Activity	Description
	yard.
Dredging Works	The proposed Project requires capital dredging to form the required navigation channel and the harbour basin for marine vessels and transportation barges to traverse and dock. The proposed channel is about 3.5km long in south east direction from the proposed site. It is estimated that a total of about 17.7 million m^3 will be dredged to achieve the required depth of -12m CD. The dredging works are to be carried out for Phase 1a, 1b, 1c and 2 only. There is no capital dredging for Phase 3.

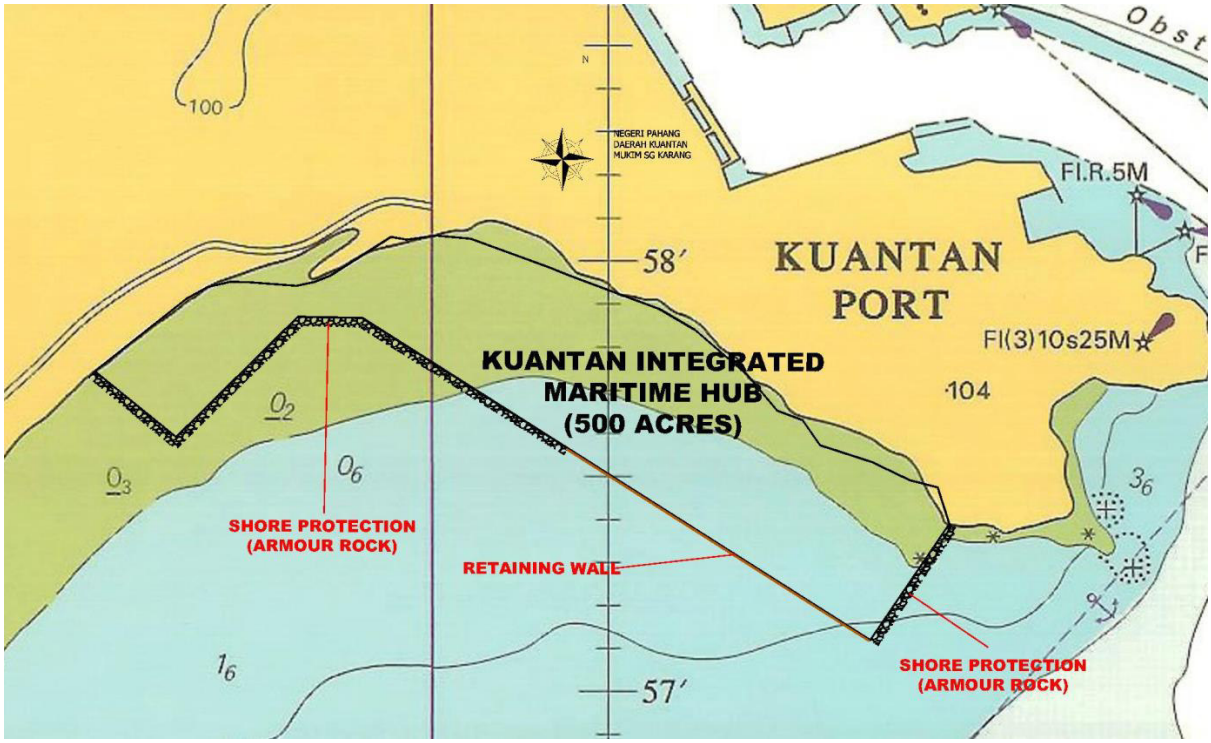


Figure ES9: Proposed Type of Shoreline Protection

Table ES 5: List of Activities for Land Works

Activity	Description
Mobilisation of Workers and Machineries	Initial activities will include setting up of site office, workers' accommodations, sanitary facilities and other temporary facilities required for the construction works. It is estimated during the peak construction period, about 2,800 workers including professional, skilled and semi-skilled workers will be engaged. Workers' accommodation will mostly be on-site and daily transportation of the workers to work site is not anticipated to be significant. Material

Activity	Description
	transportation shall include pick-up trucks, multi-axle vehicles for heavy haul deliveries and large sized equipment deliveries as well as from transport barges from the sea.
Foundation Works	After the completion of the land reclamation, soil improvement maybe initiated to enhance settlement of the reclaimed land. Some soil and foundation improvement works are anticipated especially at areas to be loaded with heavy components. Typical foundation work includes piling.
Civil and Structure Works	Civil and structural works involve frame work, casting, and building components of the proposed Project. These works will include, but not be limited to the upgrading of the existing access road to the site, and the establishment of internal access roads for the movement of materials, equipment, and for maintenance works. Storm water drainage system will be installed throughout the site to collect runoff water and for proper conveying to discharge point. Structural steel work may include fabrication, erection, painting, sheeting and cladding works.
Drainage Works	There are one stream (Sg. Pengorak) and two discharge points along the existing shoreline near the proposed Project site. In order to ensure that the proposed Project does not impact these discharge points, an extension of these discharges is required to allow good flushing capability. At the same time, the extension of channel shall be as such that it does not cause a significant increase of water level upstream of the discharge points which could increase the risk of flooding upstream. Drainage design for the extension of channel is presented in **Table 5.3.3 of Chapter 5**
Mechanical and Electrical Works	Mechanical works, equipment installations and electrical works are necessary to ensure functionality of the proposed Project's components. These will include the necessary piping, electricity, material and water supply connection with external sources. The environmental impacts from these activities are not significant although it may be necessary to assess the occupational related hazards.
Testing and Commissioning	Some components of the proposed Project such as the sewage treatment plant and utility services, will need to be tested and commissioned as they are completed. Various load tests and performance tests will be conducted once all the associated plant's components are commissioned. During this testing and commissioning period, the operation mode will be fine-tuned and optimized where

Activity	Description
	necessary.
Demobilisation of workers quarter and temporary facilities.	On completion of the construction stage of the proposed facilities, all temporary facilities will be removed from site and these shall also include any excess of construction materials and wastes.

8.2 Operational Stage

8.2.1 Shipyard

Shipbuilding activities will involve designing work, cutting and welding work, blasting and painting works, outfitting, testing and ship launching. Shipbuilding requires skilled workers.

Cutting and Welding Works

Gases are used to melt and cut or to weld the steel. It also requires operations at high places (working at height) and cranes are used to transport and assemble each steel sheets into the shape of a ship.

Blasting and Painting Works

Blasting and painting are performed to protect the ship against aggressive corrosion and to enhance the aesthetic outlook of the ship. The nature of shipbuilding and repair may require several types of paints to be used for various applications (e.g., rust prevention, anti-fouling and alkaline resistance). Paint types range from water-based coatings to high-performance epoxy coatings. The type of paint needed for a certain application depends on the environment to which the coating will be exposed.

Outfitting

Outfitting is the process of installing parts and various subassemblies (e.g., piping systems, ventilation equipment, electrical components) on the block prior to joining the blocks together at erections. The outfitting of blocks throughout the shipyard lends itself to forming an assembly line approach to shipbuilding. For simplicity, outfitting can be divided into three main stages of construction once the steel structure of the block has been assembled, namely unit outfitting, on-block outfitting and on-board outfitting.

Testing

The operation and test stage of construction assesses the functionality of installed components and systems. At this stage, systems are operated, inspected and tested. If the systems fail the tests for any reason, the system must be repaired and retested until it is fully operational.

Repair and Maintenance Works

The shipyard will have the capability to provide ship repair and maintenance works. These works are largely done at dry dock and the activities include mechanical and electrical repairs, hot works, cleaning, blasting and painting works. Ship owners may engage his own work team, including waste handling contractors.

8.2.2 Fabrication Yard

A steel fabrication yard would generally accommodate activities such as workshops covering cutting, welding and grinding works, blasting work, painting work, packing and shipping of products to customer. Most of these activities are generally similar to those elaborated under Section 8.2.1 of this Executive Summary. Products to be fabricated are dependent on customers' requirement and design.

8.3 Sewage Treatment Plant

The proposed Project is required to be self-sufficient with provision for sewage treatment. The estimation of PE is presented in **Table ES6** and 4 units of sewage treatment plants (STP) are planned.

Table ES6: Estimation of Population Equivalent (PE) for STP

STP	Phase	Establishment	Population	Population Equivalent	PE	Total PE
1	1a	Shipyard Staff Workers	 40 1000	 0.3 per staff 1 per person	 12 1000	1012
2	1b	Fabrication Yard Staff Workers	 400 1600	 0.3 per staff 1 per person	 120 1600	1720
3	1c	Institution Business Residential	800 89,710 m^2 914	1 per person 3 per 100m^2 5 per house	800 2691.3 4570	8061.3
4	1c	Maritime Industrial Park	8224	0.3 per staff	2467.2	2467.2

These STP shall be designed to meet at least Standard B of the Environmental Quality (Sewage) Regulations 2009. The final discharge of treated sewage effluent is to the sea via discharge points identified on **Figure ES3**.

8.4 Waste Management and Pollution Control System

The proposed Project is expected to generate some wastes during both the construction and operation stages. **Table ES7** presents the summarised list of anticipated wastes and its associated sources. As the generation of wastes are subjected to the type of projects / contracted activities, an estimation of wastes generation is not possible.

Table ES7: Type of Anticipated Wastes

Stage	Category	Type of Waste	Possible Source
Construction	Scheduled Waste	Ballast water-oil mixture (SW309)	Working barge, dredger
		Diesel and Oil spills (SW307)	Working barge, dredger
		Equipment with mineral oil (SW409)	Working barge, dredger, workers
		Rags or filters contaminated with scheduled waste (SW410)	Workshops/stockpile on site
	Solid Waste	Metal Scrap	Workshops/stockpile on site
		Domestic	Temporary sanitary facility on site
Operation	Scheduled Waste	Spent garnet sand (SW104)	Fabrication yard
		Spent lubricating oil (SW305)	Barges, docks, workshops
		Spent hydraulic oil (SW306)	Barges, docks, workshops
		Diesel and oil spills/ Spent coolant (SW307)	Barges, docks, workshops
		Ballast water-oil mixture (SW309)	Barges, docks
		Clinical Waste (SW404)	Office
		Empty paint container (SW409)	Docks, workshops
		Rags and gloves contaminated with scheduled waste (SW410)	Workshops
		Waste of inks and paints (SW417)	Painting room, workshops
	Solid Waste	Metal Scrap	Workshops
		Domestic	Sanitary facility on site, sewage treatment plant

Sources: Muhibbah Steel Industries Sdn Bhd and Muhibbah Marine Engineering Sdn Bhd

9 Project Options

9.1 Project Siting

Muhibbah's Group is currently operating its shipyard and fabrication yard at Telok Gong, next to South Port in Port Klang, Selangor. Future expansions of these facilities are deemed difficult due to limited availability of land in the area.

In June 2016, Muhibbah Engineering (M) Bhd (MEB) was given the authority by the *Perbadanan Setiausaha Kerajaan Pahang* to develop 3 plots of land with total area of 500 acres along the coast of Mukim Sungai Karang in the District of Kuantan and in proximity to Kuantan Port (**Figure ES2**). MEB has taken this opportunity to propose the Kuantan Maritime Hub (KMH) which is planned for a much bigger shipyard and fabrication yard with associated maritime industrial park as well as institution, business and residential parks.

The proposed Project site is selected based on several site specific advantages as described in the following.

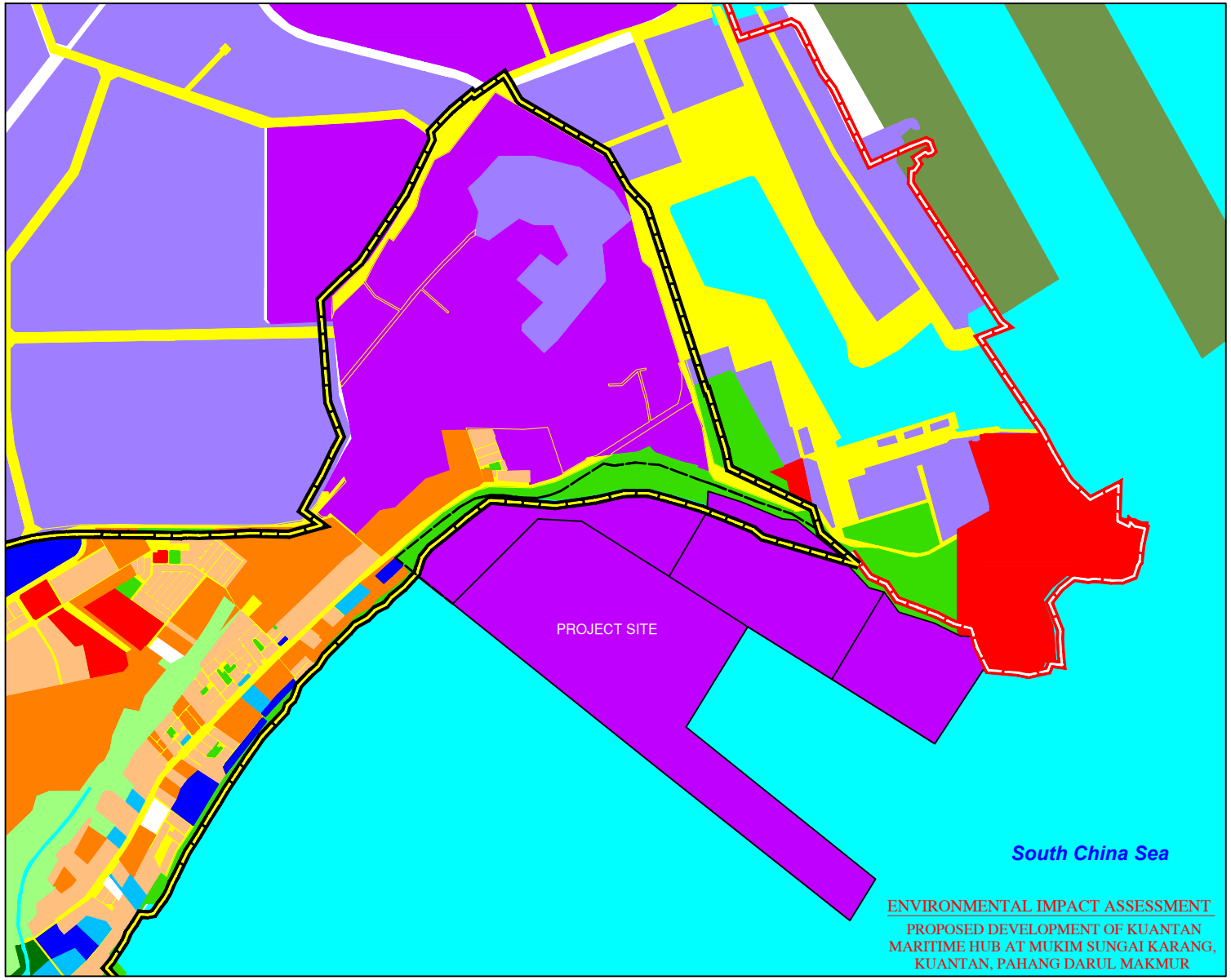
Strategic location with close proximity to potential customers

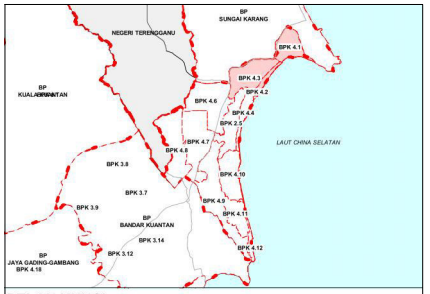
The proposed KMH will benefits vessels calling Kuantan Port and the deep-water port (currently under construction) and any other offshore vessels in the near future for ship maintenance and repairs works and any other marine engineering requirement. Meanwhile the steel fabrication yard will cater for offshore and onshore requirement especially fabrication of large steel structures, which are common requirement for the existing industries in the Gebeng – Kuantan areas as well as the oil and gas groups in the east coast region. It is believed that the proposed KMH could contribute as one of the key catalyst to support new investments and future developments within the East Coast Economic Region.

Readily available area and compatible land use

The Project requires sizable land area and its key activities are required to be sited on industrial area. The availability and allocation of 500 acres by the State Government for Phase 1 development substantiate the land area requirement for initial investment and development of the proposed KMH. Even though the allocated area need to be reclaimed, MEB sees the opportunity to consider and design a sustainable layout for Phase 1 and also future Phases 2 and 3 land uses. The options on layout design are discussed in Section 4.3.

As the proposed site is surrounded by industrial land use zoning and it is within the port limit, the proposed Project site has been zoned for industrial use under the *Draf Rancangan Tempatan Daerah Kuantan* 2035 as shown on **Figure ES10**.





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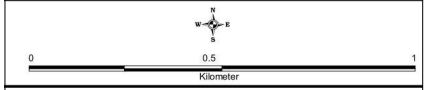

PETUNJUK

JENIS GUNATANAH	SEDIA ADA	CADANGAN
Kediaman		
Perniagaan dan Perkhidmatan		
Industri		
Institusi dan Kemudahan Masyarakat		
Tanah Lapang dan Rekreasi		
Infrastruktur dan Utiliti		
Pengangkutan dan Jalanraya		
Pertanian		
Hutan		
Badan Air		

BP SG. KARANG (BPK 3.7 & 3.8)

BP BESERAH (BPK 4.1,4.2 & 4.3)

N

0 0.5 1 1.5KM

SCALE IN KILOMETERS (1:35,000) – A4 MEDIUM

ENVIRONMENTAL IMPACT ASSESSMENT
PROPOSED DEVELOPMENT OF KUANTAN MARITIME HUB AT MUKIM SUNGAI KARANG, KUANTAN, PAHANG DARUL MAKMUR

PROJECT LOCATION ON DRAFT KUANTAN LOCAL PLAN 2035

Source: - Pengubahan Rancangan Tempatan Daerah Kuantan 2010-2015
- Rancangan Tempatan Daerah Kuantan 2035 (Penggantian)

FIGURE: ES-10

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Accessibility

The proposed site has open access to the sea and the proposed KMH will have a dedicated navigation channel to the proposed shipyard and fabrication yard. With its dedicated navigation channel, the launching of marine vessels and transportation barges will be much at ease and the proposed Project site is deemed strategic to serve these potential customers with shorter delivery time to projects in the east coast region.

The Project site is easily accessible by land via Federal Route 3 (along Jalan Pintasan Kuantan) and Federal Route 2 (along Jalan Kuantan – Kemaman). The site is approximately 20km from Kuantan town and about 260km from Kuala Lumpur. Another associated access to the site is Jalan Tanjung Gelang.

The Project site is located about 30 km away from Sultan Haji Ahmad Shah at Kuantan. Moreover, with the commencement of construction of the new railway link infrastructure project, East Coast Rail Link (ECRL), the access option to the site will be increased after the completion of the railway as there will be a station named Kuantan Port City near Kuantan Port. Layout Options

9.2 Layout Options

Four different proposed layouts were considered and the main differences between these layouts were the configuration on the southern (single) pier and the orientation of navigation channel. These different layouts are shown and described in **Chapter 4** of the EIA report.

Layout Option 4 shown in **Chapter 4** is selected as it does not impact the existing Kuantan Port anchorage zone and does not require the use of the Kuantan Port navigation channel to access the proposed KMH. As such, no conflict of marine traffic with the Kuantan Port is anticipated and the proposed KMH would enjoy ease of operation especially during launching of marine vessels as well as movement of transportation barges to deliver raw materials and fabricated products.

9.3 No Project Option

The benefits of considering the “No Project Option” will be the absence of all environmental impacts and its associated costs as a result of the proposed Project. However, some potential social, economic and environmental benefits will be lost as a result of the “No Project Option”.

10 Existing Environment

The existing environment of the surrounding area of the Project site is summarised in the following **Table ES8**. The baseline monitoring stations are illustrated on **Figure ES11**.

Table ES8: **Summary of the Existing Environment**

Parameters	**Description**
Physical Environment	
Topography and Bathymetry	The Project site and surrounding areas was reported to be between +3m CD and -20m CD. Intertidal areas are largely sandy and deepest end of the proposed area to be reclaimed is about 4m deep. The proposed harbour basin and navigation channel currently measures from 1m to 14m. The side scan sonar records acquired within the surveyed area exhibit moderate to high sonar reflective seabed with seabed sediments interpreted to consist of gravel, sandy, silty clay with shell fragments. Other seabed features observed from the side scan sonar record are debris, mega ripples, moderate to high sonar reflective seabed, high sonar reflective seabed and seabed scars. No pipeline, cable or coral mass were observed from the side scan sonar record.
Hydrology and Drainage	A small stream knowns as Sg Pengorak which flows from east to west, currently discharges to the proposed Project site. Some thin mangroves patches are seen along the riverbanks of Sg. Pengorak near its estuary. Beside Sg Pengorak, there are two other existing storm water drainage discharge points which flows directly into the Project site. These natural and designed drainage systems serve the catchment of the Kuantan Port and land uses along the Jalan Tanjung Gelang areas including storm water conveyed from road side drain. The main drainage discharge from Kuantan Port catchment seem to cater for industrial wastewater discharges too, based on site observation and discharge water quality presented in Section 6.2.4.1.
Meteorology	The meteorology of an area can be described by the wind pattern, rainfall amount, surface temperature and relatively humidity measured at the area. Meteorological data of the Project site was acquired from the nearest Malaysian Meteorological Service (MMS) station at the Sultan Ahmad Shah (SAS) Airport in Kuantan, which is approximately 20 km from the Project site. The meteorological station is located at 3°47' N, 103°13' E. In general, the climate of Malaysia is equatorial characterized by uniform temperatures, high humidity and copious rainfall throughout the year with little seasonal variation.
Marine Water Quality	Based on the test results, most of the water parameters analysed were well below the stipulated guideline limits for Class 3 of the Malaysia Marine Water

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LEGEND:

- PROJECT SITE
- AIR AND NOISE MONITORING (A1/N1 - A3/N3)
- MARINE WATER (W1 - W10)
- MARINE SEDIMENT (S1 - S6)
- MARINE ECOLOGY (ME1 - ME5)
- F — FISHERIES (F1 & F2)

BASELINE MONITORING LOCATIONS

FIGURE: ES-11

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Parameters	Description
	Quality Criteria and Standard during both neap and spring tides.
Marine Sediment	The test result indicates that the marine sediment of around the Project site was relatively clean and the heavy metal content in the marine sediment samples were well below the stipulated guideline levels. Meanwhile particle size distribution test shows that the surface marine sediment sampled were mainly sandy and silty, which agrees with the seabed scan exercise as reported in Section 6.2.1 and **Appendix 6.2**.
Air Quality	The test results indicate that the existing ambient air quality at A2 (located at surau of Kampung Selamat) was dusty and reported with some measured NO_2 levels during morning and evening times. Meanwhile the measured ambient air parameters at A1 and A3 were reported to be within the respective guideline limits.
Noise Level	Measured night time noise levels at all monitoring locations were above the recommended guideline limit of 50 dB(A) and noise level at N1 during day time was above the requirement of 60 dB(A). As these sensitive receptors are located within the industrial zone of Kuantan Port and Bukit Pengorak and near main access roads to these industrial areas, the contributing noise sources observed during monitoring exercises were vehicles movement and human activities around the area.
Biological Environment	
Terrestrial Ecology	Areas surrounding the Project site are already developed and urbanized with industrial establishments, mixed development, recreational establishments and various infrastructures. This establishment has taken over most of the surrounding areas along Pantai Pengorak and all the way towards Jalan Tanjung Gelang, hence not much areas are left with natural vegetation. Nonetheless, notable locations still covered with vegetation were observed during site visit where natural vegetation was still intact, even though very much in disturbed form. With the stretch of coastline affected by the proposed Project is estimated about 4 km long, the adjacent areas with natural vegetation are as follow: ▪ Fringing beach vegetation at Pantai Pengorak ▪ Remnants of mangrove at river mouth of Sg Pengorak (about 1.4 ha) ▪ Secondary forest at Bukit Tanjung Gelang (about 122.0 ha)
Marine Ecology	The results indicated that taxa richness of macrobenthos within and around the propose reclamation area was low, and the distribution of each taxa was patchy.

Parameters	Description
	In term of fauna composition, the result is similar to other past studies conducted in the region. A total of 234 samples of fish and crustacean were caught at the two stations. The list of fish and crustacean caught from each of the station is shown in **Table 6.3.11** of Chapter 6 of this EIA report.
Land Use and Human Environment	
Land Use	Based on the *Draf Rancangan Tempatan Daerah Kuantan* 2035, the Project site and its immediate surrounding areas are zoned for industrial (**Figure ES10**). The proposed KMH is to be located fronting the South China Sea and in proximity to Kuantan Port. The proposed Project site is situated immediately south of Kuantan Port, approximately 0.9km from Gebeng Industrial Estate and 100m southeast of Kampung Selamat. The proposed Project boundaries cover the Tanjung Gelang coastal area which is located south of Kuantan Port and along Pantai Pengorak.
Human Settlement	Nearest living quarter is Lembaga Kuantan Port's (LPK) Apartment and is approximately 100m North of the Project site.
Public Participations	**Socioeconomic Survey** Generally, the respondents think the existing local environment is good/very good (51%) although some of them perceived it as either less satisfactory (36%) or poor (12%). The prominent environmental concern is air pollution as most of the respondents (73%) perceived the air quality as less satisfactory or poor. This is followed by the concern on flooding (54%), water (45%) and tranquillity (45%). Some respondents had shared multiple concerns. Most of the respondents (55%) are aware of the proposed Project, only a few claimed that they are unaware of it (45%). Most of those that are aware, claimed that they heard it from friends or relatives. Generally, the local communities are aware of the proposed Project but not clear on what the project is about. **Dialogue with the Communities and Stakeholders** Two dialogue sessions were carried out. First dialogue was held on 3rd March 2017 at Kuantan Port Authority Building with Kuantan Port Authority and relevant stakeholders; while second dialogue was held on 14th April 2017 at LKIM Kuantan office with the officers of LKIM and representatives of fishermen. The dialogue sessions were carried out by oral-and-slide presentation of the proposed Project, explaining the nature of Project, layout and components as

Parameters	Description
	well as the purpose of the assessment was given. This was followed by a question-and-answer session. A copy of the presentation slides, notes of meeting and comments by attendees are attached in **Appendix 6.4**..

11 Impacts Assessment and Mitigation Measures

The findings from the environmental impact assessment and the recommended mitigation measures are summarised in **Table ES 9**.

Table ES 9: Summary of Impacts and Recommended Mitigating Measures

Aspect	Impacts	Mitigation Measures	Monitoring
Marine Water Quality	**Reclamation and Dredging Stage** ▪ One of the major sources of impact during reclamation and dredging is potential sediment plume. ▪ Spillage of fuel, diesel, oil and chemicals, greywater, and solid waste from the vessels during the activities is another potential source of pollution. ▪ Reclamation and dredging activities involved the direct removal of macro benthos and results in physically smothering the coastal and marine habitat. The physical and chemical alteration such as degradation of water quality may reduce biodiversity, richness, abundance and biomass of macro benthos. ▪ With the completion of the reclamation, the originally sea body will be permanently converted into reclaimed land. Expected permanent impacts are water levels, current flows, wave patterns, adjacent coastline and sediment transport, flushing capability, retention time and water levels in artificial river channel. **Land Work Construction** ▪ Storm water runoff is one of the major sources of water pollution. However, with implementation of temporary drainage system and permeability of the	▪ Implementation of LDP2M2 during reclamation and dredging work. Conceptual LDP2M2 is included in Section 7.2.4 of this EIA report ▪ Temporary toilet facilities which fulfil specifications set by the Ministry of Health or National Water Services Council (SPAN) shall be made available throughout the construction stage. Toilets with septic tanks and portable toilets shall be adequately and strategically located at workers' rest area and site office. ▪ Septic tanks and portable toilets shall regularly inspected and de-sludged. ▪ The Proponent has proposed 4 units of Sewage Treatment Plant (STP) which are to be installed accordingly to the development phases as presented below. These STP shall be designed to at least Standard B of the Environmental Quality (Sewage) Regulations 2009. ▪ Implementation of specially designed drainage system such as increase of width of extended Kuantan Port channel and decrease of curvature of bends in channels near the existing outfalls to minimize the risk of flooding. ▪ Implementation of shoreline monitoring program. ▪ All temporary fuel tanks and storage areas should	Marine Water Impact Monitoring Marine Ecology Impact Monitoring BMP and Pollution Control Compliance Monitoring Shoreline Monitoring

Aspect	Impacts	Mitigation Measures	Monitoring
	reclaim material, sand, storm water runoff volume is expected to be much less significant than normal construction site. ▪ Untreated sewage will potentially impact the water quality of the surrounding area around the Project site. ▪ During construction of shipyard and fabrication yard, there is a possibility of oil and grease spillage from the heavy machinery and maintenance work on the reclaimed land. The oil and grease spills may adverse effects on marine organisms by reducing the concentration of dissolved oxygen (DO). **Operation stage** ▪ Potential sources of pollutants to unit-in-dock wash water and storm water include abrasive blasting; hydro blasting; pressure washing; sanding; painting; electrical work; mechanical work; metal work; short-term material storage (paints, lubricants, solvents, zinc anodes, etc.); heavy equipment operations; and other industrial activities ▪ Paint for painting typically used includes anti-corrosives to prevent rust and anti-foulants to prevent sea growth. These materials contain a variety of pollutants including copper, lead, zinc, and tributyltin which potentially pollute the water without proper control. ▪ The construction, maintenance and repair activities of ships involved the generation and daily handling of a substantial amount of toxic materials, fumes and fluids such as heavy metal and particulate matter which may lead to discharge of toxic	be provided with drip collection devices and be sited on sealed areas with a bund enclosure capable of containing 110% of the inventory of the largest tank; the provision of a weather shelter over the storage tank is an appropriate measure to prevent the accumulation of rainwater within the bund. This fuel storage facilities and refuelling activities shall be located away from any waterways. ▪ Spill cleaning kits are to be made available and located at strategic locations on-site and be used in the unlikely event of a spillage of chemical or oil related material. The disposal of used rags and spill kit materials is to be in accordance with the Environmental Quality (Scheduled Waste) Regulation 2005. ▪ Any other wastewater generated shall be treated to Standard B of the Environmental Quality (Industrial Effluent) Regulations 2009 prior to discharge or contain for off-site treatment. ▪ Vessels involve in the Project activities are to comply with MARPOL requirements which covers preventions of pollution by oil, pollution by noxious liquid substances in bulk and harmful substances, pollution by sewage and garbage from ships. Oily effluents from the moving vessels must be treated to meet MARPOL requirements of 15 mg/L. ▪ The use of anti-fouling paint shall comply with International Maritime Organisation's (IMO) Convention on the Control of Harmful Antifouling Systems for Ships by using organotin-free anti-fouling paints or biocide-free non-stick coatings	

Aspect	Impacts	Mitigation Measures	Monitoring
	compound into water. ▪ There is also a high risk of oil and grease spillage during the operational stage that will severely deteriorate the marine water quality if fail to control Quantification of the risk is presented in Section 7.2.2 of this EIA report		
Air Quality	**Construction stage (Marine Work)** ▪ Primary potential air quality impacts from the activities are the combustion gases from the machineries, equipment and working barges and marine vessels. As the marine works will be done from the sea, the potential receptors are limited and any emissions generated will be dispersed quickly by the sea breeze. Therefore, the potential impacts from marine works are expected to be insignificant and limited to the duration of marine works. **Construction stage (Land Work)** ▪ Fugitive dust may be generated from entrainment of windblown dust over exposed surfaced (fine particles including fine sand) and due to vehicular movement at the work areas. This fugitive dust may be more prominent during dry and windy days. ▪ Land construction works will commence once the reclaimed areas are stabilised, as such the potential impact from this dust generation is expected to be localised and short term, during active construction stage only. **Operation stage** ▪ Sand blasting and spray-painting works are largely	▪ Fuel burning equipment to be regularly maintained and serviced to prevent emission of excessive dark smoke. ▪ Engine to be switched off in enclosed or partially enclosed area if to be stationary for more than 3 minutes. ▪ Exposed areas including access roads and stockpiles of loose construction materials shall be damped (water sprinkler) or covered during dry and windy days to reduce fugitive dusts. ▪ Exposed areas shall be stabilised or vegetated (where applicable) as soon as practicable. Vegetation and trees are effective wind breaker and could trap entrained dust. ▪ Provision of full hoarding along the land side boundary of the work areas. This is to trapped entrained dust from the work areas to the nearby receptor areas. ▪ Vehicle wash trough with silt trap is to be constructed at the exit point from the Project site prior entering to the public road. This is to reduce sediment from work areas being carry onto the public roads. Also refer Section 7.2.4.1 of this EIA report.	Ambient Air Impact Monitoring

Aspect	Impacts	Mitigation Measures	Monitoring
	to be carried out at designated buildings and with specialised machines for smaller components. Potential air pollutants are generally fugitive in nature and to ensure a safer work environment, these facilities will be equipped with bag filters and scrubbers to trapped air pollutants prior to emission to the ambient air. ▪ Welding works may be carried out at open yards and other combustion machinery and equipment are largely mobile in nature. Active work areas at shipyard and fabrication yard are planned nearer to the seaward boundaries of the proposed site. The stronger sea breeze at these locations will also help to provide better dispersion for air pollutants generated by these operational activities. ▪ Emissions associated with increase of land vehicles is also expected to be limited with effective dispersion of traffic with the planned three junctions from the proposed Project site and good internal road circulation network. ▪ Potential impact to the ambient air quality as a result of the proposed Project activities is limited to the respective work areas and potential concern to other external receptors is insignificant.	▪ Speed limit to be imposed on vehicles entering the Project site to reduce dusts entrainment. ▪ Contractor shall adhere to all applicable requirements including the Environmental Quality (Control of Emission from Diesel Engines) Regulations, 1996. Maximum concentration of smoke from construction vehicles shall not exceed Ringelmann No. 2, in accordance with the procedure specified in the Fourth Schedule of the said regulations. All vehicles used on site must adhere to the emission standard of pollutants as in the Second Schedule of the said regulations. ▪ Major blasting and painting activities to be done within enclosed space / building to contain any fugitive emissions. ▪ Proposed bag filters and scrubber shall be designed and operated to meet the requirement of Environmental Quality (Clean Air) Regulations 2014 and associated design guidance documents. Competent person is required to operate and ensure the performance of these pollution control systems. ▪ Maintenance of pollution control systems shall be scheduled and spare parts are to be made available for efficient repairs when required. ▪ Prohibit open burning at site.	
Noise	**<u>Construction stage</u>** ▪ Noise impacts from construction activities are temporary in duration and can generally be controlled to within acceptable levels.	▪ Provision of full hoarding along the land side boundary of the work areas. This is to attenuate noise generated from the work areas to the nearby receptor areas. ▪ Establish periodical maintenance schedule for all	Boundary noise monitoring

Aspect	Impacts	Mitigation Measures	Monitoring
	Operation stage ▪ Activities within fabrication yard and shipyard may generate and contribute to high noise levels. The highest noise levels are deemed to be from the blasting / gauging works. ▪ No noise impact is anticipated during day time operation and it is recommended no noisy activities during night time.	motorised machineries and equipment as preventive measure to minimise emission of loud noise. Attention shall be given to efficiency of mufflers / silencers to reduce noise emission. ▪ Enclosure or other type of acoustic measures shall be applied on equipment which contribute to noise levels higher than 85 dB(A). ▪ Safety signage shall be installed to inform workers of areas with high noise level. To ensure a safe and healthy workforce, proponent and its contractors shall provide workers who work in high noise level areas with adequate protective devices such as earmuffs or earplugs. Exposure to high noise levels shall be managed and limited as prescribed in the First Schedule of the Factories and Machinery (Noise Exposure) Regulation 1989.	
Waste generation	▪ Anticipated waste generated from the construction and operation is listed in Section 7.5.1 of this EIA report. ▪ Among the anticipated waste during construction are ballast water-oil mixture (SW309), diesel and oil spills (SW307), Rags contaminated with scheduled waste (SW410) and solid wastes ▪ Among the anticipated waste during construction are Spent garnet sand (SW104), Spent lubricating oil (SW305), Spent hydraulic oil (SW306), empty paint container (SW409), Waste of inks and paints (SW417), and solid and domestic wastes	▪ Good housekeeping ▪ Minimise generation of wastes by sound planning of material usage, using reusable items and encourage 3Rs (Reuse, Reduce and Recycle) concept. ▪ To establish scheduled waste management plan to ensure that scheduled wastes are managed and handled in accordance with the Environmental Quality (Scheduled Wastes) Regulation, 2005. ▪ To dedicate storage areas for scheduled wastes where floor should be concreted, roofed, provision of concrete dyke and sump for spillage containment. Incompatible scheduled wastes shall be segregated accordingly. ▪ Scheduled wastes shall be stored in leak-proof containers, labelled, inventoried and temporarily	-

Aspect	Impacts	Mitigation Measures	Monitoring
		stored within the dedicated scheduled waste storage area prior to disposal off site. These wastes may be stored on site for 180 days or less, provided that the accumulation quantity does not exceed 20 MT at one particular time. ▪ Spill kits are to be made available for the containment or clean-up of spills. Material used to contain / clean-up spillage shall be handled as scheduled waste. ▪ Collection, recovery or disposal of scheduled wastes shall be by DOE licensed transporters to approved and licensed premises. ▪ Waste with recovery value should be reused or recovered to minimize the actual amount of waste that needs to be disposed.	
Economic Evaluation	Six (6) potential changes in environmental services ▪ Degradation of mangrove area ▪ Loss of fishing ground access to sea (higher cost of fishing effort). ▪ Loss from repair and replacement of nets damaged during dredging operation ▪ Decline in recreational services due to the reclamation activities and proposed project ▪ Loss of mudflat due to reclamation; ▪ Loss of mudflat due to capital and maintenance dredging	▪ These economic value losses could be used as a yardstick to encourage Corporate Social Responsibility (CSR) programmes that the Project Proponent could undertake to compensate for local losses. ▪ There are many programmes that could be undertaken such as efforts at mangrove rehabilitation programme, new entrepreneurial skill development programme for affected fishermen, financial and technical compensation programme to affected fishermen, and improved road and marine route safety programmes.	-

12 Study Findings

Perceived residual impacts are associated with marine water and marine hydrology during construction and operational stage. It is suggested that while residual impacts will remain, the impacts will be within Malaysian planning and environmental standards and regulations, and will not cause significant adverse effects on the surrounding environment. In order to ensure that the measures implemented are effective at all times and residue impacts remain insignificant, an Environmental Management Plan with associated environmental monitoring and auditing as well as Emergency Response Plan are recommended to the Proponent.

This EIA has demonstrated that with proper incorporation of the recommended mitigating measures, the proposed Project can be implemented with acceptable environmental risk and impacts.