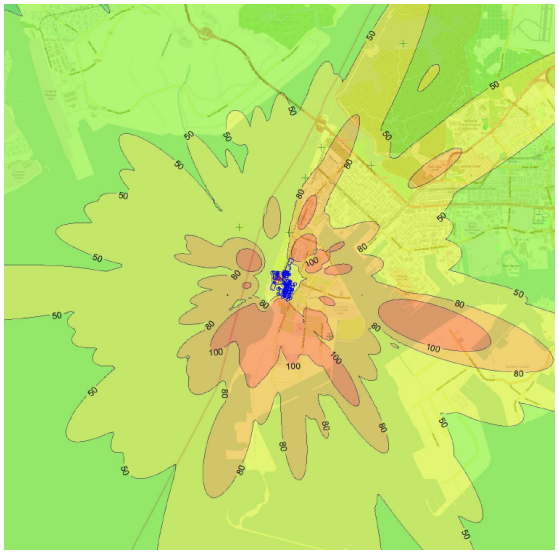
ENVIRO PRO
Enviro Pro Green Innovations Pte Ltd

Environmental and Social Safeguards Services

TRACK RECORD OF ENVIRO PRO GREEN INNOVATIONS (S) PTE LTD



Environmental and Social Management System (ESMS) and Environmental and Social Management Plan (ESMP) for Off-Grid Community Owned Renewable Energy Project: East Sumba Micro Grids, Indonesia, 2016 - Present

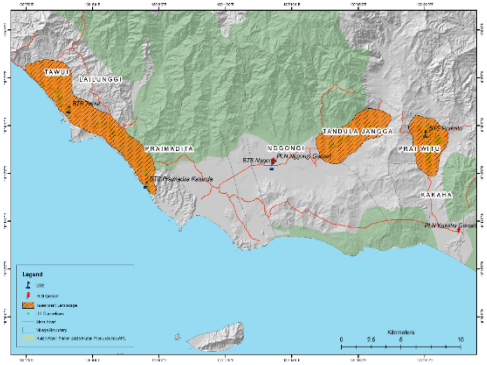
In East Sumba, 23% of population does not have access to electricity. Thus, a properly developed, constructed and sustainable community-owned off-grid renewable energy (RE) power system is an appropriate solution to raise the quality of life in these communities. This project aims to design, develop, construct and operate community-owned RE power generation for the underserved rural communities with the assistance of the Millennium Challenge Account – Indonesia (MCA-I) grant under the Green Prosperity (GP) Project.

The project aims to establish a system of utility poles with Solar photovoltaic (PV) panels on top linked with battery houses each connected to groups of four houses. A smart metering system will be introduced whereby users can prepay for electricity using their mobile phones.

Enviro Pro was tasked to develop the environmental management component in the Environmental and Social Management System (ESMS) together with the Environmental and Social Management Plan (ESMP) to international best practices, i.e. International Finance Corporation's (IFC) Policy on Environmental and Social Sustainability standards.

Enviro Pro's scope included environmental and social site assessments as well as Public Consultation with the villagers in East Sumba.

Solar PV panels installed with battery



Development landscape (orange)

Public consultation

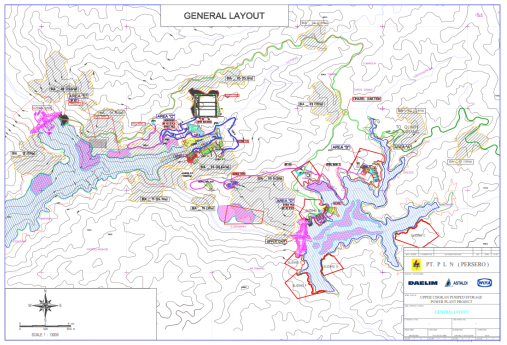
Environmental and Social Management Plan (ESMP) for Upper Cisokan Pumped Storage Power Plant Project, Construction Phase – Indonesia, 2017 – Present

Due to increasing electricity demand in the Java-Bali region, the Government of Indonesia (GOI) through its state-owned firm PT PLN (Persero) intends to construct a Pumped Storage Hydro-Power Plant, known as the Upper Cisokan Pumped Storage Power Plant (UCPSP). The UCPSP will have an installed capacity of 1,040 MW and will be Indonesia's first pumped-storage power plant and one of the largest in South East Asia. It comprises of an upper and lower reservoir, each with an active water storage volume of 10,000,000 m^3. The project is co-financed by the International Bank for Reconstruction and Development (IBRD), part of the World Bank Group (approximately USD 650 million).

This project involves the construction of two dams and reservoirs, as well as pipelines to transfer the water between the reservoirs and generate power in the process. A 27km long access road and other facilities will need to be constructed into mountainous, geologically unstable terrain. All these activities will lead to direct and indirect impacts on the environment, with appropriate abatement and mitigation measures to be provided as part of the environmental and social safeguard process.

Enviro Pro was tasked to provide the *International Senior Environmental Engineer* as part of Project Construction Supervision Consultancy Services on behalf of PLN. This includes the management and supervision of the implementation of the project's **Environmental Management Plan (EMP) and Environmental and Social Management Plan (ESMP)** during construction in line with the regulations of GOI and guidelines of International Finance Corporation (IFC). Furthermore, stakeholder capacity building and training programs are conducted.

Location of the project



Layout of the project location

Road Access

Technical Assistance on Environmental and Social Safeguards and Climate Change for PT Sarana Multi Infrastructure (PT SMI), Indonesia, 2016 – Present

PT Sarana Multi Infrastructure (PT SMI) is an infrastructure financing company, which was established on 26 February 2009, as a state owned enterprise (SOE) under the Ministry of Finance.

With approximately USD 1.8 billion in lending funds, PT SMI plays an active role in facilitating infrastructure financing as well as preparing infrastructure projects and serving in an advisory role for projects in Indonesia.

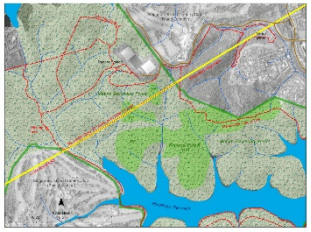
Enviro Pro was tasked with reviewing the newly developed Environmental and Social Management Framework (ESMF) and Environmental and Social Safeguards – Operation Manual (ESS OM). ESMF and ESS OM are meant to ensure that the environmental and social safeguard standards and management procedures meet international requirements and were according to the multilateral financial institutions. The introduction of the ESMF and ESS OM is undertaken in a phased approach to allow a smooth transition from national to international safeguard systems.

Enviro Pro's engagement is part of a soft loan and grant facility for Energy Efficiency and Renewable Energy, funded by Agence Francaise de Developpement (AFD). This includes the identification of fundable energy efficiency and renewable energy projects in Indonesia and their eligibility for the AFD facility.
Enviro Pro assisted PT SMI in the assessment of the projected environmental, social and climate change impacts in this context.

Tenayan Coal-Fired Power Plant

Cikopo-Palimanan Toll Road

Air Putih Hydropower Project (Renewable Energy)



Environmental Management and Monitoring Plan (EMMP) for Supply and Laying of Additional Outlet Pipes at Bukit Kalang Service Reservoir Area, 2017 - Present

The proposed project at Bukit Kalang Service Reservoir (BKSR) aims to construct a set of new potable water pipelines and the retro-fitting of existing pipelines.

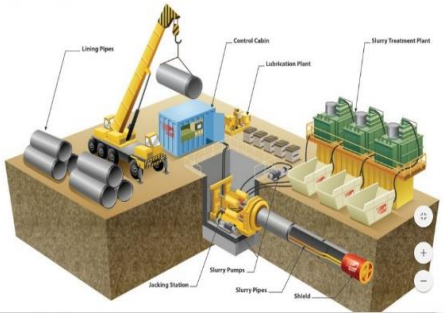
Due to the importance of the area (Central Catchment Nature Reserve) for biodiversity conservation, National Parks Board (NParks) and Public Utilities Board (PUB) called for an Environmental Management and Monitoring Plan (EMMP) to mitigate against impacts caused by the construction works.

Enviro Pro was tasked with the collection of pre-construction biodiversity baseline data and the development of the Biodiversity Management Plan (BMP), which was incorporated in the Environmental Management and Monitoring Plan (EMMP). Weekly biodiversity and non-compliance monitoring of construction activities during the construction phase are performed by Enviro Pro.

Key Methodology

- **Camera Trapping** – Study on the presence of the species at fixed locations at the ground level.
- **Transect Study –** Identified species which were not captured by the camera trap and also record visual and audio data of the biodiversity.

PUB Bukit Kalang Service Reservoir



Pipe jacking works

Wetland nearby the site

Environmental and Social Impact Assessment (ESIA), Pollution Control Study (PCS), Quantitative Risk Assessment (QRA) and Environmental Management and Monitoring Plan (EMMP) for TuasOne Waste-To-Energy Plant in Singapore, 2014 - Present

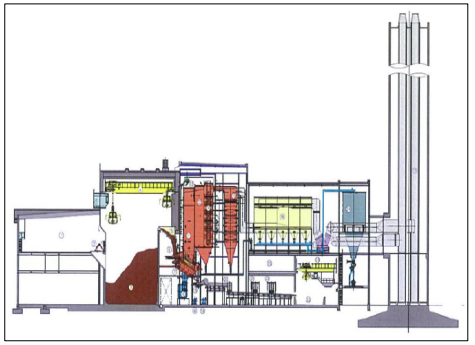
TuasOne Plant is Singapore's sixth and largest waste-to-energy (WTE) plant. Designed to process 3,600 tonnes of waste per day and generate 120 MW of clean and renewable energy, the plant will have one of the best land utilisation factors in terms of incineration capacity per unit floor area, and be one of the most efficient in terms of energy recovery per unit waste incinerated globally when it is completed in 2019.

Enviro Pro was appointed to conduct a Pollution Control Study (PCS), an Environmental and Social Impact Assessment (ESIA) and Quantitative Risk Assessment (QRA), before construction commenced. Enviro Pro is also involved in implementing the Environmental Monitoring and Management Plan (EMMP) during the construction phase of Hydrochem TuasOne Waste-to-Energy Plant.

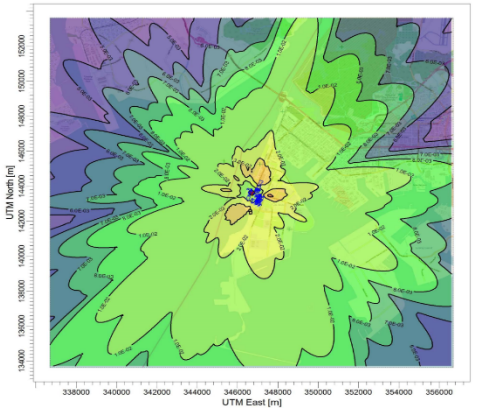
EMMP is the primary method of control to ensure that the construction, testing and operation, of TuasOne WTE Plant, will not cause any significant adverse environmental impacts.

Key Methodology

- **BREEZE AERMOD model** – was performed to simulate the dispersion of selected air pollutants (NO_2, SO_2, CO and PM_{10}) released at the top of chimney.
- **SINGLAS accredited laboratory testing** for Ambient Water Quality Monitoring
- **Sound Level Meter for Ambient Noise Level Monitoring**
- **Air Monitoring Meter for Ambient Air Quality Monitoring** – $PM_{2.5}$, PM_{10} and TSP are monitored monthly.



Cross-section of WTE plant



Air dispersion model

Construction site

Pollution Control Study (PCS) & EMMP during the Construction, Testing, Commissioning and Operation Phase of Tuaspring Desalination Plant in Singapore, 2011 - 2014

Tuaspring Desalination Plant is Singapore's second desalination plant. With a designed capacity of 318,500 m^3/day of desalinated water, it is the largest seawater reverse osmosis desalination plant in South East Asia.

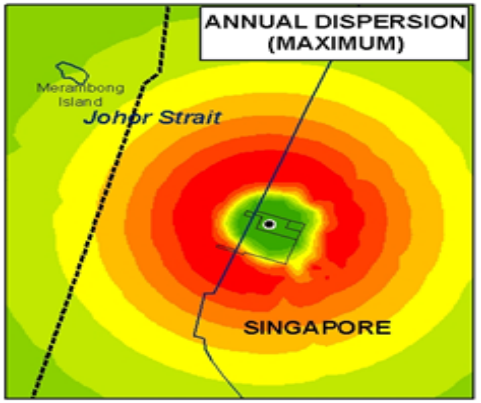
Enviro Pro was appointed as the project's environmental consultant to conduct the necessary pollution control study (PCS) and other environmental compliance matters. The PCS identified sources of emission of air pollutants, discharge of trade effluent, generation of waste and emission of noise; quantified and evaluated the impacts of the emissions; recommended measures to be incorporated in the design and operation of the plant to reduce pollutants emitted to acceptable levels.

Furthermore, Enviro Pro implemented the Environmental Monitoring and Management Plan (EMMP) during the construction, testing, commissioning and operation phase of the Tuaspring Desalination Plant. Monthly EMMP reports were produced to ensure environmental mitigation measures were in place and impacts to the environment were limited.

Key Methodology

- **BREEZE AERMOD model** – was performed to simulate the dispersion of selected air pollutants (NO_2, SO_2, CO and PM_{10}) released at the top of chimney.
- **SINGLAS accredited laboratory testing** for Ambient and Marine Water Quality Monitoring during construction
- **Sound Level Meter for Ambient Noise Level Monitoring**

Tuaspring Desalination Plant



Dispersion pattern of air pollutants

Marine water quality sampling

Pollution Control Study (PCS) for SingSpring Desalination Plant in Singapore, 2003

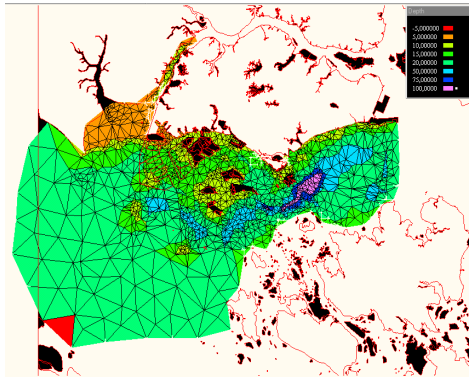
SingSpring Desalination Plant is the first desalination plant built in Singapore and supplies maximum net capacity of 136,000 m^3/ day of potable water to the Public Utilities Board (PUB). The project is to produce fresh water from seawater with a reverse osmosis (RO) plant.

Enviro Pro was engaged as an environmental consultant to conduct a Pollution Control Study (PCS). The PCS identified sources of emission of air pollutants, discharge of trade effluent, generation of waste and emission of noise; quantified and evaluated the impacts of the emissions; recommended measures to be incorporated in the design and operation of the plant to reduce pollutants emitted to acceptable levels.

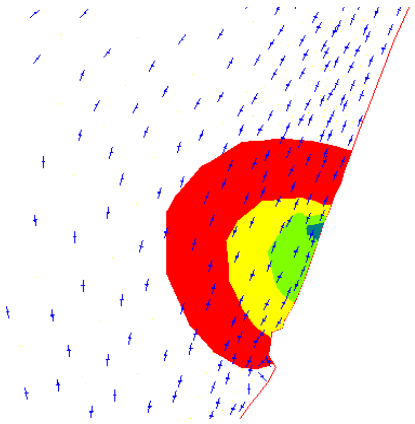
Key Study Methods

- **Pollution Control Study –** Potential impacts of air emission, trade effluent discharge, noise pollution and toxic wastes due to the operation of the plant were studied.
- **SINGLAS accredited laboratory testing for Water Quality –** Baseline condition obtained were compared with established guidelines to predict future impacts.
- **Modeling Study -** Assessment of numerical simulation data of tidal circulation and brine plume distribution in coastal water were conducted.

Operations at SingSpring Desalination Plant



Bathymetry model



Saline Plume

Air Dispersion Study for Waste-to-Energy Boiler Plant, Jurong Island, Singapore, 2009

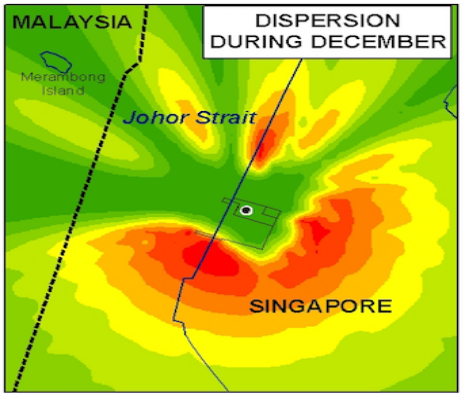
Sembcorp Cogen Pte Ltd planned to construct additional waste-to-energy boiler plant at lot 2225 PT MK 34, Sakra Road – Copeland Avenue, Jurong Island.

Enviro Pro was appointed to study the dispersion of key air pollutants to be emitted by the plant. The result of the study would serve as one of required information to assess the potential environmental impact on subsequent study such as the mandatory Pollution Control Study (PCS) of Singapore's NEA.

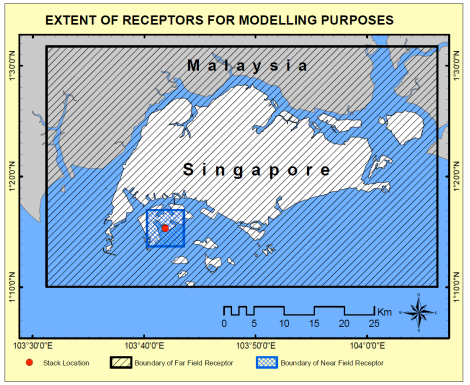
Key Methodology

- **BREEZE AERMOD model** – was performed to simulate the dispersion of selected air pollutants (NO_2, SO_2, CO and PM_{10}) released at the top of chimney.
- **Additional Ground Level Concentration (AGLC)** – was presented as the result of simulation due to the source emission in spatial and tabular form for easy reference and interpretation

Waste-to-Energy Boiler Plant



Example of dispersion concentration image using BREEZE AERMOD model



Stack location and map

Due Diligence Exercise and Environmental Performance Improvement Services for International Engine Component Overhaul Pte Ltd, Singapore, 2012

International Engine Component Overhaul Pte Ltd (IECO) specialised in the maintenance, repair and overhaul of engines, engine modules and components. IECO is the joint venture of Rolls-Royce and Singapore Airlines Engineering Company. In an attempt to improve its environmental performance, IECO engaged the services of Enviro Pro as an environmental consultant.

The consultancy services such as conducting a professional environmental operational audit, evaluating of their current wastewater treatment and their containment facility were undertaken. Furthermore, an assessment of operational noise levels were performed in the factory's facility.

During the project, Enviro Pro proposed solutions to potential environmental and occupational health risks and professional recommendations on the operational systems and wastewater treatment facility. As a result, a new waste water treatment systems by Siemens AG was designed and built successfully at the facility to improve effluent quality.

Key Analysis Methods

- **Gap Analysis** – Performed for data that are missing from chart.
- **Site Operational Audit and Compliance Assessment** – Conducted on the previously existed wastewater treatment system
- **Environmental, Health and Safety (EHS) risk assessment and non-compliance monitoring**

Existing wastewater treatment system

Operations at IECO

Pump system

Environmental Monitoring and Management Plan (EMMP) for Redevelopment of Sungei Buloh Wetland Reserve, 2011-2014

Sungei Buloh Wetland Reserve. Singapore's largest coastal wetland reserve, was reopened on 6 December 2014. It was redeveloped to include a 31 hectare extension, which allows visitors to visit mudflats at low tide. Some of the other new features include the mid-canopy walk, coastal boardwalk as well as the mangrove gallery.

Sungei Buloh Wetland Reserve is home to many wildlife and the EMMP acts as a primary control to ensure that construction activities do not cause any impacts on the biodiversity as well as the environment.

Enviro Pro was tasked with providing environmental management and monitoring (EMMP) consultancy services and ensuring that mitigation efforts were in place to prevent any disturbances to the wildlife during the entire construction phase. Enviro Pro also undertook the monitoring of the ambient water quality as well.

Key Study Methods

- SINGLAS accredited laboratory testing for Water Quality – Baseline condition obtained were compared with established guidelines to predict future impacts.

Mangrove swamp

Mangrove at low tide

Water quality sampling

Environmental Impact Assessment for Cluster IV Flood Control Development, Development of Main Drainage and Irrigation Rehabilitation in Aceh Province, Indonesia, 2010 – 2012

Cluster IV Flood Control and Irrigation Development included proposed efforts that meant to improve and restore the livelihoods of communities in Nanggroe Aceh Darussalam (NAD) Province, affected by the tsunami/earthquake that occurred on 26 December 2004.

Enviro Pro was tasked with performing the Environmental Impact Assessment (EIA) for Cluster IV Flood Control Developments.

Some of the undertakings of Cluster IV include:

- Construction of a drainage network in the City of Meulaboh
- Construction of flood control canals along Kr. Meureubo
- Construction of a flood protection dam along Kr. Cangkoy
- Rehabilitation of the irrigation network and dam at Panton Pineung Irrigation Area.

The potential benefits and risks of the development were discussed and assessed. The EIA also considered design alternatives, measures to avoid and minimize effects and identified advantages, disadvantages and net effects of these projects.

In the process of performing the Environmental Impact Assessment (EIA), a new freshwater fish species was discovered in the Alue Sungai Pineung in West Aceh, Indonesia.

Map of Cluster IV Developments

Sluice of Susoh Kanan Dam

New catfish species discovered by scientists from NUS during the EIA.

Environmental Impact Assessment For the Development of The Outpost and Village Hotel at Artillery Avenue, Sentosa Island, 2014 - 2015

The development of two distinctive hotels – Outpost Hotel Sentosa and Village Hotel Sentosa with a site area of 44,685 m^2 is expected to be completed in 2018.

Enviro Pro conducted an Environmental Impact Assessment (EIA) for the development for the developer. The principal objective of the EIA was to provide technical information for decision-making process for the detailed building design and selected construction methodologies to abate and minimize the potential environmental impacts associated with the proposed development.

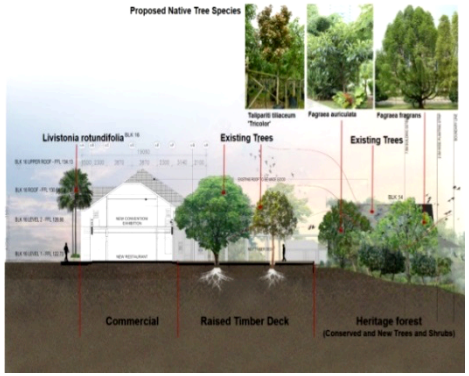
The development site contained some remnant forest areas of ecological value. These trees were incorporated into the landscape design of the hotel development and this was expected to mitigate the loss of habitat for the fauna. A connecting green corridor was also proposed to be one of the mitigation measures for the development.

Key Study Methods

- **SINGLAS accredited laboratory testing for Water Quality –** Baseline condition obtained were compared with established guidelines to predict future impacts.
- **Sound Level Meter for Noise Quality** – Baseline condition obtained were compared with established guidelines to predict future impacts.
- **Arborist Survey for Flora Inventory** – Trees of conservation value were recommended for retention by arborist.
- **Rapid Site Survey** – A rapid biodiversity study was undertaken.

Identified sensitive receptors

Artist's impression of the project



Proposed enrichment planting with native and ornamental tree species

Environmental Management Report (EMR) for Office Tower Development at Putrajaya, Malaysia, 2013 - 2014

An area of approximately 1.84 acre in Putrajaya, the federal administrative centre of Malaysia, was planned to be developed into a commercial area with multiple tenancy office suites with retail content below.

The project site is surrounded by government and commercial buildings, an Environmental Management Report (EMR) was required to ensure that the project would have a minimal impact to the environment.

Enviro Pro was tasked with the preparation of this EMR which complied with the Environmental Management Unit (EMU), Putrajaya and Department of Environment (DOE) regulations.

Site assessment were carried out by Enviro Pro before introducing environmental pollution control measures that would be implemented during construction and operation phase of the project.

This included, for example, the lay out design and specifications for erosion and sedimentation control measures.

Erosion and Sedimentation Control Layout Plan

One of the air quality sampling point

Noise level measuring

Environmental Scoping Assessment for Proposed Seaside Development, Penang, Malaysia, 2010

SDB Properties Sdn. Bhd. proposed for a seaside development "By The Sea" in close proximity of the beaches along Batu Ferringhi, located on the Northern Coast of Penang, Malaysia, As a recognized tourist destination, the development aimed to provide additional residential accommodations.

Enviro Pro was appointed to conduct an environmental scoping study at the Seaside Penang Development site. The initial environmental scoping study was to identify the existing environmental site conditions and propose environmental improvements. The result of the study lead to the development of the first privately-financed and award-winning river rehabilitation project, undertaken by SDB Properties between 2013 and 2016.

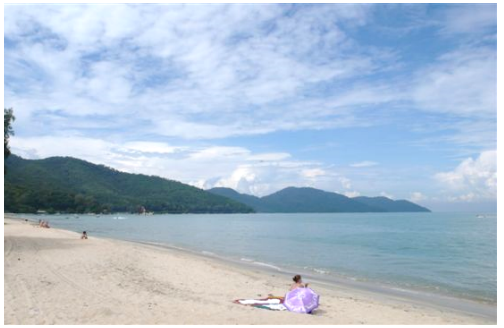
During the site assessments, available environmental resources and critical environmental receptors were identified. Amongst others, community interviews were conducted and physical observations and water quality tests were collected.

Key Study Methods

- **SINGLAS accredited laboratory testing for Water Quality** – Baseline condition obtained.
- **Rapid Site Survey** – Studies on water resources, hydrology, geo-morphological features, fauna & flora, and socio-economic environment were undertaken.

Awards:

- **FIABCI – Winner of Best Environmental Malaysia Property Award (Rehabilitation/Restoration) - 2016**



Northern coast of Penang nearby site

Construction of wetland at site

After project completion