

# ***ENVIRONMENTAL IMPACT ASSESSMENT***

***FOR***

## ***HUGH PARKEY'S BELIZE ADVENTURE ISLAND (FORMERLY SPANISH BAY RESORT)***

**A PROPOSED TOURISM EXPANSION PROJECT  
FOR SPANISH LOOKOUT CAYE**



**Belize District, Belize, C.A.**



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## TABLE OF CONTENTS

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<i>List of Annexes</i>	<i>vi</i>
<i>List of Tables</i>	<i>vii</i>
<i>List of Figures</i>	<i>ix</i>
<i>List of Plates</i>	<i>xi</i>
<i>Glossary of Terms</i>	<i>xi</i>
<i>Glossary of Acronyms</i>	<i>xv</i>
<i>Placement Notes</i>	<i>xvii</i>
<i>Executive Summary</i>	<i>xviii</i>

### **Section 1 Project Description**

1.1	Project Location	1-1
1.2	Existing Development	1-3
1.2.1	Physical Plan	1-4
1.2.2	Existing Buildings	1-4
1.2.3	Recreational Infrastructure	1-4
1.2.4	Service Infrastructure	1-5
1.2.5	Existing Reclaimed Areas	1-8
1.3	Project Rationale	1-8
1.4	Overview of Proposed Expansion Project	1-9
1.4.1	Physical Development Plans and Layout	1-9
1.4.2	Detailed Development	1-10
1.5	Project Development	1-19
1.5.1	Project Implementation	1-19
1.5.2	Specifications for the Facilities and Forecast of Activities	1-21
1.5.3	Overall Management Structure	1-21

### **Section 2 Project Environment**

2.1	Physical Environment	2-1
2.1.1	Meteorology	2-1
2.1.2	Oceanography	2-1
2.1.2.1	Hydrographic Profile	2-1
2.1.2.2	Winds and Waves	2-4
2.1.2.3	Tides	2-4
2.1.2.4	Currents	2-4
2.1.2.5	Bathymetry	2-5
2.1.2.6	Water Quality	2-5
2.1.2.7	Zone of Influence	2-7
2.1.3	Geology	2-8
2.1.3.1	Geomorphology and Sub-surface Geology	2-8
2.1.3.2	Geological History	2-9
2.1.3.3	Seismology	2-9

2.1.3.4	Soils	2-13
2.1.3.5	Extraction of Materials	2-14
2.1.4	Land Use	2-20
2.1.4.1	Land Use of Project Site	2-20
2.1.4.2	Land Use of Surrounding Area	2-21
2.2	Bio-physical Environment	2-23
2.2.1	Flora	2-23
2.2.2	Fauna	2-25
2.2.2.1	Invertebrates	2-25
2.2.2.2	Vertebrates	2-25
2.2.3	Conservation Issues	2-29
2.2.3.1	Endangered Species of Special Significance	2-29
2.2.3.2	Conservation Areas	2-30
2.2.4	Marine Protected Areas	2-30
2.3	Social Environment	2-31
2.3.1	Social Infrastructure and Services	2-31
2.3.2	Traditional User Activities and Tenure	2-32
2.3.3	Tourism Activities in the Region	2-33
2.3.4	Tourism Activities in the Area	2-33
2.3.5	Transportation	2-34
2.4	Archeological Environment	2-35
2.4.1	Project Description	2-36
2.4.2	Literature Review	2-38
2.4.3	Description of the Area	2-39
2.4.4	Methodology	2-42
2.4.5	Results of Survey	2-43
2.4.6	Recommendation	2-43
2.5	Legal and Policy Setting	2-45
2.5.1	Environmental Protection Legislation	2-45
2.5.1.1	The Environmental Protection Act SI 22/1992 and 328/2003	2-45
2.5.1.2	Environmental Impact Assessment Regulations SI 107/1995 and 25/2007	2-46
2.5.1.3	Effluent Limitation Regulations SI 94/1995	2-47
2.5.1.4	Pollution Regulations SI 56/1996	2-47
2.5.2	Coastal Zone Management Strategy Chap. 329 2000 Revised Edition	2-47
2.5.3	Cayes Development Policy – CZMIA/FD 1995	2-48
2.5.4	Solid Waste Management Authority Act SI 224 of 2003	2-48
2.5.5	National Institute of Culture and History 330/2000	2-48
2.5.6	Belize Water Industry Act No. 1 of 2001	2-48
2.5.7	Belize Public Health Act Revised Edition SI 40/2000	2-49
2.5.8	National Lands Act (No. 6 of 1992) and SI 191 of 2000	2-49
2.5.9	Crown Land Rules SI 60 of 1939	2-49
2.5.10	Mines and Minerals Act Chap. 226 of 2000	2-49
2.5.11	Forests (Mangrove Protection) Regulations, SI No. 52 of 1989	2-49
2.5.12	The Forest Act SI 213/2000	2-50
2.5.13	Belize Tourist Board Act SI 275 of 2000	2-50
2.5.14	Hotels and Tourist Accommodation Act SI 285/2000	2-50
2.5.15	Protected Areas Conservation Trust Act (PACT) Chap. 218/2000	2-51
2.5.16	Customs and Excise Duties Act Revised Edition SI 48 of 2000	2-51
2.5.17	Civil Aviation Act	2-51
2.5.18	International Conventions and Agreements	2-51

### **Section 3 Details of Supporting Services**

3.1	Introduction	3-1
3.2	Water Resources	3-1
3.2.1	Occupancy	3-1
3.2.2	Potable Water Demand	3-2
3.2.3	Water Sources	3-4
3.2.4	Source Supply Description	3-5
3.2.5	Water Treatment Methods	3-7
3.2.6	Water Conservation	3-9
3.3	Wastewater Management	3-10
3.3.1	Projected Wastewater Composition	3-10
3.3.2	Wastewater Production	3-10
3.3.3	Environmental Wastewater Load	3-12
3.3.4	National Effluent Standards	3-13
3.3.5	Wastewater Collection and Treatment	3-14
3.3.6	Wastewater Management	3-15
3.3.7	Wastewater Disposal	3-17
3.4	Solid Waste Management	3-18
3.4.1	Introduction	3-18
3.4.2	Waste Types	3-18
3.4.3	Construction and Field Waste	3-19
3.4.4	Domestic Solid Waste Generation	3-20
3.4.5	International Waste	3-21
3.4.6	Commercial Waste	3-21
3.4.7	Solid Waste Disposal Alternatives	3-23
3.4.8	Typical Solid Waste Management Plan	3-22
3.5	Energy Generation	3-25
3.5.1	Energy Demand	3-25
3.5.2	Energy Supply Sources	3-26
3.5.3	Power Transmission Lines	3-28
3.5.4	Fuel Management	3-28
3.6	Transportation	3-32
3.6.1	Board walks and Walk ways	3-32
3.6.2	Helipad	3-33
3.6.3	Drainage	3-36
3.6.4	Marina Component	3-36
3.6.5	Shoreline Protection	3-39
3.6.6	Transportation of Materials	3-42
3.7	Carrying Capacity	3-42
3.7.1	Coastal Planning	3-42
3.7.2	Physical Development Plans and Layout	3-43
3.7.3	Justification of the Development Plans	3-46
3.7.4	Carrying Capacity	3-46

### **Section 4 Development Alternative**

4.1	Introduction	4-1
4.2	The 'No Action Alternative'	4-1
4.3	Technical and Economic Analysis	4-2
4.4	Conceptual Strategy for Alternative Analysis	4-2

4.4.1	Potable Water Alternatives	4-2
4.4.2	Wastewater Treatment Alternatives	4-4
4.4.3	Solid Waste Disposal Alternatives	4-6
4.4.4	Energy Generation Alternatives	4-7
4.4.5	Siting and Placement	4-8
4.4.6	Dredging and Land Reclamation	4-10
4.4.7	Marina Development Alternatives	4-12
4.4.8	Ecological Development Alternatives	4-12
4.5	Conclusion	4-13

## **Section 5 Environmental Impact Analysis**

5.1	Introduction	5.1
5.1.1	Conceptual Approach	5-1
5.1.2	Environmental Principles in Impact Analysis	5-1
5.2	Overview of Proposed Cumulative Impacts	5-2
5.2.1	Impact Rating Matrix	5-3
5.2.2	Overview of Environmental Impacts	5-5
5.3	Details of Environmental Impacts	5-6
5.3.1	Dredging Impacts	5-6
5.3.2	Land Reclamation Impacts	5-8
5.3.3	Domestic Effluent Impacts	5-8
5.3.4	Potable Water Impacts	5-9
5.3.5	Solid Waste Impacts	5-9
5.3.6	Energy Generation Impacts	5-10
5.3.7	Impacts from the Building Construction	5-10
5.3.8	Boardwalk Impacts	5-11
5.3.9	Heliport Impacts	5-12
5.3.10	Impacts of Kayak Trail and Kayaking Activities	5-12
5.3.11	Boating and Marina Impacts	5-12
5.3.12	Social Impacts	5-12
5.4	Indirect Impacts	5-14
5.4.1	Impact on Fishing Activities	5-14
5.4.2	Impacts on Tourism Activities	5-15
5.4.3	Other Related Impacts	5-15

## **Section 6 Environmental Management System**

6.1	Introduction	6-1
6.2	Benefits	6-1
6.2.1	Financial	6-2
6.2.2	Operational and Internal	6-2
6.2.3	External	6-2
6.2.4	Benefits of third party verification	6-2
6.3	Impact Mitigation Measures	6-2
6.3.1	Mitigation Measures In Relation To Dredging and Land Reclamation Activities	6-3
6.3.2	Mitigation Measures in Relation to Domestic Effluent Impacts	6-6
6.3.3	Mitigation Measures in Relation to Solid Waste Management	6-9
6.3.4	Mitigation Measures in Relation to Energy Generation	6-11

6.3.5	Mitigation Measures In Relation To Socio-Economic Concerns	6-14
6.3.6	Other related Impacts	6-19
6.4	Environmental Monitoring Plan	6-21
6.4.1	Purpose of Environmental Monitoring	6-21
6.4.2	Principles Underpinning Environmental Monitoring	6-22
6.5	Specific Monitoring Plan	6-22
6.5.1	Surface Water Quality Monitoring Program	6-23
6.5.2	Wastewater Monitoring Program	6-25
6.5.3	Solid Waste Monitoring Plan	6-26
6.5.4	Biodiversity Monitoring Program	6-27
6.5.5	Social Monitoring	6-29
6.5.6	Other Monitoring Plans	6-30
6.6	Disaster and Contingency Management Framework	6-31
6.6.1	Administrative Framework	6-32
6.6.2	Hurricane Preparedness Plan (Evacuation Plan)	6-32
6.6.2.1	Purpose of Plan	6-33
6.6.2.2	Storm Information System	6-33
6.6.2.3	Action Plan	6-33
6.6.2.4	Safety Precautions	6-35
6.6.3	Fire Prevention and Response Plan	6-36
6.6.3.1	Purpose of Plan	6-36
6.6.3.2	Fire Prevention	6-36
6.6.3.3	Fire Protection Equipment/Systems	6-37
6.6.3.4	Fire Response	6-37
6.6.4	Spill Contingency Plan	6-38
6.6.4.1	Purpose of Plan	6-38
6.6.4.2	Response Policy	6-38
6.6.4.3	Fuel Management	6-39
6.6.4.4	Waste Oil Management	6-39
6.6.4.5	Contingency Equipment	6-40
6.6.5	Tidal Rise Contingency Plan	6-40
6.6.5.1	Purpose of the Plan	6-40
6.6.5.2	Adapting to Sea Level Rise	6-40
6.6.5.3	Climate Change Affects	6-41
6.6.6	Medical Emergency Plan	6-41
6.6.6.1	Purpose of the Plan	6-42
6.6.6.2	Basic First Aid	6-42
6.6.6.3	Transportation (Evacuation) of Patient	6-42
6.6.6.4	Contact Information	6-42
6.6.7	Environmental Safety	6-43
6.7	Conclusion	6-45
7.0	References	6-46

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## LIST OF ANNEXES

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- Annex I – Terms of Reference
- Annex II – EIA Preparers
- Annex III – Deed of Conveyance
- Annex IV – Water Quality
- Annex V – Seismic Code Evaluation
- Annex VI – Wind Code Evaluation
- Annex VII – Soil Investigation Report
- Annex VIII – BESST
- Annex IX – Earth Tub Composting Technology
- Annex X – Sheet Pile Specification

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## LIST OF TABLES

---

Table 1.1:	Planned Expansion Project	1-11
Table 1.2:	Proposed Expansion Project Developments	1-20
Table 2.1:	Anticipated Dredging Volumes for the Proposed Project	2-15
Table 2.2:	List of Birds Identified on Spanish Lookout Caye	2-27
Table 2.3:	Licenses and Permits required by the Development	2-53
Table 3.1:	Daily Occupancy for Hugh Parkey’s Belize Adventure Island Expansion	3-1
Table 3.2:	Projected Water Demand for the Expansion Phase	3-3
Table 3.3:	Projected Water demand According to Zones	3-4
Table 3.4:	Water Source Options	3-4
Table 3.5:	Water Volumes for Various Options Analyzed	3-7
Table 3.6:	Typical Composition of Untreated Domestic Sewage*	3-10
Table 3.7:	Projected Wastewater Productions for Hugh Parkey’s Belize Adventure Island	3-11
Table 3.8:	Wastewater generated by marine vessels	3-12
Table 3.9:	Environmental Wastewater Loading Profile	3-13
Table 3.10:	Effluent Limitation Standard for Commercial Activities	3-13
Table 3.11:	Projected Performance of BESST Treatment Plant and its equivalent	3-15
Table 3.12:	Wastewater Alternative Uses	3-17
Table 3.13:	Projected Solid Waste Production volumes by Zones for HP Belize Adventure Island	3-20
Table 3.14:	International waste generated by marine vessels	3-21
Table 3.15:	Waste Reduction Yield for HP Belize Adventure Island	3-24
Table 3.16:	Projected Energy Demand for HP Belize Adventure Island	3-25
Table 3.17:	Selection of Sources for HP Belize Adventure Island	3-28
Table 4.1:	Summary of Alternative Potable Water Sources	4-4
Table 4.2:	Generic Evaluation of Wastewater Disposal Alternatives	4-5
Table 4.3:	Domestic Waste Disposal Option	4-6
Table 4.4:	Alternative Analysis for Energy Generation	4-7
Table 4.5:	Options for Development	4-8
Table 4.6:	Land Reclamation Activities	4-11
Table 4.7:	Marina Development	4-12
Table 4.8:	Ecological Alternatives	4-13
Table 5.1:	Impact Rating Matrix for Hugh Parkey’s Belize Resort	5-4
Table 6.1:	Mitigation Responses in relation to Dredging Impacts	6-4
Table 6.2:	Summary of impacts associated with human wastes and domestic effluents	6-7
Table 6.3:	Mitigation Measures in Relation to Solid Wastes	6-10
Table 6.4:	Mitigation Measures in relation to Energy Generation	6-12
Table 6.5:	Mitigations In Relation to Socio-Economic Concerns	6-15

Table 6.6:	Mitigation Measures in Relation to Other Impacts	6-19
Table 6.7:	Monitoring Plan for Surface Waters	6-23
Table 6.8:	Wastewater Monitoring Template	6-25
Table 6.9:	Parameters for Solid Waste Monitoring	6-26
Table 6.10:	Proposed Biodiversity Monitoring Plan	6-28
Table 6.11:	Social Monitoring Issues	6-29
Table 6.12:	Proposed Monitoring Plan Hugh Parkey's Belize Adventure Island	6-30
Table 6.13:	DMCP for Hugh Parkey's Belize Adventure Island Resort	6-31
Table 6.14:	NEMO Warning Flag System	6-33
Table 6.15:	NEMO Hurricane Categories	6-33
Table 6.16:	Marine Spills Levels	6-38
Table 6.17:	Inland Spill Level	6-39
Table 6.18:	Hugh Parkey's Belize Adventure Island Emergency Services	6-43

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## LIST OF FIGURES

---

Fig. 1.1:	General Location of Project Site	1-1
Fig. 1.2:	Detailed Map of Project Site	1-2
Fig. 1.3:	Exiting Developments on Spanish Lookout Caye	1-7
Fig. 1.4:	North Island and West Beach Expansion	1-14
Fig. 1.5:	East Side Expansion	1-15
Fig. 1.6:	South Island Expansion	1-16
Fig. 1.7:	Overwater Cabañas for East Side Development	1-17
Fig. 1.8:	Management Structure for Hugh Parkey Foundation	1-22
Fig. 1.9:	Management Structure for Belize Dive Connection	1-23
Fig. 2.1:	Rainfall Isoleth Map of Project Site	2-2
Fig. 2.2:	Hydrographic Profile of the Expansion Project	2-3
Fig. 2.3:	Water Sampling Points for Expansion Project	2-6
Fig. 2.4:	Geological Fault Map of Belize	2-11
Fig. 2.5:	Seismic Intensity Map of project site	2-12
Fig. 2.6:	Probe Location Plan	2-13
Fig. 2.7:	Proposed Dredging Sites and Dredge Volumes	2-16
Fig. 2.8:	Expansion Project Fill Requirements	2-17
Fig. 2.9:	Typical Fill Section	2-18
Fig. 2.10:	Proposed Land Use Development Scheme	2-22
Fig. 2.11:	Proposed Mangrove Clearing for the Expansion Project	2-24
Fig. 3.1:	Project Water Zones and Supply Schematic	3-8
Fig. 3.2:	Recycled wastewater treatment plan	3-9
Fig. 3.3:	Project Sewer Zones and Schematics	3-16
Fig. 3.4:	Proposed Electrical Distribution Layout	3-29
Fig. 3.5:	Typical above ground storage tanks	3-30
Fig. 3.6:	General Utility Areas of the Proposed Expansion Project	3-31
Fig. 3.7:	Helipad Dimension	3-35
Fig. 3.8:	Typical Main Pier Section	3-36
Fig. 3.9:	Marina Layout Plan	3-38
Fig. 3.10:	Shoreline Protection for Marina Basin	3-37
Fig. 3.11:	Proposed Canal Cross-Section	3-41
Fig. 5.1:	CEQ's Impact Structure	5-3
Fig. 5.2:	Cumulative Potential Impacts	5-3

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## LIST OF PLATES

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Plate 1.1:	Panoramic aerial view of Spanish Lookout Caye	1-3
Plate 1.2:	Existing Development	1-6
Plate 2.1	Seismicity of Central America 1990-2000	2-10
Plate 2.2	Geotextile Containment Structure	2-19
Plate 2.3	Side View of Geotextile Containment Structure	2-19
Plate 2.4	Former Development during First Phase	2-37
Plate 2.5	Development in Phase 1	2-37
Plate 2.6	Phase 1 Showing Development and Channel	2-38
Plate 2.7	Marine Museum and Educational Center	2-38
Plate 2.8	Short/Dwarf Mangrove Vegetation	2-40
Plate 2.9	Close Up of Canal running through Wetland	2-40
Plate 2.10	Other smaller canals or channels	2-41
Plate 2.11	Panoramic View of Developed and Undeveloped Areas	2-44
Plate 3.1	Hybrid System of Water Distribution	3-6
Plate 3.2	Frontal View of Existing Board Walk	3-32
Plate 3.3	Lateral View of Existing Board Walk	3-32

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## GLOSSARY OF TERMS

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**Algae:** one celled or many celled plants that have no root, stem, or leaf system.

**Avifaunal:** Pertaining or relating to birds

**Bathymetry:** depth profile of the ocean bottom or seafloor.

**Beach:** sediment seaward of the coastline through the surf zone that is in transport along the shore and within the surf zone.

**Bedrock:** the solid rock that underlies loose material, such as soil, sand, clay, or gravel.

**Benthic:** pertaining to the ocean bottom or seafloor.

**Benthos:** the forms of marine life that live on the ocean bottom or seafloor.

**Biogenic Sediments:** sediments containing materials produced by plants or animals such as corals, shell fragments and tests housing diatoms and radiolarians.

**Biomass:** total weight of the organisms in a particular habitat, species, or group of species.

**Canal:** a strip of watercourse that is used by the residents to access their lots via a marine vessel

**Coast:** a strip of land that extends inland from the coastline as far as marine influence is evidenced in the landforms.

**Coastline:** landward limit of the highest storm waves' effect on the shore.

**Coliform:** type of bacteria found in faeces

**Construction:** excavation, movement of earth, erection of forms or structures, or similar activities at a development or project site.

**Developer:** see Proponent

**Disposal:** the discharge, deposit, injection, dumping, spilling, leaking, or placing of any waste into or on any land, water so that it may enter the wider environment, including ground water sources.

**Effluent:** water discharged from a development into receiving water body or the environment otherwise.

**Estuary:** the mouth of a river valley, or a bay or lagoon receiving freshwater, where marine influence is manifested as tidal effects and increased salinity of the freshwater.

**Euryhaline:** pertaining to the ability of a marine organism to tolerate a wide range of salinity.

**Eutrophication:** elevation of nutrient content of water through input of fertilizers, fecal materials and domestic effluents

**Fauna:** animals.

**Fecal:** of or related to faeces.

**Fetch:** area of the open ocean over which the wind blows with constant speed and direction thereby creating a wave system.

**Flora:** Pertaining or relating plants.

**Geogenic Sediments:** sediments derived from non-living or inorganic sources such as silicate sand.

**Geology:** The scientific study of the origin, history, and structure of the earth.

**Groundwater:** water below the land surface in a zone of saturation.

**Habitat:** a place where a particular plant or animal lives generally refers to a smaller area than environment.

**Incineration:** 1. Burning of certain types of solid, liquid, or gaseous materials. 2. A treatment technology involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to remove the water and reduce the remaining residues to a safe, nonburnable ash that can be disposed of safely on land, in some waters, or in underground locations.

**Incinerator:** A furnace for burning wastes under controlled conditions.

**Intertidal Zone:** lies between the high and low tide extremes and can be divided into a *high tide zone* which is mostly dry and covered by the highest high tide but not the lowest high tide, the *middle tide zone* exposed and covered equally by all high tides and exposed during all low tides, and the *low tide zone* which is mostly wet and covered during the highest low tides and exposed during the lowest low tides.

**Irrigation:** Technique for applying water or wastewater to land areas to supply the water and nutrient needs of plants.

**Lagoon:** a body of water separated from the sea by a bank or coral reef: Also the region between a shore and a barrier reef or inside a ring of islands composing an atoll.

**Land reclamation:** dredging to mine sand, clay or rock from the seabed and using it to construct new land elsewhere. This is typically performed by a cutter-suction dredge or trailing suction hopper dredge. The material may also be used for flood or erosion control

**Littoral Forest:** low-lying coastal forest impacted by tidal influence.

**Littoral Zone:** also known as the foreshore or intertidal zone lies between the high and low tide extremes.

**Macroalgae:** algae that project more than 1 cm above the substrate, such as *Dictyota spp.*, and *Halimeda spp.*

**Mangal:** a swamp dominated by mangroves.

**Mangroves:** collective term used for range of salt-tolerated inter-tidal plants found throughout the tropics and within latitude of 20° north and south of the equator.

**Marina:** A boat basin that has docks, moorings, supplies, and other facilities for small boats, yachts and cabin cruisers.

**Marina Slips:** A docking place for a ship between two piers.

**Neap Tide:** tide of minimal range occurring when the moon in quadrature, or its 1<sup>st</sup> Quarter and 3<sup>rd</sup> Quarter Phases.

**Near shore Zone:** the seaward zone from the shoreline to the line of breakers.

**Pelagic Environment:** the open ocean environment which is divided into a neretic province with water depths 0 to 200 m and the oceanic province with depths greater than 200 m.

**Pelagic Organism:** free-swimming or floating biota that live exclusively in the water column, not on the sea floor or ocean bottom.

**Permitting Agency:** a Government Agency is responsible for issuing permits that allow various aspects of a development to proceed within the context of the Laws of Belize.

**Permit:** authorization, license, or equivalent control document issued by an Agency of the Government of Belize to implement various aspects of a development.

**Point Source of Pollution:** any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft from which pollutants are or may be discharged.

**Pollutant:** any dredged spoil, solid waste, incinerator residue, sewage, garbage, chemical waste, heat, and industrial, domestic, municipal or agriculture waste discharged into the environment.

**Primary Productivity:** the amount of organic matter organisms synthesize from inorganic substances within a given volume of water or habitat in a unit of time.

**Proponent:** developer proposing a particular project.

**Red List:** Catalogue of Threatened Species compiled by IUCN.

**Residents:** Locals or community members of a development, housing project etc.

**Riprap** (also known as **rip rap**, **rubble**, **revetment**, **shot rock** or **rock armour**) is pieces of rock or other material used to armor shorelines or stream banks against water erosion. Riprap reduces water erosion by resisting the hydraulic attack and dissipating the energy of flowing water or waves.

**Salinity:** a measure of the quantity of dissolved solids in ocean water: it is expressed in part per thousand by weight after all carbonates have been converted to oxide, the bromide and iodide to chloride, and all the organic matter oxidized.

**Sessile:** attached to the bottom or to rocks, pilings, etc. and unable to move.

**Sewage:** any human body waste and the waste from toilets and other receptacles intended to receive or retain body wastes that are discharged into the environment.

**Sand:** particle size ranging from 1/16 to 2 mm: It pertains to particles that lie between silt and granules on the Wentworth Scale of grain size.

**Sanitary Landfill Site:** a facility at which municipal, industrial wastes and hazardous wastes are applied onto or incorporated into the soil surface.

**Shore:** the section of land seaward of the coast: This extends from the highest level of wave action during storms to the low water line.

**Shoreline:** the line marking the intersection of the water surface with the shore: It migrates up and down as the tide rises and falls.

**Silt:** a particle size ranging from 1/128 to 1/16 mm: It is intermediate between sand and clay.

**Spring Tide:** tide of maximum range occurring every fortnight and coincides with when the moon is new and full respectively.

**Sublittoral:** seabed below the low tide mark.

**Suction Dredges:** These operate by sucking through a long tube, like some vacuum cleaners. A plain suction dredger has no tool at the end of the suction pipe to disturb the material.

**Supralittoral Zone:** this is the backshore environment above the spring high tide line and is only covered by water during storms and heavy sea states.

**Tide:** periodic rise and fall of the ocean surface and connected bodies of water resulting from the unequal gravitational attraction of the moon and sun on different parts of the earth.

**Tidal Range:** the difference in height between consecutive high and low water: The comparison may also be a day, month or year.

**Tidal Period:** elapsed time between successive high or low water.

**Topography:** the physical shape of the land surface.

**Transect:** a line or narrow belt used to survey the distribution of organisms or substrate across a given area.

**Wastewater Treatment:** Removal of organic solids and materials through aerobic or anaerobic conditions via the three known treatment methods of Primary, Secondary and Tertiary treatment.

**Wave:** a disturbance that moves over or through a medium with a speed determined by the properties of the medium.

**Wave Height:** is a vertical distance between a crest and the preceding trough.

**Wave Length:** horizontal distance between two corresponding points on successive waves such as from crest to crest.

**Watershed:** The region draining into a river, river system, or other body of water.

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## **GLOSSARY OF ACRONYMS**

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**AST:** Above ground Storage Tank

**BAS:** Belize Audubon Society.

**BEL:** Belize Electricity Limited

**BESST:** Biological Engineered Single Sludge Treatment

**BCCDG:** Belize City Cayes Development Guidelines

**BOD<sub>5</sub>:** 5 days Biological Oxygen Demand test

**BSWMP:** Belize Solid Waste Management Program

**BWSL:** Belize Water Services Limited

**CEQ:** Council of Environmental Quality

**CITES:** Convention on the International Trade in Endangered Species of Wild Flora and Fauna

**CSO:** Central Statistical Office, See SIB

**CZMAI:** Coastal Zone Management Authority and Institute.

**ECP:** Environmental Compliance Plan

**EIA:** Environmental Impact Assessment.

**DoE:** Department of the Environment.

**GoB:** Government of Belize.

**GPS:** Global Positioning System

**IMO:** International Maritime Organization

**IUCN:** International Union for the Conservation of Nature.

**NEAC:** National Environmental Appraisal Committee

**NEMO:** National Emergency Management Organization

**NFS:** National Fire Service

**NGO:** Non-Government Organization.

**MoH:** Ministry of Health

**MSL:** Mean Sea Level

**SIB:** Statistical Institute of Belize

**TNCE:** Tunich Nah Consultants and Engineering

**TSS:** Total Suspended Solids

**SWMA:** Solid Waste Management Authority

**WTS:** Waste Transfer Site

**TBFIM:** To Be Filled In later by Management

**TOR:** Terms of Reference

## **Placement Notes**

The proposed expansion project is a tourism based development aimed at attracting a larger 'pool' of visitors to the caye. This EIA submission is comprised and supported by the data collected and found in the Spanish Bay Resort EIA (TNCE, 2004). This submission is composed of two important components which includes a description of the project in an expansive narrative (Sections 1, 2 and 3) coupled with a summary of its impact and mitigation measures.

The narrative consists of the immediate project concerns which are supported by a number of annexes that in principle provide further details to the issues covered.

The main narrative is further broken down into two subcomponents as summarized in the following:

- The main narrative begins with the project description and the physical environment in which the project will be located. This is an important component in any EIA as it allows the reader to get an understanding of the overall project development along with a description of the environmental setting in which the project will be located.
- The other component relates to the infrastructural support or support services that will be recieved from the utilities and amenities in order to make the project viable. Such support services include the calculation of the water and energy demands as well as the estimation of the wastewater and solid waste production. In addition, other components in this narrative include the transportation mechanism that will be employed and the associated carrying capacity that is expected on the caye.

The other component in this document deals with the magnitude and scope of the impacts and alternatives arising from the proposed schedule of activities for the development. These components are described in Sections 4, 5 and 6 of the document and entail a detailed description of the development alternatives, potential impacts and the proposed environmental management system to mitigate the negative impacts that could arise from the operation of the expansion project.

The overall document was prepared with the fundamental view of understanding the project and its anticipated impacts on the receiving environment. Care was taken in obtaining the necessary information to satisfy the project's TOR and the overall intentions of the proponents to exercise the right to further develop the caye in an environmentally sustainable manner.

## EXECUTIVE SUMMARY

### Project Location

The proposed Hugh Parkey's Belize Adventure Island (formerly Spanish Bay Resort) owned and operated by a group of investors and governed by a Board of Directors, is to be located on Spanish Lookout Caye which is 8.6 miles south-east of Belize City. The project site lies on some 186 acres of land with the most part being partially inundated mangrove wetlands.

In general the Spanish Lookout Caye consists of a north and south caye circumvented to the east by two smaller un-named cayes. The Spanish Lookout Caye is geologically a part of the Drowned Caye Range and in effect forms the southern extreme of the island chain. The proposed development focuses in large part on expanding and improving the pre-existing infrastructure on the caye to accommodate an increased overnight clientele.

### Recreational Tourism Aspects

The recreational tourism aspect of the operation will build on the current activities which are based on scuba diving, snorkeling, kayaking, education center and the dolphin encounter program. The recreational aspect of the Hugh Parkey's Belize Adventure Island operation is currently being run and owned by Belize Dive Connection. Belize Dive Connection is a well known establishment in the dive-tourism industry. The main gate of this aspect of the program is the Radisson Fort George Marina, from where it has been operating since its founding in 1995.

The primary clientele of the expansion project will come from overnight arrivals. At full project development, the peak visitation to the caye is estimated to be about 744 guests. It is anticipated that while there will be less cruise days visitors, the overnight visitors count will increase.

### Proposed Components

The proposed expansion project for Hugh Parkey's Belize Adventure Island (formerly Spanish Bay Resort) will be divided into four developmental components mainly:

- **North Island Development** – This development will consist of 12 North Island Villas that will be comprised of 3 to 4 bedroom units.
- **East Side Development** – This phase will see the most development and will consist of a number of different buildings including 14 Beach Side Town Houses ranging from 1, 2 and 3 bedroom units; a 30 unit Beach Side Hotel; 10 single unit Beach Side Casitas that will be constructed in front of the Town Houses; 32 Marina Town Houses that will range from 1 to 3 bedroom units. The East Side will also have 7 Overwater Cabañas that will be linked to 6 Tree Houses on land and each is expected to be a single room unit. In addition, there will also be a bunkhouse that will be constructed to house 28 souls who may either be workers, staff or visiting students.
- **West Beach Development** – This development will be comprised of two components mainly the West Beach Hotel which will have about 20 units and the West Beach Cabañas which is anticipated to have 10 units.

- **South Island Development** – To complement the development, the proponents plan to construct the South Island Development that will include 12 South Island Villas and 60 South Island Town Houses. Collectively these units will vary from 1 to 3 bedroom units.

Of these four developmental zones, three will be expanded and one will be constructed to accommodate a new development. Collectively, these development areas are referred to as the expansion project. The East Side development, which will see most of the activity, currently has several proposed buildings that have not been constructed as part of the original Phase 1 development.

There will also be several amenities and infrastructural works that will be added as part of the developmental process. These include:

- The upgrading of the present docking system and the construction of additional docks for the recreational purposes such as the swimming and kayak docking stations that will be a part of the South Island Development.
- The installation of a service area for the refueling of marine vessels both local and international. In addition it is anticipated that full sanitary services will be included to cope with the international vessels.
- The proposed expansion project plans to construct an additional elevated boardwalk that will link the West Beach Recreational area to the South Island and the Marina. This board walk will measure about 0.4 miles and will consist of interconnecting ‘islands’ that will serve as a turning basin and rest area.
- The proposed expansion development plans to upgrade this existing infrastructure by constructing helipad on the proposed boardwalk. This pad will be constructed with dredged spoils that will be contained in palmetto stakes and will measure about 0.22 acres.
- The proposed expansion project plans to construct a marina on the East Side Development phase to provide access for the guests, residents, transient visitors and others who wish to dock their boat at this development. It is anticipated that the marina, once constructed, would consist of a main with pier fingers to accommodate about 27 boats of varied sizes of up to 75 feet in length, including the boats owned by Belize Dive Connection.
- The expansion project plans to reclaim the recreational beach that has been eroded as a result of wind and wave action. This infrastructure is important in supporting the visiting population by offering them a recreational area on the caye.

It is anticipated that these development zones will tie in the project rationale and bring a common goal in the development of the caye.

## **Project Justification**

The proposed expansion project is being carried out both to upgrade and expand on the existing infrastructure which involved mainly the implementation of the different facilities to service the cruise industry. Prior to the construction of the Phase 1 development, the cruise segment of the tourism industry was growing at an increasing rate.

During the construction phase, the cruise tourism began to experience a downward trend with fewer cruise ships presently arriving in Belize than before and the arrival of the ships is crowded into arrivals on Tuesdays, Wednesdays, and Thursdays. This results in the operation being busy less than 50% of the time and having excess capacity for the other 4 days of the week.

In order for the proponents to offset this gap and to tap into a larger 'pool' of guests, the development plans to expand and offer a variety of living accommodations to suit the varied lifestyles of the visiting population. This will include hotel rooms, condo units, villas, tree houses and overwater cabanas. It is anticipated that some units will be rented, some will be sold to single owners, and others will be sold as fractional or interval ownership. With this in mind, the primary purpose of the expansion project is to create a community on the island.

## **Potential Environmental Impacts**

The impacts arising from the development and implementation of the expansion project are positive or beneficial, as well as negative or adverse. These impacts are related to both the construction phase, as well as the operational phase of the expansion. The negative impacts of the project are for the most part minor, although some have been categorized as moderate.

The primary developmental activities that are likely to give rise to environmental impacts of note are the dredging and land reclamation activities and the general operations of the project when it has been fully commissioned. In the case of the latter, domestic effluents and its attendant 'nutrient enrichment' or eutrophic impacts, as well as BOD and human health impacts are relevant. Relevant also in this regard is the issue of solid wastes.

### *Dredging Impacts and Mitigation*

The pertinent ecological impacts related to dredging are the water quality impacts. The primary or causative parameters of note are 'suspended solids' and 'turbidity' impacts. The geographic area most significantly impacted by this activity is the Marina. However the impact has been categorized as 'moderately adverse' only given the sparsity of biota on the seabed and consequently its low productivity and conservation value.

The barrier reef is a couple miles from the development site and should not be affected by the dredging. The nearest patch reef in the area is in a relatively poor status of health given the heavy natural sedimentation of the area. Although this patch reef is some distance from the burrow pit every precaution will be taken to ameliorate the impacts through the use of 'silt curtains' and the confinement of dredging operations to calmer sea state conditions.

The lack of impacts on the patch reef and the wider reef systems in the area in general is related to the relatively limited volumes of materials to be dredged from the seafloor. The volume of materials to be dredged from the seafloor is 139,997.8 cubic yards.

The other issue related to the dredging operation is navigational safety. The area is fairly busy in relation to boat traffic. Thus the threat of physical harm and injury from a dredge berthed and

operating in the area is highly relevant. The mitigative responses to be implemented are the deployment of navigational aids such as buoys and lights to alert and ward off mariners. This will be pertinent to both the dredge itself and the 'spoil discharge' pipes running ashore.

#### *Water and Wastewater*

It is anticipated that 47,950 gallons of water will be required daily at full operation and occupancy of the project. It is also anticipated that 70 % of the demand will be converted to wastewater or 33,565 gallons a day. It is anticipated that potable water for the development will be gotten from rain water harvesting as is presently the case. The present infrastructure is presently storing and using harvest water. A closed circuit system will facilitate the transfer of water from one location to another. In addition to this source, several other sources (See Section 4) were looked into and these will account for a fraction of the initial water demand.

Wastewater and sewage derived from human activities are to be treated through the use of a secondary treatment technology in the form of a 'BESST' Treatment Plant. The technology implemented will reduce the major pollutants such as the macro-nutrients (nitrates and phosphates), ammonia, as well as Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD) to levels where they do not pose a threat to the integrity of the environment.

The collection and treatment system is divided into smaller zones with various pumping stations. This will be able to facilitate growth without having to purchase a big treatment plant from the beginning. The post-treated effluent from the BESST Treatment Plan is to be stored and used for irrigation and fire-fighting processes.

#### *Solid Waste Management*

The issues of solid waste are also highly relevant in terms of its associated impacts on the receiving environment. One of the potential impacts of solid waste would be the attraction of feral animals such as rats, crocodiles and birds to the area to scavenge. The mitigative response to be implemented by the Hugh Parkey's Belize Adventure Island is the judicious collection and segregation of the wastes to organic and inorganic components. These wastes are to be removed from the caye on a regular and recurrent basis and disposed of at the sanitary landfill site in Belize City.

#### *Energy*

The energy requirements for the proposed expansion project are expected to be mainly for residential (domestic) and marina operation purposes. Energy for the different development sites will be created by expanding the present hybrid system which includes a combination of wind turbine energy, solar and diesel generators.

Energy will be required to power domestic appliances, project infrastructure as well as marina based infrastructure including maintenance equipment. The environmental impacts related to the energy generation will be minimal as modern mitigation technologies can be adapted to suit the equipment. Site selection and equipment placement will, however, be an issue to consider when developing energy resources.

#### *Marina Related Activities*

It is anticipated that the marina activities will be limited in scope and will include the fuelling of vessels, providing water and wastewater services, solid waste collection and disposal and vessel

maintenance. These services will be provided at a service station that will be located at the entrance of the marina channel.

Potential impacts associated with this activity include hydrocarbon spills and leaks that can arise during marine vessel servicing. Mitigation measures include the use of a certified attendant trained in these sorts of activities and the use of spill control kits at key areas.

### *Social Impact and Mitigations*

The fisher folks utilize the immediate areas of Spanish Lookout Caye for minor fin-fish fishing and the harvesting of conch and sometimes lobster. The livelihood and vocation of these folks should in no way be interrupted or impaired by the developmental aspects or operational phases of the expansion project. Every consideration has been taken on board in regards to the dredging operation to ensure that access to the area, or the loss, or destruction of fishing gear will not be a problem. Related ecological impacts are only limited to the near shore ecosystem where the dredging will occur. Mitigation measures include the conservation of much of the coastal ecosystem for recreational use.

### **Environmental Management System**

The proposed expansion project plans to implement an Environmental Management System to reduce its environmental impact and increase its operational efficiency and investment returns by developing sound environmental practices towards its tourism related components. In addition, the project will carry out its monitoring plan which will focus on water quality parameters, biodiversity issues, engineering considerations and socio-economic concerns.

The proposed monitoring program has been developed not only in relation to satisfying the statutory requirements of the EIA process, but also as a consequence of the proper implementation of the proposed development and its relationship to the integrity of the environment and indeed the stakeholders in the area.

### **Conclusion**

The proposed expansion project intends to expand on its present infrastructure in order to attract a much larger 'pool' of guests to the caye. This is as a result of the declining cruise tourism industry and an increase in the overnight arrivals to Belize. The developers hope that this new venture will subsidize the existing infrastructure while conserving the integrity of the caye.