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Study Findings

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Ideal Heights Development Sdn. Bhd. intends to perform a mixed development involving land reclamation at Tanjung Lumpur, Kuantan. Upon the application made for this intent, the State Secretary of Pahang had subsequently approved for this Project to be developed off the coast of Tanjung Lumpur via a letter dated 13<sup>th</sup> January 2012 (Ref. No.: SUK.PHG/UPEN.002/8.08.331 ()). The proposed Project lies on an extensive mudflat and abuts three (3) kilometres along the coastline of Tanjung Lumpur where the northern border is opposite the on-going construction of KWRC Phase 1 whereas the southern border ends at Kampung Anak Air. The Project is located 2 km east of Kuantan City and 4 km south of Teluk Cempedak. Kuantan Port is located approximately 11 km away towards north of the Project. With a distance of less than 300 m from the Sungai Kuantan river mouth, the existing navigation channel for Sungai Kuantan runs parallel to the northern boundary of the Project site.

By land, the Project will be connected via Federal Road 183 (Tanjung Lumpur Highway) and subsequently connected through the northern and southern accesses via Jalan Kampung Tanjung Lumpur and Jalan Yayasan Pahang respectively.

The land reclamation will cover an area of 273.57 hectares (676 acres) with a built-up area of about 472.67 hectares (1,168 acres). The proposed man-made land will also bring about improvements to the Sungai Kuantan river mouth. The Project Proponent is committed to dredge the Sungai Kuantan river mouth and its navigational channel. Suitable dredged material will be used as the reclamation fill material. The estimated overall period for the whole Project to be completed is within 40 months which will be done over two (2) phases. However, it should be noted that this 40-month period is for the land clearing, reclamation and dredging works only.

Several reclamation configurations were assessed to define the best possible layout to be opted. Amongst the criteria that were looked into are the Environmentally Sensitive Areas (ESAs) and hydraulic components. The “No-Build Option” was also assessed by assuming that the KWRC is not implemented. If this were to be the case, several of the planned national and state development objectives will not be achieved since the proposed Project is unique in its own concept. The existing seafood and fishing businesses will be maintained as status quo.

The existing physical environment was assessed which include the hydraulic components, coastal morphology, soil characteristics, climate and meteorology, hydrology and drainage, land use, water quality, sediment quality, air quality, noise, vibration, marine traffic and land traffic. Overall, the water quality within the Project site was in average condition, especially near the Sungai Galing and at Sungai Kuantan river mouth where the levels of *E.coli* and *Enterococci* were found to be significant. At the coastal zone, the elevated microbial level has been reduced. However, activities involving body contact is still not advisable in view of the close proximity with Sungai Galing and Sungai Kuantan river mouth. This is due to the still-existing inherent risk of contamination. The sediment sampling results also showed elevated levels of arsenic (As). It is unclear whether the arsenic is inherently present in the bottom strata or had been transported from upstream sources.

Assessment of the existing marine traffic and navigation safety had covered the navigation approach, anchorage, marine activities and Kuantan Port. The Project is located nearby the Sungai Kuantan river mouth which is lined with small jetties, a sandy beach and with many fishing boats moored off the coast. These show that the area is an important fishing base. For existing land traffic, a traffic impact assessment (TIA) was carried out to evaluate the existing traffic flow on the surrounding road network. The results show that the existing condition during peak hours and the surrounding road network are operating at a good level of service.

Several ESAs adjacent to the Project site were identified. These include two (2) forest reserves i.e. Kuantan Forest Reserve and Beserah Forest Reserve which are classified under Rank 1. Mangroves along the Sungai Kuantan were also addressed as one of the ESAs is categorised as Rank 2. On the other hand, the ESA layers for Rank 3 are the shoreline (Pantai Teluk Cempedak and Pantai Tanjung Sisek), river mouth (Sungai Kuantan, Sungai Galing and Sungai Semilang), structure (Tanjung Lumpur bridge) and tourism attraction at Tanjung Tembeling. The populated areas within 5 km of the study area were also assessed.

The existing biological components consist of terrestrial environment (flora and fauna) and marine environment. The mangrove study had covered areas along the Tanjung Lumpur shoreline and along the Sungai Kuantan until the junction of Sungai Isap. Overall, healthy mangrove forests were observed along the rivers on both or either side of the river banks. Most of the mangrove trees were flowering/ fruiting during the study period. Among the most noteworthy mangrove species observed were *Ceriops zippeliana*, *Kandelia candel*, *Bruguiera sexangula*, *Merope angulate*, and *Brownlowia argentata*. These species are among the uncommon/rare species of mangrove plants in Malaysia but are found in abundance in the study area, especially the *Kandelia candel* and the *Brownlowia argentata*.

For the bird survey, a total of 72 species of birds from 26 families was recorded. The conservation status of all the birds recorded are of "Least Concern (LC)" according to the IUCN Red List of Threatened Species, except for Chestnut-bellied Malkoha, Cinnamon-headed Green Pigeon; Jambu Fruit Dove, Mangrove Pitta, White-chested Babbler (which are "Near Threatened") and Chinese Egret (which falls under the category of "Vulnerable").

The marine biological sampling processes involved four (4) important marine biological components mainly the phytoplankton, zooplankton, macrobenthos and fisheries within the 5-km study area. Generally for planktons, the diversity and richness index values within the study area were fairly high and the evenness index value was good. The dominant index value was very low, which specified that the population was still in equilibrium and no indication of disturbance was shown. The overall results showed that the macrobenthos community within the study area was in good condition. There were high numbers of species present, high abundance and with good ecological index values. There was no indication of disturbance or an unbalanced condition. The fish survey conducted had recorded a total of 67 species from 39 families. Generally, the species richness recorded during the survey is moderate, and it is expected to be much higher if a longer period had been set. There are no invasive (introduced) species of fish that was recorded and none of these are categorized under the "Threatened" list published by the IUCN. On the sandy and silty beaches as well as the small mangrove creeks in the vicinity of the proposed Project area, several of the common species like mudskipper, *Periophthalmus gracilis* were found.

The social profile of the existing population within the 5-km impact zone of the Project showed one with a matured age structure for the business operators and beach users. but a young population age structure for the fishermen and the public. The respondents were of mixed educational background, with the fishermen group being the least educated and the public and beach users were better educated. The general public and the beach users were mainly income earners working mainly in the public and private sectors. Overall, 69.7% agreed to the implementation of the Project whilst 27.3% disagreed and the remaining 3% not sure. The public seemed to be the least supportive when only 47.5% agreed with the implementation of the Project. The reasons for agreeing were mainly because they believe the KWRC development would be able to bring about an increase in job opportunities for the locals and that it can become one of the tourist destinations in Pahang. Those who disagreed quoted the fear of the fishing route and coastal fishing activities being disturbed, with the former hampering the movement of the fishing boats from going out to and coming in from the sea and thus affecting the income of fishermen in the area.

The potential impacts on the physical and biological environment were assessed according to the Project activities i.e. land clearing, reclamation and dredging, post-reclamation and operational activities. The reclamation and dredging activities are envisaged to increase the concentration of suspended solids and turbidity within the waters. Maximum sediment dispersion is predicted to occur at the southwest and northeast of the Project site. However, the maximum sediment concentration will not significantly impact to the nearby ESAs. The sediment dispersion can be minimized by constructing perimeter rock bund enclosing the reclamation area and installation of silt curtain at the discharge outlet throughout the Project period.

The coastline of about 1 km immediately south of the Project is expected to erode by about 0.1 m/year due to interruption of sediment bypassing originating from Tanjung Tembeling. Sedimentation is expected to occur within the navigation channel and areas within the Project. Thus, suitable dredged material removed during maintenance dredging works could be placed along the potentially eroding coastline south of the Project site. The Project activities will also give minimal impact on water quality, marine traffic, terrestrial biological and marine environment. On the other hand, the newly-reclaimed land is envisaged to increase demand on infrastructure and utilities which include road, drainage and sewerage system, water supply, electricity and telecommunication services.

The economic evaluation of the environmental impact was conducted to assess the impact of the proposed Project on the flow of environmental services. There are eight (8) potential changes in environmental services that may change as a result of Project implementation. Out of seven potential changes in environmental services, three (3) are considered to be significant for evaluation. These are loss of mudflat due to reclamation, loss of mudflat due to capital and maintenance dredging and loss of fishing ground across to sea (higher cost of fishing effort). The 8% rate is chosen to reflect the market rate of interest conventionally used for Project evaluation while 6% and 4% are the more appropriate rates for social evaluation. When discounted at the rate of 8%, the total present value of the stream of annual loss amounts to RM 28.9 million over a period of 50 years. The corresponding values for 6% and 4% discount rates are RM 36.5 million and RM 48.8 million respectively. This study notes that the sum should not be construed as indicating Project feasibility. Rather, they provide some indication of the magnitude, in monetary terms, of the reduction in the flow of environmental services as a result of the implementation of the Project over the evaluation period.

From the overall assessment, it can be concluded that the implementation of the Project is expected to cause minimal impacts on the environment, particularly on social environment. However, continuous commitment is required from the Project Proponent in implementing all mitigation measures proposed so that this development will be beneficial not only for the Project Proponent but also for the locals as well as the State of Pahang.