EXECUTIVE SUMMARY

i. Name and Title of Project

The title of the project is "The Proposed 120 Acres of Coastal Reclamation and 50 Acres of Water Chalets (Without Reclamation) At Pekan Klebang Section III, Mukim Klebang Besar, Daerah Melaka Tengah, Melaka." Hereinafter, it will be referred to as the "Project".

ii. A Description of the Project and the Environment

The Project Proponent, Awan Plasma Sdn Bhd (APSB) intends to undertake the reclamation of 120 acres of coastal area and the development of 155 units of floating water chalets within an area of 50 acres in front of the proposed reclamation land. The Project site covers an area of 170 acres (68.8 hectares) and it is located along the Klebang Beach. At the time of preparation of this EIA report, there is no proposal for the top development. Hence, the assessment presented in this Environmental Impact Assessment (EIA) report covers the reclamation activity and the development of floating water chalet.

The project will be carried out along the seafront of Klebang Beach. The existing environment of the proposed project is presented below:

Components	Description
Hydraulic Study	• Meteorological -Melaka is hot and humid throughout the whole year and it is one of the driest city in Malaysia. • Temperatures generally range between 30 °C – 35 °C during the day and 27 °C – 29 °C during night time. • Wind data – During Northeast monsoon, a local wind of an average 5.2 m/s blowing from NE direction. While during Southwest monsoon, a local wind of an average 5.2 m/s blowing from S-SW direction. • Current – The fastest current speeds recorded by two (2) Acoustic Doppler Current Profiler (ADCPs) for the study are 0.91 m/s and 1.13 m/s, respectively. • Tide and water levels - The tide at the project site is semi-diurnal. Differential datum differential from Mean Sea Level to CD are 1.19 meter. • Wave - the project area has typically low wave heights lower than 0.4 m.

Components	Description
Landuse	The major land use within 5km radius is generally comprised of agricultural, residential, commercial and tourism establishments. • 0.5km radius - The land uses within 500m from the boundary are dominated by urban areas to the northern region. The nearest settlements are Taman Puncak Maju and Taman Nirwana to the north, Taman Spring Garden and Taman Pinang Batang Tiga to the northwest. • 0.5 – 1 km radius - this impact area is mainly covered with part of Dataran 1 Malaysia, Klebang beach and the reclamation project for the Development of Cheng Ho City to the north. The northern region are paddy fields and residential settlements. • 1 -3 km radius - The land uses of this radius are dominated by urban areas from northwest to northeast. Northern region is mainly agricultural land for paddy plantation while the Straits of Melaka is located at the southern region of this impact area.
Seawater Quality	Seawater samples were collected around at eight (8) sampling locations around the project area at two water depths level (surface and bottom). The data obtained were compared with the Class II of the Marine Water Quality Criteria and Standard (MWQCS. It is noted that most of the parameters measured were below the recommended limit as stipulated in MWQCS.
Sediment	The percentages of sand in the sediments ranged from 0.11% to 46.55% with an average of 13.75% while the percentages of silt ranged from 26.27% to 73.59% with an average of 56.15%. Clay ranged from 20.28% to 64.80% with an average of 30.10%. Whereas gravel was not found in the samples.
Ambient Air Quality	Ambient air quality at the project site was assessed for the nitrogen dioxide (NO2), sulphur dioxide (SO2), carbon dioxide (CO) and particulate matter (PM 10 and PM 2.5). It is observed that parameters measured at all the

Components	Description
	four (4) sampling station were found below the recommended limit stipulated for Malaysian Recommended Air Quality Guidelines.
Noise Levels	Four (4) noise quality monitoring stations were establish within the proposed project site. The results were lower than Recommended Noise Limit of 65.0 dB (A) at day time and 55.0 dB (A) at night time.
Marine Environment	• The concentrations of chlorophyll-a found at the seawater in the area ranged from 0.029 mg/l to 0.037 mg/l (average value: 0.033 mg/l). • A total of 82 phytoplankton species were enumerated and identified during this study. They comprised 53 species of diatoms, 18 species of dinoflagellates, 3 species of blue-green algae, 2 species of silicoflagellates, 5 species of flagellates and 1 others. • A total of 34 species of marine zooplankton were identified for all stations sampled. The total densities ranged from 2720 cell/m^3 to 3585 cell/m^3 with an average of 3004 cell/m^3. • From the eight (8) stations sampled, a total of 54 species of macrobenthos were identified.
Fisheries	• The coastal region in Central Melaka is divided into sixteen (16) fish landing areas. • A total of 1200 fishermen are working on Licensed Fishing Vessels in Zone A Fisheries Zone of Melaka. • The total landing of marine fish in Melaka is 2,019 tonnes in 2015.
Marine Turtle	The tiny island of Upeh is located near Klebang town in Melaka (situated some 2.8 km southeast of the project site). Pulau Upeh was gazette as hawksbill turtle nesting ground.
Ecological Study	• A total of fifty-two (52) terrestrial flora from eighteen (18) families were identified in the study area during the survey. These area was covered with sandy beach forest and is typified by the presence of rhu laut

Components	Description
	(*Casuarina equisitifolia*) and ketapang (*Terminalia catapa*) as the dominant species. • A total of fifty-three (53) different species of avifauna were recorded during the survey.
Marine Traffic	• Number of vessel passing through the Straits of Melaka in 2016 is 82616. • No piracy and robbery cases were reported since 2009 until year 2016 except for year 2011 (2 cases), 2014 (2 cases) and 2015 (1 case).
Land Traffic	• The traffic survey includes traffic counts carried out at Road FR5 or Jalan Klebang Besar to assess the traffic condition. • The mode of transport at Road FR5 surveyed are cars, followed by motorcycles, vans/small lorries, lorries/tankers and finally buses. • The heavy vehicle composition at Road FR5 is 5.7%.
Human Environment	• Survey was conducted at the settlements near to the project site and visitors to the coastal area. • The majority of respondents were male with 80.57% and the majority of the local community surveyed (81.43%) were 31 years and older. • The level of awareness of the project among the local community was only 43.43%. • The more frequent perceived impacts raised during the construction phase are loss of recreational area destroyed i.e. both coastal beaches and recreational fishing spots. • The more frequent perceived impacts raised during operational phase increase job opportunities to local people. • The perspective of fishermen on the impacts of the project is absolutely negative.
Public Dialogue	Public Dialogue to brief and conduct a dialogue relating to the EIA was successfully held on 9th February 2017 located at Kg. Hailam fishermen unit adjacent to Jetty Tanjung Kling at 10.30am

Components	Description
	to 1.00pm. From the above dialogue several suggestions were agreed upon.
Infrastructure and Utilities	• Syarikat Air Melaka Berhad (SAMB) is responsible for the provision of the reticulated water supply of the State of Melaka. • The electricity supply in is distributed from Tenaga Nasional Berhad (TNB) while waste is managed by SWM Environment Sdn Bhd. • IWK is responsible for the handling and maintenance the sewerage treatment services.

iii. Project Proponent

The Project Proponent for this project is Awan Plasma Sdn Bhd (APSB). Its registered and correspondence address is as follow:

Awan Plasma Sdn Bhd

Unit 2F-6, 2nd Floor, Tower 1 @ PFCC,
Jalan Puteri 1/2,
Bandar Puteri, 47100 Puchong,
Selangor

Contact Person : **Deric Cheong**
Position : Project Director
Contact Number : +60-3-8051 7335
Facsimile : +60-3-8051 6779
Email : dericcyh.biz@gmail.com

iv. EIA Consultant

Integrated Envirotech Sdn. Bhd. (IESB) has been appointed as the Environmental Consultant to carry out the study and preparation of the Environmental Impact Assessment report for this project. Enquiries and correspondence pertaining to this report can be made to:-

Integrated Envirotech Sdn. Bhd. (650387-K)

No. 32-2, Jalan Setiawangsa 11A,
Taman Setiawangsa,
54200 Kuala Lumpur,
Malaysia.

Contact Person : **Hung Yee Hong**
Telephone : +603-4256 6623
Facsimile : +603-4251 9623
Email : yeehonh@yahoo.com

v. Project Location

The proposed project is located at Pekan Klebang off Lot 152, PT 149 and PT 50 of Mukim Klebang Besar and District of Melaka Tengah. It is accessible from Melaka town via Jalan Klebang Besar heading towards Tanjung Kling. A left junction off Jalan Klebang Besar at coordinates N 2°13'16.97" and E 102°10'54.60" will lead to the proposed site. The coordinates of the project site are given in the table below and the location of the proposed project site is shown in **Figure ES-1** while the proposed area to be reclaimed is presented in **Figure ES-2.**

Table ES-1 Project Coordinates

Point	Latitude	Longitude
1	2°13'9.47"N	102°10'34.11"E
2	2°13'9.47"N	102°10'43.53"E
3	2°13'5.70"N	102°10'43.23"E
4	2°13'4.96"N	102°10'61.33"E
5	2°13'4.07"N	102°10'51.33"E
6	2°13'4.09"N	102°11'7.82"E
7	2°12'47.14"N	102°11'7.81"E
8	2°12'41.49"N	102°10'34.20"E

N

OVERVIEW

LEGEND

- Proposed Site
- Forest
- Water Bodies
- Other Reclaimed Area

0 500 1000 1500

Meters

PROJECTION PARAMETERS

Notes

1. Projection parameters are in Geographical/WGS84
2. Image source : Google

Rev	#	Drawing by	Date
00	1	MAF	1/8/2016

ENVIRONMENTAL IMPACT ASSESSMENT FOR PROPOSED MIXED DEVELOPMENT AT PEKAN KLEBANG, OFF LOT 152, PT 149, PT 50 OVER 120 ACRES RECLAIMED LAND AND 50 ACRES SEABED IN MUKIM KLEBANG BESAR, DAERAH MELAKA TENGAH, MELAKA

Figure ES 1 Project Location Map

INTEGRATED ENVIROTECH

A3

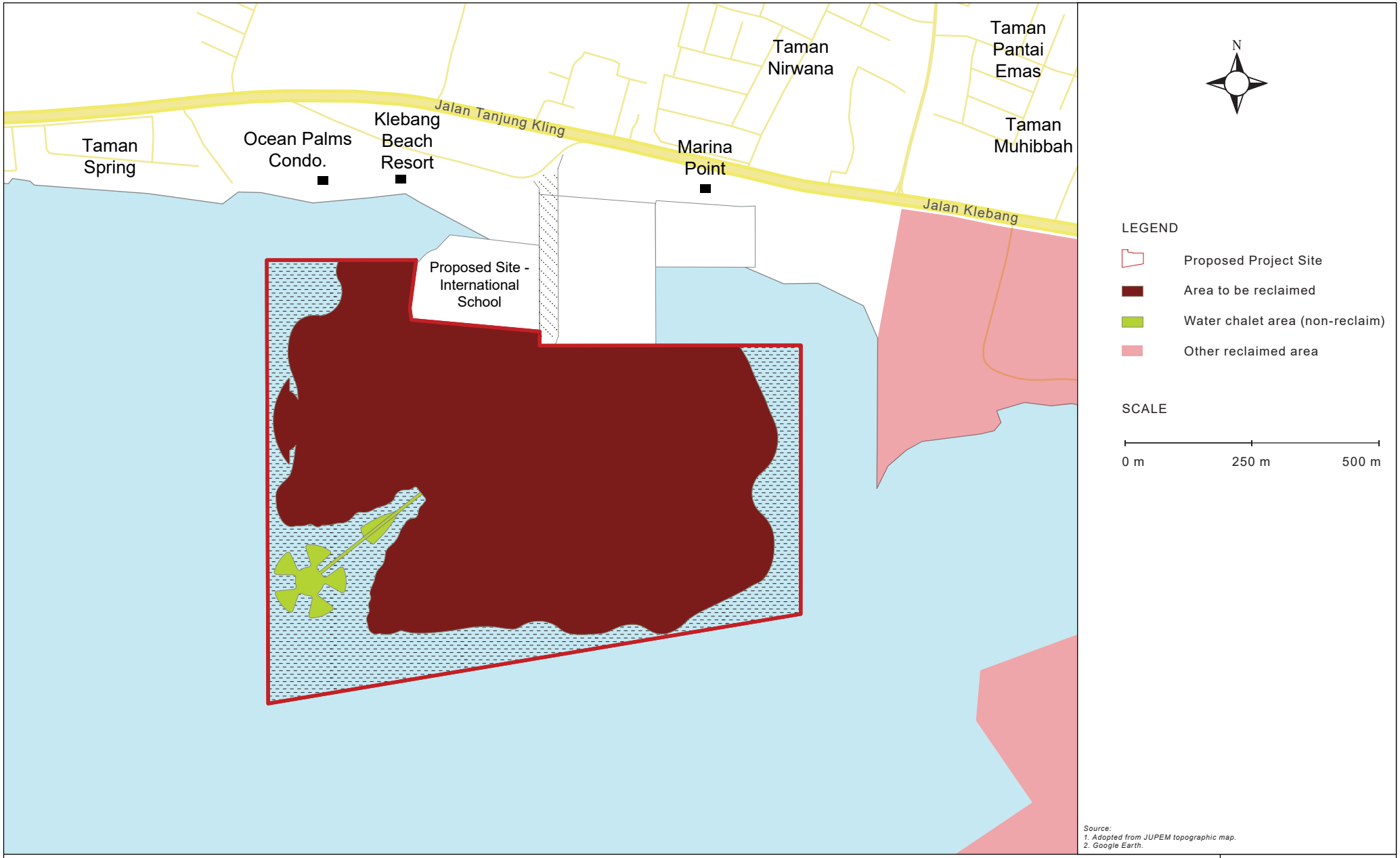


Figure ES 2 Area To Be Reclaimed

A4

vi. Project Development

Fill material for the reclamation will be sourced from the nearest licensed sea sand source concession site in Melaka namely Extrorish Sdn Bhd. Extrorish Sdn Bhd is located at 10.4 km southwest of the proposed project site (**Figure ES-3**).

The estimated volume of fill material is about 2 million cubic metres. A sand carrier with capacity 1000 m^3 to 2000 m^3 has been selected for the reclamation. This vessel will be used for transporting the sand from the sand concession area to the reclamation site. Estimated trip for the sand carrier to 3 trips per day will be carried out to attain sand from the nearest sand source.

Only suitable fill material will be transported to the proposed project site. Thereby, there will be no disposal of unsuitable material (USM) involved for the proposed project.

The proposed project development phases include the followings:

a) Site Preparation Phase
This phase mainly involves project kick-off, mobilization of project team and machineries, establishment of temporary facilities on-site as well as the clearance and removal of debris and rubbish.

b) Reclamation Phase
Reclamation works would take place where sand fill shall be measured net based on the differences between RL 3.0 and the bathymetric levels shown in the drawing. This phase involves the following steps:
- Pre-survey
- Sandkey trenching and construction of perimeter bund
- Sand transportation and filing works
- Soil treatment (installation of prefabricated vertical drain)
- Sand spreading and surface compaction
- Excess sand fill surcharge removal
- Water quality and geotechnical monitoring
- Silt curtain installation

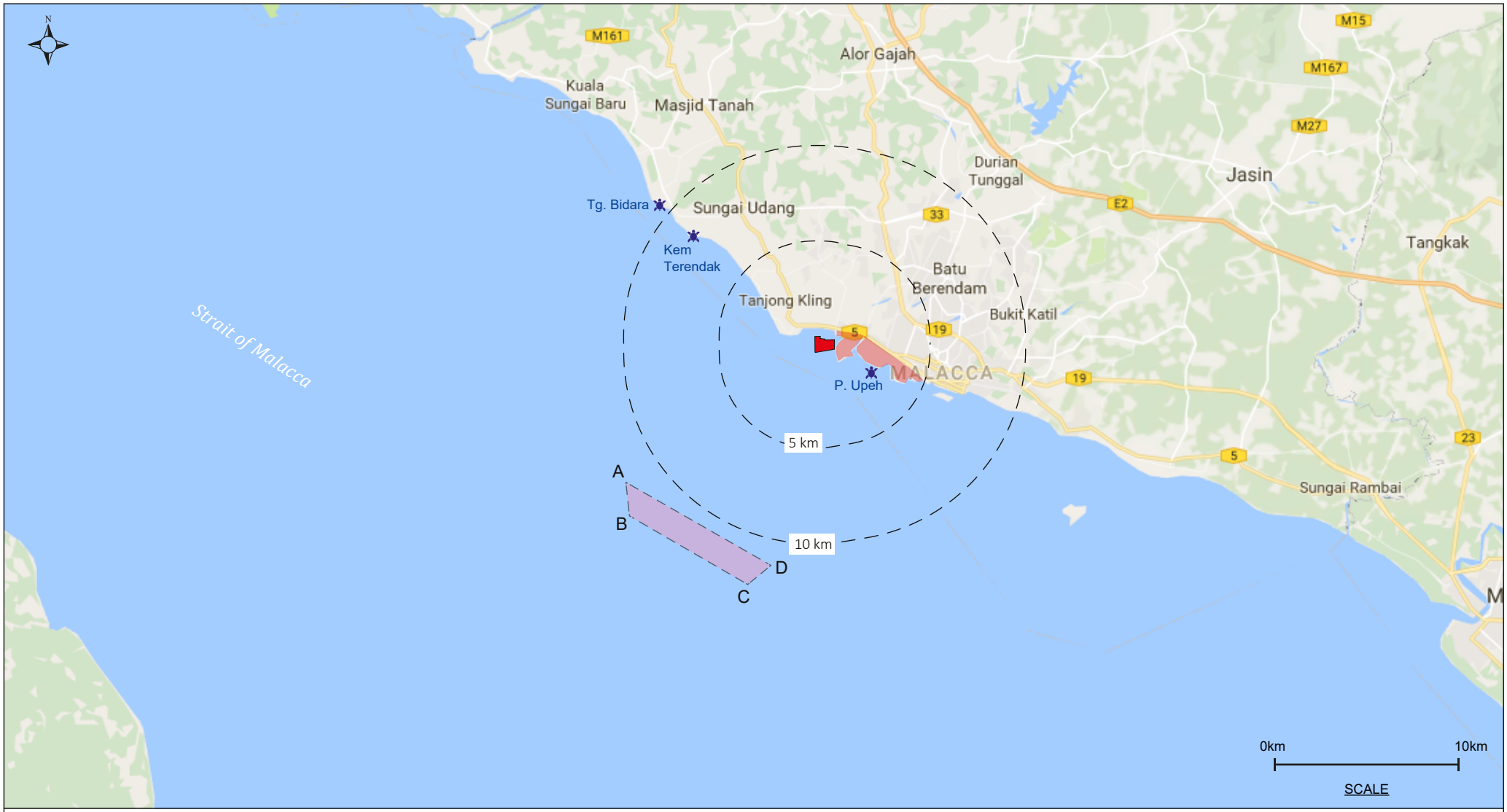
Single layer silt curtain is to be installed during this stage. The proposed location for silt curtain installation is presented in **Figure ES-4.**

c) Construction of Coastal Protection Structure
After completion of the reclamation works, the edge works can commence. Rock revetment is a form of coastal defense made by placing the rock inland so that the land may be protected against powerful waves. The scope of these activities is the supply and installation of rock revetment protection works along or around of the reclamation areas, including installation of geotextile underneath the rock works.

d) Construction of Water Chalets
   The component consist of two types of floating residential which is Floating Villa (Type A), The Wharf Villa (Type B) that comprises of 155 units of accommodation. On top of that, this development also comes with a clubhouse, centralize parking and boat deck.

The proposed project is expected to take 6 years to complete. It is scheduled to commence in March 2017 and end in September 2024. The overall Project Implementation Schedule in **Table ES-2**.

Operational of water chalets and maintenance works of waste disposal system, water reticulation system, electricity supply, and etc. are the main activities undertaken during the operational phase of the proposed project.

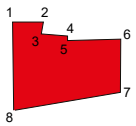


LEGEND

- Sand source
- Water bodies
- Forest
- Other reclaimed area
- Roads
- Turtle landing site
- Proposed project site

SAND SOURCE COORDINATES

A -	2°08'18.0"N 102°06'00.0"E	C -	2°05'00.0"N 102°09'30.0"E
B -	2°07'25.0"N 102°06'00.0"E	D -	2°05'30.0"N 102°10'00.0"E



PROJECT BOUNDARY COORDINATES

1) 2° 13' 9.47"N, 102° 10' 34.11"E	5) 2° 13' 4.07"N, 102° 10' 51.33"E
2) 2° 13' 9.47"N, 102° 10' 43.53"E	6) 2° 13' 4.09"N, 102° 11' 7.82"E
3) 2° 13' 5.70"N, 102° 10' 43.23"E	7) 2° 12' 47.14"N, 102° 11' 7.81"E
4) 2° 13' 4.96"N, 102° 10' 61.33"E	8) 2° 12' 41.49"N, 102° 10' 34.20"E

Figure ES 3 Location of Sand Source at Klebang, Malacca

INTEGRATED ENVIROTECH

Figure ES 4: Proposed Position of Silt Curtain

Activity	Duration (Month)	Start Date	Finish Date	2018												2019												2020						
				1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
Reclamation Phase																																		
Mobilization Phase																																		
Vessels and Machineries	1 month	Mar-18	Apr-18																															
Site office establishment	1 month	May-18	May-18																															
Survey Phase																																		
Pre-dredge survey reclamation area	1 month	1 month	1 month																															
Out-survey reclamation area	1 month	1 month	1 month																															
Reclamation Phase																																		
Imported Sandfill	4 months	Oct-18	Feb-19																															
Soil Improvement Works	3 months	Mar-19	Jun-19																															
Sand Settlement Period	3 months	Jun-19	Sep-19																															
Sand Surcharge Removal	3 months	Sep-19	Dec-19																															
Rock Revertment Work	3 months	Dec-19	Mar-20																															
Demobilisation Phase																																		
Survey equipment/Machineries	1 month	Mar-20	Apr-20																															
Construction of Water Chalet Phase																																		
Sub Structure Work - Site Foundation	6 months	May-20	Dec-20																															
Main Building work	18 months	Jan-21	Jun-22																															
Exterior Finishes	12 months	Jun-22	Jun-23																															
Infrastructure Work	12 months	Jun-22	Jun-23																															
Interior Trim	12 months	Jun-22	Jun-23																															
Exterior Landscapping	6 months	Jul-23	Dec-23																															
Final Building Inspection	3 months	Jan-24	Mar-14																															
First Walk thru	2 months	Apr-24	Jun-24																															
Final Walk thru	2 months	Jul-24	Sep-24																															

continue below:

Activity	2020					2021												2022												2023												2024											
	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Reclamation Phase																																																				
Mobilization Phase																																																			
Vessels and Machineries																																																			
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Sand Settlement Period																																																			
Sand Surcharge Removal																																																			
Rock Revertment Work																																																			
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Construction of Water Chalet Phase																																																			
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Infrastructure Work																																																		
Interior Trim																																																		
Exterior Landscapping																																																		
Final Building Inspection																																																		
First Walk thru																																																		
Final Walk thru																																																		

Figure ES 5 Overall Project Implementation Schedule

vii. Potential Impacts and Proposed Mitigation Measures

The potential environment impacts of the proposed project were identified by evaluating the interaction of proposed project activities with specific components from the existing environment. A summary of the impact assessment and proposed mitigation measures is provided in **Table ES-3** below:

Table ES-3 Summary of Potential Impacts, their Magnitude and Proposed Pollution Prevention and Mitigation Measures

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
Site Preparation Phase					
1	Air	• Reduce air quality due to the dust generated during the carrying out of site preparation. • Impact on air quality due to emission from the exhausts of moving vehicles constituting SO2 and CO.	Short term and insignificant	• Provision should be made for water sprays to be available for use when dusts are being generated or at times of strong wind. • Tyre washing facility is to be installed at all entrances to public roads or at points when the trucks leave the working site. Where possible, main road within the working site should be paved or overlain with aggregate prior to the start of construction works. • Truck speed on unpaved roads or open spaces is to be limited to 20 km/h within the project area, unless sufficiently wetted to prevent dust generation.	Pg. 8-2
2	Noise	• Noise emission from the vehicles and machinery		• Machineries and equipment used during the site preparation should be fitted with effective exhaust silencers. • Whenever possible, the level of noise should be minimized at all time so that it would not disturb the nearby people • Regular maintenance for all machineries involved in the Project	Pg. 8-2
3.	Waste Management	• Generation of minimal amount of debris and rubbish		• All solid wastes generated from must be disposed of at the local authority approved landfill, i.e. Sungai Udang Sanitary Landfill. • Open burning of waste is prohibited.	Pg. 8-2
Sand Mining and Transportation					
1.	Hydrodynamic	• Suspension and redistribution of finer sediments will lead to temporary increase in turbidity and alteration of sediment particle distribution. • This will cause loss in benthic and bottom feeding organisms.	Minor and in a short period	• Minimising the reclamation period to the shortest period possible. • Anchoring at only pre-determined locations and based on the approved anchor pattern.	Pg. 8-3
2	Water Quality	• These activities will cause an increase in turbidity due to increase in Total Suspended Solid (TSS) concentration • Accidental spillage of fine materials or oils along the way may occur which will cause sea water pollution. • Water pollution due to the discharge of bilge water from ship/sand carrier, fuel oil sludge and oily ballast water from fuel tanks .	The impact is expected to be localized and minimal.	• The increase in turbidity can be reduced significantly with proper dredging technology and a correct handling of machineries. • Standard of Operation Procedure for the Transportation of fill material should be in place. • Limit the speed of sand carrier during the transportation to avoid spills and the sand carrier should not be overloaded. • Conduct regular maintenance of oil separator of the sand carrier in order to maintain its design treatment capability and also to prevent breakdown of the oil separator. • Oily wastes shall be treated and disposed accordingly to avoid seawater pollution. • The contractors shall ensure that their vessels are equipped with slop tanks (if applicable). The wastes collected shall be disposed at approved premises onshore.	Pg. 8-3

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
				• Non-biodegradable wastes shall not be flushed together with the sewage but should be compacted and stored before disposal onshore. • Emergency response and contingency plans to be put in place for response in emergency cases.	
3	Noise	• Underwater noise due to propellers and thrusters will also be generated by vessels	Minor and in a short period	• Restricting working hours to daytime only. • Maintenance of all vehicles and machinery to ensure good working condition and reducing possible noise emission. • Shut down engine/machinery when not in use. • Machinery emitting high noise levels should be installed with suitable noise absorbent materials and shall be sited within an enclosure.	Pg. 8-3
4	Marine Traffic	• Vessel collisions, groundings and other accidents and interference with other maritime and marine-based activities (fishing).	There is only a small likelihood as marine traffic in the vicinity of the project area is low	• The mobilization route must be planned to avoid fishing areas and shipping lanes where possible. • All installation vessel and barge must have adequate navigational equipment to provide sufficient warning to approaching vessels. • Vessel collisions, groundings and other accidents can be avoided through implementation of navigational safety practices which include the enforcement of safety zones, use of radar, routine surveillance, installation of navigation safety beacons. • All vessel and barge should be sufficiently lighted up so that they are visible in poor weather condition and at night. • Notify the Melaka Marine Department on the project's activities so that 'Notice to Mariners' could be issued to prohibit mariners including fishermen from encroaching into the project site.	Pg. 8-4
5	Waste Management	• Generation of general rubbish, perishable food waste as well as scheduled waste from the sand carrier. • Generation of ballast water	Minor and in a short period	• Direct discharge of any kind of wastes (including sewage) from the sand carrier and other supporting vehicles are not allowed. • All wastes generated during the transportation of fill material should be transported back to nearshore. • Wastes are to be disposed of by licensed contractors to municipal landfill (i.e. Sungai Udang Sanitary Landfill) approved by the local authority. • All scheduled wastes generated are to be managed according to the Environmental Quality (Scheduled Wastes) Regulation, 2005.	Pg.8-4
Reclamation					
1.	Hydrodynamic	• Change in the pattern of maximum and mean current speed at and around the project site, which will have a significant impact on morphological changes around the project site. • Change in water level and wave pattern around the project site.	From Hydrodynamic simulation it is clear that the reclamation work will not create any significant change nearby the project site. However, it is also evident from the morphological	A continuous monitoring is needed at some specific locations nearby the project site.	Pg.8-4

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
		• Impact on erosion and deposition change around the project site.	model results that there will be no significant change in erosion and deposition if the reclamation work continues for a long duration.		
2.	Sediment Spill	• Increase in TSS levels in the seawater is expected to contribute to the increased suspended solids in the receiving watercourses which subsequently affect the marine water quality of Straits of Melaka.	The plume patterns indicate that excess suspended sediment concentrations generated from the pilling work only at the project site and nearby. The maximum plume extent approximately up to 0.85 km during neap tide and 1.0 km during spring without installing silt curtain. Whereas with silt curtain the maximum plume reaches approximately 0.4 km during neap tide and 0.55 km during spring tide.	• Silt curtain are able to control the dispersion of turbid water by diverting the flow under the curtain, thereby minimizing turbidity in the upper layer of the water column outside the silt curtain. • If the silt curtains were found ineffective, it is recommended that rock bund shall be constructed in order to contain the spread of the sediment concentrations.	Pg.8-5
3.	Sungai Lereh	• Impact on erosion and deposition change • Impact on backwater	Based on the simulation results, there is no significant impact on Sungai Lereh and very less formation of siltation around the project area.		Pg.8-5
4.	Water Quality	• During the reclamation phase, there is an increase in TSS levels in the seawater due to the sand filling activities. • The increase of surface runoff on the exposed land, especially during the heavy downpour is also expected to contribute to the increased suspended solids in the receiving watercourses which subsequently affect the marine water quality of Straits of Melaka. • Besides, any accidental spilling from the sand carrier and other associated vehicles/machineries may also cause water pollution in the receiving water bodies i.e. Straits of Melaka. • Discharge of sewage/waste water from the project site	The impact is expected to be localized but moderate.	Installation of silt curtains must be made mandatory so that the re-suspended bottom materials would be contained within the project area. Other proposed mitigation measures include: • No direct discharge of untreated sewage and sullage into the waterways from the sand carrier and other vehicles. • Regular checking and maintenance on the silt curtains. • Reclamation is to be done within the approved area only and to be carried out in phases. • Conduct periodic water quality during reclamation where water samples shall be collected as proposed in EMP report.	Pg.8-6

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
5.	Air Quality	• Dust generated during the carrying out of site preparation. • Emission from the exhausts of moving vehicles constituting SO_2 and CO.	Minor and in a short period	• Equipment and machineries are in good repair and can operate efficiently to prevent carry through of elevated levels of hydrocarbons from engine operation. • The barges and workboats are contracted from third party. Incorporate clauses into the contract on the need to regularly maintain the engine to achieve high combustion efficiency and conform to the MARPOL 73/78 Annex V1 or other applicable standards to the vessel class requirements.	Pg.8-6
6.	Noise Levels	• High noise generating equipment or machinery cause disturbance onto the sensitive receptors.	Minor and in a short period	• Machinery emitting high noise shall be sited within an enclosure to reduce noise pollution. • Barges/workboats are contracted from third party. Incorporate clauses into the contract on the need to regularly maintain the engine to achieve low noise production. • Restricting working hours to daytime. • Shutdown machineries when not in use.	Pg.8-11
7.	Marine Environment	• The marine habitats are permanently lost where land is reclaimed from the sea. • Adverse effects on coastal and near shore marine habitats as well as species occurring in these habitats.	Adverse effects long term effects.	• Ensure minimum seabed disruption and dispersion of sand. • Phased reclamation to allow marine animals to move away from the proposed site. • The reclamation period should be optimized to reduce the reclamation time; thus re-colonization or re-establishment of new communities will occur faster. • Reduction of vessel speeds, implementation of marine navigation management plan to reduce impact of noise and vibration to marine animals. • Workers to be educated and trained with regard to protected and threatened species. • Restricted corridors of working. Works are prohibited from the designated boundaries. • Anchors should be placed at pre-determined locations (anchor pattern plan) to minimize the risk of anchors dragging which could smother the benthic organisms. • Strict adherence to safety standards should be enforced and provision of safe working conditions should be made at all times during reclamation activities.	Pg.8-11
8.	Fisheries	• Fishing activities of the local fishermen will be interrupted by the noise and disturbances associated with the reclamation activities.	However, as the entire coastline is continuing to be subjected to extensive land reclamation, the adjacent marine areas are no longer viable as fish breeding grounds.	• A dialogue or meeting involving representatives from the affected fishermen and other related agencies (Fisheries Department, Lembaga Kemajuan Ikan Malaysia, Persatuan Nelayan) is recommended to assess the damage and to agree on the quantum of compensation.	Pg.8-11
9.	Marine Traffic	• Potential of collisions, groundings and other accidents during the reclamation.	Minor and in a short period	• The mobilization route must be planned to avoid fishing areas and shipping lanes where possible. • All installation vessel and barge must have adequate navigational equipment to provide sufficient warning to approaching vessels. • Implementation of navigational safety practices which include the enforcement of safety zones, use of radar, routine surveillance, installation of navigation safety beacons. • All vessel and barge should be sufficiently lighted up so that they are visible in poor weather condition and at night.	Pg.8-11

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
				• Notify the Melaka Marine Department on the project's activities so that 'Notice to Mariners' could be issued to prohibit mariners including fishermen from approaching into the project site.	
10	Waste Management	• Generation of construction debris, solid waste and scheduled wastes	Minor and in a short period	• Direct discharge of any kind of wastes from the sand carrier and other supporting vehicles are not allowed. • All wastes generated during the transportation of fill material should be transported back to nearshore for disposal only. • Regular training for staff on the safe handling of equipment, spill prevention and response procedures and proper clean-up for hazardous materials to ensure adequate level of awareness of the environmental sensitivity of the environmental components among contractors undertaking construction (as well as during maintenance and repair operations). • Scheduled wastes and construction wastes generated during reclamation and construction of water chalet stages should be temporary stored at the designated zones. The wastes stored within these designated zones will be segregated according to type. • For construction wastes, they should be reused and recycled as much as practically possible prior being disposed of by licensed contractors.	Pg.8-12
Construction of Revetment and Water Chalet					
1.	Water Quality	• Improper handling of fuel on site may lead to spillage of chemicals and oils to nearby watercourses, polluting the receiving streams. • Any accidental spilling of these materials may be carried into the receiving water bodies, causing potential water pollution. • Placement of the rock revetment will also cause resuspension of the bottom material resulting in increase in turbidity. • Discharge of sewage/waste water from the base camp	May not be a serious as when the reclamation activities are carried, a proper mitigation measures will be taken.	• Proper operating procedures should be established to reduce excessive re-suspension of bottom materials when placing rock materials. • No direct discharge of untreated sewage and sullage into the waterways. • To provide adequate temporary sanitary facilities, which are located away from watercourses. • All waste water generated from the project site must be treated in the sewage treatment system before it is discharged into sea. • Carry out regular preventive maintenance on the sewage treatment system to ensure its capability is always maintained. • Construct dykes, bunds, culverts to control the surface runoff from the reclaimed area. • Conduct periodic water quality during this phase where water samples shall be collected as proposed in EMP report.	Pg.8-12
2.	Air Quality	• Dust may be generated when strong winds blow across exposed surfaces or areas where fine materials are to be found. • Emissions such as fumes and dust from construction equipment may cause occasional nuisance within the construction sites but not outside of them.	The impacts are localized, the atmospheric environment is not expected to be adversely affected during the construction phase	• Provision should be made for water sprays to be available for use when dusts are being generated or at times of strong wind. • Tyre washing facility is to be installed at all entrances to public roads or at points when the trucks leave the working site. Where possible, main road within the working site should be paved or overlain with aggregate prior to the start of construction works. • Truck speed on unpaved roads or open spaces is to be limited to 20 km/h within the project area, unless sufficiently wetted to prevent dust generation. • Truck loads such as sand, aggregate, cement, soil and other materials transported to the construction site should be covered.	Pg.8-13

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
				• Open burning is prohibited; instead all vegetation and construction wastes are to be disposed of at the nearest municipal dumpsite. • Construction equipment are to be kept in good repair and operate efficiently to prevent carry through of elevated levels of hydrocarbons from engine operation.	
3.	Noise Level	• Noise generation is expected from construction activities will cause disturbance onto the sensitive receptors.	Minor and in a short period	• Restricting working hours to daytime only. • Maintenance of all vehicles and machinery to ensure good working condition and reducing possible noise emission. • Shut down engine/machinery when not in use. • Establish hoarding and maintain vegetation belt along the terminal boundary. • Suitable noise absorbent materials should be installed on machinery that produces high noise levels. Machinery emitting high noise shall be sited within an enclosure to reduce the noise impact; and • Speed limit for heavy vehicles is imposed on site.	Pg.8-13
4.	Marine Environment	• The placement of the rock bunds will most likely annihilate the benthic population of the area	The impacts on the benthos will be localised. Impacts on local non-sedentary organisms are considered insignificant due to their mobility and ability to recover at a fast rate.	• To minimize the impacts on the benthos population, the revetment shall be positioned as proposed using the proposed engineering method to avoid the least damage possible. • Restricted corridors of working. Works are prohibited from the designated boundaries. • The works have to be scheduled in phases. The disturbances will be limited to certain areas at one time. • The reclamation period should be optimized to reduce the reclamation time; thus re-colonization or re-establishment of new communities will occur faster. • Strict adherence to safety standards should be enforced and provision of safe working conditions should be made at all times during reclamation activities.	Pg.8-13
5.	Land Traffic	• Occasional traffic congestion at the approach to the site, most likely at the junction to enter the project site; • Traffic accident due to increased volume of traffic traveling along the roads; • Potential damage to the public roads; • Noise and vibration caused by the movement of heavy vehicles; and • Air pollution due to movement of and exhaust emission by heavy vehicles along the road.	Minor and in a short period	• It is therefore considerate to plan, schedule and control of heavy vehicle trips, especially during the peak hours, so as to minimize the adverse traffic impact. • Working vehicle movements within the site do not contribute to traffic impact on the road network. However, to avoid unnecessary accident, it is desirable to plan, schedule and control the deployment and operation of working vehicles for smooth and unhindered traffic movements within the site. • For the sake of environmental control, it is necessary to direct all vehicles entering or exiting from the site to pass through a wash trough to clean their tires and to receive a water jet spray to remove dust particles on them.	Pg.8-14
6.	Socio-Economic	• There is the possibility that the presence of heavy vehicles carrying construction materials plying the main access road can hinder or endanger other road users in the vicinity of the project site. • The public will have to bear with recurrent noise pollution during the	Minor and in a short period	**<u>Mitigation Measure for Job and Business Opportunities to Local Communities</u>** • For the project to be relevant to the local communities, it should have deployed the local community in the work force and have some ratio for the local community recruitment. • To ensure that local content is included, contracting tenders would have to be included as one of the prerequisites for tender award	Pg.8-14

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
		construction of revetment and water chalets. • Minor impact on aesthetics is expected from the presence due to construction, work activities. • Visiting anglers suffer a loss of satisfaction since their favourite angling site will be disturbed. • Improper management of sanitary facilities such as sewage and solid waste may affect the general health of workers. • Potential benefit of the proposed project to the local population is the generation of employment and business opportunities.		• It is proposed that a meeting between the local fishermen association units, the state fishermen's association, LKIM and other related agencies with the Project Proponent be held. **<u>Mitigation Measure for Livelihood</u>** • The community fear of losing their livelihood especially among the fishermen should not be overlooked or unheeded. Some forms of compensation, where applicable, should be considered and worked out with the affected parties through their representatives and should be settled accordingly and amicably. • To facilitate grievance resolution particularly among the fishing communities, representatives each from the local Persatuan Nelayan Units within the zone of impacts (5 km) be employed by the Project Proponent during the reclamation duration to liaise between the fishing community with the developer directly. • As a measure of Goodwill, the developer should consider the initial compensation to fishermen affected to not only licensed fishermen immediately off the coast of project site but also other fishermen from other Persatuan Nelayan Units nearby using the proposed reclamation area for their fishing activity. • Whatever compensation decision should base on several considerations, such as genuinely, the type of inconveniences faced, frequency and the paying agency should also be considered. **<u>Mitigation Measure for Safety</u>** • "Safety First" should always be stressed upon. Hence, workers ought to be exposed to proper work ethics and trained to be always on the alert. They are required to wear personal protective equipment (PPE) including safety googles and masks, overalls and safety shoes. The contractor need to observe this strictly to reduce industrial accident and the like. • Transport operators should be more considerate and always observe safe driving at all time and the activities should be carried out during non-peak hours. • Safety precautions should also consider effects upon local fishing communities. Hence, no reclamation work should be undertaken at night to avoid destruction of fishing nets and any risk to human lives. **<u>Mitigation Measures on Tranquility and Aesthetics</u>** • The activities that could cause nuisance to the public such as noise pollution emitted from dredging boats, heavy machinery and piling works should be avoided or minimized. Schedule of work time should be accommodative to the needs of the people.	
7.	Occupational health and safety	• Accidents can occur during the course of the site clearing and construction activities. • Accidents resulting in fatality or injury can occur from the use of hand tools and	Minor and in a short period	• All construction workers will be properly trained and informed with respect to potential hazards and risks associated with the works. • All construction workers should be provided with proper personal protective and safety equipment such as hard hats, goggles, well-insulated safety boots, proper work gloves and safety belts, to prevent falls and hit by falling objects.	Pg.8-16

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
		power tools, as well as vehicle movement and lifting operation. • Construction workers are exposed to the sun and heat during daytime		• Lifting equipment should be used to prevent ergonomic problems associated with manual handling. Training on proper techniques in manual handling including lifting, carrying, pushing and pulling will need to be given to workers to reduce musculo-skeletal disorders. • To reduce exposure to noise during construction activities, quieter equipment should be used, and workers should be provided with hearing protection devices. • Record all accidents, near misses, unsafe acts and bodily potential hazardous situation. • Construction activities should only be carried out during daytime. • All construction personnel must pass a medical examination prior to being engaged, both as a fitness for work assessment as well as a baseline for monitoring any deterioration or changes in health status. • Ensure that all necessary first aid measures and fire prevention measures are provided on site. • An Emergency Response Team along with supporting rescue services are on standby to respond to any safety incidents during the construction phase.	
8.	Waste Management	• Generation of construction debris, solid waste and scheduled wastes • Improper management of domestic waste could lead to proliferation of disease vectors as well as degradation of aesthetic value.	Minor and in a short period	<u>Scheduled Wastes</u> • Scheduled wastes should be managed according to the Environmental Quality (Scheduled Wastes) Regulation, 2005 and to be disposed of by DOE licensed contractor only. • Maintenance of vehicles and machinery should only be undertaken at workshops and places where there are facilities for collection of such wastes. • Regular training for staff on the safe handling of equipment, spill prevention and response procedures and proper clean-up for hazardous materials to ensure adequate level of awareness of the environmental sensitivity of the environmental components among contractors undertaking construction (as well as during maintenance and repair operations). • Scheduled wastes and construction wastes generated during reclamation and construction of water chalet stages should be temporary stored at the designated zones. The wastes stored within these designated zones will be segregated according to type. <u>Construction Wastes</u> • For construction wastes, they should be reused and recycled as much as practically possible prior being disposed of by licensed contractors to. • Construction waste should be temporary stockpiled within the designated storage area for the waste. • Open burning of construction and solid waste is prohibited. <u>Solid Wastes</u>	Pg.8-16

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
				• Construction area and worker camp should be kept clean at all time. Maintain high quality of housekeeping and the requirements shall be included in the contract document for the contractors. • Solid waste should be stored in containers of sufficient capacity (preferably covered) and be collected regularly by a licensed contractor. As Solid Waste and Public Cleansing Management Act 2007 (Act 672) is enforced in the State of Melaka, the Project Proponent/contractors should ensure that waste segregation at source is implemented on-site. • Sufficient number of waste bins to be provided at the worker camp, site office and at strategic locations to minimize littering and encourage proper disposal. • No open burning of solid wastes shall be carried out at any time. • All solid wastes from the site must be regularly removed and disposed of to the municipal landfill (i.e. Sungai Udang Sanitary Landfill) approved by the local authority by licensed contractors.	
Operational Phase					
1.	Water Quality	Reduce the water quality of the Strait of Melaka due to long term discharge of treated sewage from the proposed development.	Minor but in a long period	To ensure all sewage/waste water treated to fulfill the Environmental Quality (Sewage) Regulations, 2009 prior being discharged to nearby waterway.	Pg.8-17
2.	Land Traffic	Vehicles or van or buses driven by tourist or local residents will increase the traffic volume onto the existing road network and contribute traffic impact to the effected road especially at the ingress / egress point of project site.	Minor but in a long period	By year 2021, when the Proposed Project is in operation, the traffic forecasts indicate the existing road facilities in the traffic influence area is still able to cater for the increase traffic. However, the following are recommendations to be considered: • The proposed T-junction connecting the main road to Project site shall be designed properly as it might have impact to accommodate the traffic flow in or out of project site as indicated by the higher v/c ratios and average delay due to increase traffic. • Traffic management system to be implemented at the ingress / egress point of project site in order to manage the traffic accordingly	Pg.8-17
3.	Socio-Economic	• There is the potential increase in employments, as the new business and non-business establishments are set up to meet the needs of the increase of incoming tourist. • With more new jobs being created the effect will be reduced incentives for emigration among the young members of the local population to seek jobs elsewhere. • The surrounding region is expected to experience improvements in the physical infrastructures and social services, such as better schools, more housing, electricity, water supply and roads to	Long term positive	• Foreign workers involved in construction works should be demobilized according to proper procedures and either re-located to other project sites or return to their country as per their work permits. • All unused building materials should be cleared to prevent the area from becoming breeding grounds for mosquitoes and rodents to curb vector-borne diseases from recurring. • Any significant increase in demand for social facilities should be matched with the corresponding equal amount of additional funding to improve and to expand the existing social facilities.	Pg.8-18

No.	Aspect	Potentially Significant Environmental Impacts	Magnitude of Significant Potential Impacts	Proposed Pollution Prevention and Mitigation Measures	Reference Pages
		cater for the enlarged and more economically active population.			
4.	Waste Management	• General rubbish and perishable food waste will be generated daily from the proposed development. These wastes eventually will be disposed of at the landfill.	Moderate and long term	• All solid wastes generated from must be disposed of at the local authority approved landfill, i.e. Sungai Udang Sanitary Landfill. Disposal of solid wastes need to be regulated and coordinated with the relevant authorities. It will be the responsibility of the project proponent to ensure that proper collection and disposal of solid wastes is carried out. • It will also be the responsibility of the project proponent to ensure the proper implementation of waste segregation at source during the operational phase. • Regular collection to prevent the occupants from resorting to open burning of refuse. • Recycling of waste material should be encouraged as solid waste generated would mainly consist of salvageable residential-households, bottles, tins, paper and plastic. • Open burning of waste is prohibited.	Pg.8-18

viii. Proposed Monitoring Program

For this reclamation project, the following Impact Monitoring Program (IM) will be proposed for the reclamation and the construction phases of the project:

Seawater Quality

Monthly Seawater Quality Monitoring Program is proposed for the project. For this monitoring program, a total of eight (8) water sampling locations will be established. The proposed sampling locations are given in **Table ES-4** and presented **Figure ES-5**.

Marine Biology

Monitoring for marine biology (phytoplankton, zooplankton and macrobenthos) is proposed to be carried out once every 6 months. The stations to be monitored are presented in **Table ES-4** and **Figure ES-5**.

Table ES-4 Proposed Sampling Locations for Seawater Quality Monitoring

Sampling Station	Latitude	Longitude
SW-1	2° 13' 10.0080" N	102° 10' 20.3038" E
SW-2	2° 12' 35.7153" N	102° 10' 20.2982" E
SW-3	2° 12' 39.6500" N	102° 11' 20.6333" E
SW-4	2° 13' 04.5349" N	102° 11' 22.1461" E
SW-5	2° 12' 38.7575" N	102° 09' 33.8414" E
SW-6	2° 12' 13.5771" N	102° 10' 15.7229" E
SW-7	2° 11' 57.7730" N	102° 11' 05.8439" E
SW-8	2°11'40.7800" N	102°10'09.5700" E

Ambient Air Quality

Quarterly Ambient Air Quality Monitoring Program is proposed for the project. Ambient air quality will be collected from four (4) sampling locations (as given in **Table ES-5** below) for PM2.5 and PM10. The proposed locations for air quality sampling are depicted in **Figure ES-5** and the results will be compared with the Malaysian Ambient Air Quality Standard, 2013.

Table ES-5 Proposed Sampling Locations for Ambient Air and Noise Levels

Point	Coordinate
A1/N1	2°12'42.74"N 102°11'16.47"E
A2/N2	2°13'2.90"N 102°11'19.27"E
A3/N3	2°13'13.12"N 102°10'50.98"E
A4/N4	2°13'16.68"N 102°10'29.73"E

Noise Levels Quality

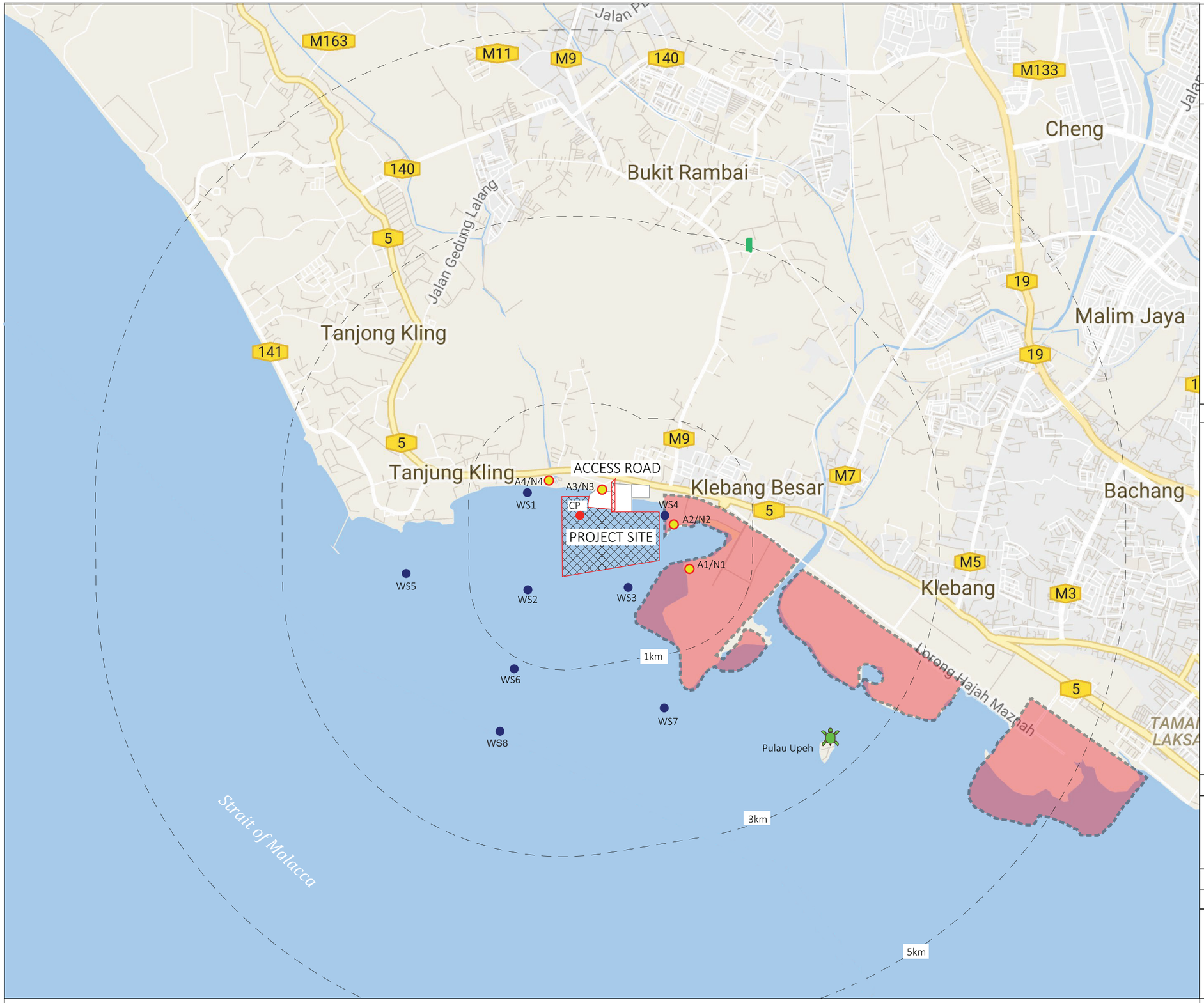
Quarterly Noise Levels Quality Monitoring Program is proposed for the project. 24-hours continuous noise levels measurement will be carried out at four (4) proposed sampling locations as presented in **Table ES-5** above and **Figure ES-5**. The measurement will be conducted using a Noise Level Meter for a 24 hours' duration. Data will be recorded for:

- Equivalent Continuous Sound Level (L_{eq})
- Statistical Indices (L_{10}, L_{50} and L_{90})
- Maximum Noise Level (L_{max})
- Minimum Noise Level (L_{min})

Table ES-6 Proposed Impact Monitoring throughout the Project Activities

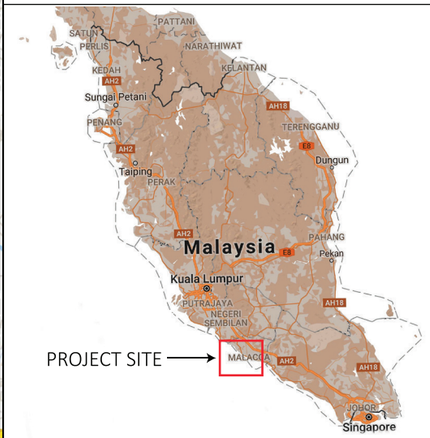
Component	No. of Point	Parameter	Duration of Monitoring	Frequency of Monitoring	Limit	Reporting Frequency
Seawater	8	• pH • Temperature • Turbidity • Conductivity • Salinity • Dissolved Oxygen • Total Suspended Solids • Oil & Grease • Nitrogen (Ammonina) • Nitrogen (Nitrite) • Nitrogen (Nitrate) • Phosphate • Fecal Coliform • Heavy Metals • Mercury • Phenol (µg/L) • Tributyltin (µg/L) • Polynuclear Aromatic Hydrocarbon	Water sample taken at 2 depths (top and bottom)	Monthly	Class II of the Marine Water Quality Criteria and Standard (MWQCS).	Monthly
Air	4	• NO_2 • SO_2 • CO • PM2.5 • PM10	24 hours	Monthly	Malaysian Ambient Air Quality Standard, 2013.	Monthly
Noise	4	• Leq • L10 • L50 • L90	24 hours	Monthly	Planning Guidelines for Environmental Noise Limits and Control, 2007	Monthly

Component	No. of Point	Parameter	Duration of Monitoring	Frequency of Monitoring	Limit	Reporting Frequency
		• Lmax • Lmin				
Marine Biology	8	• Chlorophyll a • Phytoplankton • Zooplankton • Macrobenthos	-	Quarterly	NA	Quarterly



N

OVERVIEW



LEGEND

- Project Site
- Forest
- Water Bodies
- Proposed Coral Survey
- Sampling Station
- Air/Noise Sampling Station
- Turtle Landing Site
- Existing reclamation projects

0 1.5 3 4.5

Kilometers

PROJECTION PARAMETERS

Notes

1. Projection parameters are in Geographical/WGS84
2. Image source : Google

Rev	#	Drawing by	Date
00	1	MAF	3/8/2016

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED 120 ACRES OF COASTAL RECLAMATION AND 50 ACRES OF WATER CHALETS (WITHOUT RECLAMATION) AT PEKAN KLEBANG SECTION III, MUKIM KLEBANG BESAR, DAERAH MELAKA TENGAH, MELAKA

Figure ES 6 Proposed Sampling Station for EMP Monitoring

INTEGRATED ENVIROTECH

A3

Coastal Monitoring Program

Coastal monitoring program one of the component that required by Drainage and Irrigation Department (DID) for reclamation work. The survey lines are designed in two different intervals such as 100 meter intervals and 200 meter intervals. Erosion and deposition pattern of the coastal morphology need to be monitored using topographical and hydrographic survey. Random survey plan line is proposed throughout the monitoring period as per drawn in **Figure ES-6**. Monitoring period, at three months interval survey should be executed during the dredging and reclamation work at the project site and every 6 months for 3 years period after completion of reclamation work. This programme can be summarized as in **Table ES-7** below.

Figure ES-7 Proposed Monitoring Survey Line after Reclamation Work

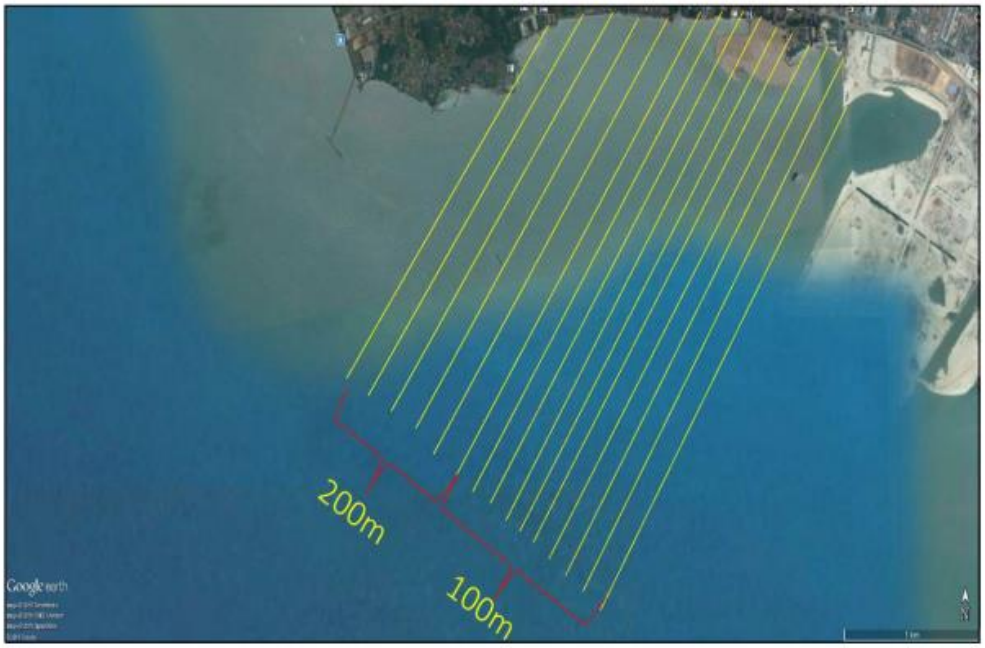


Table ES-7 Shoreline Monitoring Work Progaramme

Items	Duration
Shoreline Monitoring work 1	Before reclamation works
Shoreline Monitoring work 2	During reclamation works
Shoreline Monitoring work 3	After completion of reclamation works
Shoreline Monitoring work 4	6 months After completion of reclamation works
Shoreline Monitoring work 5	12 months After completion of reclamation works
Shoreline Monitoring work 6	18 months After completion of reclamation works
Shoreline Monitoring work 7	24 months After completion of reclamation works
Shoreline Monitoring work 8	30 months After completion of reclamation works
Shoreline Monitoring work 9	36 months After completion of reclamation works