pipelines and the landfill as per the Applicant's commitments.

Commissioning requirements have been included for the Beneficiation and pipelines only as requested by the Applicant. Time limited operational requirements have been included for the Crushing and screening plant, beneficiation plants, settling ponds, process water pond, NE WRD and landfill.

4.1.2 Seepage from the NE WRD

Applicant controls are conditioned in the works approval and the addition of the following conditions:

- Prior to commissioning of the NE WRD and Settling ponds, baseline groundwater sampling of the newly constructed groundwater monitoring bores is required;
- Applicant to provide a construction report within 60 days following completion of the groundwater monitoring bores; and
- Applicant to undertake test work on the tailings slimes waste within 30 days of the commencement of time limited operations.

Justification:

Baseline groundwater monitoring at the NE WRD is required before the commencement of commissioning to determine if groundwater levels are changing or water quality has been affected as a result of seepage.

Construction reports required for the monitoring bores to determine if they are appropriately located for monitoring purposes.

Tailings waste characterisation test work for a previous mining proposal at the Premises was undertaken in 2014. Characterisation test work on the actual tailings materials during time limited operations is required in order to validate the assumptions made on previous test work.

4.1.3 Monitoring requirements

The works approval requires the following monitoring requirements:

- Baseline monitoring of groundwater quality at the newly constructed groundwater

monitoring bores at the settling ponds and NE WRD, and then quarterly during commissioning and time limited operations;

- Sampling of discharge waters from the Plant Site sediment basin and NE WRD sediment basin prior to discharge to the environment. Sampling is required within 48 hours of discharge occurring then weekly during the discharge period.
- Recording the volume of ore processed at the crushing and screening plant;
- Recording the volume of ore processed, product and rejects produced and volume of tailings (slimes) discharged at the beneficiation plants;
- Record the volume of thickened tailings (slimes) discharged to the settling ponds and the water recovered;
- Record the volume of water (thickener overflow) discharged into the process water pond and water recovered from the pond;
- Record the quantity of lump rejects, fines rejects and dried slimes waste discharged at the NE WRD; and
- Record the location of the deposited dried slimes waste at the NE WRD.

Justification:

Monitoring of ambient groundwater levels and quality is required to determine if the SWL is changing or water quality is deteriorating indicating seepage from the settling ponds and/or NE WRD.

Monitoring the discharge water from the sediment basins is required to determine if the infrastructure is effective in reducing suspended solids, and to identify the concentration of particular elements present within the discharge to determine if those elements will present a risk to the receiving environment.

Monitoring the volumes of wet tailings (slimes) discharged, thickened tailings (slimes) discharged to the settling ponds and the water to the process water pond, and recovered water from the settling ponds and process water pond in order to determine the water balance at the Premises.

4.1.4 Inspections

The works approval requires the following inspection procedures:

- Integrity check of pipelines for the transfer of tailings (slimes), thickener overflow, slimes decant return water and process return water;
- Freeboard at the Settling ponds and process water pond; and
- Inspect for any sign of seepage occurring from the embankment walls of the NE WRD.

Justification:

Visual inspections of containment infrastructure and pipelines are required during commissioning and time limited operations and the Applicant is required to keep records of visual monitoring undertaken.

4.1.5 Monitoring reports

The works approval requires the following reports be submitted:

- Environmental Compliance Report and Critical Containment Infrastructure Report demonstrating that the infrastructure has been installed as committed to and as per the required Infrastructure and equipment requirements tables, with no material defects;

- Environmental Commissioning Report providing a summary of the commissioning activities with timeframes, ore processed, product produced, waste deposited, summary of monitoring results obtained and environmental performance; and
- Time Limited Operations report providing ore processed, product produced, wastes deposited, water recovered, water balance for the Premises, summary of monitoring results obtained and environmental performance.

Justification:

Reporting requirements are necessary for the administration of the works approval, validating against the design criteria and ongoing acceptability of the operations.

5. Consultation

Table 8 provides a summary of the consultation undertaken by the department.

Table 8: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website (28/12/20)	None received	N/A
Email to Dale Carter, Senior Environmental Advisor Mineral Resources 28/01/21. Requested information about the size and capacity of the WWTP and irrigation field.	Email from Dale Carter 28/01/21 providing information as requested.	Accepted. Information updated in decision report and works approval.
Email to Dale Carter, Senior Environmental Advisor Mineral Resources 28/01/21. Requested information regarding the process water pond design specs.	Email from Dale Carter 4/02/21 and 10/02/21 providing information as requested.	Accepted. Information updated in decision report and works approval.
Email to Dale Carter, Senior Environmental Advisor Mineral Resources, 11/03/21. Clarification required on WRD design and sedimentation ponds at the WRD and plant infrastructure.	Phone call (12/03/2021) from Dale Carter and emails dated 12/3/21 and 16/3/21. Dale clarified the correct WRD design provided in the supporting documentation. Dale will also provide design drawings for the sedimentation pond.	Accepted. Information updated in decision report and works approval.
Applicant was provided with draft documents on 23/03/2021. Applicant provided comment 14/05/2021.	Refer to Appendix 1	Refer to Appendix 1

6. 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

1. Department of Environment Regulation (DER) 2016, *Guidance Statement: Environmental Siting*, Perth, Western Australia.
2. DER 2017, *Guidance Statement: Risk Assessments*, Perth, Western Australia.
3. DER 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
4. Preston Consulting, *Ant Hill Manganese Project – Ore Processing and Landfill Works Approval Application,* October 2020
5. RPS Aquaterra, *Ant Hill Project – Comprehensive Surface Water Assessment,* September 2014.
6. Galt Environmental Pty Ltd, Technical Memorandum – *Acid Mine Drainage Characterisation of Waste Materials – Proposed Ant Hill Project*, 31 January 2014.
7. Mineral Resources, Letter, *Application for a Works Approval – Ant Hill Manganese Project – Request for Further Information (DER2018/001042-4)*, 14 December 2020

Appendix 1: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of applicant's comment	Department's response
1, Table 1, Row 2	Correction required on the Beneficiation Plant process description. Recovered materials are pumped back into the circuit for reprocessing instead of the Dilute Media Hopper as shown in the draft.	Supported. Description updated.
1, Table 1, Row 5	Correction. The minimum total freeboard required is 500 mm which includes the storage of a 1 in 50 year rainfall event (288 mm over 72 hours), not a combined freeboard off 500 mm plus an additional allowance for the 1 in 50 year rainfall event.	Supported. Condition updated.
2, Table 2, Row 1	Correction. The minimum total freeboard required is 500 mm which includes the storage of a 1 in 50 year rainfall event (288 mm over 72 hours), not a combined freeboard off 500 mm plus an additional allowance for the 1 in 50 year rainfall event.	Supported. Condition updated.
16, Table 7, Row 1 & 2	Correction. The requirement to record volumes should be corrected to recording tonnes in line with the throughput description of the works approval.	Supported. Condition updated.
16, Table 7, Row 4	Correction. The minimum total freeboard required is 500 mm which includes the storage of a 1 in 50 year rainfall event (288 mm over 72 hours), not a combined freeboard off 500 mm plus an additional allowance for the 1 in 50 year rainfall event.	Supported. Condition updated.
16, Table 7, Row 4	The Applicant has stated 'What is the requirement for recording the volume of water recovered from the settling ponds. Are water balance calculations sufficient or does it require instrumentation?'.	Recording the volume of water recovered from the settling ponds is required to calculate the water balance for the Premises which is a condition of the works approval. Instrumentation is likely to be required for measuring volume. The submersible pumps located in the settling ponds operate automatically depending on the pond water surface level, and therefore achieving an accurate recording of water volumes recovered from the settling ponds would seem unlikely.

Condition	Summary of applicant's comment	Department's response
		This part of the condition remains unchanged.
16, Table 7, Row 5	Correction. The minimum total freeboard required is 500 mm which includes the storage of a 1 in 50 year rainfall event (288 mm over 72 hours), not a combined freeboard off 500 mm plus an additional allowance for the 1 in 50 year rainfall event.	Supported. Condition updated.
16, Table 7, Row 5	'Record the volume of water (thickener overflow) discharged into the pond' to me implies measuring the flow which is not possible as it's an open ended pipe gravity flowing from the thickener into the process water pond. By way of a water balance this volume can be calculated based on measuring (flow meter) the overall volume of water pumped out of the pond into the crushing/bene plant and measuring the total amount of raw water pumped into the pond from each bore and applying an assumed evaporation rate. If this is sufficient the wording in the Works Approval needs to change to read "Calculate the volume of water (thickener overflow) discharged in the pond". All this is also covered off in clause 21(g) – "water balance at the Premises".	Supported. Condition updated requiring the Applicant to calculate the volume of water (thickener overflow) discharged into the pond and record the volume of water recovered from the pond.
Condition 17	The applicant has requested 6 representative tailings samples are collected over 30 days (One every 5 days), instead of 10 over 30 days.	Supported. 6 representative samples over 30 days is considered sufficient to gather the required data. Condition updated.
Condition 21 (c)	The applicant requested the requirement to measure the volume of tailings slimes discharged to the thickener is removed as this data (tailings discharged from the process plant) can be determined from from the requirements of condition 21 (d).	Supported. Condition 21 (c) removed.
Condition 21 (d)	The applicant has requested this condition is reworded to 'calculated volume of thickener overflow to the process water pond'.	Partially supported. Condition updated to include 'calculated' however the requirement to calculate the volume of thickened slimes waste discharged to the settling ponds will remain. This data assists in calculating a site water balance.

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY (as updated from validation checklist)					
Application type					
Works approval	☒				
Licence	☐	Relevant works approval number:		None	☐
		Has the works approval been complied with?		Yes ☐ No ☐	
		Has time limited operations under the works approval demonstrated acceptable operations?		Yes ☐ No ☐ N/A ☐	
		Environmental Compliance Report submitted?		Yes ☐ No ☐	
		Date Report received:			
Renewal	☐	Current licence number:			
Amendment to works approval	☐	Current works approval number:			
Amendment to licence	☐	Current licence number:			
		Relevant works approval number:		N/A	☐
Registration	☐	Current works approval number:		None	☐
Date application received		27/10/2020			
Applicant and Premises details					
Applicant name/s (full legal name/s)		Comcen Pty Ltd			
Premises name		Ant Hill Manganese Project			
Premises location		M46/238			
Local Government Authority		Shire of East Pilbara			
Application documents					
HPCM file reference number:		DWERDT356422			
Key application documents (additional to application form):		Application form Ant Hill Manganese Project, Ore Processing and Landfill Works Approval Application, 26 October 2020 Certificate of analysis Ant Hill Flood Assessment Ant Hill surface water assessment Technical memorandum AMD characteristics of waste material Ant Hill water supply assessment Ant Hill Biological assessment Ant Hill targeted flora survey Ant hill Level 1 biological survey SDS magnafloc			

Scope of application/assessment	
Summary of proposed activities or changes to existing operations.	Construction of: Crushing and beneficiation plants Waste rock landform Settling ponds Class II putrescible landfill

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Proposed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 5: Processing or beneficiation of metallic or non-metallic ore	1.2million tonnes per year	
Category 89: putrescible landfill	400 tonnes per year	

Legislative context and other approvals		
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 ☐ No ☒	Referral decision No: Managed under Part V ☐ Assessed under Part IV ☐
Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: EPA Report No:
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No:
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☐ General lease ☐ Expiry: Mining lease / tenement ☒ Expiry:5/11/2021 Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why? Mining tenement
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☒ No ☐	CPS No: 8715/1

Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	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 ☒ No ☐	Application reference No: Licence/permit No: GWL167224(1) Application submitted to Water Licensing section for transfer of Licence from previous owner.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☐ No ☐	Name: Type: Has Regulatory Services (Water) been consulted? Yes ☐ No ☐ N/A ☐ Regional office:
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☐ No ☒	Name: N/A Priority: P1 / P2 / P3 / N/A Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☐ N/A ☐
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☒ No ☐	Dangerous Goods Safety Act 2004 Mining Act 1978
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	

Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☐ No ☒	Classification: N/A Date of classification: N/A