EXECUTIVE SUMMARY

(A) TITLE OF PROJECT

The Project is titled the "**Granite Quarry Operation on Lot 1367 and PT 689 Measuring 40.21 ha in the Sub-District of Melaka Pindah, District of Alor Gajah, Melaka**". Hereafter, it will be known as the 'Project' in this EIA Report.

(B) DESCRIPTION OF PROJECT

The Project is to extract and produce granite products by blasting and crushing of granite rocks available at the Project site. The quarrying operation involves removal of overburden, benching of pit followed by normal drilling and blasting works. This involves drilling of holes into the rocks and charging them with explosive to blast the rocks. The blasted rocks are loaded onto trucks and hauled for crushing and screening within the quarry vicinity. The rocks are then crushed and screened into aggregates of various sizes as end products.

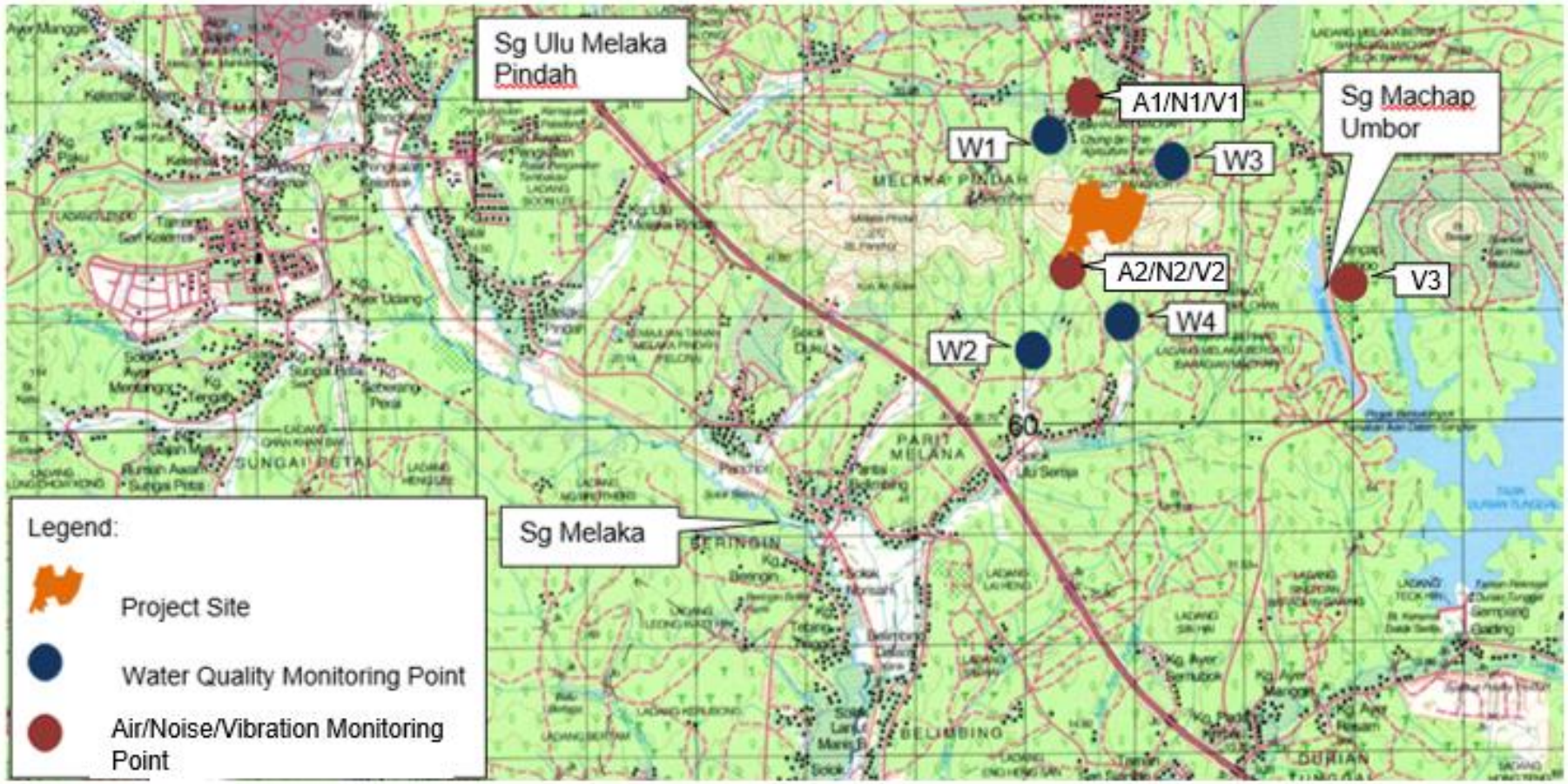
(C) EXISTING ENVIRONMENT

Parameters	Description
Physical Environment	
Topography	The topography of the quarry working area itself is a relatively rugged terrain with elevations ranging from 40 to 240 m above mean sea level. The area dips from higher elevations to lower elevations in the northwestern, western and southwestern directions from a hill peak located near the western edge of the site.
Geology	The rocks are formed during the Devonian period.
Soils	The soil in the Project site belongs to the Rengam-Jerangau type.
Hydrology	The surface runoff is generally from an existing stream which flows on the western perimeter of the Project site. This stream is an upper tributary of Parit Melana which eventually flows into Sg Melaka. Referring to the Environmental Quality Act 1974 (Act 127), there are two water intake points, both located more than 5-km radius from the Project site. The *Empangan Durian Tunggal* water intake point which is nearer to the Project site is at 5.1 km (**Figure E1**) southeast of Project site. The Sg Melaka water intake point which situated directly south of Project site is 7.3 km away. No incidences of flooding were reported either in the Project site or downstream areas.

<table>
<tr><th>Parameters</th><th colspan="3">Description</th></tr>
<tr><td></td><td colspan="3"><table>
<tr><th>Name of River / Reservoir</th><th>Location of Water Intake</th><th>Water Supply Scheme</th><th>Distance from Project Site (km)</th></tr>
<tr><td>Sg Melaka</td><td>2° 17’ 55”, 102° 15’ 50”</td><td>Melaka Tengah, Alor Gajah, Jasin</td><td>7.3</td></tr>
<tr><td>Empangan Durian Tunggal</td><td>2° 20’ 00”, 102° 18’ 40”</td><td>Melaka Tengah, Alor Gajah, Jasin</td><td>5.1</td></tr>
</table></td></tr>
<tr><td rowspan="3">Climate</td><td colspan="2">Humid tropical with heavy seasonal monsoonal rains.
(Meteorological station at Melaka Airport)</td></tr>
<tr><td>Average Annual Rainfall (2008)</td><td>Between 79.4 and 263.6 mm</td></tr>
<tr><td>Annual 24-hour Mean Temperature</td><td>21.6 to 34.6 °C</td></tr>
<tr><td colspan="3">Environmental Quality</td></tr>
<tr><td>Water Quality</td><td colspan="2">Four (4) water samples were taken at upstream and downstream of two streams found on the eastern and western boundaries of the Project site. For parameters TSS at station W2 and NH_3-N at W1, W2 and W3, the results shown had exceeded the NWQS Class IIA limits. The status of the water quality is classified as slightly polluted for all sampling locations except at W2 (polluted) based on DOE WQI Index. (Figure E2)</td></tr>
<tr><td>Air Quality</td><td colspan="2">The ambient air quality was good. All the parameters measured at location A1 and A2 were well within the Recommended Malaysian Air Quality Guideline. (Figure E2)</td></tr>
<tr><td>Noise Level</td><td colspan="2">The noise levels recorded at location N1 and N2 were within the recommended limit of 70 dB(A) at the plant boundary for daytime and 60 dB(A) for night time. The noise was mainly from the vehicular movement along the road and human activities within the surrounding quarry sites. (Figure E2)</td></tr>
<tr><td>Ground Vibration</td><td colspan="2">Ground vibration measurements to establish the background vibration level adjacent and around the Project site (near the Empangan Durian Tunggal) will be conducted during the EMP stage. Three locations of the ground vibration measurement points are indicated in Figure E2.</td></tr>
<tr><td colspan="3">Biological Resource</td></tr>
<tr><td>Ecosystems</td><td colspan="2">The Project site which had been mined for the past 30 years is practically devoid of plant cover part from some shrubs and grass on the outer fringes of the Project boundary. The areas in the vicinity however are of oil palm plantation and two quarry sites. The steeper slopes of the hill are not cultivated and covered with shrubs and plants of no commercial value.</td></tr>
</table>

Figure E1: Location of *Empangan Durian Tunggal* Water Intake Point

Figure E2: Proposed Water and Air Quality Monitoring Stations, Noise Level and Ground Vibration Measurement Stations



Existing Landuse	
5-km radius	The quarry site is surrounded primarily by quarry operation sites, oil palm plantations, Durian Tunggal Reservoir (on the eastern side), residential estates, commercial areas and secondary forests within a 5-km radius. By and large, the oil palm plantations and secondary forests cover a major part of the area within the five-kilometer radius from the Project site. At the eastern and western boundaries of the site, small streams can be seen flowing southwards. Within the study boundary (5-km radius), three quarry sites are found to be located in close proximity to each other. Another remarkable landscape viz. the Durian Tunggal Reservoir, also known as *Takungan Durian Tunggal* in Malay can be found located circa 1.7 km on the east of Project site. Residential areas within the 5-km radius of the Project site consist predominantly of housing estates comprising village-type and terraced houses.
Socio-economic Profile	
Socio-economic Survey	A socio-economic survey was undertaken in May 2017, to establish the socio-economic status of the population and with the objective to comprehend the local community's awareness, concerns, perception and reaction towards the Project. **Sample Size** The primary target of this survey is the villagers and residents that will be potentially affected by the Project. They will provide information that is essential for further planning purposes. The sample size of 100 is reckoned to be adequate to provide a sound representation of the population profile in the study area.

(D) PROJECT PROPONENT

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(E) EIA CONSULTANT

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(F) LOCATION

The quarry site is situated in Mukim Melaka Pindah **(Figure E3**), sited on Lot 1367 and PT 689 in the District of Alor Gajah, Negeri Melaka Darul Azim. The central coordinates of the quarry area are at latitude N 2° 21' 54.84" and longitude E 102° 16' 34.90".

The Project site can be accessed via the North-South Expressway (PLUS). From the north, take the highway exit at Simpang Ampat (Exit 227) and continue on Lebuh AMJ and Jalan Bukit Bulat/Machap Umboo (M8). Then, continue straight on Jalan Alor Gajah Lama and take the left junction after passing Masjid Parit Melana. Continue on this unnamed road northeastwardly for another 3.4 km (10-minute drive) will lead to the Project site (**Figure E4**).

Meanwhile, the Project site is also accessible from the south by taking the highway exit at Ayer Keroh (Exit 231) toward Ayer Keroh and Bandaraya Melaka. Continue on Jalan Durian Tunggal will eventually lead to the Project site.

Existing access road as shown in **Figure E4** has been used for long time by the existing quarry operators. It will need to cater additional 135 trips of trucks daily with 20 tonnes loading capacity. Since the access road had become an issue and highlighted in DOE letter during TOR endorsement, the Project Proponent had carried out meeting with Majlis Perbandaran Alor Gajah (MPAG) on 18th August 2017. The officer, En Sugiman informed that the existing access road were actually located on other people land (private land) and not a reserve for road.

Melaka State Government had decided to divert the trucks from quarry operators to the new access road which is about 3 km to Jalan Machap. The proposed new access road is shown in **Figure E5** in below. At present, all quarry operators are allowed to use the existing access road before completion of the construction of new access road. The State Governmentwill detail out the actual planning of the new Access Road and further discussion /meeting with all Quarry Operator will be held from time to time.

Figure E3: Project Location Plan

Figure E4: Access Road to the Project Site

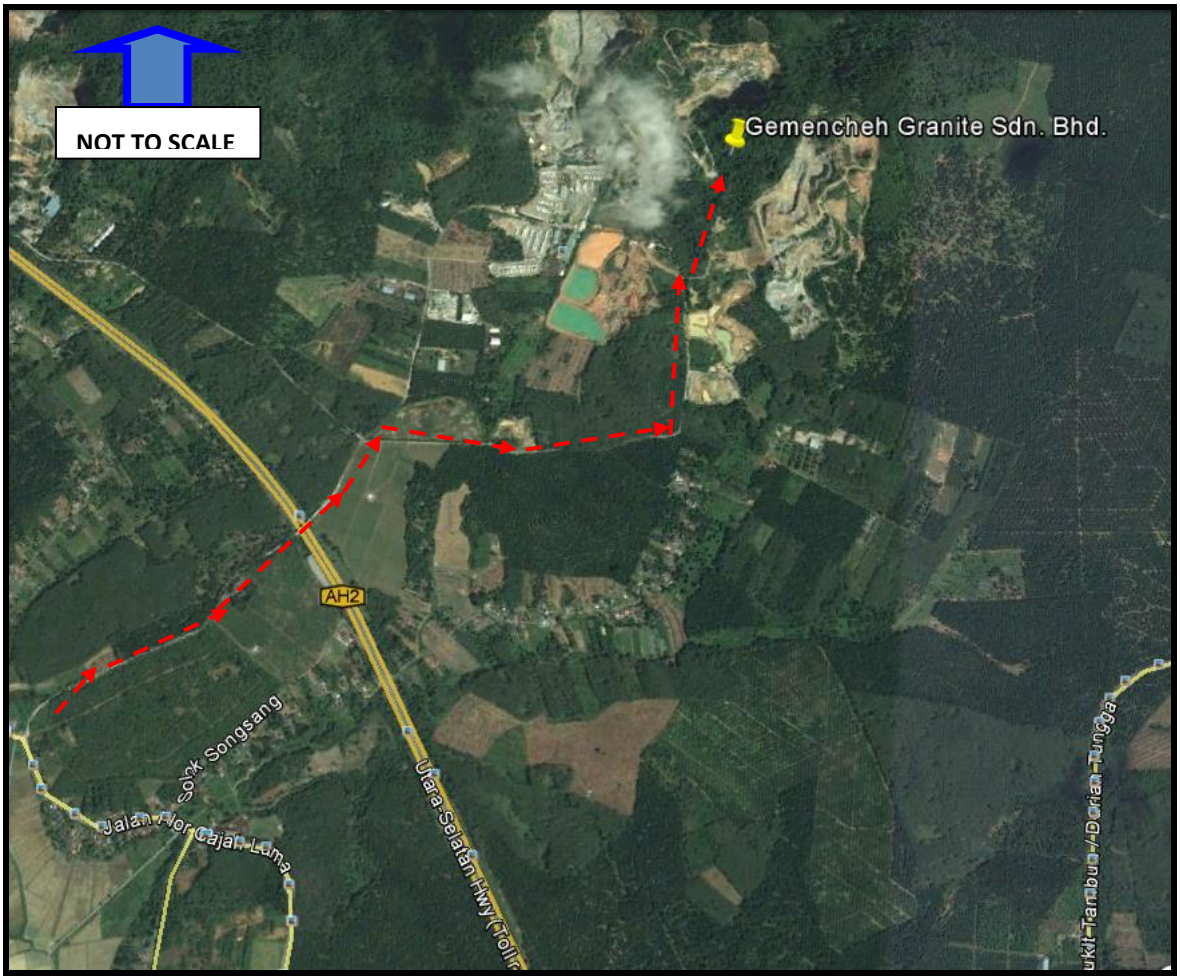
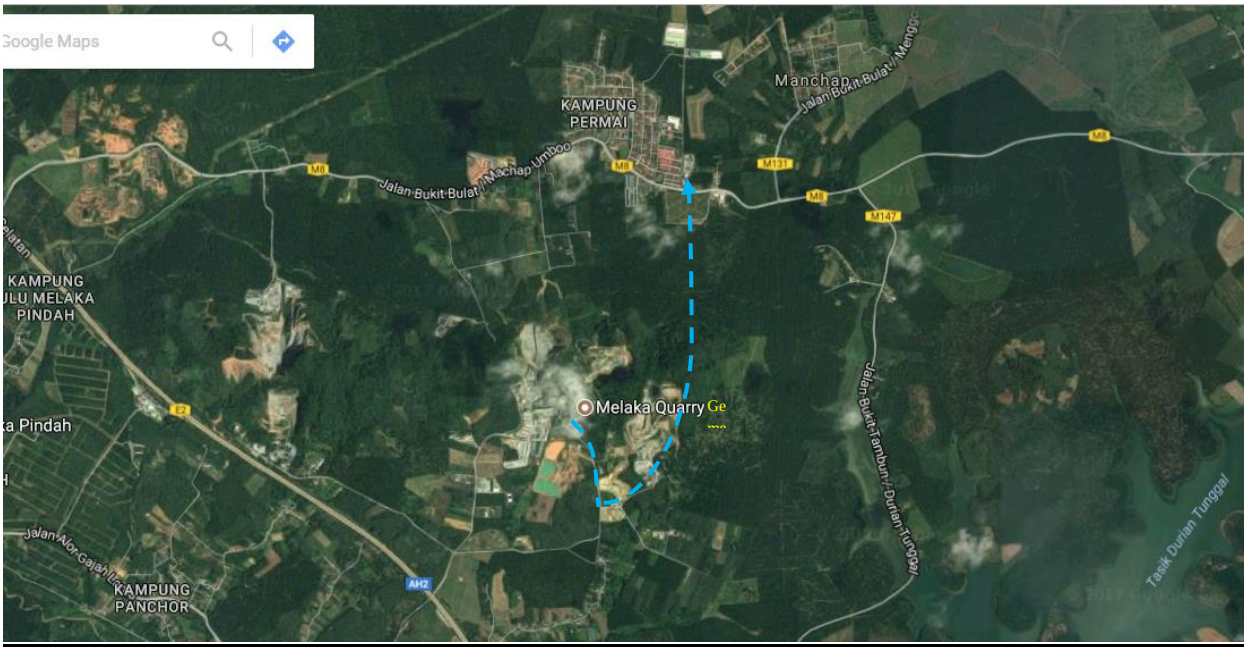


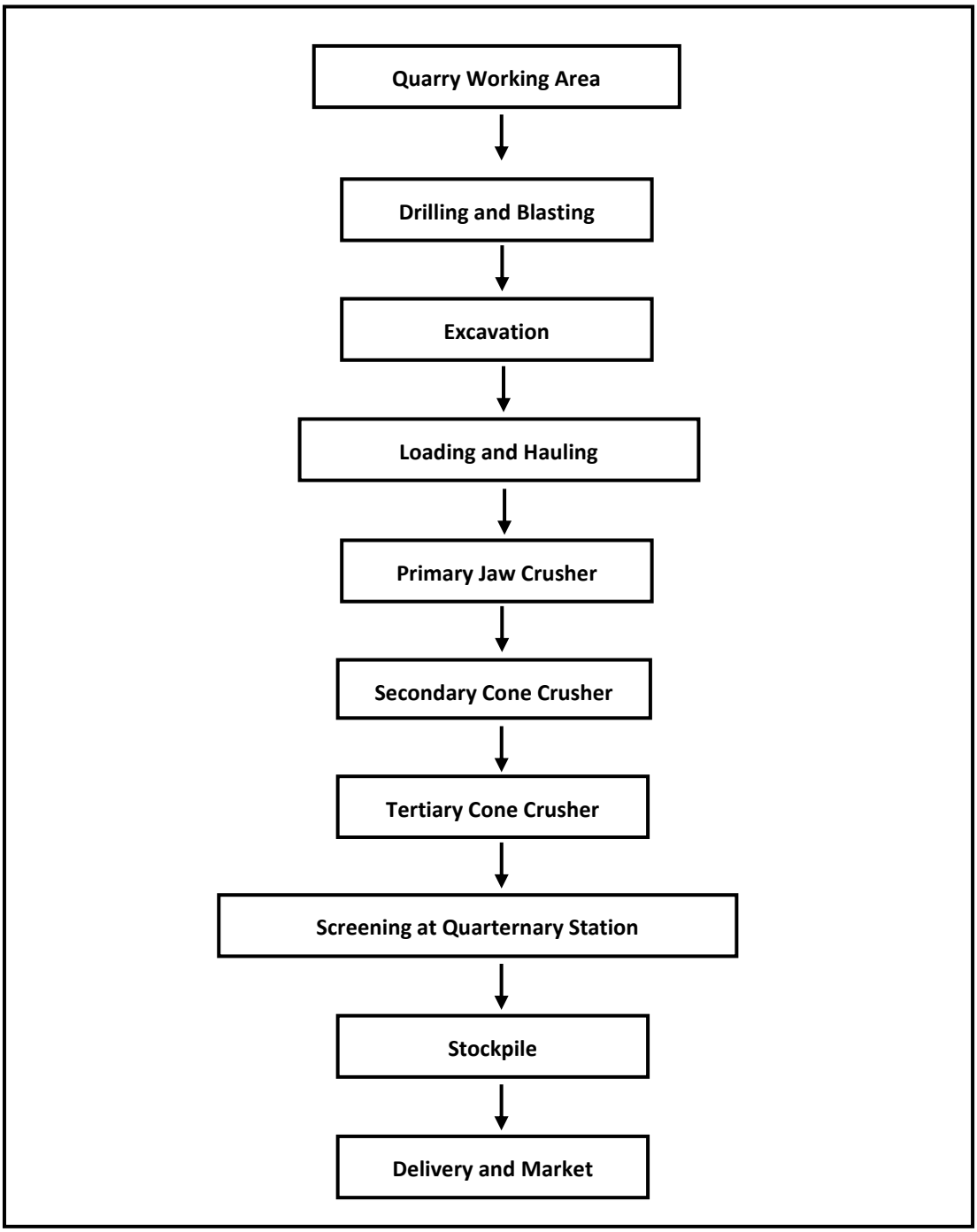
Figure E5: Proposed New Access Road for Quarry Operators



(G) FLOW DIAGRAM OF MAIN PROCESS

The flow diagram of the main process is shown in **Figure E6**.

Figure E6: Schematic Representation of Granite Quarrying Operation



(H) POTENTIAL IMPACTS, PROPOSED POLLUTION PREVENTION AND MITIGATION MEASURES

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
Site Preparation and Developmental Stage				
• Boundary demarcation and positioning • Mobilisation of workforce • Transport of equipment and supplies • Construction of silt trap • Site clearing • Overburden removal • Construction of haulage road and working platform • Improvement of drainage system	• Soil erosion and associated sediment pollution of the watercourses • Air pollution • Noise pollution • Vibration • Airblast • Generation of solid and liquid wastes • Aesthetics • Socio-economic impacts • Loss of fauna, flora and habitats • Loss of topsoil	Significant (Short term)	1. Limit the work area to the minimum and expedite work during dry season. 2. Overburden stockpile cleared regularly and be compacted. 3. Frequent spraying of water on the exposed surface especially during dry seasons. 4. Vehicles transporting earth and other construction materials should be covered properly with tarpaulin to reduce wind-blown dust. 5. The burning of plant debris and other construction wastes is prohibited. A warning sign board must be erected to send the message across at all time. 6. Carry out dust monitoring programme. 7. Proper disposal of domestic waste at approved dump site. 8. Allocate adequate disposal bins on site. 9. Employment to be prioritised to hire local employees. 10. Only foreign workers with valid work permits will be allowed to work at Project site	8-20 to 8-22

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
Operational Stage				
• Drilling	• Dust • Noise from machinery • Risk to worker's health and safety	Not significant	**<u>Dust / Air Pollution</u>** 1. Frequent spraying of water on the exposed surface especially during dry seasons. 2. Regular spraying at the entrance and exit points of the site. 3. Implement all construction vehicles to go through the washing bay within the quarry site before exiting the site. 4. Traffic controls such as speed limits and traffic volume restrictions to reduce dust churned up by vehicles. The recommended speed is not exceeding 30 km/h along the haulage road. 5. Transport of earth and materials should be confined to non-peak hours, if possible. 6. Regular checking and maintenance of the air pollution control equipment and production equipment to mitigate fugitive dust. 7. Carry out dust monitoring programme. 8. Workers should be supplied with respiratory masks. **<u>Noise Pollution</u>** 1. The machinery used should also be properly checked and maintained at optimum operating conditions. All machinery should be shut down when not in use. 2. Overall noise level emitted from the transportation of the	8-20 to 8-22
• Blasting and excavation	• Dust and gas from blasting and excavation • Noise and air-blast from controlled explosion • Vibration from shock-waves • Flyrock • Soil erosion and sedimentation • Risk to worker's health and safety	Significant		
• Crushing and screening	• Dust • Noise from crushing activities	Significant		
• Handling and storage of rocks	• Dust • Noise from operating equipment	Significant		

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
• Transportation	• Noise from vehicle movements • Dust from vehicle movements	Significant	equipment and materials to be controlled by routing all vehicles to routes that will cause minimum disturbance. 3. Any complaints from nearby residents should be immediately attended to and actions taken. Impose and enforce a speed limit on all vehicles moving within the Project site, i.e. at maximum 30 km/h. 4. Regulate the number of external vehicle trips per day. 5. Maintain natural buffer zones to attenuate the noise impact. 6. Carry out noise monitoring programme 7. Provide workers with earplugs or earmuffs. 8. Organise shifts work for the workers. 9. Carry out regular audiometric test on the workers. 10. Adopt proper and safe blasting technique. 11. Engage qualified personnel to handle blasting and explosive. 12. Avoid secondary blasting. 13. Use delay blasting technique and correct stemming. 14. Carry out quarry face survey. 15. Monitor blast as feedback for future blast design. 16. Install effective noise suppression system.	
• Waste disposal	• Health problem may arise if disposal of solid waste is not properly handled • Environmental pollution due to improper handling, spillage or leakage of scheduled waste	Significant		

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
			Soil Erosion 1. Limit the work area to the minimum and expedite work during dry season. 2. Maintain the sediment pond constructed. 3. Maintain bund and drainage in place within the Project sit to minimise soil erosion on-site as well as runoff and siltation off-site. 4. Overburden stockpile cleared regularly and be compacted. **Water Pollution** 1. Ensure minimum or no direct water discharge into any of nearby natural water courses. 2. The surface runoff from the development area is being channeled into the temporary drainage system and subsequently to the sedimentation pond built in place, before finally discharge. 3. Adequate sedimentation pond, siltation pond to contain water. 4. Oil and grease leakages from servicing the construction equipment, is to be drained into a drum for collection and disposed as scheduled waste at the designated skid areas. 5. Fuel, grease, engine oil storage must be carefully sited to avoid contamination of the surface waters. 6. Domestic and solid wastes should be collected in	

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
			covered bins and finally disposed of into an approved dumpsite. **<u>Waste Generation</u>** **(a) Domestic Waste** 1. Proper disposal at approved dump site. 2. Adequate disposal bin prepared on site. **(b) Scheduled Waste** 3. Storage and handling of scheduled wastes will be carried out according to the Environmental Quality (Scheduled Wastes) Regulations, 2005. **<u>Health and Safety</u>** **(a) Dust Nuisance** 1. Carry out dust monitoring programme. 2. Workers should be supplied with respiratory masks. **(b) Noise Nuisance** 1. Carry out noise monitoring programme. 2. Provide workers with earplugs or earmuffs. 3. Organise shifts work for the workers. 4. Carry out regular audiometric test on the workers. **(c) Occupational Accidents** 1. Follow the emergency response plan formulated.	

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
Rehabilitation and Abandonment Stage				
• Compaction, levelling, grading and topsoiling • Re-vegetation	• Soil erosion, and associated sediment pollution and siltation • Air quality • Noise pollution • Aesthetics • Socio-economic impacts	Significant	**<u>Soil Erosion</u>** 1. Limit the work area to the minimum and expedite work during dry season. 2. Maintain the sediment pond constructed. 3. Maintain bund and drainage in place within the Project sit to minimise soil erosion on-site as well as runoff and siltation off-site. 4. Overburden stockpile cleared regularly and be compacted. **<u>Air Quality</u>** 1. Regular spraying at the entrance and exit points of the site. 2. Workers should be supplied with respiratory masks. 3. Frequent spraying of water on the exposed surface especially during dry seasons. **<u>Noise Pollution</u>** 1. Overall noise level emitted from the transportation of the equipment and materials to be controlled by routing all vehicles to routes that will cause minimum disturbance. 2. Maintain natural buffer zones to attenuate the noise impact.	8-20 to 8-22

Activity	Significant Potential Impact	Magnitude of Significant Potential Impact	Proposed Pollution Prevention and Mitigation Measure (P2M2)	Reference Page
			3. Provide workers with earplugs or earmuffs. 4. Organise shifts work for the workers. **<u>Human Environment</u>** 1. Employment to be prioritised to hire local employees. 2. Only foreign workers with valid work permits will be allowed to work at Project site.	

(I) COMPLIANCE MONITORING PROGRAM

Compliance monitoring (CM) such as environmental audit will be carried out annually in order to ensure the EIA conditions of approval (COAs) are complied all the times during operation. It could assess the overall project compliance and provide opportunity for optimisation and further improvement in environmental management of the Project.

(J) IMPACT MONITORING PROGRAM

An environmental impact monitoring (IM) program to identify the predicted and unanticipated changes to the environment brought about by the Project will be carried out as stated below.

A quarterly Environmental Quality Monitoring Report is recommended for submission to DOE based upon monitoring data collected monthly. The locations and frequencies of monitoring are shown in the tables below.

Water Quality

Location	Description	Coordinates	Frequency
W1	A stream at the northwest direction (downstream) of Project site which will join Sg Ulu Melaka	N 2º 22' 23.4", E 102º 16' 23.4"	Monthly
W2	A stream at the southwest direction (downstream) of Project site which will flow into Sg Melaka	N 2º 21' 12.2", E 102º 16' 17.5"	Monthly
W3	A stream at the northeast direction (downstream) of Project site which will flow into Sg Machap Umbor	N 2º 22' 15.2", E 102º 16' 55.6"	Monthly
W4	A stream at the southeast direction (downstream) of Project site which will flow into Sg Melaka	N 2º 21' 24.6", E 102º 16' 41.6"	Monthly

Air Quality

Location	Description	Coordinate	Frequency
A1	At an open space, adjacent to the workers quarter in the oil palm estate	N 2º 22' 26.0", E 102º 16' 34.2"	Monthly
A2	At an open space, adjacent to the office building	N 2º 21' 41.4", E 102º 16' 29.3"	Monthly

Noise Level

Location	Description	Coordinate	Frequency
N1	At an open space, adjacent to the workers quarter in the oil palm estate	N 2º 22' 26.0", E 102º 16' 34.2"	Monthly
N2	At an open space, adjacent to the office building	N 2º 21' 41.4", E 102º 16' 29.3"	Monthly

Vibration

Location	Description	Coordinate	Frequency
V1	At an open space, adjacent to the workers quarter in the oil palm estate	2º 22' 26.0" 102º 16' 34.2"	Every Blasting
V2	At an open space, adjacent to the office building	2º 21' 41.4" 102º 16' 29.3"	Every Blasting
V3	An open space near to Empangan Durian Tunggal, parallel to the Project site	2º 21' 41.0" 102º 17' 42.7"	Every Blasting