

EXECUTIVE SUMMARY

ENVIRONMENTAL
IMPACT ASSESSMENT



Proposed Manganese Ore Mining Operations on Lot PT 7306, Proprietary Mining License (PML) 48/2014 (Pembaharuan 1), 202.37 Ha (500 Ac), Aring 6, Mukim Relai, District of Chiku, Jajahan Gua Musang, Kelantan Darul Naim

EXECUTIVE SUMMARY

PROJECT PROPONENT


EIA CONSULTANT

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PROJECT OVERVIEW

Project Location




- Lot PT 7306 Aring 6, Mukim Relai, District of Chiku, Jajahan Gua Musang, Kelantan Darul Naim

Proprietary Mining License

Duration


Total area: 202.37 Ha (500 ac)
 4 Years: 26th March 2019 to 25th March 2023

Zoning




Forest within the BP 2: Chiku and BPK 2.2: Aring

Environmental Sensitive Area (ESA)



ESA 3


Phasing



Proposed : Phase 1 (12 Ha)
 Phase 2 (70 Ha)

STATEMENT OF NEEDS

Economic Benefit




- In 2013, Malaysia exported 1.11 Mt of manganese mainly to China and the rest to Indonesia and India. In the State of Kelantan only, the production of manganese is about 846,255 tonnes from ten operating mines which is the major production in Malaysia

State Taxes and Royalties




- Kelantan Mineral Enactment 2001 (Mineral Regulations Amendment 2018), the royalty rate for Kelantan State is 12% from the market value.

Socio – Economic Benefit



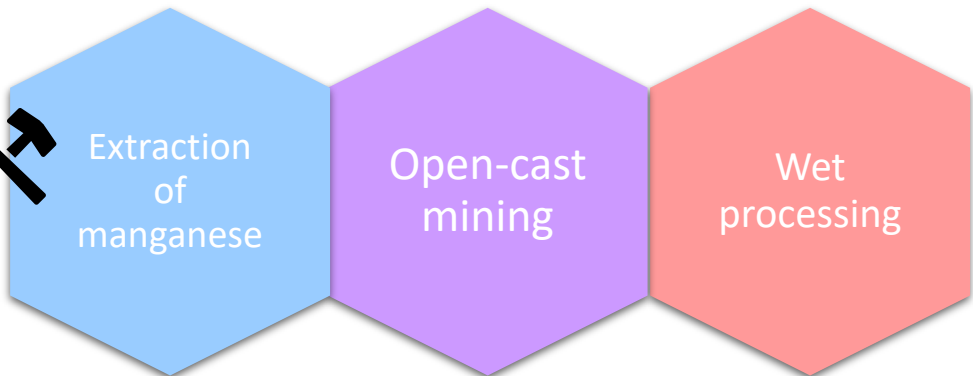
- Employment opportunities

Local Planning Strategy



- Thrust 1: Expansion of Mineral Sector of the NMP2

PROJECT CONCEPT

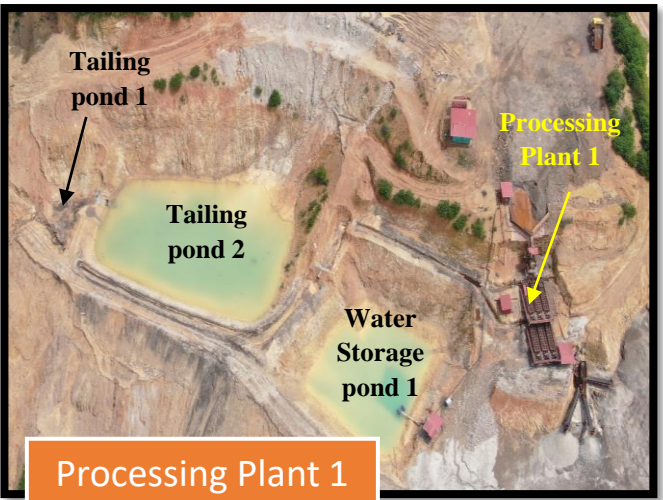


MANGANESE ORE RESERVES AND MINE OPERATIONAL LIFE

Estimated Mining Area	Mn Ore Reserves	Mine Life	Processing Plant
82 Ha	4,428,000 MT	77 years	3

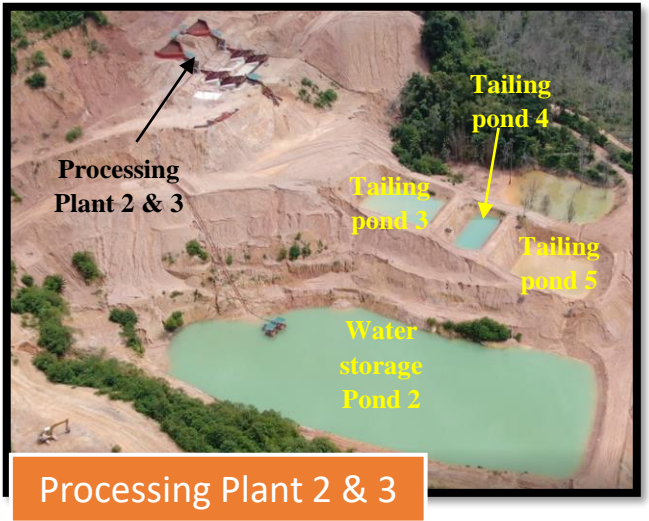
WATER POND

Processing Plant	1	2 & 3
No. of Water Pond	1 (WP1)	1 (WP2)
Total Volume Capacity	16,200 m ³	



TAILING POND

Processing Plant	1	2 & 3
No. of Tailing Pond	2 (TP1 & TP2)	3 (TP3, TP4 & TP5)
Total Volume Capacity	19,200 m ³	





Open-cast Mining Operation

1. Site clearing, constructions of haul roads, BMPs, ponds, installation of processing plants and infrastructure.
2. Excavation of the reserves (overburden and ores).
3. Hauling of excavated ores to the processing plants. The overburden dump at dry dump area for use in reclamation.
4. Ore processing and production of tailings and products.
5. Reclamation of completed sites will run concurrent to ore excavation at other active sites, during the mining operation.
6. Stockpiling of products.



Tailing Pond Recycle

1. Closed circuit water recirculation
2. There will be no effluent discharge
3. Desilting of the ponds will be carried out periodically to restore the tailing retention capacity.



Production Capacity per Month

**2,000 m³/month of manganese ore
(about 10,000 MT/month)**

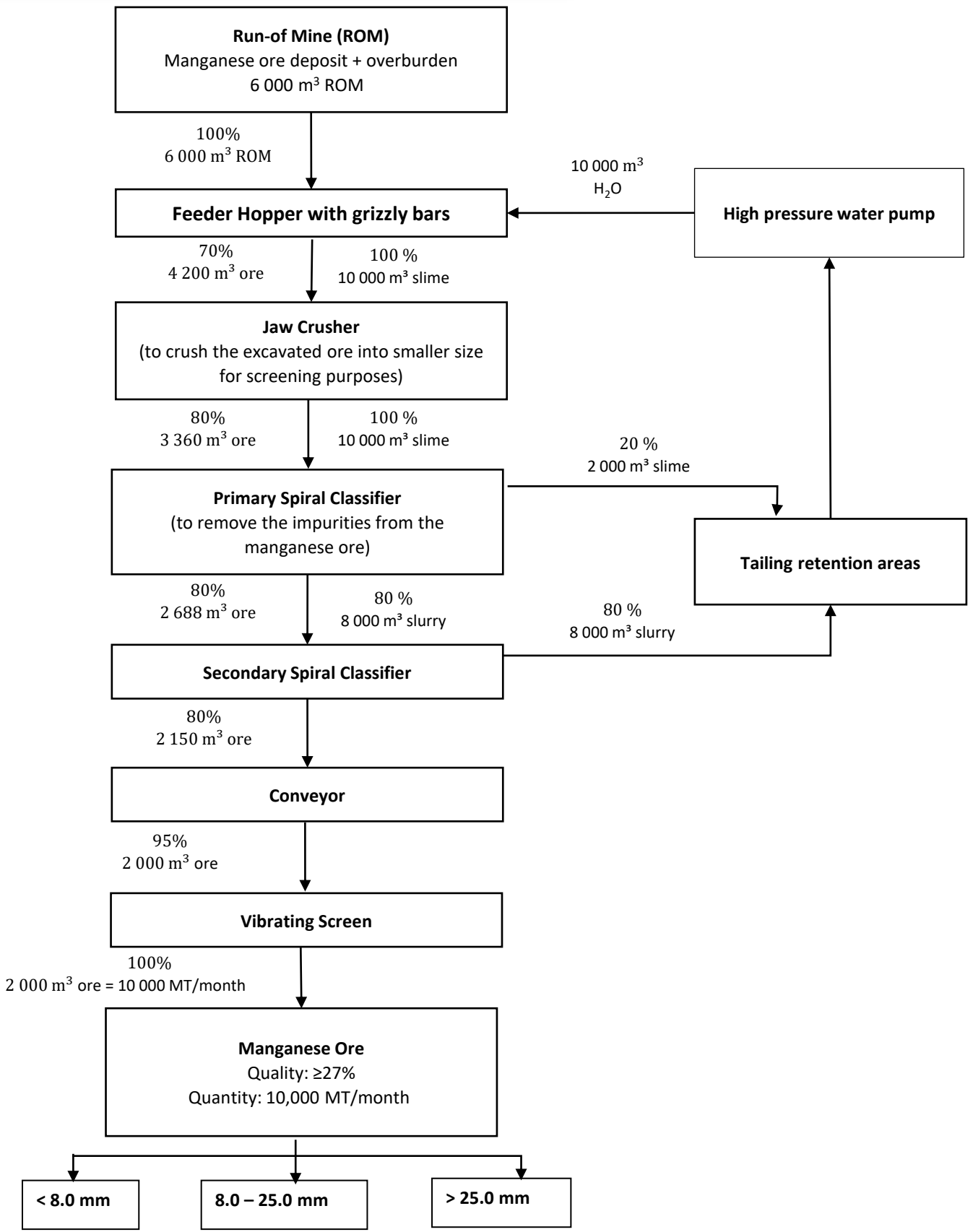


The Final Product

The final product with quality of $\geq 27\%$ (size < 8.0 mm, $8.0 - 25.0$ mm and > 25.0 mm) will be sent to Kuantan Port.



FLOWCHART AND MASS BALANCE





Project Activities

BEFORE OPERATION

EXPLORATION AND INVESTIGATION STAGE

- Site exploration of mineral deposits

BEFORE OPERATION

DEVELOPMENT AND PLANNING

- Demarcation of boundary and setting-out survey
- Mobilization of machineries, manpower and materials for construction
- Land clearing of areas for mine pit, tailing ponds and infrastructures
- Construction of internal haulage road & up-grading of external access road
- Construction of tailing ponds
- Construction sedimentation and water retention ponds
- Construction of P2M2 and BMPs (bunds, drainage system)
- Installation of processing plant
- Construction of infrastructures and facilities

DURING OPERATION

MINING AND PROCESSING STAGE

- Excavation of ores
- Overburden to the dry dump area and ROM hauled to the processing plants
- BMPs maintenance (inc. tailing ponds)
- Processing of the ores to finished products
- Maintenance of haulage and access road
- Concurrent reclamation of sites
- Stockpiling of end products

AFTER OPERATION

REHABILITATION AND ABANDONMENT

- Plan for mine closure
- Decommissioning
- Reclamation and backfilling
- Rehabilitation

EXISTING ENVIRONMENT

Landuse



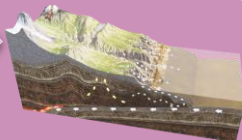
- Mainly forest area, oil palm and rubber plantation.
- Other landuse include *Acacia mangium* plantations, mining and logging activities, and WTP Lebir (1km)
- Sensitive receptors/settlements (5km ZoS): Kg. Kesedar Lebir (nearest to site: 0.61km), Kg. Felda Aring 6 (2.3km) and Kg. Kemajuan Relai (4.65 km)
- Rangkaian Ekologi Utama CFS1 PL07 which is ± 5.2 km and ± 12.7 km (northwest) from the Taman Negara Kelantan.

Hydrology



- Main river: Sungai Lebir, located on eastern side
- Largest tributary of Sungai Lebir within Project site: Sungai Aring, located on western side

Topography



- Elongated hill
- Elevation: 80 – 300 mRL
- Most of the area are above 120 m height above the sea level.
- Soil characteristics: Durian-Munchong-Bungor and Steepland

Geology



- The site underlain under Aring Formation.
- Geological age: Triassic
- Lithology: Extrusive rock - acid to intermediate volcanics. Mainly pyroclastic, rhyolitic to dacitic composition.
- Site surficial geology is characterised by soft to stiff yellowish-brown sandy silt.

Meteorology



Felda Sungai Chiku 3 Station (2015 - 2019)

Temperature

Highest = April 2016 (29.9°C)
Lowest = December 2019 (24.7°C)

Relative Humidity

Highest = November 2019 (91%)
Lowest = April 2016 (70.3%)

Rainfall

Highest = November 2016 (484.5mm)
Lowest = March 2016 (14.4mm)

Raindays

Highest = November 2016 (27 days)
Lowest = March 2016 & 2019 (5 days)

Wind Speed

Highest = 3.4 – 5.4 m/s from NE (1.1%)
Lowest = 0.3 – 1.5 m/s from SE (7.2%)

EXISTING ENVIRONMENT

Water Quality



- 19 sampling points

Water Quality Index (WQI):

- W11 Class I 'Clean'
- W15 Class III 'Slightly Polluted'
- All other sampling points are display WQI Class II 'Clean' except W3, W16 and W19 as Class II 'Slightly Polluted'

Air Quality



- 7 monitoring points
- NO₂, SO₂, O₃ are not detected at all points.
- All PM₁₀, PM_{2.5} and CO are within permissible limits as per MAAQS 2020 except PM_{2.5} at A3, A4 and A7.

Groundwater Quality



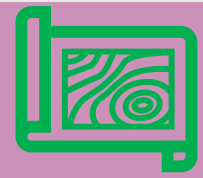
- 1 sampling point
- All the parameters are within the limit of National Drinking Water Quality Standards (MOH, 2004) and Malaysia Groundwater Quality Standards (DOE, 2019)

Noise Level



- 7 monitoring points
- All points are within limit Guidelines for Environmental Noise Limits 2019, Schedule 1 (low density), daytime 55 db(A), nighttime 50 db(A)
- Sources: vehicles, people talking, thunder & raining, dogs barking, insects and birds

Geotechnical



Terrain classification (based on site survey):

Terrain classes	Area (m ²)	Percentage (%)
Class 1: 0° – < 15°	358,400.81	17.71
Class 2: ≥ 15° – < 25°	1,241,147.47	61.33
Class 3: ≥ 25° – < 35°	366,900.44	18.13
Class 4: ≥ 35°	57,271.28	2.83

EXISTING ENVIRONMENT

Terrestrial Fauna

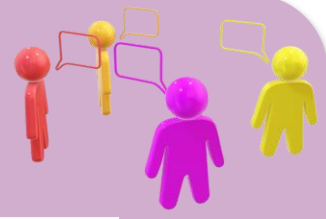


- Mammals: 39 species
- Avifauna: 97 species

Species	Protection Status Wildlife Conservation Act 2010 (Act 716)			IUCN Red List of Threatened Species (2020)				Red List of Mammals for Peninsular Malaysia (2017)			
	TP	P	NP	EN	VU	NT	LC	EN	VU	NT	LC
Mammals	9	7	23	2	4	2	31	1	2	6	30
Birds	80	9	8	0	0	4	93	-	-	-	-

(TP) Totally Protected (P) Protected (NP) Not Protected (EN) Endangered (VU) Vulnerable
(NT) Near Threatened (LC) Least Concern

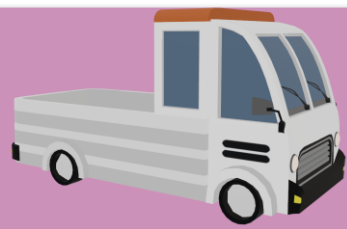
Socio-economic



Public acceptance of the Proposed Project

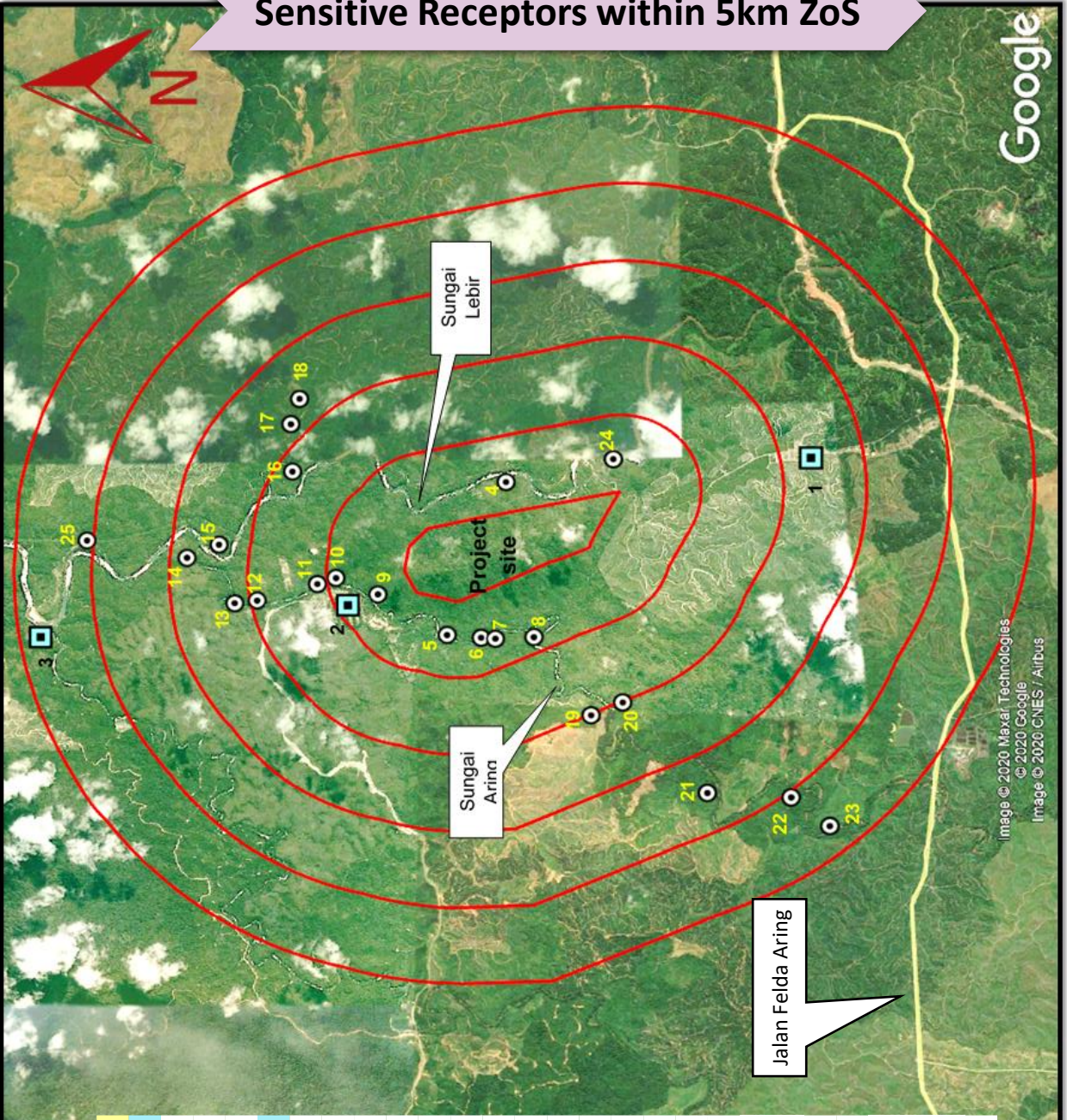
Respondent's Acceptance	Percentage (%)
Agree	34.0
Disagree	53.0
Not Sure	11.0
Total	100

Traffic



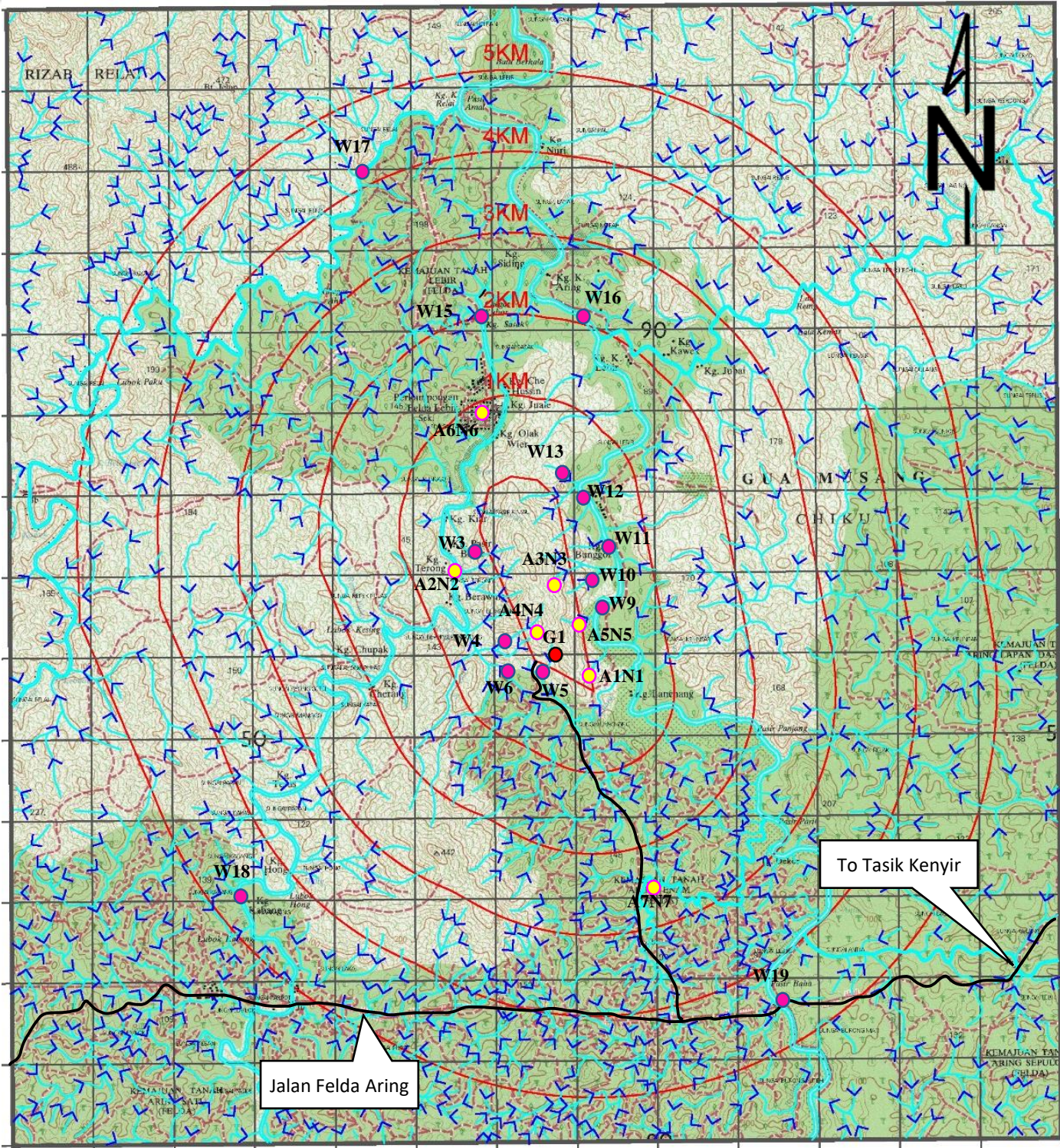
- Main access: Jalan Felda Aring
- AM and PM peak hours: Level of Services (LOS) – A
- No change in traffic before and during mining operations

Sensitive Receptors within 5km ZoS



No.	Villages	Distance
Having residents		
1.	Kemajuan Tanah Aring 6 (Felda)	2.3 km
2.	Kg. Kesedar Lebir	0.61 km
3.	Kg. Relai	4.7 km
Abandoned		
4.	Kg. Bunggor	0.4 km
5.	Kg. Kiar	0.5 km
6.	Kg. Pasir Besar	0.6 km
7.	Kg. Terong	0.7 km
8.	Kg. Berawing	0.9 km
9.	Kg. Olak Wier	0.5 km
10.	Kg. Juale	0.9 km
11.	Kg. Che Hussin	1.2 km
12.	Kg. Sasak	1.95 km
13.	Chegar Kubor	2.2 km
14.	Kg. Siding	2.8 km
15.	Kg. K. Aring	2.4 km
16.	Kg. K. Lebir	1.8 km
17.	Kg. Kawek	2.2 km
18.	Kg. Jubai	2.5 km
19.	Kg. Chupak	2.0 km
20.	Kg. Cherang	2.0 km
21.	Kg. Teras	3.5 km
22.	Kg. Hong	4.1 km
23.	Kg. Kabang	4.7 km
24.	Kg. Lanchang	0.45 km
25.	Kg. Nuri	4.1 km

Water, Air and Noise Sampling Points Map



- Water sampling point (W)
- Groundwater sampling point (W)
- Air and Noise sampling point (AN)
- Access road

EVALUATION OF POTENTIAL IMPACT



Hydrology (Flood)

- Land clearing activities may expose large tract of soil to the impacts of rain. The unhindered flow of high volumes of surface runoffs down a bare slope will increase in velocity and capable of eroding more surface soils, bringing large volumes of water with sediments at a faster rate to the nearest rivers.
- Can potentially increase the frequency of flash flood in the downstream area.
- Increase sedimentation rate at the nearby river may reduce river conveyance capacities.



Soil Erosion and Sedimentation

- Removal of ground cover will expose surface soil to erosion. The eroded soil or sediments carried in the surface runoffs will enter the river and affect the water quality, e.g., increase in the turbidity.
- High rainfall intensity will increase the volume of surface runoffs with higher sediments, leading to an increase in sediment deposition in rivers.
- Influences soil quality and fertility, water quality and deposition of sediment on the riverbed, that will be detrimental to the aquatic life and habitat.
- Reduction in river depth, resulting channel overflow during high rainfall.

Erosion of overburden dump site


- Overburden mounds may be exposed to soil erosion. Surface runoffs carrying sediments from the mounds into nearby rivers.
- Dumping mound is unsightly, and more importantly, pose safety hazard to workers if landslide occur.
- Topsoil blended with the barren overburden will render the topsoil unsuitable material for rehabilitation.
- Activities carried out during the drier period can cause problems with air pollution.



Riverine Riparian Zones

- Clearing of vegetations from riverbanks can cause an increase of soil erosion and decreased in water quality through the loss of filtration services.
- Contributes to the loss of critical species habitat. A river buffer zones of 20 m or more, will be kept along the rivers/streams.

EVALUATION OF POTENTIAL IMPACT

Water Quality 


- Fine silt increases the suspended solids and turbidity of the waterways and can be detrimental to aquatic life as well as render the waterway unsuitable for other uses.
- Indiscriminate disposal of waste, including vegetative waste, general domestic waste, solid waste, scheduled waste, and sewage into the river system may contribute to increased nutrients into waterways, leading to eutrophication and ecological degradation.
- The use of machinery and equipment on site may lead to water pollution through leakage of oil, grease, and fuel into the water courses.
- Changes physical and chemical quality of water, particularly with runoff from stockpiles and working faces and effluent discharge from settlement ponds and other treatment facilities.

Acid Mine Drainage (AMD)

- Iron and sulphide interacts in the presence of oxygen to form Ferrous sulphide (FeS₂) (pyrite).
- Causing decrease in pH.
- Water become dark, reddish-brown due to ferric hydroxide (Fe(OH)₃) precipitating out of the water.


Groundwater Quality

- Potential change in groundwater levels and flow.
- Potential groundwater contamination and contaminant movement.

Air Quality 


- The impacts of the emissions of PM_{2.5} and PM₁₀, SO₂, and NO_x from the sources to the air pollution concentration at sensitive receptors are lower than the Malaysia Ambient Air Quality Standard (MAAQS) 2020.
- The emissions of these fugitive dust are from land clearing, tipper lorries travelling on unpaved surfaces, excavators preparing the site and clearing land, exposed areas of the mining area, and dry dump area and dumping into hopper.
- Elevation, wind direction, and wind speed greatly influence the dispersion of air pollutants with hotspots mainly lying downwind of the dominant wind directions.

EVALUATION OF POTENTIAL IMPACT


Noise Level 

- The main source of on-site noise is primarily from equipment and machinery.
- Excessive and prolonged exposure to noise can be disruptive to the human hearing.
- Cumulative impact can significantly affect wildlife and create annoyance to nearby residents.

Terrestrial Fauna

- Loss of habitat and impact on forest edge.
 - Loss of species
 - Human-wildlife conflict and food shortage.
 - The presence of workers post threat to wildlife through illegal hunting (poaching).
 - Noise will directly or indirectly cause a disturbance to the existing wildlife community.
 - Illegal bird trapping
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Solid and Hazardous Wastes

- Significant amount of solid waste (tree trunks, branches, shrubs, and green vegetative material) will be generated due to the land clearing and site preparation.
 - Construction wastes.
 - Poor storage and handling of general refuse resulting in odor problems, windblown litter, water quality impacts if waste enter water courses, visual impacts, attraction of pest, disease vectors and scavenging animals (insects, rodents etc.) to the site.
 - Scheduled wastes such as lubricating oils, diesel and hydraulic fluids are the examples of waste liquids that will be produced from on-site workshop.
- 

Wastewater and Sewage Discharge

- If the domestic sewage is not well maintained, odor and diseases might be triggered.
- Organic matter, coliform bacteria and suspended solids is the primary contaminants in sanitary effluents which will result in decreasing dissolved oxygen content elevated organic and coliform levels in downstream watercourses.

EVALUATION OF POTENTIAL IMPACT

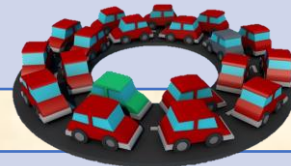
Socio-economic

- Perceptions from surrounding villagers and residents.
- Surrounding environmental quality such as noise annoyance and air pollution.
- Risk local's safety.
- Traffic congestion.
- Job opportunities.



Traffic and Transportation

- The Level of Services (LoS) of the Jalan Felda Aring is performing at the excellent performance, LoS A for both peak hours in the year 2020 due to the traffic volume is lesser than the road capacity.
- During mining operation in 10 years duration and afterwards (>2030), the road is still able to cater the additional traffic with the generated traffic from the site and performing at the satisfactory performance, LoS A



MITIGATION MEASURES

Hydrology (Flood)

- Build detention ponds to provide temporary storage for the excess runoff during storm event.
- Build sufficient diversion and earth drains and other BMPs on site to direct the surface runoff flows within the site to the sedimentation ponds, or silt ponds.
- Continuous monitoring and maintenance of all the BMPs and take immediate action on any noncompliance.
- Enough storage volume within the ponds should be provided in order to control flood of 50-year ARI.
- Construct sufficient height and length of perimeter bunds in low lying areas.

Soil Erosion and Sedimentation

- Control stormwater flows/surface runoffs onto, through, and from the site in stable drainage structures.
- Install diversion, earth drains, perimeter drains and other BMPs to control surface runoffs.
- Stabilize and cover disturbed land areas promptly in a timely manner to minimize the exposure to rain.
- Protect steep slopes.
- Drainage and slope stabilization specifically designed to nurture the geology, soils, and terrain of the affected areas.
- Maintain river riparian buffer zones; rehabilitate areas that have been worked out.

MITIGATION MEASURES

Erosion of overburden dump site
<ul style="list-style-type: none"> Reused the surplus excavated material as bund and embankment. Disposed the overburden at the designated dumping area. Install silt fence at the base of the mounds. Proper drainage systems and facilities shall be constructed surrounding overburden dump area.
Riverine Riparian Zones
<ul style="list-style-type: none"> Map and mark the riparian reserves. Riparian management plan. Riparian monitoring program. Riparian restoration plan.
Water Quality
<ul style="list-style-type: none"> Implementation of water management techniques. Preservation and stabilization of drainage and waterways. Minimize the extent and duration of disturbance. Control of runoff flows into, through and from the site via stable drainage structures. Installation of perimeter controls (silt fence, perimeter drains, etc.) Fuel, grease, and engine oil storage must be carefully sited to avoid contamination of the surface waters. Proper drainage and sanitation facilities. Ensure minimum sediment discharge. Provide vegetated filter strips between exposed soil surfaces and receiving waters. Protect inlets, storm drain outfalls and culverts. Inspect and maintain BMPs for control measures. Streams must be protected with a vegetated buffer zone. Prepare an emergency plan on oil spills and pond overflow.
Acid Mine Drainage (AMD)
<ul style="list-style-type: none"> Prevent sulfuric acid from forming. Neutralize the acid after it forms (use NaOH, Ca (OH)₂ or NaCO₃). Remove the metals (Fe, Al, Zn etc) via precipitation, filtration etc. This will reduce original solute concentration. Collect runoff/seepage to contain the acid.



MITIGATION MEASURES

Groundwater Quality

- Regular monitor and maintenance of groundwater monitoring well.
- Properly design the tailing ponds to prevent any leakages and overflow and prevent infiltration of contaminant to sub-surface.
- Mining operation (excavation for the extraction of minerals) in the Project site shall be performed sequentially, one working area after another to minimize the accumulative impacts to groundwater system.
- Regularly undertake the inspection, assessment, and maintenance of the tailing ponds.
- Groundwater monitoring wells will be properly managed (maintenance) to ensure their sustainability in performing their function.

Air Quality

- Periodically check on maintenance of machinery and vehicles.
- Transportation with minimum height of fall.
- Vehicle speed restrictions.
- Exposed soil areas, excavated materials, stockpiles and haul roads shall be dampened with water.
- Frequent spraying of water on the exposed surface (stockpiles of loose materials).
- Vehicles go through the washing bay before exiting the site.
- Train workers to operate machinery properly to reduce dust generation.
- Workers should be supplied with respiratory masks.
- Open burning of biomass or domestic waste is prohibited.

Noise Level

- All machinery should be utilized and properly maintained during the operation.
- Impose and enforce a speed limit on all vehicles.
- Heavy vehicles moving in the path that will cause minimal interruption.
- Restricted the hours of operation.
- Install effective noise suppression system.
- Installation of proper sound barriers and/or noise containment.
- Provide workers with earplugs or earmuffs.
- Project proponent shall monitor and act closely on any local community complaints and concerns pertaining to the noise generation from the mining activity (especially Kg. Kesedar Lebir– 0.61 km from site).
- Carry out a noise monitoring program.
- Noise level can be reduced by undertaking the mining activity on phase by phases basis.

MITIGATION MEASURES

Terrestrial Fauna

- A Wildlife Management Plan (WMP) if required, needs to be established to provide detailed action related to wildlife issue.
- Project Proponent need to establish Wildlife Monitoring Team (WMT) with the supervision of PERHILITAN to manage all situation involving wildlife, including wildlife conflict.
- WMT need to conduct periodic briefing session to all workers about wildlife conservation, prohibited law about poaching, guidelines, everything about wildlife and its consequences if they found guilty in disobeying the law.
- Place “No Hunting” and “No Trespassing” signage at appropriate locations that can be seen by the contractors, workers, and villagers.
- Mining in an orderly sequence to minimize habitat disruption and facilitate gradual movement of wildlife away from the mining areas.
- Fence the mining area, processing sites and processing ponds to prevent entering of wildlife to the areas.
- Any sighting of displaced or presence of wildlife within or near project site need to be reported to PERHILITAN.
- Seek the assistance and advice of PERHILITAN on how to handle wildlife and human conflicts.
- Proper signage on prohibition of bird hunting or trapping.
- Plant Napier crops in the disturbed area during rehabilitation phase as it will be a source of wildlife food and can indirectly reduce the issue of human-wildlife conflict around the project site area

Solid and Hazardous Wastes

- To be segregated and disposed appropriately so as not to create potential vector source.
- No haphazard disposal on site or off site.
- No open burning.
- A good solid waste management system is to be provided. All wastes (nonscheduled) are to be disposed at approved dumping ground.
- The installation of skid tank shall be made as according to the **Guidelines by Malaysia Standard MS761 – Code of Practice for Storage and Handling of Flammable and Combustible Liquids** (SIRIM, 1982). The non-permeable bund area must be capable to accommodate at least 110% of total volume of skid tank. The base of the tank storage is to be made of concrete and facilities to pump spilled material is to be provided.
- If there is any spillage on the ground, the mining operator must take an action according to the **Regulation 14 (Spill or accidental discharge)**.

MITIGATION MEASURES

Wastewater and Sewage Discharge

- Use of septic tanks. The septic tanks must be maintained by regular desludging and it will be prohibited from throwing used oil down the toilets or sinks.
- No direct discharge is allowed from any toilet facility to rivers or streams.
- Effluents to be discharged have to be treated using systems approved by Ministry of Housing and Local Government and it should comply with Standard A (discharge upstream of any raw water intake) Environmental Quality (Sewage) Regulation, 2009.

Socio-economic

- Project Proponent should give correct information towards community related to work development by holding discussion and meeting between community representatives.
- Apply tyre washing facility that consists of wash through at the entry point of the access road, so that the dust not generate from the transportation of the product.
- Restricted working hours.
- Monitor the movements of equipment and machineries at various locations and stages.
- Transportation of the products to be scheduled during off-peak periods.
- Inform the working community earliest before abandonment to prepare themselves in finding other jobs.

Traffic and Transportation

- Restrict the speed limit and traffic volume.
- Transport of processed products should be confined to non-peak hours, if possible.
- Drivers must be well trained and law abiding with no serious traffic offence.
- The entrance should be paved within 150 meters of the existing road. The washing trough should be provided 150 meters before the intersection.
- Comply with the restrictions on the permitted allowable load as gazette in P.U. (A) 275/2003 for federal road (FT1744).
- The specification of the pavement in 150 m stretch of Jalan Felda Aring and the proposed site access should be designed by the R5 design standard (Arahan Teknik (Jalan) 8/86) and must be constructed before the operation of the mining includes proper Traffic Management Plan (TMP) on-site during construction.
- From 250 m to the junction must place the warning signboard and speed limit and placed the street lighting minimum 6 nos for both directions to light up the street during nighttime.
- The roads should be constructed and maintained regularly by project proponent in 10 years' time or during mining operation

PERFORMANCE MONITORING (PM)

LD-P2M2	Performance Monitoring (PM) Parameters	Recommended Limits	Frequencies
Silt trap	Silt marker	-	Weekly or after rain event
Sediment basin	Silt marker	-	
Earth drain with check dam	Sediment level	-	Quarterly
Earth bund	Performance	-	
Silt fence	Performance	-	
Roadside drain	Performance	-	
Overburden stockpile	Performance	20 m away from any watercourse	
River Riparian Buffer Zone	Performance	20 m or more at both sides	



COMPLIANCE MONITORING

Item	Monitoring Frequency	Environmental Quality Standards
Water Quality	Once a month	Results will be compared with: <ol style="list-style-type: none"> i. Baseline samplings ii. National Water Quality Standards (NWQS). iii. Mineral Development (Effluent) Regulations 2016
Noise Level	Once a month Daytime 15 hours (from 7.00 am to 10.00 pm) Nighttime 9 hours (from 10.00 pm to 7.00 am)	Results will be compared with: <ol style="list-style-type: none"> i. Baseline samplings ii. Guidelines for Environmental Noise Limits & Control, Third Edition (DOE, 2019), First Schedule of Permissible Sound Levels.
Groundwater Quality	Twice a year	Results will be compared with: <ol style="list-style-type: none"> i. Baseline samplings ii. National Standard for Drinking Water Quality (Revised December 2000), Second Version (MOH, 2004). iii. Malaysia Groundwater Quality Standards and Index – for Conventional use of Raw Water Treatment (Drinking Water) (DOE, 2019).
Air Quality	Once a month	Results will be compared with: <ol style="list-style-type: none"> i. Baseline samplings ii. Malaysia Ambient Air Quality Standards (Standard value by 2020).



IMPACT MONITORING

Item	Impact Monitoring
Water Quality	<ul style="list-style-type: none"> i. Continuous water quality monitoring for turbidity and total suspended particulates. ii. If silt trap/sediment containment structure is employed to contain the resuspended particulates, this must be regularly monitored for tear and displacement from the intended location. iii. Even with a silt trap/sediment containment structures in place, the water quality beyond the silt trap/sediment must be sampled for turbidity. iv. Records regular maintenance of the drainage structure provided on site and ensure there is no blockage to the water flow or excessive siltation.
Groundwater Quality	<ul style="list-style-type: none"> i. Continuous groundwater quality monitoring. ii. Records the measured water level. iii. Records regular maintenance of monitoring well to prevents well water quantity and quality deteriorating in longer term.
Air Quality	<ul style="list-style-type: none"> i. Records to show regular maintenance of equipment, machineries and vehicles used for this project development. ii. Records of provision of adequate dust protective device to workers working in dusty areas. iii. Records of provision of dust suppression facilities such as water bowser. iv. Records on air quality monitoring results. v. Checking on the soil surface to ensure proper soil compaction is practiced onsite especially on exposed area.
Noise Level	<ul style="list-style-type: none"> i. Records to show regular maintenance of equipment, machineries and vehicles used for this project development. ii. Records of provision of adequate noise protective device to workers working in high noise level areas. iii. Schedule of working hours, transportation in and out of the project site showing the type of loading and maintenance tasks carried out for vehicles.