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## CHAPTER 1: EXECUTIVE SUMMARY

### 1.1 INTRODUCTION

- This Project is for the:

**ENVIRONMENTAL MANAGEMENT PLAN FOR PROPOSED PELICAN PARADISE DEVELOPMENT, TIBAR-TASI TOLU, TIMOR-LESTE.**

- The Project is an integrated mixed development with a focus on resort living and recreation, comprising commercial, institutional and environment components. It is supported by infrastructure and utilities.
- The Project covers a land area of 563.04 ha which straddles Post Administration Dom Aleixo, Dili Municipality, and the Post Administration Bazartete, Liquica Municipality. It is located ~2 km southwest of Presidente Nicolau Lobato International Airport and 8 km from the capital, Dili.
- This Environmental Management Plan (EMP) is prepared to mitigate the adverse impacts and enhance the positive impact throughout the construction, operation and decommissioning of the Project.

### 1.2 PROJECT PROPONENT

**Pelican Paradise Holdings (Timor-Leste)**

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Attn: Mr Ravi Kathiravelu (Director)

Dr Jeremiah Chan Kin Meng (Executive Director)

### 1.3 ENVIRONMENTAL CONSULTANTS

**Asia Pacific Environmental Consultants Sdn Bhd**

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Attn: Dr Low Kwai Sim (Director)

Dr Jamie Chong Li Yean (Executive Director)

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## 1.4 PROJECT DESCRIPTION

### 1.4.1 Identification of Project

- **Figure 1.4.1** shows the Project area and the coordinates of the Project boundary.

### 1.4.2 Category of Project

- The NDPCEI has categorised the Project under Category A, vide letter [ref: 353/DNCPIA/XXII/2016 dated 20 December 2016], which requires an Environmental Assessment (EA) that involves the preparation of an Environmental Impact Statement (EIS) and EMP, which is the subject of this submission.

### 1.4.3 Brief Description of the Project

- The Project advocates for an eco-friendly concept development with the following design aspirations:
  - (i) Good access.
  - (ii) Efficient and sustainable use of natural resources.
  - (iii) Economic, social and cultural interactions.
  - (iv) Urban and environmental enrichment.
  - (v) Sufficient utilities and amenities.
- The Project has four major components:
  - (i) Commercial component: comprises an 18-hole golf course, two hotels, service apartments, residential units and commercial centres.
  - (ii) Institutional component: comprises a youth development and community centre, a school and a hospital.
  - (iii) National and environmental component: comprises parks and hill areas which will be reforested.
  - (iv) Infrastructure and utility component: comprises a utility centre, sewage treatment plant (STP) and water recycling plant, etc.
- **Table 1.4.1** and **Figure 1.4.2** show the 13 Plots of land usage in the Project area. A total of 62.94% will remain as hill forests, which is the largest component; followed by commercial (26.95%); residential development (8.09%); institutional (1.46%) and infrastructure and utilities (0.56%).
- The Project does not include the areas under Plot 12, which is for a large iconic national public park to be developed by the Government separately.
- The Project will be developed in three phases within the duration of six years with overlapping development over the three phases.

**Table 1.4.1: Development Components**

No	Development	Area (ha)	Percentage (%)
<b>Commercial Component</b>			
1	Plot 1: 5-Star Hotel (464-room)	27.15	4.82
2	Plot 2: 18-Hole Championship Standard Golf Course	98.19	17.44
3	Plot 3: Service Apartments (93 units)	5.91	1.05
4	Plot 7: Commercial Centre 1	9.25	1.64
5	Plot 8: Residential Units	14.56	2.58
6	Plot 9: Residential Units	31.00	5.51
7	Plot 10: 2 <sup>nd</sup> Hotel	9.68	1.72
8	Plot 13: Commercial Centre 2	1.55	0.28
	<b>Sub-total</b>	<b>197.29</b>	<b>35.04</b>
<b>Institutional Component</b>			
9	Plot 5: School	3.00	0.53
10	Plot 6: Hospital	3.04	0.54
11	Plot 14: Youth Development and Community Centre	2.17	0.39
	<b>Sub-total</b>	<b>8.21</b>	<b>1.46</b>
<b>National and Environmental Component</b>			
12	Plot 11: Forest Reserve Area (Reforestation)	354.38	62.94
	<b>Sub-total</b>	<b>354.38</b>	<b>62.94</b>
<b>Infrastructure and Utility Component</b>			
13	Plot 4: Hotel Service Support Centre (Utility Centre)	3.16	0.56
	<b>Sub-total</b>	<b>3.16</b>	<b>0.56</b>
	<b>Grand Total</b>	<b>563.04</b>	<b>100</b>

Note: The acreage of public park (Plot 12 – 58.80 ha) which will be developed by the Government of Timor-Leste is not included in the total area of Project site (563.04 ha).

#### 1.4.4 Justification and Need for Project

- The need to develop the Project is altruistically predicted on a number of strategic factors underpinning the scope of works (see **Chapter 4: Description of the Project**) as follows:
  - (i) Promote tourism activities in Timor-Leste.
  - (ii) Integrated development planning and future growth.
  - (iii) Socio-economic development.
  - (iv) Conserve and rehabilitate the environment.

#### 1.5 LEGAL REQUIREMENTS

- **Table 1.5.1** provides the environmental policies, legislation and regulations for the EIS and EMP to follow.
- Standards and guidelines for environmental quality benchmarking from the World Health Organisation (WHO), Malaysia and other Association of Southeast Asian Nations (ASEAN) countries will be referred to when there is a lack in Timor-Leste.

**Table 1.5.1: Legislation, Regulation, Standard and Guidelines Related to the Project**

Components	Legislation, Regulation, Standard and Guidelines
Environmental Assessment	<p><b><u>Legislations</u></b></p> <ul style="list-style-type: none"> <li>• Decree-Law No.26/2012 on Environmental Basic Law (EBL)</li> <li>• Decree-Law No.5/2011 on Environmental Licensing Law (ELL)</li> </ul> <p><b><u>Regulations and Guidelines</u></b></p> <ul style="list-style-type: none"> <li>• Guidelines on Ministerial Diploma on Regulation on Detailed Requirements for Screening, Scoping and the Terms of Reference, Environmental Impact Statements and Environmental Management Plans for Environmental Assessment</li> <li>• Guidelines on Ministerial Diploma for Regulations on Status and Rules of Procedures for Evaluation Committee for Managing the Environmental Assessment Procedure for Category A Projects</li> <li>• Guidelines on the Ministerial Diploma for Regulations on Impacts and Benefits</li> <li>• Ministerial Diploma for Regulation on the Public Consultations Procedures and Requirements during the Environmental Assessment Project</li> </ul>
Biodiversity and Protected Areas	<p><b><u>Legislations</u></b></p> <ul style="list-style-type: none"> <li>• UNTAET Regulation No.2000/19 on Protected Places</li> <li>• UNTAET Regulation No.2000/17 on the Prohibition of Logging Operation and Export of Wood from East Timor</li> <li>• Draft Decree-Law on Biodiversity</li> <li>• Draft Decree-Law on Forest Management, Draft 6</li> </ul>
Fisheries and Aquaculture Legislation	<p><b><u>Legislations</u></b></p> <ul style="list-style-type: none"> <li>• Decree-Law No.6/2001 on General Bases of the Legal Regime for Management and Regulation of Fisheries and Aquaculture</li> </ul>
Environmental Management	<p><b><u>Standards and Guidelines</u></b></p> <ul style="list-style-type: none"> <li>• International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability</li> <li>• World Bank Environmental, Health, and Safety General Guidelines (EHS Guidelines)</li> <li>• IFC Workers' Accommodation: Process and Standards</li> <li>• World Health Organisation (WHO) Guidelines for Community Noise</li> <li>• WHO Air Quality Guidelines</li> </ul>
Environmental Quality	<p><b><u>Standards and Guidelines</u></b></p> <ul style="list-style-type: none"> <li>• <b>Marine Water Quality:</b> Malaysian Marine Water Quality Criteria and Standard (MWQCS)</li> <li>• <b>Lake Water Quality:</b> Malaysian National Water Quality Standards (NWQS)</li> <li>• <b>Groundwater Quality:</b> Decree-Law No.5/2009 Licensing Regulations, Sale and Quality of Drinking Water and Malaysian Drinking Water Quality Standard</li> <li>• <b>Effluent:</b> Malaysian Sewerage Industry Guidelines</li> <li>• <b>Air Quality:</b> WHO Air Quality Guidelines</li> <li>• <b>Noise Level:</b> WHO Guideline Values for Community Noise in Specific Environments</li> </ul>

## 1.6 INSTITUTIONAL ROLES AND RESPONSIBILITIES

- The institutions that will play a vital role in ensuring a smooth and environmentally sound development of the Project for each phase of development are listed in **Table 1.6.1**.

**Table 1.6.1: Institutions Involved in the Project Development**

Phase	Key EMT Members
Pre-construction	(i) National Directorate of Pollution Control and Environmental Impact (NDPCEI) (ii) Pelican Paradise Holdings (Timor-Leste) or PP (iii) Asia Pacific Environmental Consultants Sdn Bhd (ASPEC)
Construction	(i) National Directorate of Pollution Control and Environmental Impact (NDPCEI) (ii) National Directorate of Land, Property and Cadastral Services (iii) National Directorate of Roads, Bridges and Flood Control (iv) National Directorate of Water and Sanitation (v) National Directorate of Aquaculture and Fisheries (vi) National Directorate of Sanitation Control and Environmental Health (vii) Department of Policy and Strategic Planning (viii) Suco Comoro and Tibar (iv) Pelican Paradise Holdings (Timor-Leste) or PP (ix) Main Contractor (MC) (x) Environmental Monitoring Consultant (EnvMC) (xi) Environmental Auditor (EnvA)
Operation	(i) National Directorate of Pollution Control and Environmental Impact (NDPCEI) (ii) National Directorate of Water and Sanitation (iii) National Directorate of Forestry and Watershed Management (iv) Pelican Paradise Holdings (Timor-Leste) or PP (v) Environmental Monitoring Consultant (EnvMC) (vi) Environmental Auditor (EnvA)
Decommissioning	(i) National Directorate of Pollution Control and Environmental Impact (NDPCEI) (ii) Pelican Paradise Holdings (Timor-Leste) of PP (iii) Decommissioning Contactor (DC) (iv) Environmental Monitoring Consultant (EnvMC) (v) Environmental Auditor (EnvA)

## 1.7 SUMMARY OF IMPACTS

- The Project will result in both positive and negative impacts to its environs. The potential significant impacts from various Project activities during construction, operational and deactivation/decommissioning phases are detailed in **Table 1.7.1**.

**Table 1.7.1: Summary of Positive and Negative Impacts from the Project**

Impacts		Description
<b>Pre-construction Phase</b>		
Significant Negative Impacts		<ul style="list-style-type: none"> <li>No significant negative impacts ascertained.</li> <li><b>Result:</b> No mitigations needed.</li> </ul>
<b>Construction Phase</b>		
Significant Negative Impacts	Major	<ul style="list-style-type: none"> <li>Soil erosion and sedimentation.</li> <li>Marine and lake water quality deterioration.</li> <li>Air pollution.</li> <li><b>Result:</b> Mitigations required.</li> <li><b>Time Period:</b> Short to mid-term.</li> </ul>
	Minor	<ul style="list-style-type: none"> <li>Alteration of hydrological system.</li> <li>Displacement of fauna through loss of habitat.</li> <li>Increased noise.</li> <li>Landuse change.</li> <li>Traffic congestion.</li> <li>Social conflicts.</li> <li><b>Result:</b> Intermittent mitigations required.</li> <li><b>Time Period:</b> Short to mid-term.</li> </ul>
Significant Positive Impacts		<ul style="list-style-type: none"> <li>More jobs and business opportunities.</li> <li>Multiplier effects on the local economy.</li> <li><b>Result:</b> Need only enhancements.</li> <li><b>Time Period:</b> Short to long-term.</li> </ul>
<b>Operational Phase</b>		
Significant Negative Impacts	Major	<ul style="list-style-type: none"> <li>Water pollution by sewage effluents.</li> <li>Increased traffic volumes.</li> <li><b>Result:</b> Mitigation measures required.</li> <li><b>Time Period:</b> Short to mid-term.</li> </ul>
	Minor	<ul style="list-style-type: none"> <li>Air pollution.</li> <li>Increased noise level.</li> <li>Increased peak flow discharges.</li> <li><b>Result:</b> Intermittent mitigation measures required.</li> <li><b>Time Period:</b> Short to mid-term.</li> </ul>
Significant Positive Impacts		<ul style="list-style-type: none"> <li>Aesthetic improvements to Tasi Tolu area.</li> <li>Enhanced terrestrial and lake ecology.</li> <li>Generation of jobs and business.</li> <li>Land value appreciation.</li> <li>Increase in housing, commercial and institutional development.</li> <li>Improvements in standard of living.</li> <li>Increased Gross Domestic Product (GDP) of the country.</li> <li>Increased tourist arrival.</li> <li><b>Result:</b> Need only enhancements.</li> <li><b>Time Period:</b> Short to long-term.</li> </ul>

Impacts	Description
<b>Decommissioning Phase</b>	
Significant Negative Impacts	<ul style="list-style-type: none"> <li>• Reduced aesthetics of site.</li> <li>• Loss of jobs and business.</li> <li>• Land value depreciation.</li> <li>• <b>Result:</b> Mitigation measures required for closure.</li> <li>• <b>Time Period:</b> Short to mid-term.</li> </ul>
Significant Positive Impacts	<ul style="list-style-type: none"> <li>• Reduced traffic volumes.</li> <li>• Reduced tourist foot traffic.</li> <li>• <b>Result:</b> Need to enhance the area before closure.</li> <li>• <b>Time Period:</b> Short to long-term.</li> </ul>

### 1.7.1 Potential Social Impacts

- The potential social impacts are shown in **Table 1.7.2**. The main impacts will likely be in the pre-construction phase when the Government will resettle the communities living within the Project site. During the construction and operational phases, the influx of migrant workers to work in the Project may cause social conflicts with the local population around the area.

**Table 1.7.2: Potential Social Impacts during Project Development**

Phase	Impacts
Pre-Construction	<p><b><u>Relocation</u></b></p> <ul style="list-style-type: none"> <li>• Relocation could cause some psychological impacts among the affected villagers.</li> <li>• As the Government will provide the area free of encumbrances to the PP, the scope of work will not include the relocation aspects in the EIS and EMP.</li> </ul>
Construction	<p><b><u>Public Amenities and Services</u></b></p> <ul style="list-style-type: none"> <li>• Influx of migrant workers will increase pressures on existing amenities and services.</li> </ul> <p><b><u>Public Health and Safety</u></b></p> <ul style="list-style-type: none"> <li>• Noise and air pollution from construction activities will affect the workers.</li> <li>• Poor sanitation coupled with inadequate waste disposal facilities will affect both workers and local community health.</li> </ul> <p><b><u>Social Conflicts</u></b></p> <ul style="list-style-type: none"> <li>• Conflicts may arise between local residents within the 3-km ZOI and migrant workers due to differences in social behaviours and way of life.</li> <li>• Job competition and social ills will likely to be sources of social conflicts.</li> </ul>
Operation	<p><b><u>Social Conflicts</u></b></p> <ul style="list-style-type: none"> <li>• Tranquillity and way of life affected by arrival of “outsiders”.</li> </ul>
Decommissioning	<p><b><u>Loss of Jobs</u></b></p> <ul style="list-style-type: none"> <li>• Loss of ~1,500 jobs shall occur if the Project is decommissioned.</li> <li>• This is likely to cause a cascading effect on the economy, the workers and their families.</li> </ul>

## 1.8 MITIGATION MEASURES

- Since there is no significance impact environmentally during the pre-construction phase, no mitigation measure is required.
- The mitigation measures for the potential negative impacts identified during construction, operational and deactivation/decommissioning phases, are described in **Tables 1.8.1 – 1.8.3** respectively.

### 1.8.1 Mitigation Measures for Potential Social Impacts

- **Table 1.8.4** provides the mitigation measures for socio-economic impacts. The mitigation measures are based on employment opportunities, stakeholder engagement, public safety and health and economy.



**Table 1.8.1: Summary of Potential Significant Environmental Impacts and Mitigation Measures during Construction Phase**

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/Responsibility
<ul style="list-style-type: none"> <li>• Mobilisation by contractors</li> <li>• Labour recruitment</li> <li>• Setting up base camp and site office</li> <li>• Mobilisation of construction equipment and machinery</li> <li>• Construction of the jetty</li> <li>• Land clearing</li> <li>• Biomass removal</li> <li>• Demolition of remnant squatter houses</li> <li>• Earthwork and platform formation</li> <li>• Earthworks, sculpturing and shaping the golf course</li> <li>• General piling and structural works</li> <li>• Final finishing and landscape</li> <li>• Conversion of Lake A (into freshwater)</li> </ul>	<p><b>Geology</b></p> <ul style="list-style-type: none"> <li>• Disturbance to the natural slopes through excavations and other such activities may cause slope slumping and failure, depending on the local geological strikes and dips of the Alieu Formations at the site.</li> </ul>	<p><b>Geology</b></p> <ul style="list-style-type: none"> <li>• Spraying of shotcrete to control rock falls, surface erosion, progressive disintegration of exposed bedrock and infiltration of surface water into the rock cut.</li> <li>• Concrete buttresses to support overhanging rock blocks.</li> <li>• Potentially loose blocks to be secured by applying various reinforcement techniques such as the installation of dowels, rock bolts or rock anchors.</li> <li>• Removal of unstable rock areas and replacement with reinforced wall.</li> <li>• Surface water to be diverted away from the cut slopes.</li> <li>• Horizontal or inclined subsurface drains drilled into the slope cuts will reduce the groundwater level within and prevent build-up of excess water pressure.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	-	<ul style="list-style-type: none"> <li>• PP or site representatives.</li> </ul>
	<p><b>Soil Erosion</b></p> <ul style="list-style-type: none"> <li>• Soil erosion has been identified as important during earthworks and construction, which may affect water quality in the lakes and sea.</li> </ul>	<p><b>Soil Erosion and Sedimentation</b></p> <ul style="list-style-type: none"> <li>• Minimise earthworks during the rainy season.</li> <li>• Implement best management practices (BMPs) in Erosion and Sediment Control Plan (ESCP).</li> <li>• Turfing to stabilise exposed areas.</li> <li>• Runoff control including earth drain, check dam, temporary berm drain and temporary slope drain to be constructed and well-maintained.</li> <li>• Erosion control including use of covers, such as plastic sheets, turfing and planting, buffer strips and surface roughening.</li> <li>• Sediment control includes building the long bund, check dams, silt fence, silt traps and wash trough to be constructed before commencement of the construction phase.</li> <li>• Monitoring total suspended solid (TSS) and turbidity at discharge points of silt traps.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Condition of stockpile area.</li> <li>• BMPs implemented.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily inspection by Environmental Officer (EO) of Contractor.</li> <li>• Quarterly inspection by EnvMC.</li> </ul>
	<p><b>Water Quality</b></p> <ul style="list-style-type: none"> <li>• Silt and sediment have been identified as the main pollutants.</li> <li>• Accidental leaks and spills from new and used oil, fuel and chemical storage sites affect the aquatic resources and groundwater.</li> <li>• Inadequate waste management could also cause water pollution.</li> </ul>	<p><b>Water Pollution</b></p> <ul style="list-style-type: none"> <li>• Implement all mitigation measures proposed for soil erosion.</li> <li>• Stockpile of fine materials to be sited away from any watercourses and lakes.</li> <li>• Piling works at proposed jetty to be carried out carefully to minimise sediment plume effect.</li> <li>• Manage all chemicals, fuel, machine oil and scheduled wastes on-site within proper storage spaces.</li> <li>• Adequate construction and domestic waste bins to be provided.</li> <li>• All solid wastes to be disposed off at a designated waste disposal area within the Project site before being taken to a designated landfill.</li> <li>• Waste segregation to be carried out and clearly labelled.</li> <li>• Prohibit disposal of waste generated on-site into drains and the lakes.</li> <li>• Temporary sanitary facilities to be provided at the base camp(s), site office and other strategic locations within the working area(s) and to be de-sludged regularly.</li> <li>• Kitchens or canteens to be fitted with oil and grease traps with regular maintenance.</li> <li>• All scheduled wastes to be managed properly e.g. collected in durable containers with proper labels for neutralisation or treatment</li> <li>• Conduct regular water quality monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Water quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>• Water Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily inspection by EO of Contractor.</li> <li>• Quarterly monitoring by EnvMC.</li> </ul>

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/ Responsibility
<ul style="list-style-type: none"> <li>• Mobilisation by contractors</li> <li>• Labour recruitment</li> <li>• Setting up base camp and site office</li> <li>• Mobilisation of construction equipment and machinery</li> <li>• Construction of the jetty</li> <li>• Land clearing</li> <li>• Biomass removal</li> <li>• Demolition of remnant squatter houses</li> <li>• Earthwork and platform formation</li> <li>• Earthworks, sculpturing and shaping the golf course</li> <li>• General piling and structural works</li> <li>• Final finishing and landscape</li> <li>• Conversion of Lake A (into freshwater)</li> </ul> (Cont')	<p><b>Air Quality</b></p> <ul style="list-style-type: none"> <li>• Temporary and localised dust and air pollution from construction activities, transportation, material handling and stockpile materials.</li> <li>• Minor and offensive odour caused by unsanitary conditions such as dirty toilets and uncollected wastes.</li> </ul>	<p><b>Air Pollution</b></p> <ul style="list-style-type: none"> <li>• As the Project area is dry for at least half the year, wet suppression is the best method. These include: water bowing on untarred roads; having wash troughs at the egress and ingress junctions; and sand stockpile areas.</li> <li>• For other stockpile areas, to cover the materials on-site with tarpaulin/plastic sheet.</li> <li>• Immediate turbing of bare soils after site clearing and earthworks.</li> <li>• Compact the bare and loose soil surfaces immediately after clearing.</li> <li>• Provision of temporary hoarding or barriers.</li> <li>• Tree planting and landscaping at the buffer areas to serve as dust screens.</li> <li>• Proper schedule for solid waste collection to avoid stench production.</li> <li>• Large scale land clearing for golf course development to be planned properly to reduce dust.</li> <li>• Practise good standard operating procedures (SOP) such as:               <ul style="list-style-type: none"> <li>(i) Turn off idle machinery or vehicles to reduce gaseous emissions.</li> <li>(ii) Carry out regular maintenance and frequent servicing of construction vehicles.</li> <li>(iii) Cover vehicles transporting earth materials by tarpaulin.</li> <li>(iv) Transport of earth to be scheduled to non-peak hours.</li> <li>(v) Spoils spilled on public roads to be immediately cleared.</li> <li>(vi) Impose speed limit.</li> <li>(vii) Provision of personal protective equipment (PPE) to the workers.</li> <li>(viii) Burning of wastes is strictly prohibited.</li> </ul> </li> <li>• Address all public complaints.</li> <li>• Carry out regular air quality monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>• Air Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily inspection by EO of Contractor.</li> <li>• Quarterly monitoring by EnvMC.</li> </ul>
	<p><b>Hydrology and Drainage</b></p> <ul style="list-style-type: none"> <li>• Localised ponding may occur because of earthworks and rehabilitation of the lakes.</li> </ul>	<p><b>Hydrology and Drainage</b></p> <ul style="list-style-type: none"> <li>• Provide temporary drainage systems to divert high flows to detention ponds or the lakes when they are yet to be rehabilitated.</li> <li>• Silt traps and earth drains to be constructed before earthwork commencement.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<p style="text-align: center;">-</p>	<ul style="list-style-type: none"> <li>• Site engineer.</li> <li>• Quarterly monitoring by EnvMC.</li> </ul>
	<p><b>Noise Level</b></p> <ul style="list-style-type: none"> <li>• Minor noise impact to the nearest tourism sites (i.e. St Paul's Holy House and the Pope Monument) is expected due to use of machinery and traffic.</li> <li>• Effects of loud noises to the workers carrying out construction activities could be a problem.</li> </ul>	<p><b>Noise Level</b></p> <ul style="list-style-type: none"> <li>• Noise is a pulse and goes off immediately once it is sounded. However, as many machinery will be used at different times, the din may affect visitors to the tourism and religious sites. The mitigation measures include;               <ul style="list-style-type: none"> <li>(i) Phase out development or schedule construction works, (if possible no work on Sundays).</li> <li>(ii) Erect hoardings and noise reducing barriers along the perimeter of the Project site.</li> <li>(iii) Retain vegetative buffers around the Project site as natural noise attenuators.</li> <li>(iv) Confine construction work to day time.</li> <li>(v) Maintain all vehicles and machinery at optimum operating conditions.</li> <li>(vi) Provide workers with PPE i.e. ear muffers and abide by World Health Organisation's (WHO) publication on Occupational Exposure to Noise: Evaluation, Prevention and Control.</li> <li>(vii) Work in high noise environment to be done in shifts.</li> <li>(viii) Implement traffic management and traffic control measures.</li> </ul> </li> <li>• Address all public complaints.</li> <li>• Carry out regular noise monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>	<ul style="list-style-type: none"> <li>• Noise parameters are in <b>Chapter 9</b> of this EMP.</li> <li>• Noise Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>• Site engineer.</li> <li>• Daily inspection by EO of Contractor.</li> <li>• Quarterly monitoring by EnvMC.</li> </ul>

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/ Responsibility
<ul style="list-style-type: none"> <li>Mobilisation by contractors</li> <li>Labour recruitment</li> <li>Setting up base camp and site office</li> <li>Mobilisation of construction equipment and machinery</li> <li>Construction of the jetty</li> <li>Land clearing</li> <li>Biomass removal</li> <li>Demolition of remnant squatter houses</li> <li>Earthwork and platform formation</li> <li>Earthworks, sculpturing and shaping the golf course</li> <li>General piling and structural works</li> <li>Final finishing and landscape</li> <li>Conversion of Lake A (into freshwater)</li> </ul> (Cont')	<b>Marine Ecology</b> <ul style="list-style-type: none"> <li>Land clearing, earthworks and construction of the floating jetty will cause re-suspension of silt in the seabed and erosion from the beaches that can affect the corals.</li> <li>Anchors from shipping vessels could destroy the corals.</li> <li>Spilled/leaked oil and chemicals could contaminate the seawater.</li> <li>Leaking sewage and sullage may cause algal blooms.</li> <li>Disposal of solid waste in the sea may lead to water pollution and death of large sea animals if ingested.</li> <li>Collection of corals and marine organisms could cause damage.</li> </ul>	<b>Marine Ecology</b> <ul style="list-style-type: none"> <li>Implement all mitigation measures proposed for soil erosion, water quality and waste generation.</li> <li>Provision of silt traps and silt curtain on land to reduce silt from flowing into the sea.</li> <li>Use silt curtains around piling works during jetty construction to help control the spread of re-suspended silt.</li> <li>Loading and unloading of materials and equipment to be done with care, so as not to disturb unnecessarily large areas of the beach.</li> <li>Materials spilled onto the Rua Terra Santa have to be taken away immediately.</li> <li>For shipping vessels, to ensure they dock only at certain areas away from any corals areas.</li> <li>Spill kits to be kept on floating jetty.</li> <li>Penalties such as fines to be imposed to dissuade workers from littering.</li> <li>Workers are prohibited from fishing and hunting at the nearshore waters.</li> <li>Reef transplanting and restoration if needed can be done during the operational phase.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Marine Ecology Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>Site engineer.</li> <li>Daily inspection by EO of Contractor.</li> <li>Half yearly by EnvMC.</li> </ul>
	<b>Terrestrial Ecology</b> <ul style="list-style-type: none"> <li>Although the terrestrial habitat is not rich with low numbers of wildlife, nevertheless, removal of scrub vegetation will cause some disruptions to the wildlife that is still there.</li> <li>Destruction of existing habitat with removal of plants and food sources.</li> <li>Disturbance caused by construction noise.</li> <li>Poaching and human-wildlife conflicts.</li> </ul>	<b>Terrestrial Ecology</b> <ul style="list-style-type: none"> <li>Any major wildlife displaced or encountered shall be recorded and immediately contact the relevant authority to relocate them to safe areas.</li> <li>The hills at the background will be reforested.</li> <li>Replant native vegetation around the Project site.</li> <li>Provide hoardings wherever necessary.</li> <li>Signages and posters placed at the worker camps to inform workers not to harass the animals.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>Half yearly by EnvMC.</li> </ul>
	<b>Lake Ecology</b> <ul style="list-style-type: none"> <li>Excavated materials from Lake A may contain heavy metals.</li> <li>High turbidity during lake rehabilitation.</li> <li>Lake restoration and rehabilitation will improve the aesthetic value of the Project area.</li> </ul>	<b>Lake Ecology</b> <ul style="list-style-type: none"> <li>Implement all mitigation measures proposed in the technical designs.</li> <li>Impose soil erosion and water quality control measures as stated in the BMPs and ESCP.</li> <li>Re-stocking the lakes with appropriate organisms and fish to restore the ecological balance.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li>See also Lake Ecology in <b>Section 9.10</b> in <b>Chapter 9</b> of EIS.</li> </ul>	<ul style="list-style-type: none"> <li>Half yearly by EnvMC.</li> </ul>
	<b>Infrastructure and Utilities</b> <ul style="list-style-type: none"> <li>Road damage and congestion due to heavy equipment, construction materials transport.</li> <li>Increase demand for electricity and potable water.</li> </ul>	<b>Infrastructure and Utilities</b> <ul style="list-style-type: none"> <li>Repair damaged roads immediately.</li> <li>Place proper signage to inform other road users of construction occurring ahead.</li> <li>Regular road cleaning of spilled dirt to be carried out at the roads.</li> <li>Impose maximum load limit.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>PP</li> </ul>	<ul style="list-style-type: none"> <li>See <b>Chapter 10</b> of the EMP for Monitoring Programmes.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO of Contractor.</li> </ul>
	<b>Landuse</b> <ul style="list-style-type: none"> <li>Increased pressures on existing infrastructure and services especially at the northeast quadrant (NEQ) of Zone of Impact (ZOI).</li> <li>Possible difficulties of access to religious, recreational or residential houses, will cause distress.</li> </ul>	<b>Landuse</b> <ul style="list-style-type: none"> <li>Ensure good traffic management at all times.</li> <li>Rapid response to mishaps, accidents, damage to property and even road rage.</li> <li>Provide alternative transport routes if needed.</li> <li>Provision of alternative ingress/egress for scheduled entry to religious, recreational and residential houses.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>PP</li> </ul>	-	<ul style="list-style-type: none"> <li>Daily inspection by EO of Contractor.</li> </ul>

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/ Responsibility
<ul style="list-style-type: none"> <li>Mobilisation by contractors</li> <li>Labour recruitment</li> <li>Setting up base camp and site office</li> <li>Mobilisation of construction equipment and machinery</li> <li>Construction of the jetty</li> <li>Land clearing</li> <li>Biomass removal</li> <li>Demolition of remnant squatter houses</li> <li>Earthwork and platform formation</li> <li>Earthworks, sculpturing and shaping the golf course</li> <li>General piling and structural works</li> <li>Final finishing and landscape</li> <li>Conversion of Lake A (into freshwater)</li> </ul> (Cont')	<p><b>Tourism</b></p> <ul style="list-style-type: none"> <li>Disruptions to tourist areas.</li> </ul>	<p><b>Tourism</b></p> <ul style="list-style-type: none"> <li>Provision of alternative entries into the religious and tourist sites if needed (e.g. St Paul's Holy House and the Pope Monument) because of heavier traffic flow causing congestions.</li> <li>Provide areas for sea vessels to anchor and berth away from dive spots, and areas of active works for the jetty.</li> <li>Signages, sea buoys, routing and markers for construction vessels to be provided.</li> <li>Implement BMPs for air, noise, ecology and land and sea traffic to reduce the general impact on the land and marine environmental quality, so as not to disrupt the tourists using the beach and dive areas.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>National Directorate of Tourism Enterprise, Activities and Products</li> <li>PP</li> </ul>	<ul style="list-style-type: none"> <li>See <b>Chapter 10</b> of the EMPs for Monitoring Programmes.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO of Contractor.</li> </ul>
	<p><b>Traffic</b></p> <ul style="list-style-type: none"> <li>Occasional traffic congestion.</li> <li>Higher risk of traffic accidents.</li> </ul>	<p><b>Traffic</b></p> <ul style="list-style-type: none"> <li>Plan, schedule and control trips of road loaders, tractors, etc. to avoid peak road hours.</li> <li>Positioning flagmen at suitable locations to indicate traffic diversion, if any.</li> <li>Minimum of two flagmen at suitable locations or temporary traffic lights to be installed to control traffic movement.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>National Directorate of Roads, Bridges and Flood Control</li> </ul>	<ul style="list-style-type: none"> <li>See <b>Chapter 10</b> of this EMPs for Monitoring Programmes.</li> </ul>	-
	<p><b>Waste Generation</b></p> <p><b>Biomass</b></p> <ul style="list-style-type: none"> <li>Left to decompose naturally but not in contact with water, which will cause leaching of organic compounds.</li> </ul> <p><b>Spoils from the Site</b></p> <ul style="list-style-type: none"> <li>Exposed spoils may result in windblown dust.</li> <li>Spoil materials may contain heavy metals and nutrients. They have to be tested before used as refined fills.</li> </ul> <p><b>Construction and Demolition (C&amp;D) Wastes</b></p> <ul style="list-style-type: none"> <li>Rusted steel and decomposed wood may contaminate runoff.</li> <li>They are also hazards in working areas, and have to be disposed off properly.</li> </ul> <p><b>Scheduled/Hazardous Wastes</b></p> <ul style="list-style-type: none"> <li>Water pollution may occur if discharged directly into water bodies.</li> <li>Workers may be exposed via direct contact due to improper handling or storage.</li> </ul> <p><b>Municipal Solid Wastes</b></p> <ul style="list-style-type: none"> <li>Improper management of wastes may lead to water pollution, odour and public health impacts.</li> <li>Uncollected solid waste may attract pest/scavengers.</li> <li>Open burning may trigger air pollution and health problems.</li> </ul> <p><b>Sewage</b></p> <ul style="list-style-type: none"> <li>Untreated sewage may contaminate runoff and water bodies.</li> <li>Faecal coliform contained in sewage may spread water-borne diseases to humans.</li> </ul>	<p><b>Waste Generation</b></p> <p><b>Biomass</b></p> <ul style="list-style-type: none"> <li>Generally sold if there is commercial value.</li> <li>Unsold biomass to be stored on-site at designated stockpile areas to decompose naturally.</li> <li>Burning of biomass is prohibited.</li> </ul> <p><b>Spoils</b></p> <ul style="list-style-type: none"> <li>Excess spoils to be used for landscaping and reforestation works.</li> </ul> <p><b>Construction and Demolition (C&amp;D) Wastes</b></p> <ul style="list-style-type: none"> <li>All C&amp;D wastes to be segregated and stored at designated temporary storage area(s) on-site.</li> </ul> <p><b>Scheduled/Hazardous Wastes</b></p> <ul style="list-style-type: none"> <li>Disposal of scheduled/hazardous wastes into water bodies is strictly prohibited.</li> <li>Scheduled/hazardous wastes to be stored in containers which are compatible, durable and able to prevent spillage and leakage.</li> <li>The storage area to be built away from water bodies.</li> <li>Scheduled/hazardous waste containers to be clearly labelled with date generation, contact details of waste generator and waste characteristics.</li> <li>Bunded storage area containing scheduled/hazardous wastes to be designed, constructed and maintained adequately to prevent spillage or leakage and to be sheltered or roofed or covered with suitable material.</li> <li>Scheduled/hazardous waste management to be carried out by trained personnel.</li> <li>An accurate and up-to-date inventory of scheduled/hazardous wastes to be prepared and kept for a period of three years.</li> <li>The hazardous wastes to be disposed off at a secured landfill or facility approved by the local government.</li> <li>PPE to be provided for the personnel handling the hazardous wastes.</li> <li>Emergency spill kits to be provided on-site to facilitate clean-up. Contaminated materials to be treated as hazardous wastes.</li> </ul> <p><b>Municipal Solid Waste</b></p> <ul style="list-style-type: none"> <li>Adequate bins to be provided at strategic locations in Project site.</li> <li>Waste to be disposed off at the Tibar Landfill.</li> <li>Regular housekeeping at workers quarters and construction site.</li> <li>Prohibition of open burning of solid waste.</li> </ul> <p><b>Sewage</b></p> <ul style="list-style-type: none"> <li>Provision of temporary sanitary facilities at strategic locations within working area(s).</li> <li>Regular desludging and maintenance of sanitary facilities.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Monitoring Programme is in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO of Contractor.</li> <li>Quarterly inspection by EnvMC.</li> </ul>

**Table 1.8.2: Summary of Potential Significant Environmental Impacts and Mitigation Measures during Operational Phase**

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/Responsibility
<ul style="list-style-type: none"> <li>Project operations</li> <li>Maintenance of the golf course and landscape features</li> <li>Maintenance of Lake A</li> <li>Maintenance of infrastructure, utilities and facilities</li> </ul>	<p><b>Water Pollution</b></p> <p><b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Wastewater from operational activities will be the main source of water pollution.</li> <li>Brine from desalination plant may impact the sea organisms.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>Fertiliser and pesticide runoff in large amounts could leach and cause eutrophication of the lakes.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>Hospital wastewater discharge without treatment will be a main concern as it contains antibiotic-resistant bacteria (ARB).</li> <li>Discharging harmful chemicals (i.e. x-ray contrast agents, disinfectants, etc.) will impact the aquatic ecosystem adversely.</li> </ul>	<p><b>Water Pollution</b></p> <p><b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Regular maintenance and inspection of all piping and wastewater treatment systems.</li> <li>Monitoring of sewage treatment plants' (STPs') effluent quality and performance.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>Implement pest management.</li> <li>Proper selection and use of chemicals with low leaching potential index and without organochlorines.</li> <li>Limit applications of fertilisers and pesticides and to ensure there is no direct release into water bodies.</li> <li>Record periods of fertilising, pest and weed control activities.</li> <li>Training given to employees on fertiliser and pesticide applications.</li> <li>Proper storage and management of pesticides and fertilisers.</li> <li>Provide only enough irrigation water to a depth just below the root system to minimise leaching.</li> <li>Select suitable turf grass to minimise application of fertilisers, pesticides and water.</li> <li>Use of weed-free plants.</li> <li>Conduct groundwater and surface water quality monitoring.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>Conduct regular maintenance and inspection of hospital wastewater storage and piping system.</li> <li>Provision of a hospital wastewater treatment plant, if necessary.</li> <li>Provision of an on-site incinerator for clinical wastes.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> </ul>	<p><b>Ambient Water Quality</b></p> <ul style="list-style-type: none"> <li>Water quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Water Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul> <p><b>Groundwater Quality</b></p> <ul style="list-style-type: none"> <li>Water quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Water Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<p><b>Ambient Water Quality</b></p> <ul style="list-style-type: none"> <li>Quarterly monitoring by EnvMC for one year only for indemnity period.</li> </ul> <p><b>Groundwater Quality</b></p> <ul style="list-style-type: none"> <li>Half yearly monitoring by EnvMC for one year only for indemnity period.</li> </ul>
	<p><b>Air Pollution</b></p> <p><b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Increased number of vehicles will produce more gaseous emissions.</li> <li>Sewage treatment plant (STP) failure may cause odours.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>Proper disposal of clinical wastes needed.</li> </ul>	<p><b>Air Pollution</b></p> <p><b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Maintain green buffer areas between the residential areas as natural air filters.</li> <li>Implement traffic control.</li> <li>Ensure frequent monitoring of STPs to prevent odours.</li> <li>Ensure good solid waste management and housekeeping practices at all times.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>Proper management of clinical waste.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Ministry of Health</li> </ul>	<ul style="list-style-type: none"> <li>Air quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>See <b>Chapter 10</b> of this EMP for air pollution controls.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO.</li> </ul>
	<p><b>Noise Level</b></p> <ul style="list-style-type: none"> <li>Increased noise from traffic and tourist activities.</li> </ul>	<p><b>Noise Level</b></p> <ul style="list-style-type: none"> <li>Impose speed limits to all vehicles to/from the Project site.</li> <li>Implement traffic control.</li> <li>PP to keep a complaints log book and take action immediately.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> </ul>	<ul style="list-style-type: none"> <li>Noise parameters are in <b>Chapter 9</b> of this EMP.</li> <li>See <b>Chapter 10</b> of this EMP for noise controls.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO.</li> </ul>

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/ Responsibility
<ul style="list-style-type: none"> <li>Project operations</li> <li>Maintenance of the golf course and landscape features</li> <li>Maintenance of Lake A</li> <li>Maintenance of infrastructure, utilities and facilities</li> </ul> (Cont')	<p><b>Marine Ecology</b> <b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Sewage contamination may have detrimental effects on the coral reefs.</li> <li>Microalgal blooms in the sea may affect marine and human lives.</li> <li>Hypersaline water from the desalination plant may affect corals and disrupt the osmotic balance of marine flora and fauna, if the discharge pipeline is too short for proper mixing with seawater.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>Usage of fertilisers and pesticides may pollute groundwater and lake water.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>Toxic chemicals and clinical wastes may poison marine flora and fauna if leaked to the sea.</li> </ul>	<p><b>Marine Ecology</b> <b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Regularly maintain and inspect the STPs to prevent leakages and functional failures.</li> <li>Brine to be discharged at a location far from coral reefs.</li> <li>Regular marine ecology monitoring.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>Implement integrated pest management measures, similar to the construction phase.</li> <li>Minimise use of fertilisers, pesticides and water.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>Toxic chemicals to be treated in a designated wastewater treatment plant.</li> <li>Clinical solid wastes to have pre-treatment.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> </ul>	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Marine Ecology Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO.</li> <li>Half yearly by EnvMC for one year only for the indemnity period.</li> </ul>
	<p><b>Terrestrial Ecology</b> <b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Human-wildlife conflicts.</li> <li>Lights at night throughout the development may disturb nocturnal wildlife.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>Chemical pollution from fertilisers and pesticides usage may contaminate groundwater and lake water.</li> </ul>	<p><b>Terrestrial Ecology</b> <b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>Signboards to be placed to warn and/or inform visitor on the existence of wildlife.</li> <li>Hunting, poaching and disturbing local wildlife are prohibited.</li> <li>Reforestation of hillslopes.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>Oversee turf maintenance and management such as mowing, soil aeration, topdressing with sand, and dethatching of the turf root zone.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> </ul>	<ul style="list-style-type: none"> <li>See <b>Chapter 10</b> of this EMP for monitoring terrestrial ecology.</li> </ul>	-
	<p><b>Lake Ecology</b></p> <ul style="list-style-type: none"> <li>Water pollutants from partially treated effluent, pesticides and fertilisers may be harmful to aquatic organisms in the lakes causing eutrophication.</li> </ul>	<p><b>Lake Ecology</b></p> <ul style="list-style-type: none"> <li>Maintain the efficient functions of the mechanical aeration system to aid water circulation and oxygenation.</li> <li>Implement mitigation measures and BMPs for water quality.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Golf Course Superintendent</li> </ul>	<ul style="list-style-type: none"> <li>See <b>Chapter 10</b> of this EMP for monitoring lake ecology.</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly by EnvMC for one year only for the indemnity period.</li> </ul>
	<p><b>Infrastructure and Utilities</b> <b>Integrated Mixed Development:</b></p> <ul style="list-style-type: none"> <li>Increased traffic.</li> <li>Demand for electricity and water may increase during operations of the Project.</li> <li>Municipal waste will be disposed off at Tibar Landfill.</li> </ul> <p><b>Golf Course Development:</b></p> <ul style="list-style-type: none"> <li>Need for golf course irrigation water.</li> </ul> <p><b>Hospital Development:</b></p> <ul style="list-style-type: none"> <li>Clinical wastes need to be incinerated and the ash disposed off to Tibar Landfill.</li> </ul>	<p><b>Infrastructure and Utilities</b> <b>Integrated Mixed Development:</b></p> <ul style="list-style-type: none"> <li>Maintain STPs for efficient treatment of sewage and sullage.</li> <li>Upgrade the internal permanent road network wherever necessary.</li> <li>Provisions of waste disposal bins.</li> <li>Proper collection and disposal of residual oil and grease.</li> </ul> <p><b>Golf Course Development:</b></p> <ul style="list-style-type: none"> <li>Composting of green waste.</li> </ul> <p><b>Hospital Development:</b></p> <ul style="list-style-type: none"> <li>Proper disposal of clinical waste.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	-
	<p><b>Tourism</b></p> <ul style="list-style-type: none"> <li>Disruption to the birds and other avians by golf course activities and visitors to the lakes.</li> <li>Possible eutrophication of Lakes B and C from the golf course fertiliser runoff.</li> <li>Disruption to small fishing vessels by tourist boats and services.</li> <li>Coral bleaching may occur if there are excessive leached pesticides and toxic chemicals.</li> </ul>	<p><b>Tourism</b></p> <ul style="list-style-type: none"> <li>Sea and vessel traffic to be managed by the local authorities with the assistance of PP.</li> <li>Berthing and anchoring of vessels to be demarcated clearly away from rich coral areas.</li> <li>Adequate provisions of tourist facilities (e.g. toilets, bathing areas and waste bins).</li> <li>Post signages and enforce strictly the prohibition to collect corals and marine life.</li> <li>Maintain the reforested hillslopes to provide more habitats for resting and breeding of terrestrial fauna.</li> <li>Proper irrigation management to maintain the golf course.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>National Directorate of Tourism Enterprise, Activities</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	-

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameters	Monitoring Frequency/Responsibility
<ul style="list-style-type: none"> <li>• Project operations</li> <li>• Maintenance of the golf course and landscape features</li> <li>• Maintenance of Lake A</li> <li>• Maintenance of infrastructure, utilities and facilities</li> </ul> (Cont')	<p><b>Waste Generation</b></p> <p><b>Municipal Solid Waste</b></p> <ul style="list-style-type: none"> <li>• Poor management produces leachate, odour and generation of disease vectors.</li> <li>• Garbage can attract pests and scavengers.</li> </ul> <p><b>Scheduled/Hazardous Waste</b></p> <ul style="list-style-type: none"> <li>• Impact on water quality, aquatic life and occupational health.</li> </ul> <p><b>Green Waste</b></p> <ul style="list-style-type: none"> <li>• Leachates from decomposing green wastes may affect aquatic life if leached into the lakes.</li> </ul> <p><b>Sewage</b></p> <ul style="list-style-type: none"> <li>• Mainly generated from integrated mixed development.</li> <li>• Poses problems to water quality and public health if the STPs fail.</li> </ul> <p><b>Clinical Waste</b></p> <ul style="list-style-type: none"> <li>• May cause pathogenic/infectious diseases.</li> <li>• Safety concerns due to sharps (from medical instruments).</li> <li>• Improper chemical waste management may result in hazards to workers, public and patients.</li> </ul>	<p><b>Waste Generation</b></p> <p><b>Integrated Mixed Development</b></p> <ul style="list-style-type: none"> <li>• Disposal of scheduled/hazardous wastes into drainage and sewerage systems is prohibited.</li> <li>• Hazardous wastes generated to be stored properly with clear labelling for final disposal at a secured landfill or any facility approved by the local authority.</li> </ul> <p><b>Golf Course Development</b></p> <ul style="list-style-type: none"> <li>• Green waste to be collected, composted and used as soil conditioners for golf course maintenance.</li> </ul> <p><b>Hospital Development</b></p> <ul style="list-style-type: none"> <li>• Hazardous wastes to be stored in clearly marked waste bins with plastic liners.</li> <li>• Sharps to be disposed off in puncture-proof containers, whilst chemical liquid wastes can be placed in amber disposal containers compatible with their hazardous characteristics.</li> <li>• All containers containing hazardous wastes to be labelled appropriately with symbol of waste type and weight.</li> <li>• PPE such as gloves, masks and appropriate footwear to be provided for personnel handling clinical wastes.</li> <li>• General waste from hospital can be incinerated and disposed off at Tibar Landfill through usual waste collection.</li> </ul>	<ul style="list-style-type: none"> <li>• STP Operator</li> <li>• Golf Course Superintendent</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	<ul style="list-style-type: none"> <li>• Daily inspection by EO.</li> <li>• Quarterly by EnvMC for one year only for the indemnity period.</li> </ul>

**Table 1.8.3: Summary of Potential Significant Environmental Impacts and Mitigation Measures during Deactivation/Decommissioning Phase**

Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameter	Monitoring Frequency/Responsibility
<ul style="list-style-type: none"> <li>Site rehabilitation</li> <li>Demobilisation of construction equipment and machineries</li> </ul>	<p><b>Soil Erosion and Sedimentation</b></p> <ul style="list-style-type: none"> <li>Erosion from exposed land surface if the Project is abandoned during land clearing and earthwork stages.</li> </ul>	<p><b>Soil Erosion and Sedimentation</b></p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>Turfing or equivalent to be carried out on exposed bare land.</li> <li>All drainage works to be addressed properly to control ponding.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Condition of stockpile area.</li> <li>BMPs implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Only once for closure for decommissioning.</li> </ul>
	<p><b>Water Pollution</b></p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>Bare land and disturbed soil surface may cause erosion and sedimentation in the receiving waters.</li> <li>Wastes and residual hazardous materials generated on-site, if not managed well, will cause water pollution.</li> </ul> <p><b>Operational Phase</b></p> <ul style="list-style-type: none"> <li>Potential groundwater pollution due to leachates from the central garbage collection building and golf course.</li> <li>Leaking of wastewaters from hospital, STPs, treatment systems and cooling towers, will pollute surface and groundwater.</li> <li>Leakage of chemicals and fertilisers that are not removed from storage site.</li> </ul>	<p><b>Water Pollution</b></p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>Turfing to be carried out on all residual exposed bare areas.</li> <li>Remove all wastes and chemical/oil residues from the Project site.</li> </ul> <p><b>Operational Phase</b></p> <ul style="list-style-type: none"> <li>Removal of all domestic solid wastes and disposed them at the Tibar Landfill.</li> <li>All wastewater to be treated and discharged into the sea or Tasi Tolu Lakes in small amounts at a time.</li> <li>No on-site storage of chemicals and fertilisers.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Water quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>Water Monitoring Programme in <b>Chapter 10</b> of this EMP.</li> </ul>	
	<p><b>Air Pollution</b></p> <ul style="list-style-type: none"> <li>Dust generated from residual bare lands and disturbed soil surfaces, if the Project is abandoned during land clearing and earthwork phases.</li> </ul>	<p><b>Air Pollution</b></p> <ul style="list-style-type: none"> <li>All bare lands to be turfed immediately to reduce wind blown dust.</li> <li>All stockpiles to be removed, compacted or turfed to reduce the dust dispersion.</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Air quality parameters are in <b>Chapter 9</b> of this EMP.</li> <li>See <b>Chapter 10</b> of this EMP for air pollution controls.</li> </ul>	
	<p><b>Hydrology</b></p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>Drainage system within the Project site may not be fully completed that could lead to localised ponding.</li> <li>Improper disposal of solid waste may block surface runoff.</li> </ul> <p><b>Operational Phase</b></p> <ul style="list-style-type: none"> <li>Improper waste disposal can lead to drain blockages.</li> </ul>	<p><b>Hydrology</b></p> <ul style="list-style-type: none"> <li>Ensure the drainage system is completed to avoid localised ponding.</li> <li>C&amp;D wastes to be collected and piled, away from the lakes.</li> <li>Indiscriminate disposal of garbage in drains or other water bodies is prohibited.</li> <li>All deposited wastes in the drainage system to be cleared and disposed off at the Tibar Landfill.</li> <li>Turfing to be carried out on residual exposed bare lands.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Contractor</li> </ul>	-	-
	<p><b>Marine Ecology</b></p> <p><b>Construction Phase</b></p> <ul style="list-style-type: none"> <li>Erosion from exposed soils may cause turbidity in the sea.</li> <li>Leftover C&amp;D wastes and domestic waste generated by the workers could pollute the nearshore areas.</li> </ul> <p><b>Operational Phase</b></p> <ul style="list-style-type: none"> <li>Leachate from domestic wastes may contaminate the sea.</li> <li>Leftover fertilisers may leach into sea.</li> <li>Wastewater may leak into waterways to the sea.</li> </ul>	<p><b>Marine Ecology</b></p> <p><b>Construction phase</b></p> <ul style="list-style-type: none"> <li>Bare earth to be revegetated or covered with crusher runs.</li> <li>Dispose all scheduled wastes, chemicals and oils accordingly from the Project site.</li> </ul> <p><b>Operational phase</b></p> <ul style="list-style-type: none"> <li>Remove and dispose all domestic wastes from the Project site.</li> <li>Remove all bags of fertilisers and pesticides from the golf course.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li>See <b>Chapter 10</b> of this EMP for controls.</li> </ul>	<ul style="list-style-type: none"> <li>Once for closure for decommissioning.</li> </ul>



Project Activity	Potential Significant Environmental Impact	Mitigation Measures	Mitigation Responsibility	Monitoring Parameter	Monitoring Frequency/Responsibility
<ul style="list-style-type: none"> <li>Site rehabilitation</li> <li>Demobilisation of construction equipment and machineries</li> </ul> (Cont')	<b>Terrestrial Ecology</b> <b>Construction Phase</b> <ul style="list-style-type: none"> <li>Animals that have been scared off by initial earthworks may return over time.</li> </ul> <b>Operational Phase</b> <ul style="list-style-type: none"> <li>Plants and animals will slowly repopulate the areas.</li> </ul>	<b>Terrestrial Ecology</b> <ul style="list-style-type: none"> <li>No mitigation measure required.</li> </ul>	-	<ul style="list-style-type: none"> <li>See <b>Chapter 10</b> of this EMP for controls.</li> </ul>	-
	<b>Lake Ecology</b> <b>Construction Phase</b> <ul style="list-style-type: none"> <li>Half completed works may cause worse environmental conditions at the Tasi Tolu Lakes than at present.</li> </ul>	<b>Lake Ecology</b> <ul style="list-style-type: none"> <li>The work should be carried out until there is some semblance of their condition before development, or to be made good wherever possible before leaving the place.</li> </ul>	-	<ul style="list-style-type: none"> <li>Parameters are in <b>Chapter 9</b> of this EMP.</li> <li><b>Chapter 10</b> of this EMP for pollution controls.</li> </ul>	-
	<b>Infrastructure and Utilities</b> <ul style="list-style-type: none"> <li>Minor impacts as the infrastructure of the Project site will revert back to its <i>status quo</i> condition.</li> </ul>	<b>Infrastructure and Utilities</b> <ul style="list-style-type: none"> <li>Electricity and water pipelines to be disconnected to prevent illegal tapping.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> </ul>	-	-
	<b>Landuse</b> <ul style="list-style-type: none"> <li>Loss of usage of land.</li> </ul>	<b>Landuse</b> <ul style="list-style-type: none"> <li>No mitigation measure can be taken.</li> </ul>	-	-	-
	<b>Tourism</b> <ul style="list-style-type: none"> <li>Loss of vital opportunity to develop an international mixed resort Project in Timor-Leste.</li> <li>Loss of income and business opportunities.</li> <li>Loss of improved visual aesthetics at the tourism sites.</li> <li>Loss of important tourism product in the country.</li> </ul>	<b>Tourism</b> <ul style="list-style-type: none"> <li>For the bare areas, to undertake seeding programme where agreed upon with the relevant Government agencies.</li> <li>Use of hoardings and fences to ward off unauthorised persons at the site.</li> <li>Contain all liquid and solid wastes for treatment and safe disposal in accordance with the Timor-Leste legal standards and other appropriate standards and guidelines applicable at the time.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Contractor</li> <li>National Directorate of Tourism Enterprise Activities</li> </ul>	<ul style="list-style-type: none"> <li><b>Chapter 10</b> of this EMP for controls.</li> </ul>	-
	<b>Waste Generation</b> <b>Municipal Solid Wastes</b> <ul style="list-style-type: none"> <li>Improper management will cause leachate and odour, attract pest and scavengers, generation of disease vectors.</li> </ul> <b>Hazardous Wastes</b> <ul style="list-style-type: none"> <li>Deterioration of water quality due to leakage and spill.</li> </ul> <b>Sewage</b> <ul style="list-style-type: none"> <li>Overflow affects water quality.</li> <li>Public and safety issues if detention pond is not emptied.</li> </ul>	<b>Waste Generation</b> <ul style="list-style-type: none"> <li>All municipal solid wastes to be removed and disposed off at Tibar Landfill before all staff are being evacuated from the Project site.</li> <li>Hazardous wastes to be disposed off at the secured landfill or any facility approved by the local authority.</li> <li>Untreated sewage to be pumped out and disposed off at Tibar STP.</li> <li>Retention ponds for the treated effluent are to be emptied and fenced up.</li> <li>Treated STPs effluent to be discharged to sea but in small amounts at a time.</li> </ul>	<ul style="list-style-type: none"> <li>PP</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li><b>Chapter 10</b> of this EMP for controls.</li> </ul>	<ul style="list-style-type: none"> <li>For closure or decommissioning.</li> </ul>
	<b>Cultural Heritage</b> <ul style="list-style-type: none"> <li>Both St Paul's Holy House and Pope Monument are located outside of the Project site; no impacts will be associated with these sites during the decommissioning phase.</li> </ul>	<b>Cultural Heritage</b> <ul style="list-style-type: none"> <li>No mitigation measures required.</li> </ul>	-	-	-

**Table 1.8.4: Mitigation Measures for Socio-economic Impacts**

<b>Socio-economic Impact</b>	<b>Mitigation Measures</b>
<ul style="list-style-type: none"> <li>• Relocation could cause some psychological impacts among the affected villagers.</li> <li>• Disruption in social relationships amongst relocated villagers and with the communities in the new area.</li> <li>• Potential public health and safety issue among the workers and local community from: (i) air and noise pollution, (ii) insufficient living accommodation, poor sanitation and inadequate waste disposal facilities in Project area.</li> <li>• Social conflicts due to influx of migrant workers: (i) competition of jobs among locals and migrant workers; (ii) social ills, such as drugs and alcohol abuses.</li> </ul>	<p><b><u>Stakeholder Meeting</u></b></p> <ul style="list-style-type: none"> <li>• Establish a Community Relations Committee at the Suco level to act as a communication channel between the PP and the local community.</li> </ul> <p><b><u>Employment Opportunities</u></b></p> <ul style="list-style-type: none"> <li>• Job preference given to the local population.</li> <li>• A local “labour desk” shall be set up at the Project site or contractors’ offices to facilitate employing local labour during the construction phase.</li> <li>• Locals are also encouraged to fill in clerical and managerial jobs if they are qualified with the right training related to hotel management and the tourism industries.</li> </ul> <p><b><u>Public Health and Safety</u></b></p> <ul style="list-style-type: none"> <li>• The Community Relations Committee can incorporate awareness campaigns taken jointly on precautionary measures to take related to safety and health.</li> <li>• Local residents shall be alerted to any change in traffic routes and diversion, pedestrian access, etc., wherever and whenever necessary.</li> <li>• Support facilities and infrastructure shall be adequately provided at the construction site to ensure acceptable living conditions of the workers.</li> </ul> <p><b><u>Promoting Economic Linkage</u></b></p> <ul style="list-style-type: none"> <li>• There should be a deliberate attempt to promote an economic link between the Project and the local community level. This will ensure that they form an integral component in the entire developmental process of the local economy.</li> <li>• Examples of economic integration with the local economy include purchasing local products (raw materials such as sand, etc. during the construction phase, and local produce such as vegetables, etc. during both phases). This will help grow the local economy and decrease unemployment.</li> <li>• Providing continuous training for semi-skilled and skilled jobs to the local youths.</li> <li>• The Community Relations Committee to help find workers to work in the hotel and the tourism-related business.</li> <li>• Small tourism-related business can be undertaken by the local population.</li> </ul>

## 1.9 GOVERNING PARAMETERS

- The governing parameters are best reflected in the Environmental Performance Indicators (EPs) on the status of the components in line with all relevant environmental requirements by the NDPCEI and other regulatory agencies.
- Table 1.9.1** provides the key EPs for the Project and their targeted compliance criteria.

**Table 1.9.1: EPs and Targeted Compliance Criteria**

Key Performance Indicator	Targeted Compliance Criteria	Application		
		Construction Phase	Operational Phase	Decommission Phase
Water Quality	(i) Maintain baseline water quality [refer <b>Section 6.6:</b> Water Quality in the Environmental Impact Statement (EIS) Report]	✓	✓	✓
	(ii) Conditions of Environmental License (if any).	✓	✓	✓
Marine Water Quality	(iii) Malaysian Marine Water Quality Criteria and Standards (MWQCS)	✓	✓	✓
Lake Water Quality	(iv) Malaysian National Water Quality Standards (NWQS)	✓	✓	✓
Groundwater Quality	(v) Malaysian Drinking Water Quality Standard	X	✓	✓
	(vi) Decree-Law 5/2009, Licensing Regulations, Sale and Quality of Drinking Water	X	✓	✓
Erosion and Sedimentation	(i) Maintain baseline total suspended solids (TSS) [refer <b>Section 6:</b> Water Quality in the EIS]	✓	✓	✓
	(ii) MWQCS	✓	✓	✓
	(iii) NWQS	X	✓	✓
	(iv) Erosion and Sediment Control Plan (ESCP)	✓	X	✓
	(v) Conditions of environmental license (if any)	✓	✓	✓

Key Performance Indicator	Targeted Compliance Criteria	Application		
		Construction Phase	Operational Phase	Decommission Phase
Air Quality	(i) World Health Organisation (WHO) Air Quality Guidelines	✓	X	✓
	(ii) Conditions of environmental license (if any)	✓	X	✓
Noise	(i) WHO Guidelines Values for Community Noise in Specific Environments	✓	X	✓
	(ii) Conditions of environmental license (if any)	✓	X	✓
Waste Management	(i) NWQS	X	✓	✓
	(ii) Malaysian Sewerage Industry Guidelines	✓	X	X
	(iii) Conditions of Environmental License (if any)	✓	✓	✓
Biodiversity	(i) UNTAET Regulation 2000/19 on Protected Places	✓	X	✓
	(ii) Decree Law No. 26/2012 Environmental Basic Law, Article 27	✓	X	✓
	(iii) UNTAET Regulation 2000/17 on the Prohibition of Logging Operations and the Export of Wood from East Timor	✓	✓	✓
	(iv) Draft Decree Law on Biodiversity, dated March 2012	✓	✓	✓
	(v) Draft Decree Law on Forest Management, draft 6	✓	✓	✓
	(vi) National Biodiversity Strategy and Action Plan (2011 – 2012)	✓	✓	✓
	(vii) Forestry Sector Policy Goal Objective and Strategy	✓	X	✓
	(viii) Conditions of environmental license (if any)	✓	✓	✓

Key Performance Indicator	Targeted Compliance Criteria	Application		
		Construction Phase	Operational Phase	Decommission Phase
Biodiversity (cont')	(ix) Maintain baseline results for phytoplankton and zooplankton and coral reef results in <b>Sections 6.12 and 6.15</b> of the EIS Report	✓	X	✓

## 1.10 MONITORING AND AUDITING PROGRAMME

### 1.10.1 Monitoring Programme

- An environmental monitoring programme for each developmental phase is provided together with its duration for monitoring, sampling methods and parameters. The details of the monitoring programme are in **Tables 1.10.1 – 1.10.3** for the construction, operational and decommissioning phases respectively.
- The monitoring locations for significant environment impact at each phase are shown in **Figures 1.10.1 – 1.10.4**.

### 1.10.2 Auditing Requirements

- Environmental audits provide a measure of the how the environmental is being protected. It should be conducted half yearly during the construction phase and half yearly (for one year only) during the operational phase.
- Only one audit is necessary for the closure during the decommissioning phase, if the Project is closed due to unforeseen circumstances. There will be no audit if there is no closure.

**Table 1.10.1: Environmental Monitoring and Surveillance during Construction Phase**

Environmental Components	Procedures/ Methodology	Parameter to be Analysed	Compliance Requirements	Proposed Monitoring Locations	Action by Responsible Parties/ Report Submission	Sampling Frequency																										
Water quality	<ul style="list-style-type: none"> <li>To be carried out by trained field personnel.</li> <li>Grab samples to be taken.</li> <li>Samples analysed in an accredited laboratory.</li> <li>Sampling and analytical methods shall follow the latest edition of "Standard Methods for the Examination of Water and Wastewater" or equivalent.</li> </ul>	<b>Ambient Water Quality</b> <ul style="list-style-type: none"> <li>Total Suspended Solid (TSS)</li> <li>Turbidity</li> <li>Dissolved Oxygen (DO)</li> <li>pH</li> <li>Salinity</li> <li>Conductivity</li> <li>Temperature</li> <li>Oil and Grease (O&amp;G)</li> <li>Phosphate</li> <li>Phenol</li> <li>Faecal Coliform</li> <li>Mercury (Hg)</li> <li>Cadmium (Cd)</li> <li>Chromium (VI) (Cr<sup>6+</sup>)</li> <li>Copper (Cu)</li> <li>Arsenic (As)</li> <li>Lead (Pb)</li> <li>Zinc (Zn)</li> <li>Cyanide (CN)</li> <li>Ammonia</li> <li>Nitrite (NO<sub>2</sub><sup>-</sup>)</li> <li>Nitrate (NO<sub>3</sub><sup>-</sup>)</li> </ul>	<ul style="list-style-type: none"> <li>Maintain baseline water quality (refer EIS Report <b>Section 6.6:</b> Water Quality).</li> <li>Class 2 of Malaysia Marine Water Quality Criteria and Standard (MWQCS).</li> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <tr><th colspan="2">Lake Water Sampling</th></tr> <tr><td>LW1:</td><td>S8.56623° E125.51079°</td></tr> <tr><td>LW2:</td><td>S8.56587° E125.50720°</td></tr> <tr><td>LW3:</td><td>S8.56198° E125.49990°</td></tr> <tr><th colspan="2">Coastal Water Sampling</th></tr> <tr><td>SW1:</td><td>S8.54759° E125.51584°</td></tr> <tr><td>SW2:</td><td>S8.55638° E125.50647°</td></tr> <tr><td>SW3:</td><td>S8.55572° E125.48918°</td></tr> <tr><td>SW4:</td><td>S8.55505° E125.49918°</td></tr> </table>	Lake Water Sampling		LW1:	S8.56623° E125.51079°	LW2:	S8.56587° E125.50720°	LW3:	S8.56198° E125.49990°	Coastal Water Sampling		SW1:	S8.54759° E125.51584°	SW2:	S8.55638° E125.50647°	SW3:	S8.55572° E125.48918°	SW4:	S8.55505° E125.49918°	<ul style="list-style-type: none"> <li>Indication of non-compliance by EnvMC.</li> <li>Follow-up actions by EO for non-compliance.</li> <li>Monitoring report submission to PP, MC and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly monitoring by EnvMC</li> </ul>								
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<b>Ambient Marine Water Quality (for Jetty only)</b> <ul style="list-style-type: none"> <li>TSS</li> <li>Turbidity</li> </ul>	<ul style="list-style-type: none"> <li>Class 2 of Malaysia MWQCS.</li> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <tr><th colspan="2">Coastal Water Sampling</th></tr> <tr><td>JW1:</td><td>S8.55577° E125.50344°</td></tr> <tr><td>JW2:</td><td>S8.55526° E125.50543°</td></tr> <tr><td>JW3:</td><td>S8.55703° E125.50587°</td></tr> <tr><td>JW4:</td><td>S8.55743° E125.50388°</td></tr> </table>	Coastal Water Sampling		JW1:	S8.55577° E125.50344°	JW2:	S8.55526° E125.50543°	JW3:	S8.55703° E125.50587°	JW4:	S8.55743° E125.50388°																				
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Air quality	<ul style="list-style-type: none"> <li>Measure using appropriate sampling equipment in 24-hour averaging time period.</li> </ul>	<b>Ambient Air Quality</b> <ul style="list-style-type: none"> <li>PM<sub>2.5</sub></li> <li>PM<sub>10</sub></li> </ul>	<ul style="list-style-type: none"> <li>WHO Air Quality Guidelines for Particulate Matter.</li> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <tr><td>A1:</td><td>S8.56014° E125.51417°</td></tr> <tr><td>A3:</td><td>S8.55946° E125.49766°</td></tr> <tr><td>A5:</td><td>S8.56853° E125.51466°</td></tr> </table>	A1:	S8.56014° E125.51417°	A3:	S8.55946° E125.49766°	A5:	S8.56853° E125.51466°	<ul style="list-style-type: none"> <li>Indication of low or exceedance levels of organisms.</li> <li>Monitoring report submission to PP, MC and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly monitoring by EnvMC</li> </ul>																				
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Noise	<ul style="list-style-type: none"> <li>Measure at sensitive locations on A-weighted frequency in 16-hour averaging time period.</li> <li>Noise measurement shall be taken at the boundary of the respective sensitive areas.</li> </ul>	<b>Ambient Noise</b> <ul style="list-style-type: none"> <li>L<sub>eq</sub></li> <li>L<sub>10</sub>, L<sub>50</sub>, L<sub>90</sub></li> <li>L<sub>min</sub>, L<sub>max</sub></li> </ul>	<ul style="list-style-type: none"> <li>WHO Guidelines Values for Community Noise in Specific Environments.</li> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <tr><td>N1:</td><td>S8.56014° E125.51417°</td></tr> <tr><td>N3:</td><td>S8.55946° E125.49766°</td></tr> <tr><td>N5:</td><td>S8.56853° E125.51466°</td></tr> </table>	N1:	S8.56014° E125.51417°	N3:	S8.55946° E125.49766°	N5:	S8.56853° E125.51466°	<ul style="list-style-type: none"> <li>Quarterly monitoring by EnvMC</li> </ul>																					
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Marine Ecology	<ul style="list-style-type: none"> <li>To be carried out by trained field personnel.</li> <li>Samples shall be analysed in a laboratory except for coral reefs.</li> </ul>	<b>Marine Ecology</b> <ul style="list-style-type: none"> <li>Phytoplankton</li> <li>Zooplankton</li> <li>Coral reefs</li> </ul>	<ul style="list-style-type: none"> <li>Benchmark against baseline results for phytoplankton and zooplankton (refer EIS Report <b>Section 6.15:</b> Marine Ecology).</li> <li>Benchmark against baseline results for coral reef (refer EIS Report <b>Section 6.12:</b> Corals).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <tr><th colspan="2">Phytoplankton and Zooplankton</th></tr> <tr><td>B1:</td><td>S8.54759° E125.51584°</td></tr> <tr><td>B2:</td><td>S8.55638° E125.50647°</td></tr> <tr><td>B3:</td><td>S8.55572° E125.48918°</td></tr> <tr><th colspan="2">Coral Reef Sampling</th></tr> <tr><td>T1:</td><td>S 8.55743° E 125.50452°</td></tr> <tr><td>T2:</td><td>S 8.55678° E 125.50447°</td></tr> <tr><td>T3:</td><td>S 8.55722° E 125.50043°</td></tr> <tr><td>T4:</td><td>S 8.55588° E 125.50070°</td></tr> <tr><td>T5:</td><td>S 8.55450° E 125.48945°</td></tr> <tr><td>T6:</td><td>S 8.55477° E 125.48993°</td></tr> <tr><td>T7:</td><td>S 8.55547° E 125.49722°</td></tr> <tr><td>T8:</td><td>S 8.55527° E 125.49807°</td></tr> </table>	Phytoplankton and Zooplankton		B1:	S8.54759° E125.51584°	B2:	S8.55638° E125.50647°	B3:	S8.55572° E125.48918°	Coral Reef Sampling		T1:	S 8.55743° E 125.50452°	T2:	S 8.55678° E 125.50447°	T3:	S 8.55722° E 125.50043°	T4:	S 8.55588° E 125.50070°	T5:	S 8.55450° E 125.48945°	T6:	S 8.55477° E 125.48993°	T7:	S 8.55547° E 125.49722°	T8:	S 8.55527° E 125.49807°	<ul style="list-style-type: none"> <li>Indication of low or exceedance levels of organisms.</li> <li>Monitoring report submission to PP, MC and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Half yearly by EnvMC</li> </ul>
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Environmental Components	Procedures/ Methodology	Parameter to be Analysed	Compliance Requirements	Proposed Monitoring Locations	Action by Responsible Parties/ Report Submission	Sampling Frequency
Waste management	<ul style="list-style-type: none"> <li>Visual inspection on mode and efficiency of disposal.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>General cleanliness.</li> <li>Number of bins provided and adequacy.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At site office, worker quarters and active work sites.</li> </ul>	<ul style="list-style-type: none"> <li>Indication of non-compliance by EnvMC.</li> <li>Follow-up actions by EO for non-compliance.</li> <li>Monitoring report submission to PP, MC and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Daily inspection by EO of contractor.</li> <li>Quarterly inspection by EnvMC.</li> </ul>
Biomass and spoil management	<ul style="list-style-type: none"> <li>Visual inspection on stockpile management.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>Condition of stockpile area.</li> <li>BMPs implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At designated stockpile areas.</li> </ul>		
Scheduled waste management	<ul style="list-style-type: none"> <li>Visual inspection on mode and efficiency of storage and disposal.</li> </ul>	<ul style="list-style-type: none"> <li>Waste disposal at designated scheduled waste disposal area.</li> <li>Visual inspection of storage condition.</li> <li>Signs of oil spill.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At storage areas for scheduled wastes.</li> <li>At active work areas.</li> </ul>		
Sanitation facilities	<ul style="list-style-type: none"> <li>Visual inspection and ensure no direct discharge of untreated wastewater into open areas or waters.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>Adequacy of toilet facilities.</li> <li>Treatment system installed.</li> </ul>	<ul style="list-style-type: none"> <li>Malaysian Sewerage Industrial Guidelines.</li> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At the base camp and site office.</li> </ul>		
Safety and health	<ul style="list-style-type: none"> <li>Visual inspection.</li> </ul>	<ul style="list-style-type: none"> <li>PPE use.</li> <li>Hoarding condition.</li> <li>Safety signage.</li> <li>Toolbox training log.</li> <li>Vector control programme.</li> <li>Emergency Response Plan (ERP)</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Throughout Project site.</li> </ul>		
Housekeeping	<ul style="list-style-type: none"> <li>Visual inspection.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>Proper domestic waste disposal method.</li> <li>Presence of vectors.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At the base camp and site office.</li> </ul>		

Note: PP: Project Proponent; MC: Main Contractor; NDPCEI: National Directorate of Pollution Control and Environmental Impact; EO: Environmental Officer; EnvMC: Environmental Monitoring Consultant.

**Table 1.10.2: Environmental Monitoring and Surveillance during Operational Phase (One Year Indemnity Period)**

Environmental Components	Procedures/ Methodology	Parameter to be Analysed	Compliance Requirements	Proposed Monitoring Locations	Action by Responsible Parties /Report Submission	Frequency of Sampling Frequency																		
Water quality	<ul style="list-style-type: none"> <li>To be carried out by trained field personnel.</li> <li>Grab samples to be taken.</li> <li>Samples analysed in an accredited laboratory.</li> <li>Sampling and analytical methods shall follow the latest edition of "Standard Methods for the Examination of Water and Wastewater" or equivalent.</li> </ul>	<b>Ambient Water Quality</b> <ul style="list-style-type: none"> <li>TSS</li> <li>Turbidity</li> <li>DO</li> <li>pH</li> <li>Salinity</li> <li>Conductivity</li> <li>Temperature</li> <li>O&amp;G</li> <li>Phosphate</li> <li>Phenol</li> <li>Faecal Coliform</li> <li>Hg</li> <li>Cd</li> <li>Cr<sup>6+</sup></li> <li>Cu</li> <li>As</li> <li>Pb</li> <li>Zn</li> <li>CN</li> <li>Ammonia</li> <li>NO<sub>2</sub><sup>-</sup></li> <li>NO<sub>3</sub><sup>-</sup></li> </ul>	<b>Lake A</b> <ul style="list-style-type: none"> <li>Class IIB of the Malaysia National Water Quality Standard (NWQS).</li> <li>Condition of Environmental License (if any).</li> </ul> <b>Marine Water, Lakes B and C</b> <ul style="list-style-type: none"> <li>Maintain baseline water quality (refer EIS Report <b>Section 6.6:</b> Water Quality) for the first three years.</li> <li>Class 2 of Malaysia MWQCS for fourth year onwards.</li> <li>Condition of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <thead> <tr> <th colspan="2">Lake Water Sampling</th> </tr> </thead> <tbody> <tr> <td>LW1 (Lake C):</td> <td>S8.56623° E125.51079°</td> </tr> <tr> <td>LW2 (Lake B):</td> <td>S8.56587° E125.50720°</td> </tr> <tr> <td>LW3 (Lake A):</td> <td>S8.56198° E125.49990°</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Coastal Water Sampling</th> </tr> </thead> <tbody> <tr> <td>SW1:</td> <td>S8.54759° E125.51584°</td> </tr> <tr> <td>SW2:</td> <td>S8.55638° E125.50647°</td> </tr> <tr> <td>SW3:</td> <td>S8.55572° E125.48918°</td> </tr> <tr> <td>SW4:</td> <td>S8.55505° E125.49918°</td> </tr> </tbody> </table>	Lake Water Sampling		LW1 (Lake C):	S8.56623° E125.51079°	LW2 (Lake B):	S8.56587° E125.50720°	LW3 (Lake A):	S8.56198° E125.49990°	Coastal Water Sampling		SW1:	S8.54759° E125.51584°	SW2:	S8.55638° E125.50647°	SW3:	S8.55572° E125.48918°	SW4:	S8.55505° E125.49918°	<ul style="list-style-type: none"> <li>Indication of non-compliance by EnvMC.</li> <li>Follow-up actions by golf course superintendent for lake water for non-compliance.</li> <li>Follow-up actions by PP for the Lakes and coastal water non-compliance.</li> <li>Monitoring report submission to PP and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly by EnvMC for one year only for the indemnity period..</li> </ul>
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<b>Groundwater Quality</b> <ul style="list-style-type: none"> <li>Enterococcus</li> <li>As</li> <li>Cu</li> <li>Cd</li> <li>Pb</li> <li>Cr</li> <li>NO<sub>2</sub><sup>-</sup></li> <li>Total Pesticide</li> <li>Selenium (Se)</li> <li>Sulphate</li> <li>Total Coliform</li> <li>Manganese (Mn)</li> <li>Zn</li> <li>Iron (Fe)</li> <li>Conductivity</li> <li>Chloride</li> </ul>	<ul style="list-style-type: none"> <li>Decree-Law No.5/2009, Licensing Regulations, Sale and Quality of Drinking Water.</li> <li>Malaysian Drinking Water Quality Standard.</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <thead> <tr> <th colspan="2">Groundwater Sampling</th> </tr> </thead> <tbody> <tr> <td>GW1:</td> <td>S8.55891° E125.50387°</td> </tr> <tr> <td>GW2:</td> <td>S8.55854° E125.49889°</td> </tr> </tbody> </table>	Groundwater Sampling		GW1:	S8.55891° E125.50387°	GW2:	S8.55854° E125.49889°	<ul style="list-style-type: none"> <li>Half yearly by EnvMC for one year only.</li> </ul>															
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Sewage effluent		<b>Effluent Quality</b> <ul style="list-style-type: none"> <li>Temperature</li> <li>Ammoniacal Nitrogen (AN)</li> <li>Biochemical Oxygen Demand (BOD<sub>5</sub>)</li> <li>Chemical Oxygen Demand (COD)</li> <li>pH</li> <li>TSS</li> <li>Total coliform</li> <li>NO<sub>3</sub><sup>-</sup></li> <li>O&amp;G</li> <li>Phosphorus (P)</li> </ul>	<ul style="list-style-type: none"> <li><b>Treated Sewage for Reuse:</b> Class IV of the NWQS for Malaysia.</li> </ul>	<ul style="list-style-type: none"> <li>Final discharge points of the three STPs.</li> </ul>	<ul style="list-style-type: none"> <li>Indication of non-compliance by EnvMC.</li> <li>Follow-up actions by STP operator for non-compliance.</li> <li>Monitoring report submission to PP and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly by EnvMC for one year only.</li> </ul>																		



Environmental Components	Procedures/ Methodology	Parameter to be Analysed	Compliance Requirements	Proposed Monitoring Locations	Action by Responsible Parties /Report Submission	Frequency of Sampling Frequency																										
Marine Ecology	<ul style="list-style-type: none"> <li>To be carried out by trained field personnel.</li> <li>Samples shall be analysed in a laboratory except for coral reefs.</li> </ul>	<p><b>Marine Ecology</b></p> <ul style="list-style-type: none"> <li>Phytoplankton</li> <li>Zooplankton</li> <li>Coral reefs</li> </ul>	<ul style="list-style-type: none"> <li>Benchmark against baseline results for phytoplankton and zooplankton (refer EIS Report <b>Section 6.15: Marine Ecology</b>).</li> <li>Benchmark against baseline results for coral reef (refer EIS Report <b>Section 6.12: Corals</b>).</li> </ul>	<ul style="list-style-type: none"> <li>Points: <table border="1" data-bbox="1760 386 2163 840"> <thead> <tr> <th colspan="2">Phytoplankton and Zooplankton</th> </tr> </thead> <tbody> <tr> <td>B1:</td> <td>S8.54759° E125.51584°</td> </tr> <tr> <td>B2:</td> <td>S8.55638° E125.50647°</td> </tr> <tr> <td>B3:</td> <td>S8.55572° E125.48918°</td> </tr> <tr> <th colspan="2">Coral Reef Sampling</th> </tr> <tr> <td>T1:</td> <td>S 8.55743° E 125.50452°</td> </tr> <tr> <td>T2:</td> <td>S 8.55678° E 125.50447°</td> </tr> <tr> <td>T3:</td> <td>S 8.55722° E 125.50043°</td> </tr> <tr> <td>T4:</td> <td>S 8.55588° E 125.50070°</td> </tr> <tr> <td>T5:</td> <td>S 8.55450° E 125.48945°</td> </tr> <tr> <td>T6:</td> <td>S 8.55477° E 125.48993°</td> </tr> <tr> <td>T7:</td> <td>S 8.55547° E 125.49722°</td> </tr> <tr> <td>T8:</td> <td>S 8.55527° E 125.49807°</td> </tr> </tbody> </table> </li> </ul>	Phytoplankton and Zooplankton		B1:	S8.54759° E125.51584°	B2:	S8.55638° E125.50647°	B3:	S8.55572° E125.48918°	Coral Reef Sampling		T1:	S 8.55743° E 125.50452°	T2:	S 8.55678° E 125.50447°	T3:	S 8.55722° E 125.50043°	T4:	S 8.55588° E 125.50070°	T5:	S 8.55450° E 125.48945°	T6:	S 8.55477° E 125.48993°	T7:	S 8.55547° E 125.49722°	T8:	S 8.55527° E 125.49807°	<ul style="list-style-type: none"> <li>Indication of low or exceedance level of organisms.</li> <li>Monitoring report submission to PP and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Half yearly by EnvMC for one year only.</li> </ul>
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Note: PP: Project Proponent; NDPCEI: National Directorate of Pollution Control and Environmental Impact; EnvMC: Environmental Monitoring Consultant.

**Table 1.10.3: Environmental Monitoring and Surveillance during Decommissioning Phase (One Time Only)**

Environmental Components	Procedures/ Methodology	Parameter to be Analysed	Compliance Requirements	Proposed Monitoring Locations	Action by Responsible Parties /Report Submission	Frequency of Sampling Frequency																										
Water quality	<ul style="list-style-type: none"> <li>To be carried out by trained field personnel.</li> <li>Grab samples to be taken.</li> <li>Samples analysed in an accredited laboratory.</li> <li>Sampling and analytical methods shall follow the latest edition of "Standard Methods for the Examination of Water and Wastewater" or equivalent.</li> </ul>	<p><b>Ambient Water Quality</b></p> <ul style="list-style-type: none"> <li>DO</li> <li>pH</li> <li>Salinity</li> <li>Conductivity</li> <li>Temperature</li> <li>O&amp;G</li> <li>Phosphate</li> <li>Phenol</li> <li>Faecal Coliform</li> <li>Hg</li> <li>Cd</li> <li>Cr<sup>6+</sup></li> <li>Cu</li> <li>As</li> <li>Pb</li> <li>Zn</li> <li>CN</li> <li>Ammonia</li> <li>NO<sub>2</sub><sup>-</sup></li> <li>NO<sub>3</sub><sup>-</sup></li> </ul>	<p><b>Lake A</b></p> <ul style="list-style-type: none"> <li>Class IIB of the Malaysia NWQS.</li> <li>Condition of Environmental License (if any).</li> </ul> <p><b>Marine Water, Lakes B and C</b></p> <ul style="list-style-type: none"> <li>Maintain baseline water quality (refer EIS Report <b>Section 6.6:</b> Water Quality).</li> <li>Class 2 of Malaysia MWQCS.</li> <li>Condition of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <thead> <tr> <th colspan="2">Lake Water Sampling</th> </tr> </thead> <tbody> <tr> <td>LW1 (Lake C):</td> <td>S8.56623° E125.51079°</td> </tr> <tr> <td>LW2 (Lake B):</td> <td>S8.56587° E125.50720°</td> </tr> <tr> <td>LW3 (Lake A):</td> <td>S8.56198° E125.49990°</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Coastal Water Sampling</th> </tr> </thead> <tbody> <tr> <td>SW1:</td> <td>S8.54759° E125.51584°</td> </tr> <tr> <td>SW2:</td> <td>S8.55638° E125.50647°</td> </tr> <tr> <td>SW3:</td> <td>S8.55572° E125.48918°</td> </tr> <tr> <td>SW4:</td> <td>S8.55505° E125.49918°</td> </tr> <tr> <td>JW1:</td> <td>S8.55577° E125.50344°</td> </tr> <tr> <td>JW2:</td> <td>S8.55526° E125.50543°</td> </tr> <tr> <td>JW3:</td> <td>S8.55703° E125.50587°</td> </tr> <tr> <td>JW4:</td> <td>S8.55743° E125.50388°</td> </tr> </tbody> </table>	Lake Water Sampling		LW1 (Lake C):	S8.56623° E125.51079°	LW2 (Lake B):	S8.56587° E125.50720°	LW3 (Lake A):	S8.56198° E125.49990°	Coastal Water Sampling		SW1:	S8.54759° E125.51584°	SW2:	S8.55638° E125.50647°	SW3:	S8.55572° E125.48918°	SW4:	S8.55505° E125.49918°	JW1:	S8.55577° E125.50344°	JW2:	S8.55526° E125.50543°	JW3:	S8.55703° E125.50587°	JW4:	S8.55743° E125.50388°	<ul style="list-style-type: none"> <li>Indication of non-compliance by EnvMC.</li> <li>Follow-up actions by PP for non-compliance.</li> <li>Monitoring report submission to PP and NDPCEI.</li> </ul>	<ul style="list-style-type: none"> <li>Once only for closure for decommissioning.</li> </ul>
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JW1:	S8.55577° E125.50344°																															
JW2:	S8.55526° E125.50543°																															
JW3:	S8.55703° E125.50587°																															
JW4:	S8.55743° E125.50388°																															
Air quality	<ul style="list-style-type: none"> <li>To be measured using appropriate sampling equipment in 24-hour averaging time periods.</li> </ul>	<p><b>Ambient Air Quality</b></p> <ul style="list-style-type: none"> <li>PM<sub>2.5</sub></li> <li>PM<sub>10</sub></li> </ul>	<ul style="list-style-type: none"> <li>2005 WHO Air Quality Guidelines for Particulate Matter.</li> <li>Condition of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <tbody> <tr> <td>A1:</td> <td>S8.56014° E125.51417°</td> </tr> <tr> <td>A3:</td> <td>S8.55946° E125.49766°</td> </tr> <tr> <td>A5:</td> <td>S8.56853° E125.51466°</td> </tr> </tbody> </table>	A1:	S8.56014° E125.51417°	A3:	S8.55946° E125.49766°	A5:	S8.56853° E125.51466°																						
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Marine Ecology	<ul style="list-style-type: none"> <li>To be carried out by trained field personnel.</li> <li>Samples shall be analysed in a laboratory except for coral reefs.</li> </ul>	<p><b>Marine Ecology</b></p> <ul style="list-style-type: none"> <li>Phytoplankton</li> <li>Zooplankton</li> <li>Coral reefs</li> </ul>	<ul style="list-style-type: none"> <li>Benchmark against baseline results for phytoplankton and zooplankton (refer EIS Report <b>Section 6.15:</b> Marine Ecology).</li> <li>Benchmark against baseline results for coral reef (refer EIS Report <b>Section 6.12:</b> Corals).</li> </ul>	<ul style="list-style-type: none"> <li>Points:</li> </ul> <table border="1"> <thead> <tr> <th colspan="2">Phytoplankton and Zooplankton</th> </tr> </thead> <tbody> <tr> <td>B1:</td> <td>S8.54759° E125.51584°</td> </tr> <tr> <td>B2:</td> <td>S8.55638° E125.50647°</td> </tr> <tr> <td>B3:</td> <td>S8.55572° E125.48918°</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Coral Reef Sampling</th> </tr> </thead> <tbody> <tr> <td>T1:</td> <td>S 8.55743° E 125.50452°</td> </tr> <tr> <td>T2:</td> <td>S 8.55678° E 125.50447°</td> </tr> <tr> <td>T3:</td> <td>S 8.55722° E 125.50043°</td> </tr> <tr> <td>T4:</td> <td>S 8.55588° E 125.50070°</td> </tr> <tr> <td>T5:</td> <td>S 8.55450° E 125.48945°</td> </tr> <tr> <td>T6:</td> <td>S 8.55477° E 125.48993°</td> </tr> <tr> <td>T7:</td> <td>S 8.55547° E 125.49722°</td> </tr> <tr> <td>T8:</td> <td>S 8.55527° E 125.49807°</td> </tr> </tbody> </table>	Phytoplankton and Zooplankton		B1:	S8.54759° E125.51584°	B2:	S8.55638° E125.50647°	B3:	S8.55572° E125.48918°	Coral Reef Sampling		T1:	S 8.55743° E 125.50452°	T2:	S 8.55678° E 125.50447°	T3:	S 8.55722° E 125.50043°	T4:	S 8.55588° E 125.50070°	T5:	S 8.55450° E 125.48945°	T6:	S 8.55477° E 125.48993°	T7:	S 8.55547° E 125.49722°	T8:	S 8.55527° E 125.49807°		
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Environmental Components	Procedures/ Methodology	Parameter to be Analysed	Compliance Requirements	Proposed Monitoring Locations	Action by Responsible Parties /Report Submission	Frequency of Sampling Frequency
Waste management	<ul style="list-style-type: none"> <li>Visual inspection on mode and efficiency of disposal.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>General cleanliness.</li> <li>Number of bins provided.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At site office, worker quarters and active work sites.</li> </ul>	<ul style="list-style-type: none"> <li>Make good any compliance by the DC before closure.</li> </ul>	<ul style="list-style-type: none"> <li>One inspection only for closure for decommissioning.</li> </ul>
Biomass and spoil management	<ul style="list-style-type: none"> <li>Visual inspection on stockpile management.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>Condition of stockpile area.</li> <li>BMPs implemented.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At designated stockpile areas.</li> </ul>		
Scheduled waste management	<ul style="list-style-type: none"> <li>Visual inspection on mode and efficiency of storage and disposal.</li> </ul>	<ul style="list-style-type: none"> <li>Waste disposal at designated scheduled waste disposal area.</li> <li>Visual inspection of storage condition.</li> <li>Signs of oil spill.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At storage areas for scheduled wastes.</li> <li>At active work areas.</li> </ul>		
Safety and health	<ul style="list-style-type: none"> <li>Visual inspection.</li> </ul>	<ul style="list-style-type: none"> <li>Hoarding condition.</li> <li>Safety signage.</li> <li>Vector control programme.</li> <li>ERP</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Throughout Project site.</li> </ul>		
Housekeeping	<ul style="list-style-type: none"> <li>Visual inspection.</li> </ul>	<b>Site Condition</b> <ul style="list-style-type: none"> <li>Proper domestic waste disposal method.</li> <li>Presence of vectors.</li> </ul>	<ul style="list-style-type: none"> <li>Conditions of Environmental License (if any).</li> </ul>	<ul style="list-style-type: none"> <li>At the base camp and site office.</li> </ul>		

Note: PP: Project Proponent; DC: Decommissioning Contractor; NDPCEI: National Directorate of Pollution Control and Environmental Impact; EnvMC: Environmental Monitoring Consultant.  
Remark: Monitoring programme to be updated by contractor during decommissioning phase.

### 1.11 REPORTING REQUIREMENTS

- Environmental reporting to document each work phase, includes:
  - (i) Reporting on environmental monitoring and site inspection – for internal use to provide feedbacks to the PP, MC, Environmental Management Team (EMT) and Emergency Response Team (ERT).
  - (ii) Reporting on environmental monitoring and site inspection – for external use to NDPCEI for their information.
- **Table 1.11.1** shows the environmental reporting for construction, operational and deactivation/decommissioning phases. Details can be referred to **Chapter 11**.

**Table 1.11.1: Reporting Requirements according to Project Development**

Developmental Phase	Internal	External
Construction	<ul style="list-style-type: none"> <li>• Daily site inspection checklist by EO of the contractor.</li> <li>• Monthly environmental report by EO of the contractor.</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Half Yearly Environmental Monitoring Report</u>.</li> <li>• The EnvMC shall compile and interpret the results for incorporation into the Report for submission to the NDPCEI as per requirements in Article 33 of the Decree-Law No.5/2011 on Environmental Licensing Law (ELL).</li> </ul>
	<ul style="list-style-type: none"> <li>• Quarterly environmental report by EnvMC.</li> <li>• Environmental auditing report, half yearly by EnvA.</li> <li>• <b>Implementation period:</b> throughout the construction phase.</li> </ul>	
Operation (one year only for the indemnity period)	<ul style="list-style-type: none"> <li>• Daily site inspection checklist by EO of the contractor.</li> <li>• Monthly environmental report by EO of the contractor.</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Yearly Environmental Monitoring Report</u>.</li> <li>• The EnvMC shall compile and interpret the results for incorporation into the Report for submission to the NDPCEI as per requirements in Article 33 of ELL.</li> </ul>
	<ul style="list-style-type: none"> <li>• Quarterly environmental report by EnvMC.</li> <li>• Environmental auditing report, half yearly by EnvA.</li> <li>• <b>Implementation period:</b> for one year only.</li> </ul>	
Decommissioning	<ul style="list-style-type: none"> <li>• Closure Report.</li> <li>• <b>Implementation period:</b> one-off only.</li> </ul>	<ul style="list-style-type: none"> <li>• The Closure Report shall be submitted to NDPECI and relevant authorities.</li> </ul>

### 1.12 RESPONSIBILITIES FOR MITIGATION AND MONITORING

- During Project development, an Environmental Management Team (EMT) shall be established to ensure the mitigation measures contained in the EMP, are carried out accordingly.
- **Table 1.12.1** shows a list of EMT members and the details can be referred to in **Chapter 12** of this EMP.

**Table 1.12.1: EMT Members at Each Developmental Phase**

Developmental Phase	EMT Members
Construction	<ul style="list-style-type: none"> <li>• Pelican Paradise Holdings (Timor-Leste) or PP</li> <li>• Project Manager (PM) appointed by PP</li> <li>• Main Contractor (MC)</li> <li>• Sub-contractors (SC)</li> <li>• Safety, Health and Environmental (SHE) Manager and Environmental Officer (EO) appointed by the MC</li> <li>• Environmental Monitoring Consultant (EnvMC) appointed by the PP</li> </ul>
Operational	<ul style="list-style-type: none"> <li>• PP assisted by PM</li> <li>• Golf Course Superintendent assisted by maintenance supervisor</li> <li>• STP Operator</li> <li>• EnvMC</li> </ul>
Decommissioning	<ul style="list-style-type: none"> <li>• PP assisted by PM</li> <li>• Decommissioning Contractor (DC)</li> <li>• EnvMC</li> </ul>

### 1.13 EMERGENCY RESPONSE PLAN

- The emergency response plan (ERP) for the Project for each phase is shown in **Table 1.13.1**. The details are in **Chapter 13** of this EMP.

**Table 1.13.1: Emergency Response Plan for each Project Developmental Phase**

Developmental Phase	Emergency Scenarios
Construction	<ul style="list-style-type: none"> <li>• Serious accidents involving injury</li> <li>• Fatal accidents</li> <li>• Fire or explosions</li> <li>• Oil and hazardous materials spills on land and sea</li> <li>• Structure collapse</li> </ul>
Operation	<ul style="list-style-type: none"> <li>• Wastewater overflow</li> <li>• Serious accidents involving injury</li> <li>• Fatal accidents</li> <li>• Fire or explosion</li> </ul>
Decommissioning	<ul style="list-style-type: none"> <li>• Serious accidents involving injury</li> <li>• Fatal accidents</li> <li>• Oil and hazardous materials spills</li> <li>• Structure collapse</li> </ul>

### 1.14 DECOMMISSIONING PLAN OR CLOSURE REPORT

- The decommissioning plan containing the Closure Report will be prepared for submission to NDPCEI as per requirements in the Article 33 of ELL. It will encompass closures due to unforeseen circumstances for the construction and the operational phases. The details of decommissioning are in **Chapter 8** of this EMP.

### 1.15 CAPACITY DEVELOPMENT AND TRAINING

- Training programmes are required to create competency, capability and skills in environmental management throughout Project implementation.
- The training programmes shall include, but not limited to:
  - (i) Briefing on the environmental license and the environmental management process to create awareness.
  - (ii) On-site scheduled wastes management training.
  - (iii) Environmental pollution control.
  - (iv) Environmental management and protection.

### 1.16 PUBLIC CONSULTATION

- Both formal and informal public consultations were carried out from September to October 2016, and January 2017.
- For the formal consultation, a total of 16 group discussions (September to October 2016) and one public workshop on 12 January 2017, were carried out.
- For the informal consultation, a questionnaire survey and informal consultations, were carried out on 12 – 13 October 2016 at 11 settlements located within the 3-km Zone of Impact (ZOI).
- The main concerns from the stakeholders were:
  - (i) Accessibility to the St Paul's Holy House, which is usually used for celebration events.
  - (ii) Impact(s) on air, noise and marine water quality during the construction phase of Project.
  - (iii) Socio-economic issues, e.g. livelihood, job opportunities, etc.
- During the public workshop, the concerns from the stakeholders were:
  - (i) Concerns over the future direction of socio-economic development, when there is an influx of workers who may not share the same culture and history as the locals.
  - (ii) Needed to clarify on water sufficiency for the proposed golf course and public park.
  - (iii) Concerns over electricity demand of the Project.
  - (iv) Suggested all participants involved in the public workshop to form a committee to supervise the Project development.
- All comments/view/issues received from public consultation activities were taken into account in the EIS and EMP Study.
- The questionnaire surveys showed that most of the respondents supported the development on the expectations of income benefits and employment.
- The overall findings showed that the majority of the stakeholders were in favour of the Project development, as it could boost and attract investments as well as

create job opportunities. They recommended that the Project give priority of employment to the local workers, and the training be given to strengthen their working skills.

- They recommended that stakeholders involved in the first public consultation should be invited in all future consultations.
- Public consultation is also recommended during the construction phase as part of the EMP of the Project. It shall focus on the adequacy of the mitigation measures in the development progress.

### 1.17 COMPLAINT AND GRIEVANCE MECHANISM

- Based on the public consultations, a complaint and grievance mechanism (CGM) has been proposed in the EMP. It comprises three tiers of resolutions, to be established by the PP through the environmental management team (EMT).
- The structure of CGM shall consist of members of the EMT, which will chair the CGM with representatives from:
  - (i) Two representatives from the Community Relations Committee (one each from Suco Tibar and Suco Comoro).
  - (ii) One representative from the National Directorate of Pollution Control and Environmental Impact (NDPCEI).
  - (iii) One representative from the Department of Environmental Impact Assessment.
- The details of the CGM for different levels of resolution are provided in **Chapter 17**.

### 1.18 WORK PLAN AND IMPLEMENTATION SCHEDULE

- The work plan and implementation schedule of the pre-construction, construction and operational phases are shown in **Table 1.18.1**. Construction works could overlap.

**Table 1.18.1: Work Plan and Schedule**

Development Phase	Description of Work	Working Period
Pre-construction	<ul style="list-style-type: none"> <li>• Preparation of PD, TOR, EIS and EMP.</li> </ul>	<ul style="list-style-type: none"> <li>• One year.</li> <li>• Detailed work schedule is in <b>Table 18.1.1</b> in <b>Chapter 18: Environmental Work Plan and Implementation Schedule</b>.</li> </ul>

Development Phase	Description of Work	Working Period
Construction	<p><b><u>Work Plan and Implementation</u></b></p> <ul style="list-style-type: none"> <li>• Site preparation.</li> <li>• Land clearing and earthwork.</li> <li>• Structural construction work.</li> <li>• Final furnishing.</li> </ul> <p><b><u>Environmental Monitoring</u></b></p> <ul style="list-style-type: none"> <li>• Soil erosion.</li> <li>• Water quality.</li> <li>• Air quality.</li> <li>• Noise level.</li> <li>• Ecology.</li> <li>• Site inspection.</li> </ul>	<ul style="list-style-type: none"> <li>• A total of six years.</li> <li>• Details of work plan and implementation schedule are shown in <b>Table 18.2.1</b> and environmental monitoring schedule in <b>Tables 18.2.2 (a) to (b) of Chapter 18.</b></li> </ul>
Operation	<p><b><u>Environmental Monitoring</u></b></p> <ul style="list-style-type: none"> <li>• Water quality.</li> <li>• Treated effluent.</li> <li>• Ecology.</li> </ul>	<ul style="list-style-type: none"> <li>• One year.</li> <li>• Detailed environmental monitoring schedule is shown in <b>Table 18.3.1 of Chapter 18.</b></li> </ul>

### 1.19 COST ESTIMATES

- Sufficient budget allocation shall be allocated for undertaking all environmental protection and monitoring works by the PP and the main contractors.

### 1.20 REVIEW OF EMP

- The EMP shall be reviewed by the NDPCEI and the environmental consultants based on the following:
  - (i) Significant environmental incidents that need follow-up actions.
  - (ii) When there is a need to improve performance in an area of environmental impact.
  - (iii) Periodical actions that are needed for longer time frames such as for five years or more.
  - (iv) Environmental quality standards and requirements that have been amended, upgraded and adopted by NDPCEI.
  - (v) Changing of construction methods, design or sites of construction works.
- The details to review the EMP during construction, operational and decommissioning phases can be referred to in **Chapter 20.**

### 1.21 NON-TECHNICAL SUMMARY

- A non-technical summary of the EMP is presented for **Chapters 2 – 20** in simple language to enable non-technical readers to have a clear understanding of the environmental management aspects of this Project (see **Chapter 21: Non-Technical Summary of the EMP**).