

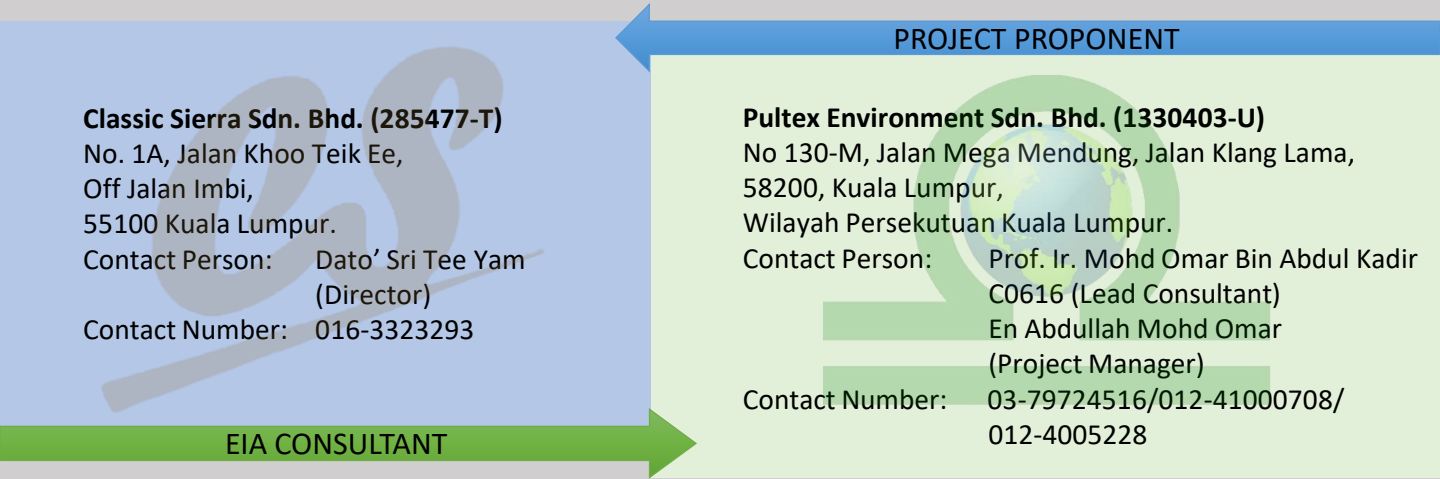
EXECUTIVE SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT



**PROPOSED GOLD MINING OPERATION ON LOT 31291
(ML. 09/2019) AND LOT 20744 (ML. 10/2019), AN AREA 157.33
HA, MUKIM BATU TALAM AND SEGA, DISTRICT OF RAUB,
PAHANG DARUL MAKMUR**

**EXECUTIVE
SUMMARY**



PROJECT OVERVIEW

Project Location
- Lot 31291 (ML. 09/2019) and
Lot 20744 (ML. 10/2019), Mukim
Batu Talam and Sega, Daerah
Raub, Pahang Darul Makmur

Mining Lease Duration
Total area: 157.33 Ha (388.8 ac)
2 Years (until 8 Oct 2021)

Land Gazetted
Tersang Forest Reserve (148.12 Ha)
(26 Aug 2019)

Zoning
Raub Forest Reserve and
Agriculture within the
BPK 5.5 at Mukim Batu
Talam and BPK 3.4 at
Mukim Sega

Phasing
Proposed : Phase 1 (26.022 Ha)
Expansion : Phase 2 (31.039 Ha) and Phase 3 (14.483 Ha)

STATEMENT OF NEEDS

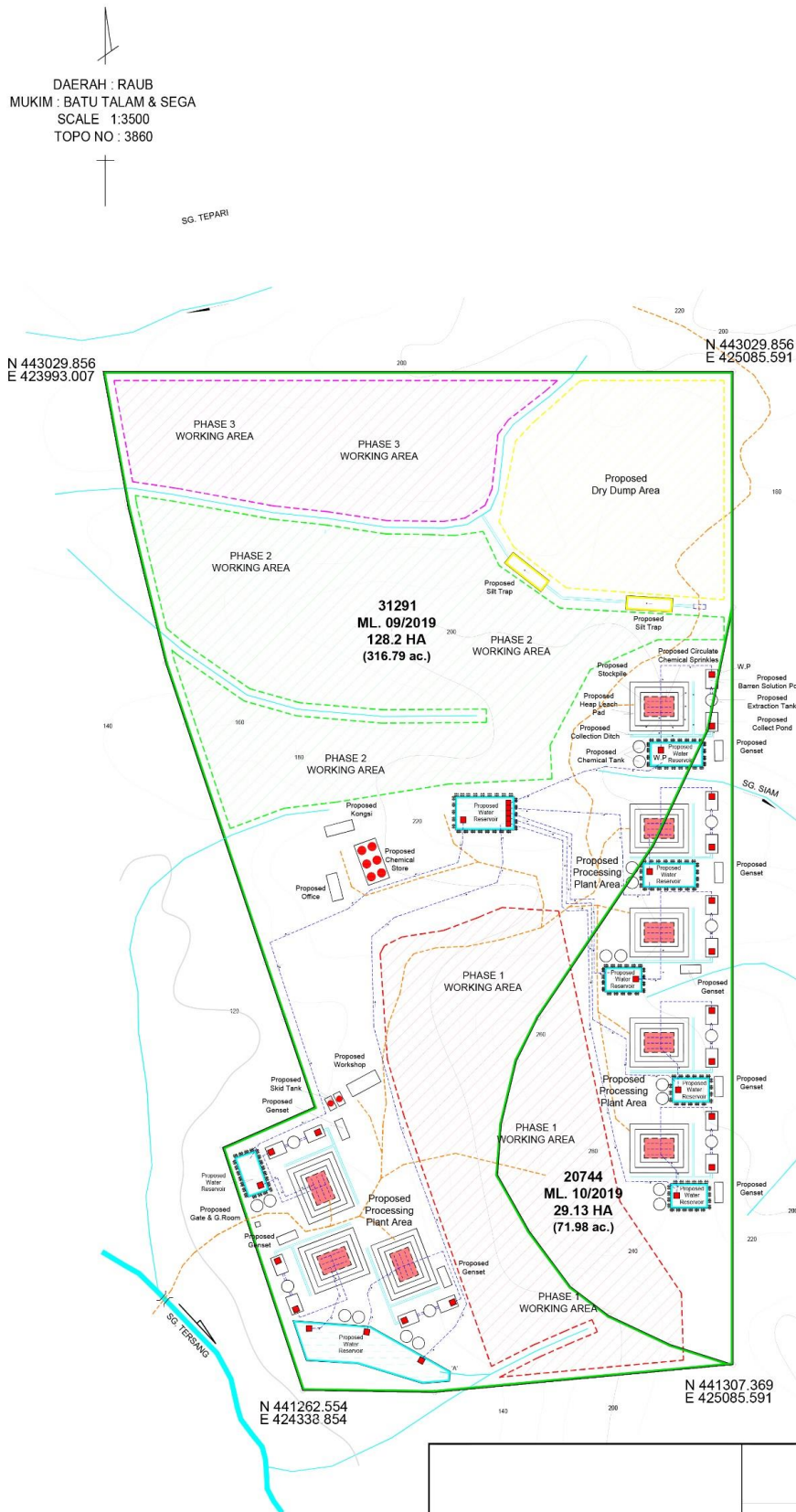
Economic Benefit
- Malaysia exports self-decorative gold
items around 50 tons/year worth
around RM 6 billion and RM 8 billion
especially to Middle Eastern countries.
This is higher than domestic
consumption, which exceeds 20-25
tons/year.

Socio – Economic Benefit
- Employment opportunities

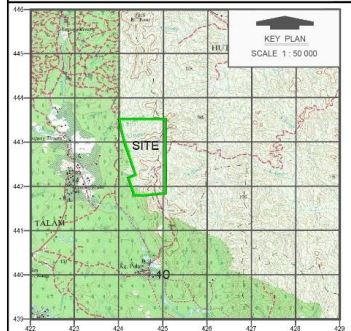
State Taxes and Royalties
- Corporate tax (10%) to the
Federal government
- Value-based royalty to the State

Local Planning Strategy
Thrust 1: Expansion of Mineral Sector of
the NMP2

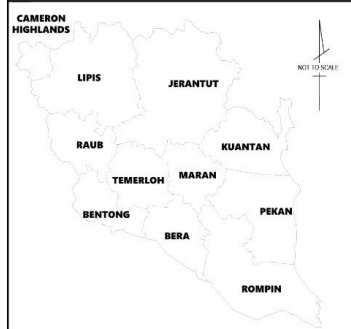
KEY, LOCATION AND SITE PLANS



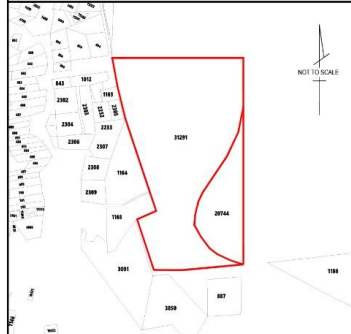
KEY PLAN



TERENGGANU MAP



LOCATION MAP



KEY, LOCATION AND SITE PLAN

AREA APPLIED FOR OPERATIONAL MINING SCHEME (OMS) APPLICATION ON LOT 31291 (ML. 09/2019) & LOT 20744 (ML. 10/2019) MEASURING 157.33 HA (388.77 ac.)

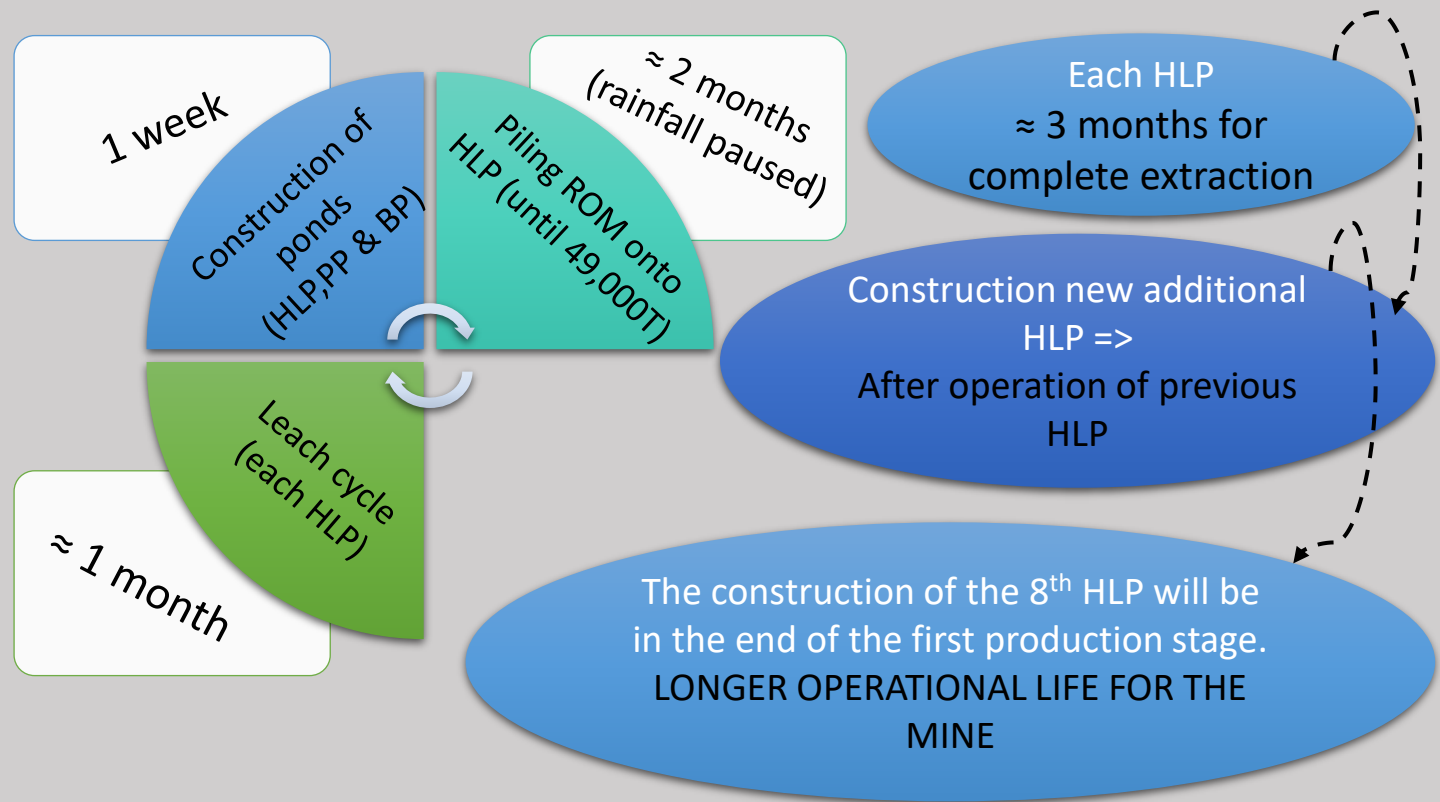
SS SUBRA MINING CONSULTANCY

PREPARED BY : RIDZUAN ASYRAF
CHECKED BY : IR. S.S. SUBRAMANIAM
DATE : 22.11.2019
PLAN NO. : SSB-PH-0147-19-01

SIGNATURE OF CONSULTANT



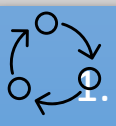
Phase	Ore Reserves	Mine Life	
Phase 1 (26.022 Ha)	1,473 kg Au	13 months ≈ (1.1 years)	Estimated operational life based on total HLPs will be operated
Phase 1, Phase 2 and Phase 3 (72.0 Ha)	4,076 kg Au	32 months ≈ (2.7 years)	
8 HLPs operating simultaneously during production stage			





Open-Pit Mining Operation

1. Involves surface excavation of the reserves (overburden and ores).
2. Site clearing activities include removal of trees and vegetation.
3. Excavation will be undertaken in stages, an increment of 4 m depth for every 2 acres of mining area until reaching the maximum depth.
4. The ROM will be sent to leaching pad while the overburden will be temporarily stockpiled at dry dump area.
5. The excavation will continue until the stacking/heaping of ROM materials for eight (8) number of HLP are completed.



Heap Leaching Process

1. Preparation of pad for leaching
2. Haulage and heaping ROM on leaching pad
3. ROM sprayed with leaching reagent (Goldix™)
4. Gold concentration using Activated Carbon Column (ACC)
5. Electrowinning



Production Capacity per HLP

17.7 kg gold ore (in pregnant solution)
recovered after 1 month of leaching cycle.

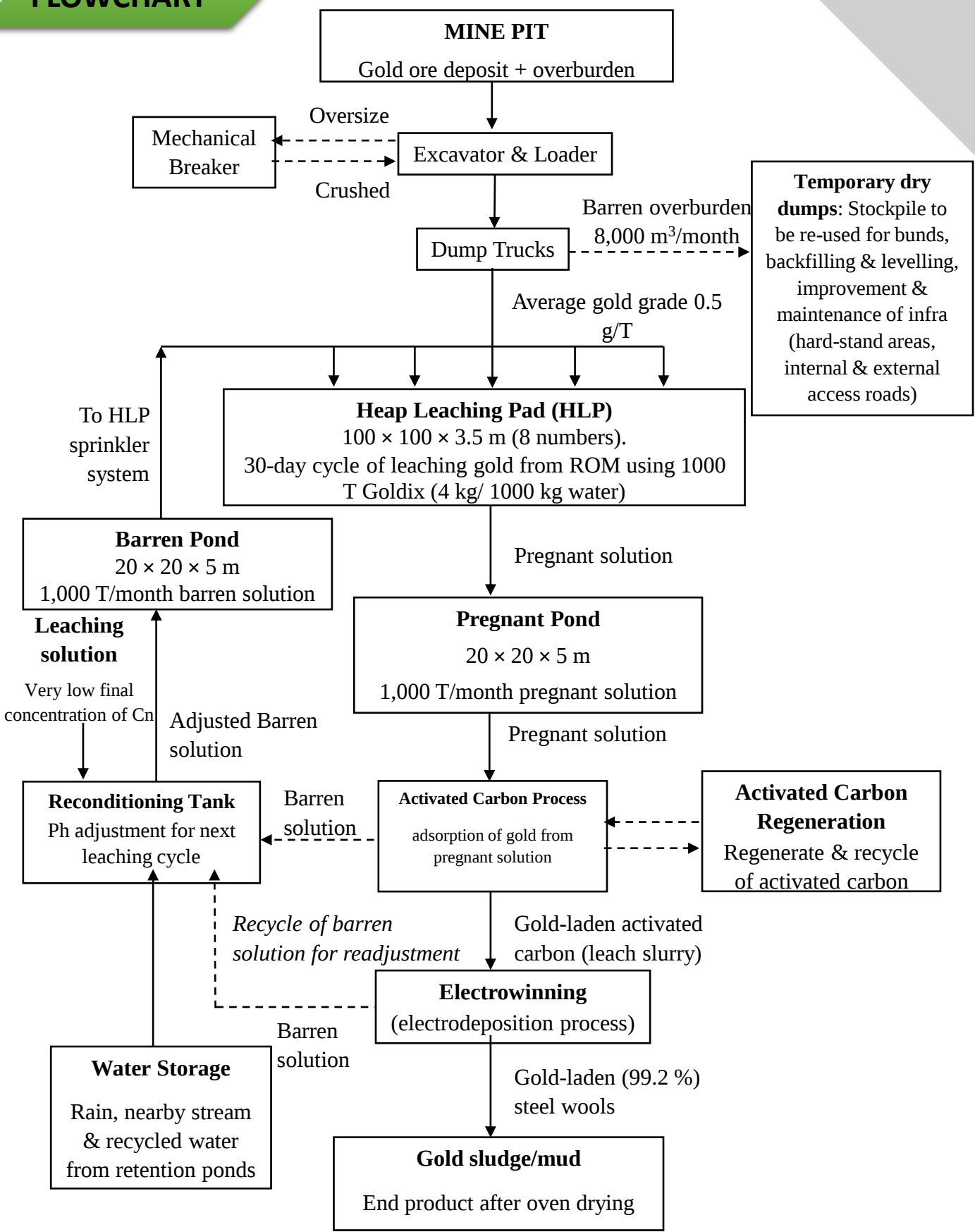
Phase-1 (8 HLPs)
Production of gold mud/sludge ≈ 142 kg



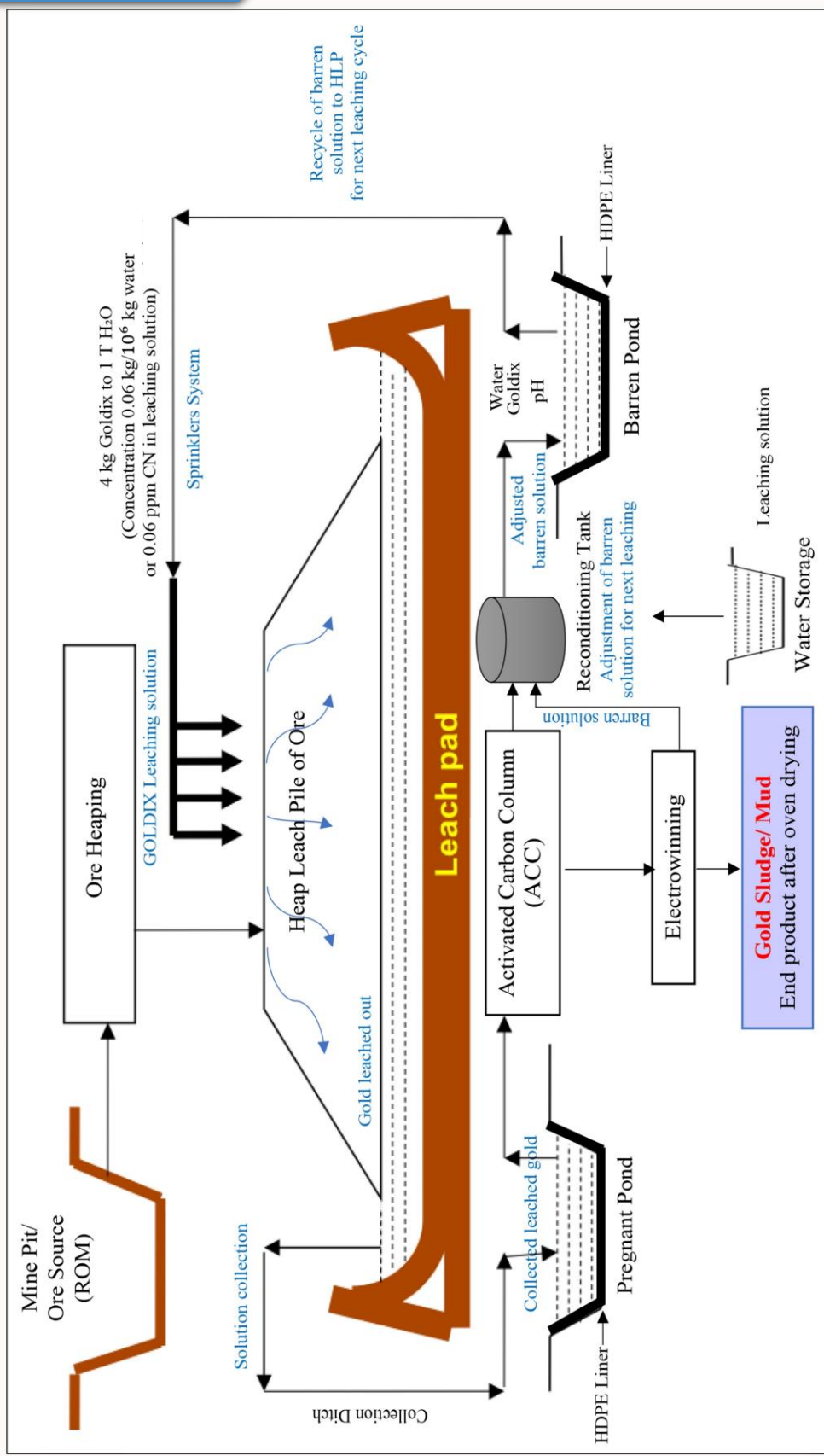
The Product

The product after electrowinning will be in the form of gold mud/sludge (99.2% purity). The gold mud will be dried in the oven before deliver to the customers

FLOWCHART



FLOW DIAGRAM



PULTEX ENVIRONMENT SDN. BHD 130-M, Jalan Mega Mendung, 58200 W.P. Kuala Lumpur. Tel: 603-79724516 / 6012-4100708 Email: pultexenviron@gmail.com	PROJECT TITLE: PROPOSED GOLD MINING OPERATION ON LOT 31291 (ML. 09/2019) AND LOT 20744 (ML. 10/2019), AN AREA 157.33 HA (388.77 ac.) MUKIM BATU TALAM DAN SEGA, DISTRICT OF RAUB, PAHANG DARUL MAKMUR.
PULTEX ENVIRONMENT SDN BHD	PREPARED BY : AMEEN/ NAJWA CHECKED BY : PROF. IR. MOHD OMAR AB. KADIR DATE : 03.03.2020

Project Activities

BEFORE OPERATION

EXPLORATION AND INVESTIGATION STAGE

To verify distribution and grade of gold deposits (boreholes & excavation pits). Clearing for access (exploration work & machinery).

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, leaching pad and infrastructures (Partially completed, only 20% of site clearing for exploration purposes)
- Construction of internal haulage road & up-grading of external access road
- Construction of leaching pad and associated ponds
- Construction sedimentation and water retention ponds
- Construction of P2M2 and BMPs (bunds, drainage system)
- Installation of processing plant (active carbon column & electrowinning)
- Construction of Infrastructures and facilities
- Lodging, site office and facilities for employees
- Procurement of utilities (power & water supply)
- Diesel storage facility
- Chemical storage facility
- Wastewater and Sewerage
- Solid waste & scheduled waste
- Perimeter fence, entrance gate/guard post and workshop
- Washing bay & workshop

DURING OPERATION

MINING AND PROCESSING STAGE

- Excavation of mine pits
- Handling of overburden and dry dump area
- Haulage and piling of ROM at leaching pad
- Leaching of ROM at HLP
- Purification of gold ore activated carbon columns and electrowinning
- P2M2 maintenance (including tailing ponds)
- Maintenance of haulage and access road
- Managing scheduled waste
- Transportation of end product

AFTER OPERATION

MINING AND PROCESSING STAGE

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

EXISTING ENVIRONMENT

Topography

Hilly with natural and altered terrains. The site terrains are inclined toward the southern part of the site with the highest elevation point of 280 Mri.

Soil Characteristics

Mainly under sedentary soils on undulating plains to rolling land of Durian-Malacca-Tavy. Durian series have a high clay and silt contents.

Site Geology

Located within Bentong-Raub Suture Zone, underlain by the Kaling Formation of Triassic age with acid intrusion where interbedded sandstone, siltstone, and shale. The site surficial geology is characterized by stiff to very stiff yellowish-brown silt and medium dense silty gravel.

Surface Hydrology

Proposed development area lies within Sg. Pahang River Basin and located in a region of Sg. Tersang Sub-catchment. Major tributaries include Sg. Tersang, Sg. Punggur and Sg. Siam. Two (2) WTPs are located nearest to Project Site (upstream), water intake from Sungai Lipis.

Climate and Meteorology

Rainfall

*Highest = November (235mm)
Lowest = April (41 mm)*

Temperature

*Highest (average) = April (27.9⁰ C)
Lowest (average)= December (25.6⁰ C)*

Temperature

*Highest average in November (86.8%)
Lowest average in March (77.3%)*

Rain Days

*Highest = November (23 days)
Lowest = February (6 days)*

Wind Speed

*Highest mean speed in Southwest direction (2.2 m/s))
Lowest mean speed in West direction (1.4 m/s))*



EXISTING ENVIRONMENT

Environmental Quality



Water Quality

Water quality determined for pH, Temperature, DO, COD, BOD, TSS, Oil & Grease, Ammoniacal Nitrogen, Alkalinity, Turbidity, E-coli, Fe, As, CN, Hg, Ni and Au were compared against the NWQS Class IIA and III.

Environmental Quality

Groundwater Quality

Groundwater quality parameters of COD, BOD, Total coliform, E-Coli, Turbidity, Color, Cl, NH₃, CO₃, HCO₃, NO₃, NO₂, Fe, F, Mn, Hg, Cd, As, CN, Pb, Cr, Cu, Zn, Na, Se, Ni, Ag, Mg, Conductivity, O/G, Phenol, TDS, Total hardness (EDTA) as CaCO₃, MBAS, Gross $\alpha^{\wedge}$ and $\beta^{\wedge}$ were compared with Malaysia Groundwater Quality Standards and Index (DOE, 2019).

Environmental Quality

Air Quality

Air parameter of PM₁₀, PM_{2.5}, NO₂, SO₂, CO, Ozone and HCN is within the acceptable level of the Malaysia Ambient Air Quality Standards (Standard value by 2020).

Environmental Quality

Noise Quality

Noise level measurement were below the limit under Schedule 1 (Sub-urban) of 60 dB(A) for day time and 55 dB(A) for night time.

Time	Range	Sources
Daytime	50.0 to 57.4 dB(A)	Vehicles, people talking, azan calls, monkeys, birds and insects.
Nighttime	48.4 to 48.8 dB(A)	

EXISTING ENVIRONMENT

Land Use

The immediate surrounding project site is a combination of forest, oil palm plantations and secondary vegetation. The nearest settlement is Kg. Tersang Hulu (1.32 km-west), Kg. Sg Rempan (1.37km- south) and Kg. Pulai (1.38 km-south). Other settlements are all located above 3 km radius ZoS. A large area of forested land and oil palm plantation separates the village from the proposed site.

Terrestrial Flora

Categorized as lowland forest. The survey has indicated a total of 462 species of tree (T), 56 species of shrub (S), 45 species of herbaceous (H), 111 species of climber (C), 20 species of palm (P), and 56 species of ferns (F) has been recorded.

Terrestrial Fauna

1. Mammalia -57 mammalian species.
2. Birds - 163 species of birds.
3. Amphibians- 18 species of frogs.
4. Reptiles - 23 species of reptiles (13-lizards, 9-snakes and 1-turtle).

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
Mamalia	8	9	40	4	5	5	43	3	1	9	44
Birds	145	11	7	0	1	26	136	-	-	-	-
Amphibians	0	4	14	0	0	2	16	-	-	-	-
Reptiles	0	11	12	0	2	0	21	-	-	-	-

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

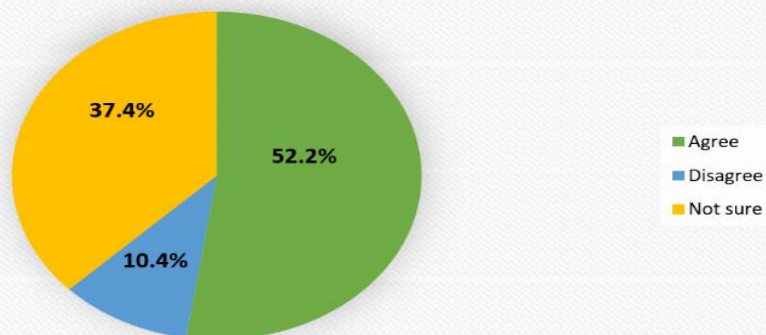
EXISTING ENVIRONMENT

Socio-economic

The proposed project activity falls within SIA Category 3.

Respondents have mixed perception of the project but the majority of respondents agree with the proposed project (52.2% agreed in questionnaire survey and total agreement in FGD,

**Percentage of Perception and Acceptance
of Project Implementation**



Community Health



Existing Burden Disease at Raub (Incidence as per 100,000 population)

Vector Borne Disease

- Lower case of Dengue (Incidence rate 18.99)
- Lower case of Malaria (Incidence rate 1.49)
- No case of Chikungunya, Japanese E and Filariasis



Vaccine Preventable Disease

- Lower case of Hepatitis B (Incidence rate 2.75)
- Lower case of Measles (Incidence rate 0.25)
- No case of Diphtheria, Tetanus and Pertussis.



Food-water Borne Disease

- Lower case of Food Poisoning (Incidence rate 8.49)
- No case of Cholera, Dysentery, Hepatitis A and Typhoid



Sexually Transmitted Infections (STIs)

- Lower case of Syphilis (Incidence rate 0.49)
- Lower case of Hepatitis C (Incidence rate 2.24)
- No case of Chancroid and Gonorrhea.

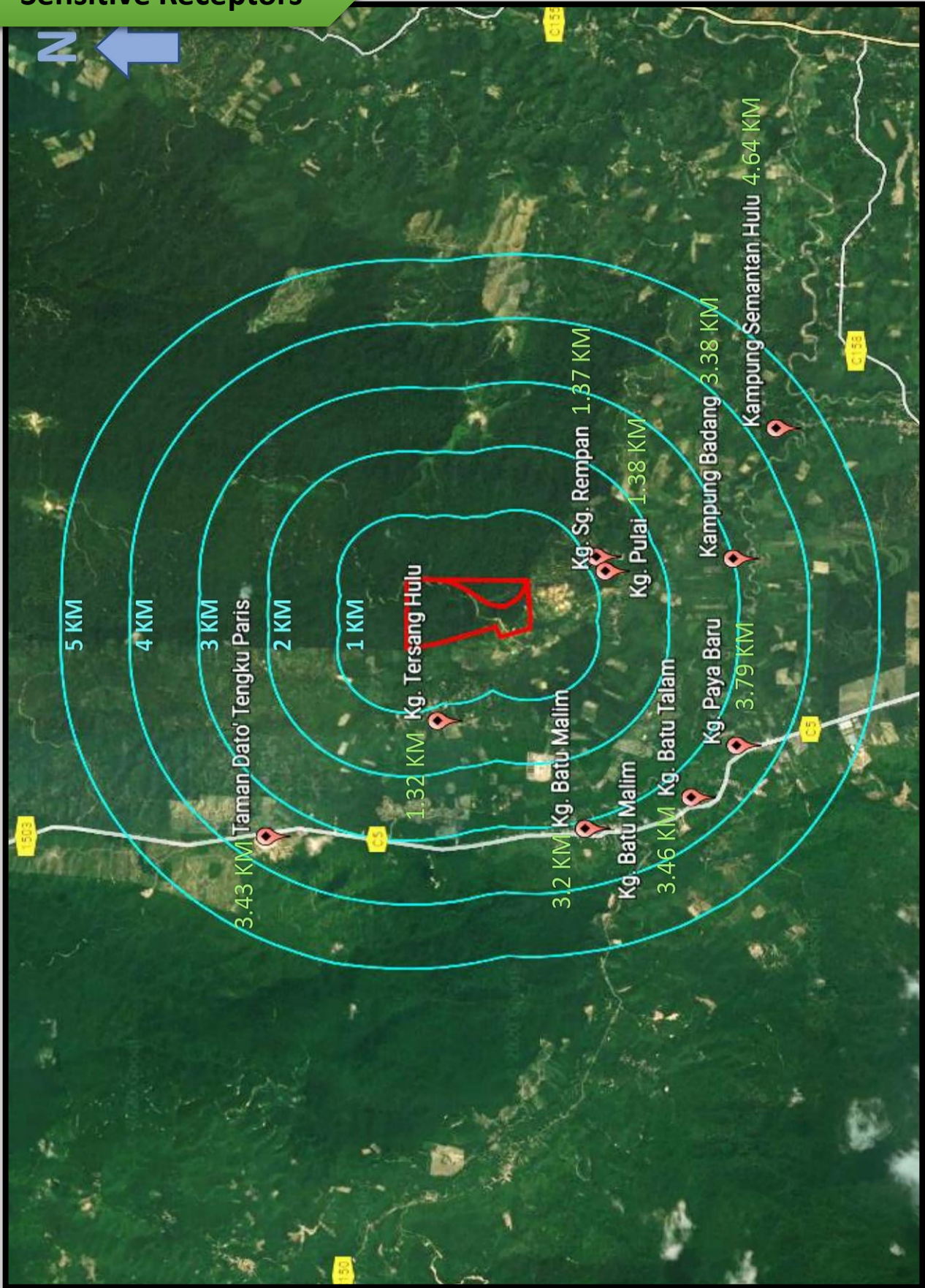


Other disease

- Lower case of HIV (Incidence rate 1.75)
- Lower case of AIDS (Incidence rate 1.49)
- Lower case of HFMD (Incidence rate 8.99)
- Lower case of Leprosy (Incidence rate 0.25)
- Lower case of Leptospirosis (Incidence rate 2.49)
- Lower case of Tuberculosis (Incidence rate 17.98)



Sensitive Receptors



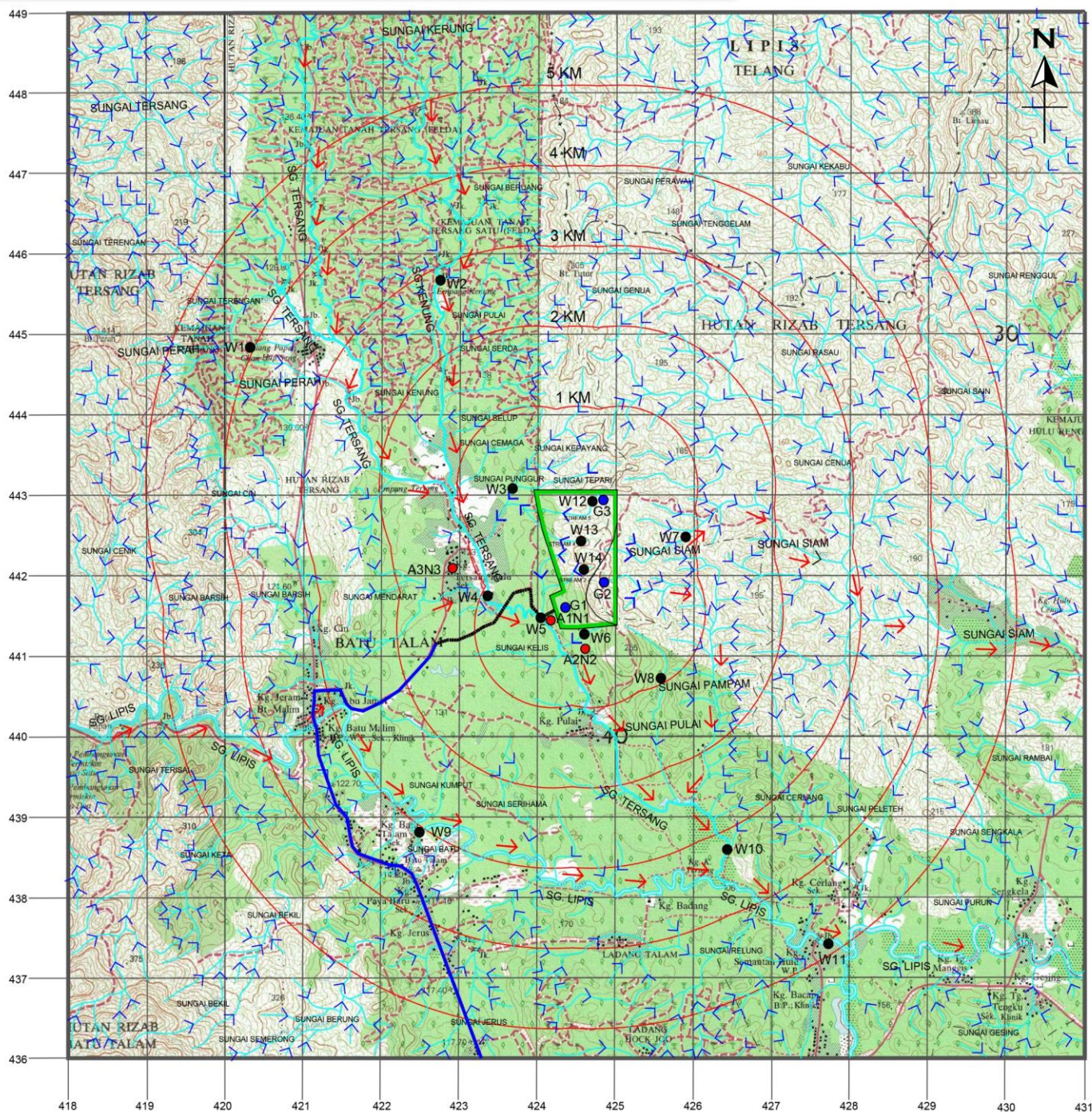


PULTEX ENVIRONMENT SDN. BHD.

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PAHANG DARUL MAKMUR

EXECUTIVE
SUMMARY

Water, Air and Noise Sampling Points Map



LEGEND

MINING LEASE AREA

WATER SAMPLING POINT (W)

GROUNDWATER SAMPLING POINT (G)

AIR AND NOISE SAMPLING POINT (AN)

ACCESS ROAD (PAVED ROAD)

ACCESS ROAD (UNPAVED ROAD)

RIVER/ STREAM

RIVER WATER FLOW

EVALUATION OF POTENTIAL IMPACT

1. Soil Erosion and Sedimentation

- Removal of ground cover will expose the soil, causing the soil prone to erosion and surface runoff will bring the soil together. The eroded soil together with runoff will enter to river and affect the water quality.
- Land degradation in watersheds entering rivers due to high rainfall intensity and increased surface runoff
- Influences soil quality and fertility, water quality and deposition of sediment on the riverbed.
- Reduction in river depth, resulting channel overflow during high precipitation.

2. Surface Hydrology

- Land clearing activities may expose the large tract of bare soil to erosion where could result in the tremendous increase in surface runoff.
- Increase the frequency of flash flood in the downstream area.
- Increase sedimentation rate at the nearby river may reduce river conveyance capacities and destroy the habitat for aquatic lives.

3. 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. It also contributes to the loss of critical species habitat. A river buffer zones of 20 m or more, will be kept along the rivers/streams.

4. 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.
- Contamination of soil with heavy metals and chemicals can cause water pollution when carried with the surface runoffs into the river.
- 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.

5. Groundwater Quality

- Change in groundwater recharge behavior to an area due to the land clearing activity.
- Land clearing may enhance surface runoff and subsequently may cause water impoundment or flooding on area of low permeability and shallow in groundwater levels.
- Affect direct infiltration of contaminant from surface to water table.

EVALUATION OF POTENTIAL IMPACT

6. Air Quality

- The emissions of fugitive dust are mainly from haul roads and this activity would emit PM_{10} and $PM_{2.5}$ because the soil will be exposed to the wind.
- Tipper lorries travelling on unpaved surfaces (haul roads)
- Exposed areas of the heap leach pad, mining area, and dry dump area
- The volatilization of hydrogen cyanide from the heap leach pad, pregnant, and barren ponds.

7. Noise Quality

- The main source of operating noise is primarily from equipment and machinery.
- Excessive and prolonged exposure to noise can cause disruption and cause high noise levels, potentially causing hearing problems.
- Cumulative impact can significantly affect wildlife and nearby residents. This also contributes to occupational hazards and causes annoyance to the local community.

8. Terrestrial Flora

- The loss of tree species due to timber extraction and subsequently the other vegetation due to mining activities is critical impacts on flora diversity.
- Impact the ecological functions of the forests as well as the ecosystem services it provided.
- Wildlife natural habitats and their source of food would be severely affected.
- During project initiation, the removal of soil cover will in turn destruct on site vegetation and further displaced the inhabitants.

9. Terrestrial Fauna and Their Habitats

- Loss of habitat and impact on forest edge.
- 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 mammal community.

10. Waste Management

- Odor problem
- Dust generation due to the wind blowing through wastes piles.
- Increasing the risk of fires from spontaneous combustion of waste piles.
- Attraction of pest, disease vectors and scavenging animals.
- Lubricating oils and diesel spill may affect the surface quality and aquatic ecology if they infiltrate to the surrounding water bodies.
- Obstruction of drainage flow

EVALUATION OF POTENTIAL IMPACT

11. Socio-economic

Potential Negative Impact:

- Disturb communities' daily activities and sources of income.
- Expose communities to health, safety and environment risk.
- Decrease the aesthetic value of the forest landscape.
- Lack of security and increase social problem due to in-migration of temporary foreign workers.

Potential Positive Impact:

- Increase employment opportunities.
- Increase inflow of population (in-migration).
- Improve socio-economic in term of income and quality of surrounding communities.
- Increase state and country revenue through expansion in mining sector.

12. Community Health

- Ambient air quality predicted to remain safe as hazard quotients were recorder less than 1 and no carcinogenic substance detected.
- Noise pollution is expected to be minimum.
- Communicable diseases – excess burden of these diseases in the district (food poisoning, hepatitis B, and hepatitis C, dengue fever and malaria).
- River water quality – deteriorate in worst case scenario, from Class IIB to Class III (not suitable for body contact and recreational purpose).

MITIGATION MEASURES

1. Soil Erosion and Sedimentation

- Control stormwater flows/surface runoffs onto, through, and from the site in stable drainage structures.
- Install perimeter runoffs controls.
- Stabilize and covering 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.
- Overburden stockpiles shall be constructed with stable slopes appropriate for the high rainfall of the area.

MITIGATION MEASURES

2. Riverine Riparian Zones

- No clearing of vegetation from stream banks to prevent soil erosion and decrease in water quality through the loss of filtration services and the loss of critical species habitat.
- No mining or other activities to be conducted within the restricted stream/river buffer zones.
- Maintenance of riparian reserve to ensure no disturbance to the natural vegetation.

3. Water Quality

- 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 chemicals spills and pond overflow.

4. Groundwater Quality

- Regular monitor and maintenance of groundwater monitoring well.
- Design heap leaching cells with strong foundation and integrated with HDPE geo-membrane as liners.
- Design pregnant pond and barren pond to sufficient capacity and lined with impermeable materials.
- Professionally installed the piping system with relevant engineering standards.

MITIGATION MEASURES

5. 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.



6. Noise Quality

- 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.
- Install effective noise suppression systems.
- Installation of proper sound barriers and/or noise containment.
- Provide workers with earplugs or earmuffs.
- Silences on equipment should be utilized and maintained.
- Carry out a noise monitoring program.
- Noise levels are to be controlled.
- Noise assessment from the source should be considered.



7. Terrestrial Flora



- Minimizing habitat destruction, modification, and further fragmentation of available forested area.
- Confine deforestation only in appropriate project sites and promote reforestation with multi-species composition.
- Retain selected area of natural vegetation and habitat areas as biodiversity refuges and ecological corridors.
- Remained vegetation buffer to minimize the ingress of sediments into the watercourses.

MITIGATION MEASURES

8. Terrestrial Fauna and Their Habitats



- Mining operations should not infringe upon protected areas or other critical or sensitive ecological areas.
- Include wildlife awareness information in regular safety and environmental inductions.
- Mining in an orderly sequence to minimize habitat disruption and facilitate gradual movement of wildlife away from the mining areas.
- Site clearing direction must be towards the forest reserve
- Placed warning signs at specific locations to reduce road kills.
- Advise mining workers to not interfere or harass wildlife.
- No hunting by project personnel permitted while working or residing on site.
- 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.

9. Waste Management

- 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.
- Bunds need to be constructed around chemical or storage tank. The bunds to be constructed must be able to contain at least 110% of the biggest tank within the bunded area. 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).

10. Socio-economic

- Prevent and monitor the river nearby the project site from pollution.
- Provision of monitoring mechanisms and action plans to regarding environmental issues.
- Priority of employment to the locals and Orang Asli Communities.
- Provision of community facilities and amenities to cater for population growth.
- Inform the Department of Orang Asli Affairs (JAKOA) if something issues that related with Orang Asli and workers.

MITIGATION MEASURES

11. Community Health

- Encourage personal hygiene among workers and those enter the project site.
- Monitor workers health condition.
- Good housekeeping and cleanliness.
- Conduct regular health monitoring
- Conduct regular health awareness programs
- Vaccinated dogs against rabies.
- Allow fogging to be carried out during outbreak to prevent from malaria disease.



1. Water Quality

- Fourteen (14) water quality monitoring stations
- Compliance with National Water Quality Standards (NWQS).

2. Groundwater Quality

- Three (3) groundwater quality monitoring stations
- Compliance with National Standard for Drinking Water Quality (Revised December 2000), Second Version (MOH, 2004).
- Compliance with Malaysia Groundwater Quality Standards and Index – for Conventional use of Raw Water Treatment (Drinking Water) (DOE, 2019).

EMP

3. Air Quality

- Three (3) air quality monitoring stations
- Compliance with Malaysia Ambient Air Quality Standards (Standard value by 2020).

4. Noise Level

- Three (3) noise monitoring stations
- Compliance with ii. Guidelines for Environmental Noise Limits & Control, Third Edition (DOE, 2019), First Schedule of Permissible Sound.

