

**ANNEX I**

**TERMS OF REFERENCE**

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AND FORMAT FOR**

AN EIA TO BE PREPARED FOR

SOUTH BEACH CORPORATION LIMITED

FOR A PROPOSED RESIDENTIAL AND TOURISM DEVELOPMENT

**SAN PEDRO, AMBERGRIS CAYE, BELIZE DISTRICT**

This Terms of Reference (TOR) has been prepared following the scoping for the most critical issues that will need to be addressed by the proposed development.

In the preparation of the EIA, the EIA preparers will need to focus on addressing the main areas of concern, such as:

IMPACTS TO:

**WATER RESOURCES, FISHERIES RESOURCES, MANGROVE ECOSYSTEM, ARCHAEOLOGY, AND WILDLIFE.**

POSSIBLE IMPACTS ASSOCIATED WITH:

**THE EXTRACTION OF MATERIALS, GENERATION OF SOLID, HAZARDOUS, LIQUID / SEWAGE WASTE, ENERGY GENERATION, ALTERATION OF MANGROVE HABITAT, TRANSPORTATION, BOAT RELATED ACTIVITIES AND INFRASTRUCTURE AND SOCIO-ECONOMIC FACTORS.**

Scoping of these issues speeds up the EIA process, cuts down its cost, improves the quality of the development, and ensures that environmental concerns are clearly addressed.

This Term of Reference (TOR) is divided into five (5) sections:

**A. PROJECT DESCRIPTION AND PHYSICAL ENVIRONMENT**

This section of the document deals primarily with information pertaining to the background of the project, and the physical environment within which it is proposed.

The EIA will need to address:

**1.0 THE PROJECT DESCRIPTION AND LAYOUT PLAN**

Maps at appropriate scales must be provided and with proper labels and legends to illustrate the general settings of project related development sites as well as surrounding areas likely to be environmentally affected. These maps shall include topographic contours, where available, as well as location of major surface waters, roads, parks or reserves, political boundaries and

existing adjacent land uses of the project area showing geomorphic features (by use of aerial photographs, if available). Additionally the following should be provided:

- 1.01 Give the exact location of the project and provide proof of ownership of the parcel of land comprising the project site. Include a copy of land tenure document. State clearly the acreage of land to be utilized for the tourism development component and subdivision, respectively.
- 1.02 A map of the proposed project site outlining its geographic relationship with marine and terrestrial protected areas, as well as the location of the project site relative to the Belize Barrier Reef.
- 1.03 Provide the following plans:
  - a. The layout plan for the overall development, including siting of all facilities and necessary infrastructure such as the utilities, water treatment facilities, sewage treatment facilities, storage facilities, drainage, administrative buildings, residential/vacation buildings, villas, hotel/casino, existing water ways, power generation, battery/fuel storage facilities, recycling/composting facilities, garbage storage/treatment facilities, pier/docks.
- 1.04 The provision of rationale and justification for the siting of all facilities and infrastructures.
- 1.05 Describe briefly the facilities provided in the plans above (1.03).
- 1.06 Provide specifications for the following (if applicable):
  - a. Collection and disposal systems for solid waste & hazardous waste;
  - b. Sewage collection, liquid waste treatment systems and disposal (including swimming pool, etc.);
  - c. Water source, treatment, storage and distribution systems;
  - d. Residential Subdivision, hotel and casino, villas and related infrastructure
  - e. Existing inland waterways (location, depth, width and design);
  - f. Estimated flushing of the existing inland waterways
- 1.07 Provide outline of the overall management structure anticipated for the proposed development.
- 1.08 Describe the implementation of the project in phases (if applicable). Detail the time-frame of the project in terms of:
  - (a) The total time frame within which the undertaking is to take place, including starting date and conclusion;
  - (b) The various phases of the project, acreage of land each phase shall comprise of and the time-frame within which each phase is to be accomplished;
  - (c) Outlining the duration and time(s) of the day within which developmental activities, such as dredging and filling is to take place

- 1.09 Give detailed information on all water sport activities that will be carried out in the area, if applicable.
- 1.10 Identify any existing features and facilities and potential impacts and/or integration of these into the proposed development, if applicable.

## **2.0 THE PHYSICAL ENVIRONMENT**

- 2.01 Provide details of the basic physical environment of the project site and zone of influence. This should include: -
- Topography: including degree of slopes, elevation, drainage patterns around project site, and flood hazard and the effects of rainfall averages on these conditions;
  - Provide information on current flow patterns;
  - Climate, hydrology and meteorology: Include the rainfall average per year, prevailing wind patterns and susceptibility to natural disasters (i.e. hurricanes, tropical storms and flooding);
  - Geology:
    - (a) Geomorphology — detailed description of the characteristics of landform, land surface including exposed rock types, types of unconsolidated materials exposed (sediments), ridges, and geological structures — faults, folds, if they can be determined by field mapping.
    - (b) Subsurface geology; detailed description of the stratigraphy of the rocks or unconsolidated materials, within the project site. This must be done by core sampling (mechanical or manual) using a pre-determined borehole grid. Cross sections of the rock types or unconsolidated materials should also be presented.
    - (c) Conduct geo-technical studies of the area, identifying the depth of bedrock and the engineering properties of the rocks and/or unconsolidated materials. Tests should also include soil permeability and soil bearing capacity to determine the suitability for the proposed development.
  - Current land use of project site and adjacent properties;
  - Physical, biological and ecological description of surrounding receiving water bodies including creeks, lagoons and sea front and relation to protected areas or marine reserves within the zone of influence;
  - Vegetation types.
- 2.02 Determine the projected number of building to be constructed, including residential dwellings, hotels, condominiums, villas, or other similar complexes;
- 2.03 Provide technical justification for the number of buildings, number of persons residing and visiting the project site/resort. This should be in such a way as to determine the physical carrying capacity of the area.

### **3.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

- 3.01 Describe the pertinent regulations, standards and policies, at the local and national levels, governing environmental quality, health and safety and protection of sensitive areas. These could include cultural resources, protection of endangered or threatened species, siting, infrastructure development, land use policy and tourism policy that may have an impact on the proposed development. Provide and discuss any policy, legal or administrative issues as they may relate to the proposed development.

## **B. ENVIRONMENTAL ISSUES**

This section of the document primarily targets the environmental issues of critical concerns based on information provided in section A.

Provide maps of the terrestrial habitats at 1:25,000 or as detailed as possible, including streams, lagoons, rivers, slopes, natural drains, etc. This should incorporate clear indicators of percent cover and habitat composition and health.

The following are the critical issues a high quality EIA will need to address for the development proposed.

### **1.0 FLORA AND FAUNA**

For the project site and the zone of influence:

- 1.01 Conduct a field survey on the terrestrial and aquatic fauna and flora; rare or endangered species or commercially valuable species within or in areas adjacent to the project site; with special emphasis on sensitive habitats such as mangrove ecosystems, national parks or reserves within or adjacent to the project site, effluent receiving water bodies and immediate areas to be used for recreational activities. This should provide a baseline from which to detect any changes in the diversity, abundance and vigour of the species due to this development.
- 1.02 Provide a general description of the methodology used to collect baseline data; this is to include the data, time, area surveyed and methods used.
- 1.03 Estimate and provide maps of the acreage and type of vegetation within the development site designated for removal and percent to be removed, taking into consideration the establishment of appropriate buffer zones along all permanent water bodies on site.
- 1.04 Identify any species (flora, fauna, aquatic and terrestrial) of conservation significance, threatened and endangered species, (such as manatees, crocodiles, turtles, etc.), and specify detailed measures for their protection, which may include the establishment of reserves within the project site.

- 1.05 Highlight, where appropriate, measures that could be taken to enhance the habitat value of the project area.

## **2.0 WATER RESOURCES**

- 2.01 Establish a base line on the water resources of the entire project area. This base line should include water quality assessment of the ground water, specifying the depths and surface waters of the project site and zone of influence. This data should be collected at appropriate intervals to establish any seasonal variation in the water quality between dry and rainy season. The base line should include, at a minimum, the following parameters:
- |       |                            |   |
|-------|----------------------------|---|
| i.    |                            | Temperature;  |
|       |                            | vii. Dissolved oxygen (surface & below surface, a.m. & p.m) |
| ii.   | Biological Oxygen Demand;  | viii. PH;   |
| iii.  | Total suspended solids;    | ix. Sulphates;  |
| iv.   | Total dissolved solids;    | x. Hardness;  |
| v.    | Total Nitrate (as N03- N); | xi. Total Phosphate;  |
| vi.   | Salinity                   | xii. Conductivity   |
| xiii. | Fecal coliform             | x1v. Total coliform   |
- 2.02 Determine the projected water needs for the entire development; including drinking water (potable) supplies, supply to household appliances, pools, irrigation of lawns and other uses.
- 2.03 Assess all potential sources of water supply, quality and quantity, paying special attention to determining the sustainable yield it can provide.
- 2.04 Given the results from above, evaluate the alternative options for the provision of water supply for the entire development.
- 2.05 Identify and evaluate the preferred option for water supply, based on environmental grounds. Where the recommended water supply source is ground water, a proper pump test of the aquifer must be completed. Specify any residual impacts of meeting water needs through this option, their significance, and any mitigatory measures to be undertaken.
- 2.06 Provide an inventory of other users in the zone of influence with respect to the selected water supply source and identify any impacts thereon and mitigation measures to be undertaken.
- 2.07 Identify and develop a water quality monitoring programme able to detect any change in ground water or surface water quality, or the water quality of the proposed effluent receiving water body (if any) that could impact:
- o Public health
  - o Forest, wetland and adjacent aquatic habitats; and
  - o Endangered or threatened species in project area and zone of influence

### **3.0 LIQUID / SEWAGE WASTE**

- 3.01 Determine the nature and volumes of liquid waste, including concentrated brine, sewage and grey water, to be generated by the entire project.
- 3.02 Evaluate a minimum of three alternatives options for the collection, treatment, recycling (if appropriate), and a minimum of three options for disposal of these liquid wastes. Be sure to identify all chemicals planned for use in the treatment or management of these wastes.
- 3.03 Identify the preferred option/s for liquid waste management, based on environmental grounds, including necessary infrastructure and land requirements. Specify any residual impacts of liquid waste management, their significance, and any mitigation measures to be undertaken.
- 3.04 Give a detailed description of the physical and chemical characteristics and profile of the landform to be used for any treatment facility.
- 3.05 Identify preferred option for surface drainage system for project area including drains, sedimentation structures and settling/ run off ponds

### **4.0 SOLID WASTE GENERATION**

- 4.01 Determine the projected types and volumes of solid waste to be produced by the entire development. This should examine (at least) oil, tyres, plastics, metals, putrescible wastes, batteries/hazardous materials and construction waste. It will also need to include solid waste from boats and other transportation vehicles. If composting of organic waste is to be conducted, provide specifications on the volumes, location of the site and procedures to be followed for the composting.
- 4.02 Evaluate at least two alternative options, including the appropriate mitigation measures and management plans for the collection, transportation, treatment and disposal of this waste.
- 4.03 Select the preferred option/s for disposal of these materials. Again, this should be based on environmental grounds, and should specify any residual impacts, their significance and the mitigatory measures, which are to be undertaken.
- 4.04 Assess the ability of the community or local government to provide the necessary infrastructure, resources and management for the collection, storage, treatment and final disposal of solid waste generated by the project should the EIA recommend the use of an existing landfill; and provide appropriate recommendations for these in the event that they are inadequate.

### **5.0 GEOLOGY, EXTRACTION OF MATERIALS AND ITS POSSIBLE EFFECTS ON THE COASTLINE**

- 5.01 Provide information on the specific soil type and submit results of analysis carried out to determine soil permeability/profile of at least three bores sites in the

proposed project area.

- 5.02 Determine the type and volume of construction materials required for the entire development.
- 5.03 Determine the sources, volumes, extraction methods and transportation of the materials and identify:
  - 5.04.1 direct and indirect biological impacts;
  - 5.04.2 direct and indirect physical impacts, specifically flooding;
  - 5.04.3 impact on water resources;
  - 5.04.4 direct impact on fisheries resources (if applicable)
  - 5.04.5 impact on the Belize Barrier Reef Complex
  - 5.04.6 specific mitigation measures
- 5.04 Evaluate the potential impacts of dredging/excavation on flora, fauna (aquatic and terrestrial) and human beings including information on sub-tidal habitats such as sea grass beds and surrounding environments and the necessary mitigation measures to address said impacts.
- 5.05 Identify the preferred option for the extraction methods, source, and transportation of materials, specifying the necessary mitigation measures, their residual impacts and significance (if applicable.)
- 5.06 Consult with the Geology and Petroleum Department over fulfilling requirements for a quarry/mining license, which will be required before any dredging/mining commences (if applicable.)

## **6.0**

### **POSSIBLE IMPACTS FROM TRANSPORTATION AND CONSTRUCTION**

#### **6.1 Roads/Walkways**

6.1.0 Provide a detailed description of the physical environment to be affected by the construction of the feeder roads and existing interior waterway, including:

- (a) A description of the marine environment to be impacted by the proposed activity, including depths, hydrographic profiles, water quality parameters including dissolved oxygen, macro-nutrients and heavy metals, sediment characteristics including origin, distribution and composition, and meteorological and physical oceanographic features including wind speed and direction, and wave height and current direction;
- (b) A detailed description of the marine flora and fauna in the vicinity of the dredging site, including seagrass (es), and corals as well as fin-fishes, marine mammals, reptiles, seabirds and macro-invertebrates, particularly those of commercial importance;

(c) Outline specific impacts (positive or negative) to marine and aquatic environment identifying specific mitigation measures for the negative impacts identified.

- 6.1.1 Provide an inventory of the activities associated with the project area(s), including terrestrial and aquatic activities (if any.)
- 6.1.2 Evaluate options for the provision of suitable roads/walkways (if any) for the development, taking into account proper access to lots, waterways etc.
- 6.1.3 Provide justification(s) for the construction of the feeder roads and interior waterway components of the proposed project, including possible alternatives.
- 6.1.4 Select preferred option for the provision of suitable roads/walkways for the development. This will need to examine construction materials (types, sources, volumes, transportation) and methods in relation to their environmental impacts.
- 6.1.5 Identify any changes in drainage patterns, as well as preferred option for surface drainage system for the project area, including drains, culverts, bridges and sedimentation structures.
- 6.1.6 Recommend precise mitigation measures, based on the specific option selected, for the proper management of the vehicular/boat traffic close to and within the project area. These mitigation measures must include recommendations for protection features against siltation, erosion, and other potential pollution to the environment.

## **6.2 IMPACTS ASSOCIATED WITH MARINE TRANSPORTATION**

- 6.2.1 Determine the projected number of boats slips and number and types of boats likely to be associated with the entire development.
- 6.2.2 Evaluate the options for storage of water borne vessels, (if applicable). This will require examination of:
  - i. Dredging requirements/volume of materials to be dredged;
  - ii. Disposal/use of dredged materials;
  - iii. Physical character of materials to be dredged;
  - iv. Benthic substrate
  - v. Type of dredging equipment;
  - vi. Need for shoreline protection;
  - vii. Near shore and off shore current patterns;
  - viii. Near shore and off shore sedimentation patterns;

- ix. Wind conditions;
- x. Wave conditions;
- xi. Transportation of construction materials;
- xii. Methods of controlling sedimentation from dredging activities.
- xiii. Requirement for maintenance dredging (frequency & volume);
- xiv. Possible contamination of water resources from boat related activities.

- 6.2.3 Evaluate options for the construction of beach protection structures/devices and identify the preferred option (if applicable).
- 6.2.4 Provide bathymetry on the area to be dredged in particular the waterways.
- 6.2.5 Determine the need for mining and impacts associated with the construction of the docking facility (if any).
- 6.2.6 Recommend precise mitigation measures, based on the specific option selected, for the proper management of the vehicular/boat traffic close to and within the project area. These mitigation measures must include recommendations for protection features against siltation, erosion, and other potential pollution to the environment.
- 6.2.7 Provide details on the use of navigational aids within the project area, especially for human safety, the protection of marine life and the prevention of erosion of the coast and inland waterways.

## **7.0 ENERGY GENERATION**

- 7.01 Determine the projected energy requirement for the entire development.
- 7.02 Evaluate a minimum of three alternative options for meeting these needs, using fossil fuel, solar, wind resources (and others if appropriate). For each of these options, it will be necessary to investigate:
  - 7.02.1 fuel sourcing and storage (where relevant);
  - 7.02.2 transportation (where relevant);
  - 7.02.3 health and safety;
  - 7.02.4 pollution sources, volumes, and types;
  - 7.02.5 significance of any pollution that may result from energy generation; and
  - 7.02.6 mitigatory measures

It will be necessary to divide examination of energy provision into construction, operation, and maintenance phases.

- 7.03 Select the preferred option for energy generation. Again, this should be based on

environmental grounds, and should specify the residual impacts of generation of the preferred option, their significance and the mitigatory measures, which will be undertaken.

## **8.0 SOCIAL FACTORS**

- 8.01 Conduct a study to determine the potential social impacts of the proposed development taking into account factors such as:
- a. Traditional resource users within the project area and zone of influence;
  - b. Population (present and projected, resident & seasonal);
  - c. Labour;
  - d. Integration;
  - e. Customs & culture;
  - f. Displacement and resettlement (if any);
- 8.02 An analysis of the requirements of areas for public services should be incorporated into this study. Issues such as the following should be addressed;
- i. Fire protection;
  - ii. Security services;
  - iii. Educational institutions;
  - iv. Recreational centres;
  - v. Medical emergency services/evacuation
- 8.03 Also an analysis of Labor;- employment opportunities; and provision of basic health care and hygiene, the provision of recreational spaces, sanitary facilities and accommodations/transportation for all workers, during construction and operation of the project.

## **9.0 ARCHAEOLOGY**

- 9.01 Consult with the Institute of Archaeology in fulfilling all requirements as it pertains to any archaeological and/or historical significance of any features located within the project area.
- 9.02 Subsequent to the consultation with the Institute of Archaeology, provide a copy of the permit/license/recommendation from the Institute of Archaeology within the document.

## **10.0 NGO AND PUBLIC INTEREST**

- 10.01 Conduct consultations with different stakeholders i.e. local NGO's, public interest groups and relevant government departments/agencies regarding the proposed project.
- 10.02 The EIA team will report on the views and concerns of local NGOs, public interest groups and relevant government departments/agencies regarding the

development of the project.

- 10.03 Provide a copy of the question/answers used for the report including the name and organization.

## **11.0 DISASTER MANAGEMENT AND CLIMATE CHANGE ISSUES**

- 11.01 Identify emergency preparation, response and applicable management measures for the proposed development (e.g. hurricane, floods, fires etc.). This should include evacuation and hazard management plans inclusive of climate change adaptation measures (such as sea level rise and structural/building design conducive with the climatic conditions of project site). This should include the number of emergency vehicle needed for the development.

### **C. ISSUES PERTAINING TO THE DIFFERENT DEVELOPMENT COMPONENTS**

This section has been developed to ensure that issues pertaining to each individual component of the proposed development are adequately addressed:

#### **1.0 TOURISM COMPONENT (HOTEL, CONDOMINIUMS, VILLAS, TOWN HOMES)**

- 1.01 Determine the projected number of buildings to be constructed, including hotels, condominiums, beach clubs, casino, or other similar complexes.
- 1.01 Provide a layout of all complexes and other infrastructure to be built; the proximity to each other should be shown. This should include the location of the pier(s).
- 1.02 Provide technical justification for the identified number of buildings and number of persons residing and visiting the project site/resort. This information will be used to determine the physical carrying capacity requirement of the area, which is to be included in the EIA report.
- 1.03 Project the volume of fresh water for the overall tourism component and indicate its proposed source.
- 1.04 Provide a detailed waste management plan (solid and liquid) for the tourism component of the project.
- 1.05 Indicate the energy source to be used.

#### **2.0 SUBDIVISION COMPONENT**

- 2.01 Indicate the acreage of the parcel of land to be subdivided, and the proposed size (surface area) of the individual lots. Provide all relevant subdivision plans, drawn to scale and identifying setbacks from any water body.
- 2.02 Indicate requirements for filling, if applicable.

## **D. POTENTIAL CUMULATIVE IMPACTS**

- 1.0 Identify all potential cumulative impacts and significant changes that may result from the implementation of this overall project. This should include, but not be limited to, changes in the following:
  - i. Water Quality of the area;
  - ii. Current patterns and hydrographic characteristics;
  - iii. Land Use pattern;
  - iv. Boat Traffic;
  - v. Infrastructure;
  - vi. Employment opportunities;
  - vii. Socio-cultural environment; and
  - viii. Abundance of flora and fauna;
  - ix. Possible effects on the Belize Barrier Reef.
- 2.0 The above analysis should distinguish between significant positive and negative impacts; direct and indirect impacts; immediate, medium and long-term impacts, irreversible or unavoidable impacts and identify impacts that may result from accidental events (i.e. oil/fuel spills, accidental release of untreated wastewater/ effluent, etc.). This analysis should be divided into construction, operational and maintenance activities / phases.
- 3.0 Characterize the extent and quality of available data, explaining significant information deficiencies (gaps) and uncertainties associated with the prediction of such potential impacts.

## **E. CONCLUSIONS/RECOMMENDATIONS**

This section proposes alternatives to the execution of the project based on the information generated by Section B, C, and D.

### **1.0 ALTERNATIVES FOR DEVELOPMENT**

Present all reasonable alternatives for development, including the no-action alternative, in comparative form, exploring each alternative. Alternatives to the development shall be examined with some orientation in regards to the merit(s) and demerit(s) of the various possible options, as well as justifying and confirming the utility of the preferred option. This should include a presentation of all reasonable alternatives in comparative form, including the no-action alternative. These alternatives should look at the following components:

- a. Siting of the necessary support infrastructure and all facilities including feeder roads, and interior waterway;
- b. Water supply alternatives (examine the different abstraction points investigated);
- c. Liquid and Solid waste treatment and disposal options (evaluate the different treatment technologies and methodologies);

2.0.

**MITIGATION AND MONITORING PLAN**

- 2.01 Based on the investigations, research and tests conducted; develop a Mitigation Matrix outlining Mitigation Measures for all potential negative environmental impacts. This should include:
- (a) The monitoring of water quality parameters as well as the monitoring of waste water discharge characteristics, water abstraction levels and changes in ecological species (including endangered species);
  - (b) The monitoring of the physical aspects of the dredging operation itself and the land reclamation aspects of the project;
  - (c) The monitoring of ecosystem recovery, including the re-colonization of flora and fauna, in particular fin-fish and macro-invertebrate life.
- 3.02 Provide a Monitoring Plan to be implemented for the entire project. This should include the monitoring of key environmental indicators (flora or fauna), wastewater discharge characteristics (if any), water abstraction levels, and changes in ecological species (including endangered species).
- 3.03 Characterize the extent and quality of available data, explaining significant information deficiencies and any uncertainties associated with the prediction of such impacts.