

02 TERMS OF REFERENCE

This chapter shall present a summary of the approved Terms of Reference (TOR) for the Project's EIA study. The TOR has been approved by DOE on 23rd May 2016 (Ref. No. JAS 50/013/100/079 Jilid 2(8)) (*Attachment 2*). The whole TOR document can be referred in *Appendix A* of Volume 3: Appendices.

The boundary of the existing environment generally covers within a 5 km radius from the Project area. The environment components to be studied are as follow and will be followed by their respective approach (T2.1).

T2.1 Summary of environmental components to be assessed and their respective approach

Environmental Components	Approach																		
Water Quality	a) The assessment for baseline water quality are as listed in Table 1 and the sampling stations comprise of marine and estuarine waters located within the Project area.																		
	Table 1 Water Quality Parameters																		
	<table border="1"> <thead> <tr> <th>Item</th> <th>Parameters</th> </tr> </thead> <tbody> <tr> <td>Physical</td> <td>Temperature, salinity, pH, conductivity, turbidity, DO, TSS</td> </tr> <tr> <td>Anions</td> <td>Ammoniacal nitrogen, phosphate, nitrate</td> </tr> <tr> <td>Cations/Heavy metals</td> <td>Cr, Cd, Cu, Ni, Fe, Pb, Mn, As</td> </tr> <tr> <td>Organics</td> <td>BOD, TOC, oil and grease</td> </tr> <tr> <td>Microbial</td> <td><i>E. coli</i></td> </tr> <tr> <td>Number of stations</td> <td>Saline water: Twelve (12) Estuarine: Five (5)</td> </tr> <tr> <td>Depths</td> <td>Three depths (surface, middle, bottom)</td> </tr> <tr> <td>Tides</td> <td>Spring and neap (flooding and ebbing)</td> </tr> </tbody> </table>	Item	Parameters	Physical	Temperature, salinity, pH, conductivity, turbidity, DO, TSS	Anions	Ammoniacal nitrogen, phosphate, nitrate	Cations/Heavy metals	Cr, Cd, Cu, Ni, Fe, Pb, Mn, As	Organics	BOD, TOC, oil and grease	Microbial	<i>E. coli</i>	Number of stations	Saline water: Twelve (12) Estuarine: Five (5)	Depths	Three depths (surface, middle, bottom)	Tides	Spring and neap (flooding and ebbing)
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b) The water quality assessment shall address the impacts from dredging and reclamation works and also the operation phase of the Project.																			

T2.1 Summary of environmental components to be assessed and their respective approach (cont'd)

Environmental Components	Approach																								
Sediment Quality	<p>a) 5 sampling stations are selected for the assessment. b) The parameters to be assessed from the sediment samples are listed in Table 2.</p> <p>Table 2 Sediment Quality Parameters</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Parameter</th> <th style="text-align: center;">Units</th> <th style="text-align: center;">Method Used</th> </tr> </thead> <tbody> <tr> <td>Zinc as Zn</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> <tr> <td>Nickel as Ni</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> <tr> <td>Copper as Cu</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> <tr> <td>Chromium as Cr</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> <tr> <td>Lead as Pb</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> <tr> <td>Arsenic as As</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> <tr> <td>Cadmium as Cd</td> <td>mg/kg</td> <td>APHA 3120 B, 1995</td> </tr> </tbody> </table> <p>b) The assessment of the sediment quality is crucial as it represents the final repository of most of the pollutants that enters the water column which also indicate the water quality of the area.</p>	Parameter	Units	Method Used	Zinc as Zn	mg/kg	APHA 3120 B, 1995	Nickel as Ni	mg/kg	APHA 3120 B, 1995	Copper as Cu	mg/kg	APHA 3120 B, 1995	Chromium as Cr	mg/kg	APHA 3120 B, 1995	Lead as Pb	mg/kg	APHA 3120 B, 1995	Arsenic as As	mg/kg	APHA 3120 B, 1995	Cadmium as Cd	mg/kg	APHA 3120 B, 1995
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Air Quality	<p>a) The ambient air to be assessed shall comprise of the following parameters:</p> <p>Table 3 Ambient Air Quality Parameters</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Parameters</th> <th style="text-align: center;">Standard Specifications</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">TSP</td> <td>Determination of Suspended Particulate Matter (TSP) - High Volume Sampler Gravimetric Method (24 hours average)</td> </tr> <tr> <td style="text-align: center;">PM_{2.5}</td> <td>Determination of PM_{2.5} (24 hours average)</td> </tr> <tr> <td style="text-align: center;">PM₁₀</td> <td>Determination of PM₁₀ (24 hours average)</td> </tr> <tr> <td style="text-align: center;">SO₂</td> <td>Determination of SO₂ (24 hours average)</td> </tr> <tr> <td style="text-align: center;">NO₂</td> <td>Determination of NO₂ (1 hour average)</td> </tr> </tbody> </table> <p>b) 3 locations are selected for the air quality sampling. c) The impacts towards air quality shall be addressed during construction phase and operation phase.</p>	Parameters	Standard Specifications	TSP	Determination of Suspended Particulate Matter (TSP) - High Volume Sampler Gravimetric Method (24 hours average)	PM _{2.5}	Determination of PM _{2.5} (24 hours average)	PM ₁₀	Determination of PM ₁₀ (24 hours average)	SO ₂	Determination of SO ₂ (24 hours average)	NO ₂	Determination of NO ₂ (1 hour average)												
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Noise	<p>a) The noise parameters that will be measured are:</p> <ul style="list-style-type: none"> ■ Equivalent Continuous Sound Level (L_{eq}); ■ Statistical Indices (L₁₀, L₅₀ and L₉₀); and ■ Maximum Noise Level (L_{max}). <p>b) 3 sampling stations are selected to monitor the ambient noise and the sampling time should be “continuous day-night sampling”.</p> <p>c) The impacts towards noise shall be addressed during construction phase and operation phase.</p>																								
Hydrology and Drainage	<p>a) The meteorological and climate of the Project site is assessed in terms of the monthly rainfall, temperature, wind, etc. (based on Department of Meteorology data).</p> <p>b) Hydrology includes assessment of backflow, drainage, flooding condition and flood issues (based on Department of Irrigation and Drainage data).</p>																								
Soil Characteristic	<p>a) The existing soil is assessed by conducting field investigations and sampling together with reference to earlier studies and published information.</p> <p>b) Soil investigation (SI) results from the area will be used to describe the subsurface conditions at the areas that will be reclaimed and dredged.</p> <p>c) These information are vital in assessing the geotechnical aspects of the Project and also determine the suitability of the dredged materials to be disposed.</p>																								

T2.1 Summary of environmental components to be assessed and their respective approach (cont'd)

Environmental Components	Approach
Marine Traffic and Navigation	<ul style="list-style-type: none"> a) The existing marine traffic, facilities and structures within the Project site will be described. These include obtaining marine traffic accident statistics (sources include Port Authority, Marine Department and other data sources). b) Marine Traffic Risk Assessment (MTRA) is not part of the study. Navigation simulations shall only be conducted once the final design of the marina on the reclaimed island is completed. c) The impact assessment for marine traffic and navigation safety will be addressed during construction phase and operation phase.
Land Traffic	<ul style="list-style-type: none"> a) A Traffic Impact Assessment (TIA) will be carried out to evaluate the existing traffic flow on the surrounding road network. b) The study will assess the impact of the proposed development onto the existing traffic flow in the vicinity of the Project. The impacts will be addressed in a form of Level of Service (LoS) and traffic flow pattern.
Hydraulic Study	<ul style="list-style-type: none"> a) Hydraulic data will be collected from available data obtained from various agencies or field survey. b) Potential impacts to the coastal environment from the Project will be simulated for existing and “with Project” conditions. c) The impact assessment shall comprise as follow: <ul style="list-style-type: none"> ■ Hydrodynamic; ■ Wave; ■ Erosion and sedimentation; ■ Sediment plume dispersion; ■ Flushing capacity; and ■ Water level.
Marine Flora and Fauna	<p>Assessment of the marine resources at the proposed Project site includes:</p> <ul style="list-style-type: none"> a) Benthic fauna diversity and distribution; b) Plankton (phytoplankton and zooplankton) diversity and density; c) Fish fauna diversity excluding quantitative assessments of stock size and productivity; and d) Marine habitats including coral reef health and status.
Terrestrial Flora and Fauna	<ul style="list-style-type: none"> a) The terrestrial flora to be assessed will comprise of mangroves, coastal vegetation and forests. b) The impacts towards flora species shall be identified during construction and operation phase of the Project. c) The terrestrial fauna will comprise of large mammals, small mammals, bats, birds and herpetofauna. d) The impacts towards flora species shall be identified during construction and operation phase of the Project.
Human Environment	<ul style="list-style-type: none"> a) The aspects of the human environment within the study area include, but are not limited to, the following: <ul style="list-style-type: none"> ■ Settlement pattern; ■ Population distribution; ■ Demography and population dynamics; ■ Population socio-economic profile; and ■ Existing infrastructure, utilities and amenities. b) The socio-economic impacts are identified through perception study using questionnaires, Focus Group Discussions (FGDs) and also public dialogue. c) Both impacts during construction and operation phase will be identified and addressed.
Environmental Economic Valuation (EEV)	<p>The study provides an economic evaluation of the environmental costs and benefits that can be attributable to the project. This is done by the identification and evaluation of the environmental benefits and costs that emanate directly from the physical impacts (whether positive or negative, if any) of the Project.</p>

T2.1 Summary of environmental components to be assessed and their respective approach (cont'd)

Environmental Components	Approach			
Environmentally Sensitive Areas (ESAs)	The list of ESAs in the TOR document is as follow. It is to be noted that these ESAs are based on secondary data and not from actual survey. The final list of ESAs that have been identified during this EIA study is represented in <i>Chapter 6 Section 6.5: Environmentally Sensitive Areas (ESAs)</i> .			
	No.	Type of ESA	Location	Remarks
	1	Forest reserve	Hutan Simpan Bukit Genting	Reclamation and dredging activities have no impact on the identified forest reserves; but nevertheless, described in Chapter 6, Section 6.5.2.3: Permanent Forest Reserves.
	2		Hutan Simpan Bukit Gemuruh	
	3		Hutan Simpan Pasir Panjang	
	4	Turtle landing area	Teluk Kumbar Beach	After conducting the EIA study, more turtle landing areas were identified as elaborated in Chapter 6, Section 6.5.2.2: Turtle Landing Areas.
	5		Teluk Kumbar near Sungai Batu	
	6	Seaweed	Near Tanjung Masari	Field survey found that there is no seaweed found near Tanjung Masari, Tanjung Gertak Sanggul, Teluk Pasir Belanda and anywhere else within 5-km radius from Project boundary.
	7		Near Tanjung Gertak Sanggul	
	8		Near Teluk Pasir Belanda	
	9	Fisherman village	Kampung Batu Maung	This EIA study has identified that there are more fishing villages present. This ESA is elaborated in Chapter 6, Section 6.5.3.1: Fisheries.
	10		Kampung Teluk Tempoyak Kecil	
	11		Kampung Teluk Tempoyak Besar	
	12		Kampung Permatang Damar Laut	
	13		Kampung Sungai Batu	
	14		Kampung Nelayan	
	15		Kampung Gertak Sanggul	
	16	Kampung Pulau Betung	These three (3) islands are further described in Chapter 6, Section 6.5.1.2: Islands.	
	17	Pulau Rimau		
	18	Pulau Kendi		
	19	Pulau Betung	This EIA study found that not only aquacultures are present within the study area, but hatcheries as well. These are further described in Chapter 6, Section 6.5.3.3: Aquacultures and Section 6.5.3.4: Hatcheries. It is also found that there are no aquacultures in Kampung Perlis Zone, Pulau Kendi Zone and Pulau Rimau Zone.	
	20	Aquaculture		Kampung Perlis Zone
	21			Near Sungai Pulau Betung
	22			Pulau Kendi Zone
23	Pulau Rimau Zone			
24	Near Kampung Teluk Tempoyak Kecil			

T2.1 Summary of environmental components to be assessed and their respective approach (cont'd)

Environmental Components	Approach			
Environmentally Sensitive Areas (ESAs)	No.	Type of ESA	Location	Remarks
	25	Coastline condition	Coastline from Tanjung Teluk Tempoyak to Tanjung Gertak Sanggul	Coastline condition or beaches is further described in Chapter 6, Section 6.5.1.1: Beaches.

The mitigating measures of the impacts towards the environmental components in T2.1 will be addressed based on the different stages of the Project.

A framework of the Project's Environmental Management Plan (EMP) will also be proposed. The major components of the EMP are:

- a) Environmental Monitoring Programme;
- b) Emergency Response Plan (ERP);
- c) Environmental Audit; and
- d) Abandonment Plan.