

## **EXECUTIVE SUMMARY**

### **I. Introduction to the Proposed Project**

The proposed Project is a **5-Star Resort Development on Lot 231 and 232 at Mukim Pulau Redang, Terengganu Darul Iman**. The total acreage of the Project Site is approximately **6.402 acres**, which is wholly owned and to be developed by ISBRO Development Corporation Sdn. Bhd. The Project Site is under the jurisdiction of Majlis Daerah Kuala Terengganu (MDKT).

Geographically, Pulau Redang is located on the South China Sea off the East Coast of Peninsular Malaysia within 5°44' - 5°50' North latitude and 102°59' - 103°05' East longitude. It lies about 45 km north-northeast of Kuala Terengganu, the state capital of Terengganu, and about 22 km off Tanjung Merang, the closest point on the mainland. The proposed site is located at the southeast of Pulau Redang along the Teluk Kalong Kecil. The general location of the Project is depicted in **Figure 1.1**.

The Pulau Redang archipelago itself comprises of Pulau Redang, Pulau Lima, Pulau Paku Besar, Pulau Paku Kecil, Pulau Kerengga Kecil, Pulau Kerengga Besar, Pulau Ekor Tebu, Pulau Ling and Pulau Pinang. Pulau Redang is the biggest of all the islands in the Marine Park, measuring about 7 km long, 6 km wide and 2,483.58 hectares. Its highest peak is Bukit Besar at 359 metres above mean sea level.

The other nearby islands of Pulau Perhentian Besar, Pulau Perhentian Kecil, Pulau Lang Tengah, Pulau Kapas and Pulau Susu Dara are also gazetted and protected as Marine Parks. At present, only the bigger islands such as Redang, Lang Tengah, Perhentian and Kapas have resort facilities for visitors. All these islands and their surrounding waters have recently been established as Marine Parks which are gazetted under the Establishment of Marine Parks Malaysia Order 1994 issued by the Fisheries Department for preservation and tourism purposes. According to this Order, the development limit for Marine Parks is two (2) nautical miles (3.2 km) towards the sea from the low water mark.

The Proposed Project is a prescribed activity stipulated in the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987 under item no. 17d (development of tourist or recreational facilities on islands in surrounding waters which are gazetted as national marine parks). Hence, a preliminary EIA has to be carried out by the registered EIA Consultant team. Apart from this, the proposed Project should also comply with the guidelines in the Planning Standards for the Physical Development of Islands (JPBD, 2001).

## II. The Existing Environment

### Physical Environment

#### a. *Topography*

- The topography of the Project Site is characterized as relatively flat to undulating terrains (i.e. 0° – 15° in gradients) as shown in **Figure 3.1** of the EIA Report.
- The existing average elevations range from 8m to 14.50m above mean sea level.
- The northeastern and western boundaries of the Project Site are moderately steep (i.e. 15° – 25° in gradients).
- Generally the coastline is gently sloping towards the water edge where the profile drops quite sharply.

#### b. *Geology and Soil*

- The geological formation is shown in **Figure 3.3**, was obtained from the Geological Map of Peninsular Malaysia (1985), published by the Geological Survey of Malaysia.
- Pulau Redang is mainly formed by granite with three (3) major granite types, granodiorite, mikrogranite and mesogranite in the northern and eastern of the island
- The Redang Formation which consists of meta-conglomerates with subordinate interbeds of black slate, quartzite and pelitic hornfels can be found at a relatively smaller area at the south-eastern part of the island.
- The soil in Pulau Redang can be categorized into 3 types:-
  - i) Steepland Soils – at the hilly areas of Pulau Redang;
  - ii) Laterite Soils (Bukit Temiang Series) – at the foothill of the hilly areas;
  - iii) Alluvial Soils - exist in the lowland area and around the bank of Sungai Redang.
- The Project Site is categorized in the laterite soils type of Bukit Temiang Series, which derives from the granite rock. Fine white sandy soils cover the beach in the east of the Project Site.

#### c. *Landuse*

- The Project Site is located on a white sandy beach stretching approximately 150 m along the beach known as Teluk Kalong Kecil.
- The surrounding areas are mostly vacant land except there are two (2) beach resorts namely Redang Kalong Resort and Mozana Beach Chalet about 150m from the proposed Project Site..
- A natural stream, which forms a creek, originates from the ridge considerably covered with native vegetations, and traverses through the Project Site prior to discharging in the sea.
- Amongst those resorts that can be found at Pulau Redang are Redang Beach Resort, Redang Lagoon Resort, Redang Bay Resort, Ayu Mayang Resort, Pelangi Beach Resort and Coral Redang Redang. The prestigious Berjaya Golf Resort and Chalet Kooperasi are located 1.5 km to the west and 1 km to

the South-East of the Project Site.

- Results of the assessment clearly show that the predominant type of landuse setting within the Project Site belongs to water body i.e. 51.04% of the total area of the Project Site.
- Other landuses are represented by plantation (coconut and rubber), mixed horticulture within the village areas (i.e. Kg. Redang) and associated non-agriculture land such as chalets and resorts at Pasir Panjang and Teluk Kalong.

*d. Water Quality*

- Sampling session was conducted from the 25<sup>th</sup> to 26<sup>th</sup> September 2007; for two (2) sessions, i.e., morning and evening for three (3) points stream water and three (3) points marine water.
- The stream and marine water quality interpretation will be in accordance to the three (3) major characteristics (i.e., physical, chemical and biological).
- For stream water, the physical, chemical and biological characteristics were basically within the recommended limit (refer **Table 3.5** for analysis results). All parameters analyzed were within the Class IIA of the INWQS.
- For marine water, all the parameters analyzed were within the Interim Standard for Marine Water Quality as shown in **Table 3.6**.
- The river water quality indices (WQI) determination used on the stream is tabulated in **Table 3.5**. The computed results showed that RW2 (evening) fall under Class I, while W1 (morning), RW1 (morning & evening), RW2 (evening) and RW3 (morning & evening) fall under Class II of INWQS.

*e. Air Quality*

- A 24-hour air monitoring was conducted from the 25<sup>th</sup> to 27<sup>th</sup> September 2007.
- The existing air quality was determined at two (2) sampling points.
  - A1 – North of the Project Site, located near the existing resort i.e. Mozana Beach Resot.
  - A2 – South of the Project Site, surrounded with vegetation.
- Results of the air monitoring analysis showed that both points A1-20 $\mu\text{gm}^{-3}$  and A2-22 $\mu\text{gm}^{-3}$  were all below the Malaysian Recommended Air Quality Guidelines (Department of Environment, 1994).

*f. Sound Level*

- The noise monitoring study was conducted on two (2) selected sites (same location as air) for 24-hour period for two separate sessions, i.e., from 7:00 a.m. to 10:00 p.m. for day-time and 10:00 p.m. to 7:00 a.m. for night-time.
- The monitoring results show that noise levels measured at N1 and N2 for both session did not comply with the DoE recommended limit of 50 dB(A) for day-time and 40 dB(A) during night-time. This was probably due to nearby chalets i.e. Teluk Kalong Beach Resort and Mozana Beach Resort.

## **Biological Environment**

### **a. *Floral Composition***

- Vegetation at the proposed site is mainly secondary forest vegetation, shrubs and coastal line vegetation. The trees are basically from the family *Dipterocarpaceae* such as *Shorea sp.*, and *Koompassia malaccensis*.
- Common understory flora found is *Tridax procumbens*, *Elaeocarpus sp.*, and *Streblus elongates*. Other plants species which are common at the Project Site are *Eugenia sp.*, *Syzygium spp.*, *Scyphiphora hydrophyllaceae (Chengam)*, *Terminalia catappa (Sea Almond)*, *Vitex spp*, and etc.
- The beachfront of the project area is made up of both indigenous species of plants and introduced species, such as coconut palm (*Cocos nucifera*), while the upper reaches of the beach are covered with creepers, grasses and sedges.

### **b. *Faunal Composition***

- Faunal species at the Project Site consist of small vertebrates and categorized into lowland species.
- There are a restricted number of reptiles and amphibians species in the Project Site i.e. monitor lizards and flying lizards. As for amphibians, the common ones being common toad.
- Most of the mammals are categorized into “Not protected species”. No traces of big mammals can be found due to the habitat location, which is near to the sea. There are no endangered species found at the Project Site.

### **c. *Avian Species***

- Previous research done indicates that there are about 50 species of birds recorded in Pulau Redang. 19 species recorded are seabirds and waders while 17 more are seasonal migrants. The most common birds at the Project Site are terns (Camar), olive-backed sunbird (Kelicap Bukit), pigeon, swallows, swift and tailorbird.

## **Marine Ecology**

### **a. *Coral Reefs***

- Pulau Redang is the home to about 500 species (over 50 genera) of reef-building corals, over 1,000 species of bivalves and about 3,000 species of fish (*Pulau Redang Marine Park Malaysia, 2007*).
- The reefs of Redang provide substrate for hosts of other organisms such as algae, sponges, worms, molluscs, crustacean etc.
- The Project Site itself is not known as breeding ground for turtles due to its proximity to the existing resort and chalet.

**b. Fish**

- The fish composition at the Project Site consists of small-sized fish to medium-sized fish.
- Fisheries Department (1996) listed 149 species of fishes around reefs of Pulau Redang of which most are reef fishes.
- Three most commonly observed fish family in Pulau Redang was Wrasse (*Labridae*), followed by Damselfish (*Pomacentridae*) and Fusilier (*Caesionidae*) while lowest abundance fish were Triggerfish (*Balistidae*) and Filefish (*Monacanthidae*).

**c. Coral Reef Surrounding the Project Site**

- It has been estimated that Pulau Redang Archipelago has over 55 general and 85 species of hard corals.
- The most diverse and richest areas of Pulau Redang are the reefs facing the eastern shoreline.
- At Pasir T. Kalong Stream (where it fronts the Project Site), the coral reef begins 60m from shore up to 50m to 100m seaward, where the depth of the water at the outer reef is about 12m, branching corals of *Acropora sp.*, *Pocillopora sp.*, and *Montipora sp.*, dominate the area.
- About 50 – 60% of the corals are dead, covered by filamentous algae. Fish life is fairly low in abundance and diversity. Sea urchins and sea cucumbers are abundant on the back reefs.

**d. Invertebrate Populations**

- Pulau Redang is also rich with other marine invertebrate species.
- Four species of crabs were found from a stream at Teluk Kalong. They are *Gecarcoide lalandii*, *Cardisoma hirtipes*, *Johora sp.*, and *Siamthelphusa sp.*
- Study by Coral Cay International Ltd (2004) has recorded Sea Cucumbers (*Holothuroidea*) were observed to have the highest overall abundance and followed by Annelids and Tunicates.
- The surrounding water fronting the Project Site, Sea Cucumber and Sea Urchins were in abundance especially at the back coral.
- Others marine invertebrates range from different taxa which is likely to be found off the water of the Project Site and also in Pulau Redang are *Crinoid featherstar*, Bivalve, Crown of Thorns (*Acanthaster planci*), Gastropods, Crustaceans and Seastar.

**Socioeconomic Environment**

- The population of Pulau Redang is approximately 1,453 people (2000).
- The main economic activity of the islands consists of tourism, with both local people and mainlanders being heavily involved. Most of the populations are involved in the tourism industry and the rest are involved in fishery, public sector and small business.

- The surrounding area has already been gazetted as a Marine Park, therefore no fishing activity is being carried out at the island areas. Most of the fishermen are now found to be involved in activities related to tourism due to lucrative income compared to fishing.

### **III. Proposed Project Description**

- The proposed development will be carried out for duration of 2 ½ years i.e. commencing in 2<sup>nd</sup> quarter of 2009.

The proposed development will encompass the following development:-

#### **Forest Studios**

- Eleven (11) blocks—two levels high—with two units on each floor.
- Each studio will have a double bed, a chaise lounge, and a double balcony concept with a long bath, a private shower and a toilet facility.
- The structure will consist of reinforced concrete, profiled metal decking, glass and timber.

#### **Rumah Enam Tiang**

- Eight (8) units *Rumah Enam Tiang* with timber-furnished detached suites.
- It will be made of local timber and roofing materials, while parts of the structure will be made of reinforced concrete.

#### **Villa**

- Four (4) single storey 1 and 2 bedroom apartments – style units.
- Equipped with separate sun decks. Each villa will contain a living and dining area, a small pantry, and a private garden.
- Other components of the development are Reception Space, Forest Spa, Sunset Bar, Beach Front Meditation, Mini-shop and Ancillary facilities (staff, plant room, services) to be in constructed in harmony with the surrounding areas.
- The quantitative demand in basic infrastructural facilities and the amount of solid waste generated by each developmental element is summarized in **Table B**.

**Table B: Estimated Utilities Demand and Waste Generated during the Operational Phase of the Proposed Project**

Sector	Estimated Demand/Output Daily
Power Supply	Use of Generator Set <sup>1</sup>
Water Demand	55,500L/day
Domestic wastewater	36,000L/day
Solid Waste	160kg per day
Telephone lines	36 lines

*Source: Europasia Engineering Services Sdn. Bhd., 2008*

- Sewerage Treatment Plant (STP) will serve the proposed development, which is located on the north-east of the Project Site.
- The treatment plant have been designed to Standard A limit of the stipulated Sewage and Industrial Effluent Regulation of 1979, prior to being discharged into the sea. The compliance limit of the STP discharge is to Standard A limits.

#### **IV. Significant Environmental Impacts & The Proposed Mitigation Measures**

The key environmental issues are those related to activities during the site clearing, construction phase and operational phase. All the impacts that are likely to be generated by the proposed Project together with the proposed mitigation measures are summarized in **Table C**.

#### **V. Environmental Management Plan (EMP)**

Apart from the recommendation of mitigating measures, this report also emphasizes on the formulation and implementation of an environmental management plan (EMP). This plan involves the participation of the Project developer, local authorities, consultants as well as the contractors. The outline of the EMP relies on a collective effort from all the various group involved regardless of their level of involvement in the hierarchy. The management schemes and monitoring program proposed for the proposed Project at construction and operational levels are:

- Supervision, field training and maintenance program for pollution control structures;
- On-site implementation of mitigation measures;
- Planning of a progress of works on site;
- Provision of safety measure along with an emergency response plan;

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<sup>1</sup> Number of genset and diesel usage to be finalised.

- Implementation of a properly documented traffic management scheme to ensure safety within the site;
- An appointed Department of Standards accredited laboratory to carry out on-site sampling and laboratory analysis;
- Water quality samples taken from sampling points similar to those in the establishment of the existing environment
- Monthly sampling of water quality for determination of water quality during site preparation and construction phase respectively (based on EIA Approval Conditions);
- Monthly assessment for suspended solids, with compliance limit of 50mg/L is likely to be imposed on surface discharges from the drain final discharge points.
- Air and noise quality monitoring is recommended once every three (3) months at nearest receptor i.e. existing resorts.
- Monitoring the quality of treated effluent generated by all the wastewater and sewage treatment plants within the development area and to comply with Standard A limits of the Sewage and Industrial Effluent Regulations (1979).

## **VI. Conclusion**

The proposed Project is a Proposed 5-Star Resort Development **on Lot 231 and 232 at Mukim Pulau Redang, Kuala Terengganu, Terengganu Darul Iman**. The total acreage of the Project Site is approximately **6.402 acres**, which is wholly owned and to be developed by ISBRO Development Corporation Sdn. Bhd. The Project Site is under the jurisdiction of Majlis Daerah Kuala Terengganu (MDKT).

Pulau Redang is located in the South China Sea off the East Coast of Peninsular Malaysia within 5°44' - 5°50' North latitude and 102°59' - 103°05' East longitude. It lies about 45 km north-northeast of Kuala Terengganu, the state capital of Terengganu, and about 22 km off Tanjung Merang, the closest point on the mainland. The proposed Project Site is located at the southeast of Pulau Redang.

This report emphasizes on the issues identified as adverse impacts especially on the biological environment (i.e., disturbance of marine ecosystem as well as the flora and fauna species at the surrounding environment) besides existing physical (i.e., transportation of machineries, coastal erosion and environmental quality degradation) and sociological environment. In addition, a comprehensive impact evaluation coupled with practical mitigation measures to be implemented on-site has been discussed in the proceeding chapters. All possible mitigation measures planned for a project of this magnitude has also been outlined. Conversely, upon full operation, the social impacts are considered as positive especially with regards to the landuse optimization, tourism appeal and a general enhancement to the existing environment.

In conclusion, success of the development will benefit the Terengganu State in the long run. Pulau Redang has always been a major tourism destination, thus with the development of the new resort which caters for the higher end of the market, it could propel its status to the like of other exclusive island resort destinations around the world. Upon completion, it will give rise to other development of the adjacent area thus elevating the economic status of the residents living in the vicinity of the development.