

**Terms of Reference**  
**Salt Whistle Bay**  
**Coastal Zone Investigations, Design and Supervision**

**1. Introduction**

Mayreau is the smallest inhabited island in the archipelago of Saint Vincent and the Grenadines. The island is less than 0.5 km<sup>2</sup>, with a population of under 300 permanent residents. The island is home to Salt Whistle Bay (also known as Carnash Bay), which is one of the premiere beaches in the Eastern Caribbean (and often mentioned as one of the best beaches in the world). The beach which attracts annually, thousands of tourists and yachts, makes it a major contributor to the livelihoods of the residents and the economy of Saint Vincent and the Grenadines. The bay is also an ecological treasure, boasting vast marine diversity and biological wealth. It forms part of the Tobago Cays Marine Park, which includes five other nearby islands (Cays).

The survival of the Bay is in jeopardy. The rapidly shrinking sandy isthmus that separates the Bay from the Atlantic to the east is testimony to its current vulnerability. Sea level rise may be a leading cause for its deterioration, as the reef that provided protection is now allowing larger waves to reach the shoreline. The destruction of the Bay would have tremendous negative economic and environmental consequences.

The government awarded a contract for emergency boulder protection work over a critical shore length as a temporary measure (July 2020), until a permanent solution is obtained.

This TOR seeks to address the protection of the shoreline through engineering interventions, considering existing marine, physical, social and environmental conditions and which protect the livelihoods of the most vulnerable and would lead to gender-responsive actions for the vulnerable in this community.

**2. Description of the Study Area**

This study will focus on the eroding isthmus at Salt Whistle Bay located at 12<sup>o</sup> 38' 21" N and 61<sup>o</sup> 23' 21" W (Appendix A)

**3. Objective**

The objective of this consultancy is to carry out coastal processes investigation and analysis of the shoreline at Salt Whistle Bay, in order to design and supervise the optimal intervention at this location that would prevent further coastal erosion, especially on the shoreline exposed to the Atlantic.

**4. Scope of Work**

In order to understand the erosion forces, sediment transport patterns, optimum interventions and the potential impacts of the proposed engineering interventions, the coastal processes investigation should include the areas immediately north and south of the isthmus.

This consultancy is divided into four tasks.

**Phase 1** – Studies for carrying out coastal process investigations, preparing preliminary design and detailed engineering designs of structural and non-structural mitigation measures and construction procurement.

The study will include:

- i) the collection of necessary coastal data (e.g. bathymetric data, currents, sediment sample characteristics, beach profiles, etc)
- ii) coastal processes modeling (wave modeling, hydrodynamic modeling).
- iii) Once the supporting coastal studies are completed, the consultant shall propose feasible interventions designed to mitigate land loss from continued erosion.
- iv) Phase 1 will conclude with the generation of bidding documents and the bid evaluation report.

There is a decided preference to seek interventions that will result in the preservation of the historical beach profile in lieu of, or in concert with, hard defensive structures designed to protect the targeted land areas. Given the value of the location as a national marine park, measures are to be designed against a 150-year return period for coastal forces such as wave, storm surge, and current dynamics. Finally, potential impacts from sea level rise, using currently accepted estimates will be integrated into the analysis. This section of the TOR also needs to refer to the gender vulnerabilities highlighted earlier. And should link how the balance between environmental sustainability, sound engineering and gender (where applicable) will guide the selection of the proposed solutions.

## **Description of Tasks**

This consultancy is divided into two phases containing five tasks in total.

**Phase 1** – Studies for carrying out coastal process investigations, preparing preliminary design and detailed engineering designs of structural and non-structural mitigation measures and construction procurement.

The first task is to gather, collate and review both existing and new engineering baseline and modeling data of coastal processes to serve as a basis for developing feasible soft and hard (engineering) interventions. The second task is to identify and evaluate potential intervention scenarios to determine which intervention or suite of interventions is feasible to achieve shoreline stabilization. These interventions will also be analysed in the context of an EIA which shall compare and analyze the potential impacts and mitigations associated with the potential interventions identified under the project. The EIA although a separate activity, will necessarily compliment and form part of Task 2. The third task is the final design, preparation of contract

documents and procurement of the contractor for the works. Phase 2 commences with the fourth task, which is the supervision of construction work. The fifth and final task is the facilitation of technology transfer, allowing the engineers from the Ministry of Transport, Works etc. (MoTW) to improve their skills by participating in the project directly as well as through planned workshops. This task is an ongoing effort in both phases.

#### **4.1. Task 1 – Data collection and Baseline Coastal Zone Modeling**

Under this task, the consultant shall collect and analyze relevant data to support modeling of coastal dynamics with respect to the littoral zone and land based influences that contribute to coastal erosion and retreat.

The analysis shall include all relevant geological, geotechnical and hydrological data that will have an impact on the design of civil infrastructure. The study should include an analysis of the operational wave climate as well as an analysis of the extreme events (storm surge, waves). It should also consider the existing coastal hydrodynamics and current sediment transport regimes as they affect the proposed site and adjacent impacted coastal areas. The effects of longshore and cross-shore currents on beach stability should also be taken into consideration. The analysis shall include consideration for any adjacent land use activities as far as they are expected to contribute to coastal instability. Modeling will be accomplished using an internationally recognized modeling system as approved by the MoTW.

Among the activities to be included in this task are:

- **Data Collection:** 3 months data collection ( in the winter swell period of January, February and March) characterizing coastal hydrodynamics and sediment characteristics. The data collection process should include but not be limited to: i) collection of offshore wave, current and tidal data. The consultant is expected to transverse deep water, near shore, storm surge and extreme wave climate information. ii) collection of sediment samples and historical beach profile measurements, as well as geotechnical and topographical information; iii) collection of bathymetric information; littoral zone physical and biological characteristics; iv) collection of coastal water quality data including turbidity, conductivity, Total Nitrogen, Total Phosphorus, pH, dissolved Oxygen, E. coli, and enterococcus; and any other necessary information required to support the modeling activities and environmental management.
- **Modeling:** i) operational wave climate modeling; ii) extreme wave climate modeling, for 50-yr, 100-yr and 150-yr return periods; iii) Hydrodynamic modeling; and iv) Sediment transport modeling.
- **Other activities:** i) analysis of historical shoreline data using aerial photography and satellite imagery and anecdotal information ii) climate change scenarios should be considered as part of this study, and should be part of the modeling exercises, to account for the water level raise and the increase in the frequency and intensity of tropical storms and hurricanes; iii) integration of land based influences affecting coastal erosion, water quality and shoreline retreat; iv) identification of physical and biological systems that may be affected by coastal zone interventions (benthic assessment).

#### **4.1.1. Data Collection Plan**

At the onset of this task, the consultant shall work closely with the MoTW and the Ministry of Agriculture (MoA) - fisheries (or agency responsible for coastal zone management) and the Ministry of Health and the Environment to collect existing data and previous studies supporting the coastal analysis. Based on these findings, the consultant shall prepare a project data collection plan including detailed data collection requirements. The data collection plan shall detail the specific data to be collected, methodology to be employed and a minimum timeframe required to compile a relevant dataset to support subsequent modeling and analysis. Data collection shall anticipate the possibility of seasonal behaviors that may affect the modeling analysis and the quality of the engineering baseline with respect to shoreline stabilization. Data shall be collected so as to support the development of specific engineering design options and shall be sufficiently robust as to allow the evaluation of consequential impacts to associated coastal systems in order to avoid unintended negative impacts to physical and biological systems.

Once completed, the consultant shall prepare and submit a data collection plan to the Economic Planning Division (EPD) / MoTW for comments and approval.

#### **4.1.2. Archiving and Distribution of Data**

All data collected shall be provided in a digital format to the Ministry of Finance Economic Planning Division (EPD), the Ministry of Works (MoTW), the Ministry of Housing/ Physical Planning Department and the Ministry of Health and the Environment in both raw and processed form. Datasets shall be provided with adequate documentation describing type of data, format, collection parameters, gaps and limitations. In the case of geospatial data, the consultant shall prepare appropriate meta-data files consistent with the standards defined for the St. Vincent GeoNode<sup>1</sup> as well as the UNDP standards.

#### **4.1.3. Topographic and Bathymetric Data**

Topographical and Bathymetric data shall be referenced against the local vertical datum and horizontally referenced against the WGS 84 datum and UTM projection zone 20. Both raw data and processed data shall be provided to the EPD and MoTW. Processed data shall be provided in a digital bathymetric format based on a 1-meter grid spacing in a format compatible with ESRI Grid, DEM, or other compatible raster format suitable for use in an ARCGIS platform (See Appendix B). Bathymetric data shall be documented as to collection method, parameters, errors of scale and data gaps and analysis methods applied as well as other relevant information needed to document the quality and utility of the dataset. A meta-data file shall be provided with delivered bathymetric models.

Given the location, it is anticipated that the consultant will cover an area of at least 20 ha for the bathymetric survey, using a boat-based bathymetric echo-sounder and GPS device. Standard terrestrial methodologies (like a Total Station) will be used to measure beach / coastal profiles.

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<sup>1</sup> GeoNode is an open source platform that facilitates the creation, sharing, and collaborative use of geospatial data. In St. Vincent a GeoNode has already been established and is currently being populated with data. The contact person is Dornet Hull, GIS officer, Ministry of Housing, Informal Human Settlements, Lands, Surveys and Physical Planning

#### **4.1.4. Water Quality Data**

Marine water quality data is to be collected at representative locations within the study site so as to provide a baseline for monitoring future changes in the system resulting from stabilization interventions and potential future development activity. A minimum of 5 samples from a minimum of 3 representative locations in the study area will be collected during the data collection program. The timing of the sample collection shall be determined based on the consultant's data collection plan and shall be designed to represent any significant temporal variation in local conditions anticipated during the data collection phase.

#### **4.1.5. Geological and Geotechnical Data**

Geological and Geotechnical data shall be collected to understand surface and sub surface conditions. This activity will require both desktop and field studies. Given the environmental sensitivity of the area, the consultant is expected to employ marine and terrestrial geophysical techniques to determine surface and sub surface conditions to assist in the foundation design of the interventions.

#### **4.1.6. Tidal, Current and Wave data**

The consultant is expected to collect tidal, current and wave data through desk and field studies. Field collection will be carried out using appropriate instrumentation, such as an Acoustic Doppler Current Profiler (ADCP). A minimum of two (2) such instruments will be required. Locations of the instruments will be done by the consultant. This field information will be compared with global data as provided by the National Oceanic and Atmospheric Administration (NOAA), the United States (US) Navy, the United Kingdom Meteorological Office (UKMO) etc.

The consultant is expected to correlate the data and thus simulate several years of nearshore data for consideration when sizing the various investigated interventions.

#### **4.1.7 Other Data**

With respect to other data collected, all data shall be provided in both raw and processed form in a digital **format** with appropriate descriptive documentation. Documentation shall include instrument type or data source together with a description of variables represented, method of acquisition and other relevant documentation.

#### **4.1.8 Baseline Modeling**

On completion of the data collection program, the consultant shall model the coastal processes using internationally recognized software, approved by the EPD and MoTW (see beginning of this section for modeling requirements), to assess the current behavior of the coastal zone with respect to erosion/depositional dynamics, coastal energies, and other relevant coastal zone interactions. The consultant shall provide engineering estimates for 50-yr, 100-yr and 150-yr return periods based on best practices and regional experiences as agreed to with the CPD and

MoTW. Baseline modeling shall be designed to benchmark the current system with respect to hydrodynamic behaviors in order to provide a foundation for the development and evaluation of potential engineering interventions. Particular attention is to be paid to coastal sediment transport processes as preferred coastal protection options will relate to those contributing to beach accretion.

Finally, while rare, the consultant shall model the impacts of a potential tsunami in the area as part of the baseline modeling exercise. The conditions to be modeled should be based on historical experience in the region and shall consider the potential for a tsunami genic event arising from activity associated with Kick-em-Jenny, a submarine volcano located on the north coast of Grenada. The criteria to be used will be developed in close consultation with the MoTW and the office of the National Emergency Management Organization.

#### 4.1.9 Task 1 Deliverables

- **Inception report** – Within 4 weeks of contract signature. The Inception report should be based on site reconnaissance visits and government and/or municipal agencies and key stakeholder consultations; and should include i) socio-economic (demographics, governance, land use, facilities) and physical conditions/characteristics of the area, ii) preliminary vulnerability and erosion issues, iii) summary of consultations, iv) detailed methodology to undertake each of the tasks, and v) data requirements and limitations. Final inception report incorporating comments within 10 working days of receiving comments. (See Appendix B for draft template)
  - **Data Collection Plan** –This plan shall detail the field sampling and analysis plan, proposed calendar for project execution.
- **Data Collection Report** – Six (6) months after submitted inception report. This report shall detail consultant's activities and findings completed under Task 1. The report shall include a review of consultant's activities, data collection and methodologies employed, review of modeling activities, a summary of the results and main conclusions and findings of the modeling exercise, a quality assessment of modeling results, data gaps and limitations, and other relevant consultant's observations.

Also to be included in this report:

- **Data and Data description** –At the conclusion of this task, the consultant shall deliver a report describing the rationale for selection of data requirements, data collected, and collection methodologies with equipment descriptions. Datasets shall be provided in both raw instrument formats and processed format. This report shall be sufficiently comprehensive so as to allow replication of the methodology and shall serve as a resource guide for future coastal engineering exercises.
- **Bathymetric map** –The consultant shall include in the data report the methodologies and procedures used to develop bathymetric data. The map and all supporting raw data as well as reduced X,Y,Z data shall be delivered with the bathymetric map prepared under

this task. This map shall be presented in a raster format suitable for use in ARCGIS (DEM, ESRI grid), geo referenced against WGS84, UTM zone 20 horizontally, and referenced against the SVG Vertical Datum. Deliverables include metadata, datafiles and prepared raster images (See Appendix C)

## **4.2 Task 2 - Engineering Options and Feasibility Evaluation**

Once the coastal zone baseline and modeling have been established, the consultant shall identify and evaluate potential shoreline protection, erosion control and beach accretion interventions, taking into consideration the development plans for the area.

Based on accepted engineering standards and consultant professional judgment, the consultant shall work closely with the MoTW to identify potential soft and hard interventions or combinations of interventions that will serve to protect the target site from further erosion and the damaging effects of wave action and storm surge. Interventions will consider the opportunity to promote beach accretion and may include offshore, onshore or combination strategies. All strategies should seek to minimize impacts to other coastal resources and should seek to preserve or enhance the existing connected beach areas. Consideration must also be given to current land use activities and coastal marine resource health, particularly with respect to water quality and fisheries production.

The consultant shall model and evaluate the performance of the proposed engineering interventions for shoreline defense based on the scenarios established under Task 1, and identify and propose alternatives based on modeled findings and engineering experience. Modeling evaluations will include the effects of overtopping events on the proposed structures and affected land areas.

Ideally, alternatives identified will promote beach accretion as a foundation for a coastal defense strategy and will not adversely affect the surrounding coastal environs.

Once candidate alternatives have been identified, the consultant shall model the impacts of these strategies with respect to the 150-yr return period. Included in the options to be analyzed is a baseline case or the “do nothing” option. Additionally, the consultant shall also model the potential impacts to and of potential interventions with respect to the tsunami event modeled under Task 1.

### **4.2.1 Coastal Water Quality**

Apart from the physical behavior of proposed interventions, the consultant shall examine the proposed interventions from the perspective of potential changes to nearshore water quality as much of the area is used for beach recreation and fishing. Proposed interventions shall be examined for potential impacts to water quality.

### **Engineering Control Options**

Based on the findings under this task, the consultant shall identify feasible engineering options to be considered for the mitigation of shoreline retreat in the study area. Options presented will include the “do nothing” option to be used as a basis for comparison of strategies. On presentation of options, the consultant shall detail the benefits and limitations associated with the strategies identified in a manner that permits a clear comparison and evaluation of attributes associated with each option.

Once suitable options have been identified and analyzed, the consultant shall provide general cost estimates for the implementation of feasible options to be used as a basis for further development.

Finally, as requested by the MoTW, the consultant shall provide up to two days for consultations and or presentations to discuss their findings. These presentations shall be scheduled together with the consultant by the MoTW.

Also to be included in this report:

- o Sea defense Intervention Options* - Delivered according to approved work plan. Under separate cover, the consultant shall present interventions options with observations and recommendations in a format suitable for distribution to decision makers. The report shall clearly detail the advantages and disadvantages of each of the control options identified and will provide cost estimates and general construction considerations for each option in a manner that is easily compared to facilitate the decision process.
- o Data and Data description* – Delivered according to approved work plan. At the conclusion of this task, the consultant shall deliver a report describing the rationale for selection of data requirements, data collected, and collection methodologies with equipment descriptions. Datasets shall be provided in both raw instrument formats and processed format. This report shall be sufficiently comprehensive so as to allow replication of the methodology and shall serve as a resource guide for future coastal engineering exercises.

#### **4.2.2 Task 2 – Environmental and Social Impact Assessment (ESIA)**

During Task 2, the consultant shall prepare an environmental and social impact assessment in accordance with the approved Environmental Management Framework for St Vincent (Used on all World Bank projects), which can be viewed at :

[http://www.gov.vc/images/pdf\\_documents/environmental\\_management\\_framework\\_march\\_2016.pdf](http://www.gov.vc/images/pdf_documents/environmental_management_framework_march_2016.pdf)

The framework document outlines the type and format of the Environmental Assessment that will be required. This report shall be concise, written in a manner that is easily understood by the general public and clearly convey the decision options without the need to refer to the technical data.

Conduct an ESIA of the proposed works. The ESIA should involve broad stakeholder



consultation and should include:

- (i) Environmental Impacts: Identifying the priority environmental impacts and mitigation measures during pre-construction, construction and operational phases. The main emphasis will be on the following:
  - (aa) Construction phase: source materials; air, noise and dust pollution; silt-run-off problems; waste generation and spoil disposal; marine pollution; reef protection; land contamination (oil spills); occupational health and safety; and
  - (bb) Operational phase: reef protection.

The ESIA should also assess the impacts of natural hazards on project alternatives and on stakeholders; assess the various project components to determine the most optimal construction and operational techniques, and technology to minimise impact on the environment; and distinguish construction and operational phase impacts, short-term and long-term impacts, positive and negative impacts, and direct and indirect impacts.

- (ii) Social and Gender Impacts

- (aa) Producing a sex-disaggregated demographic profile of communities in the project area including socio-economic, poverty and vulnerability status, individual and community characteristics including disability status, age, employment, unemployment and underemployment status, single-heads of household (male/female) and household characteristics, crime, gender-based violence, educational attainment, housing and health issues;
- (bb) Identification of key employers and livelihood activities in the communities with clear identification of opportunities to reduce poverty and promote equitable, inclusive employment through the implementation and operational phases of the project (including taking a gender perspective);
- (cc) Identification of training and other opportunities to enable females, males and PWDs from affected communities to actively participate in project-related employment opportunities with a particular focus on training for females in non-traditional trades;
- (dd) Clear identification of any potential adverse social impacts of the project, disaggregated by sex, age and disability;
- (ee) Identification of risks and vulnerabilities during implementation and operation in the following areas including inter alia: housing; economic activities by sector and level of employment;

employment opportunities; livelihoods; labour force participation; shelter management; natural hazards; security and violence (including gender-based); education; health; transportation; traffic impacts; cultural and archaeological heritage; wildlife habitat; and water, sanitation, and drainage;

- (ff) Production of a gender analysis by analysing the socioeconomic situation of women and men, girls and boys in the Project area and conduct a skills mapping exercise;
- (gg) Analysis of existing local economic and social development plans and recommendations for increasing economic opportunities, social inclusion and gender equality in communities in the Project area;
- (hh) Investigation of gender-specific risks and vulnerabilities and gender-specific coping mechanisms, including those linked to projected climate change, and project employment or indirect project-related livelihood opportunities;
- (ii) Identification and analysis of both qualitative and quantitative socio-economic benefits;
- (jj) Prioritise community risks and vulnerabilities and community priorities for potential investments. Include women and men equally in public consultations as well as stakeholders representing the various groups including youth, elderly, children and PWDs;
- (kk) Propose a gender action plan with activities for potential investment, costing and timeframe and indicators; and
- (ll) Environmental and Social Management Plan: Preparation of an Environmental and Social Management Plan (ESMP) including recommended mitigation measures, analysis of alternatives, design management and monitoring and recommended measures to facilitate social benefits, stakeholder engagement plan (SEP) and grievance mechanisms responsive to vulnerable groups' needs. This ESMP forms an integral part of the ESIA report.

The consultant shall provide an initial draft ESIA to be presented to the CPD and the MoTW for comments. The CPD and the MoTW shall have 2 weeks to provide comments. The consultant shall incorporate comments received and prepare a Draft ESIA for public comment to be published by the CPD pursuant to UNDP safeguard policy and national requirements. During a period of 3 weeks following delivery of the draft for public comment, the consultant shall advertise and conduct a public meeting in Mayreau presenting the findings of the ESIA and soliciting comments. A record of this meeting shall be kept and comments received shall be

documented and incorporated in the Final ESIA. At the conclusion of the 3 week meeting period, the consultant shall have 2 weeks to incorporate comments received and shall deliver the Final ESIA to the MOTW / CPD.

#### **4.2.3 Task 2 Deliverables**

- **Task 2 report** – Three (3) months after accepted report for task 1. This report shall include a detailed presentation of the consultant findings and methodologies applied in the execution of the task activities. The report shall also provide preliminary designs and cost estimates along with the EIA Report which will include

#### **4.3 Task 3: Preparation of Detailed Engineering Design and Bidding Documents.**

##### **Final Designs and Cost Estimates**

(a) Following approval by the client of the interventions recommended in Task 2, the consultant shall proceed to final detailed engineering documents and technical specifications for the project.

(b) The consultant is expected to prepare the detailed bill of quantities and more reliable engineering estimates based on the detailed design of the civil works. Current costs for similar works both in Saint Vincent and the Grenadines will be used as a basis for all unit rates and cost estimates.

(c) The consultant is expected to prepare programs/works in conjunction with various government and non-government agencies for non-engineered interventions. The Consultant is also expected to prepare training materials and manuals for community members to facilitate the implementation of any non-engineered interventions.

##### **Bid Documentation and Procurement**

- (a) Standard bidding documents will be produced by the consultant for the contract to allow the CPD to solicit bids from prequalified international, regional and local contractors or joint ventures local/regional/international. The bidding documents will include
- Instructions to Bidders or post qualification criteria depending upon the cost of engineering estimate.
  - General and Special Conditions of Contract
  - Working Drawings
  - Technical Specifications
  - Bills of Quantities

- Form of Contract (FIDIC)
  - Forms of Securities
- (b) The consultant shall advise on the prequalification of contractors
- (c) Conduct pre bid site meeting with attendant site minutes
- (d) Provide advice to the client during the procurement process including bid invitation, prequalification requirements, clarifications requests from the bidders, preparation of bid evaluation report and recommendation for contract award in accordance with UNDP Guidelines.

#### **4.4 Task 4 - Training and Workshops**

##### **4.4.1 Workshops**

The consultant shall conduct a three workshops to be held at an agreed location during the execution of the project. The first workshop will focus on coastal zone analysis and data collection, the second on coastal zone modeling and engineering design and feasibility analysis. The third workshop will focus on EIA and SIA data collection methodologies. It is preferred that these workshops be scheduled against the development of tasks under this consultancy, so that actual examples from the project can be presented. Workshops will be limited to no more than 20 persons in attendance. The consultant shall be responsible for providing staff, materials and refreshments for each workshop. The CPD / MOTW will provide the venue and assist in the procurement of materials, equipment and refreshments.

##### **4.4.2 Task 4 Deliverables**

- **Task 4 Report** – This report shall be included as an appendix to the inception report with a description of the training activities and workshops to be carried out, including the materials to be used during the workshops.
- Summary and conclusions of the workshop including the presentation and instructional materials used for the workshop. This information would form part of the Final design report.

#### **5.0 MANPOWER SCHEDULING AND COSTS**

In estimating man – month requirements and cost of the services, the consultants should ensure that the proposal takes full account of all of the above requirements and the following items.

- Consultants remuneration

- Consultants out of pocket expenses
- Support staff services
- Equipment hire
- Communication costs
- Report reproduction costs
- Construction documentation reproduction costs
- Supervision costs
- All data collection costs
- Local and overseas Travel and Accommodation

## **6.0 Working Team Minimum Requirements**

The consultant is expected to provide the following personnel on the contract :

### **WORK TEAM MINIMUM REQUIREMENTS**

<b>Position</b>	<b>Qualifications</b>	<b>Specific experience</b>
Team Leader	Civil Engineer with post-graduate studies in coastal engineering	Advisor, consultant or management positions in design and development of projects related to coastal defenses. Specific experience in design of both onshore and offshore coastal defense works. Overall experience not less than 20 years
Environmental Specialist	BSc in Environmental sciences	Specific experience in coastal processes and writing of EIA Reports. Overall experience not less than 10 years
Social Impact Specialist	BSc in Social Sciences	Specific experience in conducting and writing social impact analyses arising out of infrastructure projects. Overall experience not less than 10 years
Quantity Surveyor or Cost Benefit Engineer	BSc in Quantity Surveying or Civil Engineering	At least 8 years' experience as a Quantity Surveyor or Cost Engineer
Surveyor	Licensed Surveyor or BSc in Land Surveying	At least 8 years as lead surveyor with experience in land and bathymetric surveying

## **7.0 REPORTING REQUIREMENTS AND DELIVERABLES**

Task	Name of Report	Content	Time of Submission
Inception	Inception report	Inception Report in general	Four (4) weeks after

	and Data collection plan.	accordance with Appendix B. Final inception report incorporating comments within 10 working days of receiving comments.	signing contract
Task 1	Task 1 Report	Activities, Data collection and Data description. Client review and comments within ten working days	Six (6) months after client reviewed inception report
Task 2	Engineering Options and Feasibility Evaluation	Sea defense options and preliminary cost estimates based on various return periods. Client review and comments within twenty working days	Three (3) months after client reviewed Task 1 report.
Task 2	Environmental Assessment	<ol style="list-style-type: none"> <li>1. Draft Social and Environmental Impact Assessment</li> <li>2. Client review and comments within twenty working days</li> </ol>	<ol style="list-style-type: none"> <li>1. Ten (10) months after commencement of contract</li> <li>2. Together with Task 2 Engineering Report</li> </ol>
Task 3	Final Designs	<ol style="list-style-type: none"> <li>1.0 Final Designs and bidding documents</li> <li>2.0 Final cost estimates</li> <li>3.0 Final EIA and SIA</li> </ol>	<ol style="list-style-type: none"> <li>1.0 One (1) month after approval of Task 2</li> <li>2.0 Ditto</li> <li>3.0 Ditto</li> </ol>
Task 4	Workshops	<ol style="list-style-type: none"> <li>1. Description of the training activities and workshops to be held.</li> <li>2. Delivery of workshop</li> </ol>	<ol style="list-style-type: none"> <li>1. To be detailed in Inception Report</li> <li>2. To be submitted along with Final design documents</li> </ol>

Format: Three (3) printed copies and Three (3) copies in electron format.

# APPENDICES

## APPENDIX A General Sea Defense Project Area







Salt Whistle Bay

Rapid Erosion

## **APPENDIX B**

### Inception Report Template

The consultant is free to format the Inception Report to his normal presentation, but the report shall contain the following minimum content:

- Executive Summary
- Introduction
- Background and Description of various project elements
- Understanding of Project Objectives
- Contract signing and project commencement
- Team mobilization and project activities to date
- Data collection
- Data gaps
- Assumptions, Risks and Mitigation Strategy as a result of data gaps
- Comments on ToR
- Design criteria
- Project Organisation / Lines of communication
- Project execution, methodology and scheduling
- Proposed workshops and methodologies for technology transfer
- Proposed outlines for interim and final reports
- Appendices eg meeting details, Organisation Chart, ToR, Photographs etc.

## **APPENDIX C**

### **Terms of Geo-Spatial Data Delivery and Sharing**

Freely accessible data and analysis is a core component of this project. Therefore, all geospatial data collected and created by project activities must be preserved, consolidated and transferred to the Government of Saint Vincent and the Grenadines and the World Bank upon project completion, in a well-known or standard electronic format. Specifically the following terms apply:

**Licensing:** All data procured and developed for this project is done on behalf of the Government of Saint Vincent and the Grenadines and the World Bank and therefore all licensing agreements must be made similarly. In keeping with the World Bank commitment to open data, it is recommended that this license be under Creative Commons CC-BY-SA where possible and appropriate. See: <http://creativecommons.org/licenses/by-sa/2.0/> for more detail.

**Vector data:** Geospatial vector data must be converted into a standard OGC format or well-known format. This list includes, but is not limited to, shape file format. Additional formats may be delivered with prior approval. All files must include projection parameters. Vector data must adhere to topological standards.

**Raster data:** Geospatial raster data must be converted into a standard OGC or well-known format. This list includes, but is not limited to, GeoTiff format. Additional formats may be delivered with prior approval. All files must include projection parameters.

**Tabular data:** Tabular data must be converted into a readily accessible or well-known format. This list includes, but is not limited to, CSV, tab delimited text file, or spreadsheet. Additional formats may be delivered with approval.

**Media/method of transfer:** All data sets must be transferred on permanent media such as a CD/DVD disk. Very large data sets, too large for CDs and DVDs, may be provided on a hard drive or solid-state drive, as agreed by the Government of Saint Vincent and the Grenadines and the World Bank.

**Metadata:** Detailed documentation needs to be provided for each data set. This metadata must include description, source, and contact, spatial and attribute keywords, date, accuracy, restrictions. A description of attributes should to be provided for vector and tabular data sets. Spatial data must include details of projection. The World Bank has created metadata standards for internal use, based on ISO 19115:2003, that meets these requirements. Please refer to World Bank metadata standard for details. The metadata standard to be used in this consultancy will be discussed with the involved ministries and the responsible for the National Spatial Data Infrastructure.

**Derived data:** All derived data generated for this project belongs to the Government of Saint Vincent and the Grenadines and the World Bank and must be transferred under these terms.

**Periodic updates:** Ongoing updates of this data made by the selected must be provided as they are created.

**Disposal of data:** The selected firm is free to maintain copies of data collected and developed through this project, without conflicting the terms of any license agreements. Ownership remains with, and must be stated as, the Government of Saint Vincent and the Grenadines and the World Bank. Further data

sharing is permissible under these terms only if the data is made freely available without cost.

## CARTOGRAPHIC STANDARDS

### British West Indies (BWI) Grid parameters

Grid	British West Indies
Projection	Transverse Mercator
Spheroid	Clarke 1880
Datum	St. Vincent
Unit of measurement	Metre
Meridian of Origin	62° West of Greenwich
Latitude of origin	Equator (0°)
Scale factor at origin	0.9995
False Coordinates of Origin	400000 Easting
	Nil Northing

### Universal Transverse Mercator Zone 20

Grid	UTM Zone 20
Projection	Transverse Mercator
Spheroid	WGS 1984
Datum	WGS 1984
Unit of measurement	Metre
Meridian of Origin	63° West of Greenwich
Latitude of origin	Equator (0°)
Scale factor at origin	0.9996
False Coordinates of Origin	500000 Easting
	Nil Northing

## **APPENDIX D**

### **1. Final Completion Report Template**

The consultant is free to format the Final Completion Report to his normal presentation, but the report shall contain the following minimum content

This report shall address all aspects of the Project implementation, including financial summaries, suggestions and recommendations for future design and construction methods, technical specifications, any changes in Special Conditions of Contract and photographs. Three sets of 'as-built' Drawings and CDs /DVDs containing all the information contained in the Final Report is to be presented to the Client. This will be prepared by the consultant within 12 weeks of completion of the works contract.

A typical Contents page is as shown below:

- Title Page
- Table of Contents
- Acknowledgements
- Executive Summary
- Background
- Aims and Objectives
- Methodology (including codes and standards used)
- Implementation
- Outputs and Results (including designs and design calculations)
- Outcomes
- Conclusions
- Recommendations
- Lessons learned
- References
- Appendices