

VOLCANIC ERUPTION EMERGENCY PROJECT (VEEP)

Terms of Reference

Consultancy Services for design & construction supervision of bridges in the following:

Site 1: London (Sandy Bay),

Site 2: Noel (Sandy Bay

Site 3: Overland

Ministry of Finance, Economic Planning, and Information Technology

Economic Planning Division

Kingstown,

Saint Vincent and the Grenadines

July 2022

TERMS OF REFERENCE

1. Background

The Government of Saint Vincent and the Grenadines (GoSVG) has received financing from the World Bank toward the cost of the Volcanic Eruption Emergency Project (VEEP), and it intends to apply part of the proceeds to payments for goods, works, non-consulting services and consulting services to be procured under this project. This project will be jointly financed by the European Union - Caribbean Regional Resilience Building Facility Fund.

The Ministry of Transport, Works, Lands and Physical Planning (MoTW) in collaboration with the Roads, Buildings and General Services Authority (BRAGSA) has identified a number of priority investments to reduce the country's physical and economic vulnerability to adverse natural events through the piloting of adaptive measures to build resilience to current and future climatic changes.

One of the priority investments is the construction of three (3) concrete bridges in London (Sandy Bay), Noel (Sandy Bay) and Overland located on the North Windward side of the island. These two-lane bridge systems with foot walks are to be used to maintain continuous access from one village to another, cross uneven ground, and ford obstacles so that residents can conduct their daily activities without disruptions.

2. Objective

The objective of the proposed consultancy is to provide technical support to the client, Economic Planning Division (EPD), Ministry of Finance, Economic Planning and Information Technology, Kingstown, St. Vincent for the preparation of the detailed designs and bills of quantities, preparation of bidding documents and construction supervision of infrastructure works during the construction and defects liability periods for the construction of the bridges and roads. The outcome of the consultancy will be the adherence of the completed infrastructure works and other engineering activities to the approved contract documents and agreed quality control procedures, prior to handing over of the physical assets to the GoSVG.

3. Duration

It is expected that the consultancy will be completed over a period of 13 months for design, tendering, and procurement of contractors (Phase 1), 12 months for completion of infrastructure works, and 12 months for the defects liability period (Phase 2)

4. Design brief and general requirements

The EPD as the client, will be contractually responsible for the consultant's assignment, however, the consultant will work closely with the MOTW and all other relevant departments and agencies. The consultant will be responsible for carrying out pre and post contract services to ensure compliance with the approved engineering designs, bills of quantities, working drawings and technical specifications for all civil works in accordance with acceptable international design standards and engineering codes of practice.

It is understood that the consultant will provide all the necessary technical and support staff to administer, manage, and supervise the project and fulfill the requirements of the EPD, according to the drawings and contract documents. The consultant will also carry out any additional services, which the EPD may reasonably require, relating to the design and supervision of the project.

To ensure adequate project management and the implementation of agreed quality assurance/quality control procedures, the consultant must include in the technical proposal, a suitable Design and Construction Supervision Management Program emphasizing project organisations, setup to meet its budget and schedule objectives, resources management, environmental, traffic and safety administration, engineering value analysis, performance and critical path planning and monitoring, and project reporting systems.

The consultant will liaise closely with the EPD to ensure that communities are consulted, informed and forewarned of planned site activities in a timely manner. The communities are to be given opportunities to ask questions and be kept informed of the nature, timing/duration, extent of activities and short, medium, and long-term impacts on them. These consultations should be documented, and a log kept of all such communications. The following requirements apply to all bridges to be designed and constructed.

Site locations are presented in the map contained in Annex 1, site photos are presented in Annex 2.

User Requirements

The three bridges would serve as part of the Windward Highway; a road network, made up of primary two-lane asphalt and concrete pavement roads and connecting feeder roads. The user requirements of the bridge will be based on access to residential properties, commercial farming activities and activities associated with the manufacture and transportation of local products from surrounding cottage industries.

- The bridge will be a double lane, clear span bridge with a 7 m wide deck plus a protected 1m wide raised sidewalk with handrails. Additionally, the design will accommodate internal, protected utility runs for water, electrical, and fiber optic cable services.
- The bridge span and deck height will be a function of the hydrological and hydraulic studies. The deck height will permit continuous use during at least a 1:50-year storm event.

Design Requirements

General

The design of the structure shall consider stability, strength, serviceability, durability, and redundancy. The design shall be carried out in accordance with appropriate British or American Standards or approved equal.

In carrying out the design, the Consultant shall also consider the river hydraulics that will govern the necessary horizontal and vertical clearances, scour, wing walls and embankment protection and aggressive tropical marine environment.

The bridge aesthetics should be in harmony with its forest and agricultural surroundings.

Standards

The design standards to be used for the design of elements of the structure will be based on applicable AASHTO or internationally equivalent standards. Applicable standards shall be proposed by the design engineer for client approval based on the selection of a design option during the development of the feasibility analysis. Additionally, seismic design shall conform to the requirements presented in the following.

- SEAOC – Earthquake loads with ground acceleration factors from UWI Seismic Research Unit

Stability

The structure and its component elements shall be designed for both static and dynamic stability under overturning, vertical and horizontal forces. Worst case combinations of design forces shall be considered to ensure that structural resistance exceeds the imposed loads.

Strength

MoTW is in the process of selecting the design vehicle to be applied to this effort in conjunction with an ongoing bridge design project. Once identified, MoTW will provide this requirement to the consultant.

The structure and its elements shall be designed for strength in accordance with appropriate Standards together with the requirements of this document as follows:

- (a) Determine the appropriate dead and live loads
- (b) Combine and factor the loads to establish the design forces on the structure.
- (c) Determine the worst-case effect of the design loads on the component elements of the structure
- (d) Determine the design strength required for the various component elements.

The effects of fatigue from normal conditions shall be considered along with the effects of hurricane and flood conditions.

Bridge designs shall be consistent with the most updated and relevant AASHTO LRFD Bridge Design Specifications.

Serviceability

The structure and its elements shall be designed for serviceability by controlling or limiting settlement, horizontal displacement, and cracking; as well as lahars and debris flows, including logs and fallen trees.

Under the appropriate load combinations for serviceability design, vertical deflection shall be limited in accordance with the requirements of the appropriate material and design standards as the three proposed sites are within approximately 100 meters of the Atlantic Ocean.

Durability

The structure and its elements shall be designed for durability with the use of appropriate material and workmanship specifications and the recognition of hurricane events as the three proposed sites are within approximately 100 meters of the Atlantic Ocean.

Redundancy

Consideration should be given in the design of the structure and its elements, to allow for redundancies to prevent failure of the structure in the event of the loss of a major element.

Design Life

Design life is the period for which a structure or an element of the structure remains fit for use for its intended purpose with appropriate maintenance. It is recommended that a minimum design life of 50 years be adopted for this structure.

Design life should be based on consideration of maintenance expenditure. The designer, in consultation with the client will determine an appropriate maintenance regime consistent with the adopted design and materials that will achieve the design life.

Care will be taken when considering design life and maintenance regimes for inaccessible elements of the structure. Such elements should have a design life (with no maintenance) equal to the design life of the structure.

At the end of its design life, the structure should have adequate strength to resist ultimate loads and be serviceable but may have reached a stage where further deterioration will result in inadequate structural capacity, however at this stage, capital expenditure should be considered for an extended service life.

Scour and Siltation

The structure and its elements shall be designed to remain stable, of sufficient strength and not become overstressed in the event of temporary or permanent changes in the geometry of the riverbed and channel embankments due to scour or siltation. This design consideration is particularly important given the recent eruption of the La Soufriere volcano, which deposited large volumes of pyroclastic materials, together when mixed with the ash, forms lahars. This material composed of the grainy debris mixed with water, flows from the upper Water shed areas and along the river valley, causing extensive erosion and sedimentation on the lower parts and close to the mouth of the rivers. The communities in the North Windward side of the island, particularly in the proposed bridge sites, are most vulnerable to lahar flows and flash flooding, especially during the rainy season.

The Consultant shall design river embankment protection upstream and downstream to the extent required to maintain the structural integrity and use of the bridge during and after a flood event.

Approach Road to structures

The Consultant shall consider whether the approach roads should maintain the same horizontal and vertical alignments and finalise the design accordingly.

5. SCOPE OF SERVICES

The scope of services shall include, but not be limited to, the following main activities:

General Services

The services shall be carried out in accordance with generally accepted standards of professional practice, following recognized engineering and management principles and practices for Pre and Post Contract Services. The consultant's scope of work is understood to cover all activities necessary to accomplish the stated objectives of these services while adhering to the principles and practices, whether a specific activity is cited in this Terms of Reference (TOR).

The services will include an environmental and hydrological study and the recommended options for the following infrastructure works: (i) London (Sandy Bay) (ii) Tourama and (iii) Noel (Sandy Bay). It will also include: (a) detailed engineering design and prepared technical specifications and the bills of quantity; and (b) construction supervision of works during the construction period and defects liability period including the preparation of a final completion report.

Phase 1: Preparation of Design and Bidding Documents

Activities under this phase include all requirements to complete designs, required studies and bid document preparation support.

1. Task 1 - Data Collection and Analysis of the sites

The areas of study are captured in the pictures in Annex 1. The investigation and analysis of the subject area will entail field, laboratory, and desk reviews.

The field investigation will include inter-alia, topographic surveys, geotechnical surveys and soil tests and analyses, all aimed at characterizing the surface and sub-surface nature of the site.

2. Task 2 - Hydraulic and Hydrologic Analysis

Under this task, the consultant shall present a hydraulic analysis of each of the stream systems for use in informing the bridge designs. This will include an analysis of stream flow patterns and flood stage analysis based on rainfall/runoff characteristics established for each system.

The April eruption of the La Soufrière volcano deposited enormous amounts of ash, particularly in the project area. Observations to date suggest this has resulted in an increase in associated runoff bringing streams to flood stage with significantly lower rainfall rates than experienced in the pre-eruption state. Additionally, the rainfall patterns for the northeast portion of the island are significantly higher than other parts of the island owing to its Atlantic exposure and orographic effect.

To calibrate the current conditions, the consultant, using approved modeling software, shall produce an analysis of stream flood response to guide the design process. This shall be prepared in a manner consistent with internationally accepted best practices.

The consultant shall deploy temporary recording rain gauges in appropriate locations in the associated watersheds. Due to the proximity of the stream systems and the small size of their associated watersheds, this may be accomplished with 1 or 2 strategically placed rain gauges. Near the proposed work sites, the consultant shall deploy temporary recording stream gauges, one for each river. Data are to be collected for a minimum of 3 months.

To establish stream morphology, the consultant shall collect stream cross sections to support the flow analysis. These shall be collected at 10-meter intervals from the worksite to the discharge downstream and upstream for approximately 1Km. The consultant shall collect all other data required to support the modeling software as required.

Based on the data collected, the consultant shall produce a model of rainfall/stream stage response to establish both river stage and concentration times.

Design Storm

It is desired to design the bridges for a flood resulting from at least a 50 yr storm event, or the most critical/applicable storm event. Based on the observed rainfall/flood stage relationship, the consultant will attempt to calculate the most applicable rainfall event using available data. While the E.T Joshua has a long-term rainfall dataset, this area is not representative of the project area and records significantly less rainfall than experienced on the north windward side of the island. The Central Water and Sewage Authority (CWSA) operates a network of rain gauges throughout the island. With this system they have archived approximately 10 years of data.

Based on mutual agreement with the client, analytical results, and professional judgment, the consultant shall determine an acceptable maximum rainfall input to provide the basis for the modeled flood response. This result, based on the stream model developed, shall be used as a design parameter for the bridge design. As a side note, the Christmas Trough of 2013 was an unusually major rainfall event. When establishing the design storm, this event may provide a useful benchmark.

3. Task 3 - Environmental, Social, Impact Assessment and Management Plan

In accordance with World Bank safeguards requirements, the consultant shall conduct an Environmental, Social, Impact Assessment (ESIA) for the construction of the three bridges. This assessment shall provide a description of the projects and characterize the environmental and socioeconomic impacts resulting from the bridge constructions including impacts and mitigations associated with actual construction as well as impacts to the affected population resulting from the addition of the bridges to the region.

This assessment shall consider two alternatives, the construction of the bridges and leaving the environment as it currently exists.

This document is intended for public information and shall be written in a manner that is easily understood by the public. The actual assessment document shall be approximately 30 pages in length exclusive of technical supporting annexes. On completion, the draft assessment shall be made available to the public for a two-week review period. The PIU will publicly advertise the availability of the document. At the conclusion of the review period, the consultant shall arrange for a public meeting in the affected area and present to the public the findings of the assessment. At the conclusion of this meeting, two weeks will be allocated to receive additional comments through a procedure established by the PIU. At the conclusion of the comment period, the consultant shall address or incorporate comments into the final ESIA.

Once the final ESIA is prepared, the consultant shall make necessary adjustments to the project design to conform with the ESIA findings.

On completion the consultant shall prepare the Environmental, Social Management Plan to be included with the construction bidding documents. This will include requirements for the construction contractor to mitigate potential impacts resulting from construction activities.

Annex 3 presents a suggested format for the ESIA report.

4. Task 4 - Feasibility Analysis

Bridge design options

For each bridge site, the consultant shall prepare a feasibility analysis for bridge designs considering site characteristics and construction requirements. While all bridges are to be clear span designs across the active channel, the consultant shall consider the stream morphology and local topography in the selection of options to optimize, to the extent practical, the span length. Among the issues associated with the construction sites is transportation access.

The terrain is mountainous, and the road network has numerous curves. This places limitations on the length of articles that can be transported from the port to the construction site. Coastal access to the sites in the area is not feasible. This places limitations on the ability to incorporate precast girder elements in the bridge design. If a pre-stressed girder assemblies are to be incorporated, the consultant, considering transportation limitations will

determine whether precast assemblies are an option. The alternative is to cast pre-stressed elements in the vicinity of the construction site.

Alignments, approaches, and site requirements

Access to the rivers must be maintained for the clearing of debris by heavy machinery and the continued mining of the Noel River by BRAGSA.

Additional to the basic bridge design options, the consultant shall evaluate existing alignments and approaches to determine their suitability and assess the need for selecting alternative alignments to optimize construction designs. As part of this process, the consultant, based on this analysis, shall identify potential sites suitable for staging construction equipment and fabrication of bridge component assemblies as needed.

At the conclusion of this analysis, the consultant shall prepare a report presenting their findings together with scale maps of anticipated encroachments on land outside the current ford and roadway alignments. This will be used by the client to identify potential encroachments on privately held land.

5. Task 5 - Concept design

Based on the approach selected under task 3, the consultant shall prepare a concept design which will include architectural drawings, site layouts, alignments, and approaches for the three bridges. Drawings will include a detailed map of potential encroachments and concept drawings for river and bridge defense works.

The concept design is expected to include the following drawings, but it not limited to:

- Topographical site plan
- River profiles and cross sections
- Existing river crossing layout and approach roads
- Proposed bridge layout and approach roads
- General arrangement of bridge structure (abutments, deck, wing walls)
- Cross sections (abutment, deck, wing walls)
- Embankment protection layout and cross sections
- Road cross section
- Road and bridge profile

6. Task 6 - Preliminary Design

On receipt of approval of the concept design, the consultant shall prepare detailed preliminary engineering designs for all bridge structures and roadway improvements. These shall include presentation of the final alignments, detailed drawings for all bridge structures including:

- Approaches and abutments
- All associated bridge elements (girders, decking, superstructure, etc.)
- Embankment protections and river training works
- All existing by-pass roads are to be maintained and incorporated as part of the Contractor's site setup.

The preliminary design report is also expected to contain preliminary design drawings and cost estimates.

The Client shall review and conduct an independent engineering check on the designs (civil, structural, electrical, mechanical, architectural) prepared by the consultant.

7. Task 7 - Detailed Engineering Design

Following approval by the Client, the consultant shall proceed to complete final detailed engineering documents and technical specifications for both sites. The consultant shall incorporate the mitigation plan resulting from the ESIA, as necessary.

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

Performance and inspection requirements

The consultant shall prepare a construction brief for use in the construction bidding specifications. These will detail specific contractor requirements, based on the agreed standards, for each phase and type of construction involved in the contract.

Specific standards and requirements shall be prepared for inclusion in the contract to include all phases of construction including, but not limited to:

- Materials specifications and inspection requirements
- Construction inspection and testing requirements
- Special inspection and testing requirements for pre-stressed concrete; if required.
- Final acceptance inspection requirements

The consultant shall be responsible for making a presentation of the draft final report to the Client and the MoTW and is required to do this via the use of a PowerPoint presentation. The consultant shall provide complete calculations, showing methodology and step by step progression from field and desktop data to the final solution, construction drawings and specifications. The objective of this presentation/workshop is the transfer of knowledge and know-how for the design of small bridges and roads.

Included with the detailed design, the consultant shall provide a detailed reference to all applicable design and testing standards incorporated in the final design and applicable to the construction phase of the project. These standards and requirements will be included with the bid documentation.

Final Design Report

The consultant will provide a final design report.

8. Task 8 - Bid documentation and Procurement

The Client shall prepare the bid documents. The consultant however will:

- a. Provide construction drawings, BoQs and technical specifications to the Client.
- b. Provide advice to the Client during the procurement process, including bid invitation wording, attendance at pre-bid site meeting, clarifications on queries received from the bidders, preparation of the bid

evaluation report; and the preparation of the minutes of all meetings, and recommendation for contract award in accordance with the World Bank's procurement guidelines.

9. Task 9 – Contract Documentation

The consultant shall:

- a. Prepare twelve (12) physical copies of the Contract Documents for signature by the Contractor and the Client.

Phase 2: Construction Supervision

General Activities

Under phase 2 of this contract, the consultant shall provide construction supervision and quality control services for the construction of the three bridges. This includes onsite supervision of all construction and fabrication activities as well as inspections of materials and verification of all required testing. The consultant shall serve as the client's technical representative during the construction process.

Specifically, the consultant will:

- Advise the contractor on the interpretation of the engineering drawings and technical specifications and prepare and issue supplementary drawings, specifications, and instruction during the construction period, as required.
- Review the contractor's work plan including construction schedule and prepare comments for the client on the procedures, methods, and sequence of the work.
- Review engineering drawings and prepare draft amendments for the client, as needed.
- Consider and advise on alternative methods, equipment and materials proposed by the contractor and prepare clearances for the client.
- Provide advice to the EPD on the validity of any changes proposed by the contractor or by the client for additions or deletions to the contract and advise on the cost and issue of variation orders to the contractor.
- Prepare reports on contractor's progress, progress, and payment certificates for the Client.
- Maintain records related to the contracts.
- Arrange and prepare minutes of the monthly site meetings.
- Review the contractor's monthly progress reports, provide to the client comments, and recommend any appropriate action as required.
- Provide technical advice to the Client and recommend appropriate actions if needed during the construction phase on planning and scheduling.
- Conduct budgeting, estimating, and cost and quality control.
- Submit monthly progress reports to include:
 - Planned and actual progress of works
 - Status of incomplete works
 - Material, labour, plant availability
 - Revised schedules
 - Variations and change orders
 - Financial particulars

- Quality Assurance and Quality Control
 - Progress photographs
 - Environmental monitoring
 - Factors adversely affecting progress of project
 - Outstanding decisions
 - Weather conditions
 - Accidents on site and any other relevant details.
- Prepare Quarterly Financial Reports including:
 - Contract particulars
 - Contractor's claims
 - Projected final costs of projects (Revised BOQ)
 - Projected net variances
 - Expenditure to date
 - Cash-flow projections.

Project Management Information System

The Consultant will propose the setting up of a new computer-based Project Management Information System (PMIS), which will keep an up to date record of the design reports, procurement process for the award of civil work contracts, signed contract, BOQs, quality control management system, environmental and social management system, progress reports, minutes of the meetings, certification of contractor's invoices, completion reports and any other project related information on a web-based share point information system, which can be used by all the three parties: the consultant, the client and the funding agency. The EPD will provide the list of authorized users to whom a password would be given for access to the PMIS.

Resident Services during Construction

The consultant shall provide full-time onsite construction supervision services to monitor and document construction activities. Specifically, the consultant shall:

- Provide full-time resident engineer and other staff services during the construction phase.
- Verify that quantities and quality of construction materials received by the contractor meet required specifications
- Ensure that the contractor is carrying out the work in accordance with the contract documents and communicate with the contractor and the client regarding deficiencies in the work and other matters of direct interest or concern. Where necessary, check the contractor's survey lines, levels, grade, and the results of laboratory testing.
- Monitor and report on the contractor's compliance with the ESMP.
- Arrange for all necessary testing required from the material testing laboratory for the samples collected from the completed works and carry out technical inspection of materials to ensure that they are consistent with the approved technical specifications.
- Investigate and report on all unusual circumstances that may arise during construction.
- Carry out final inspection at the conclusion of the construction contract as part of the acceptance program of the client.

Post-Construction Services

- a. Ensure that the contractor prepares any necessary maintenance manuals.
- b. Ensure that the contractor prepares accurate “as-built” drawings of the works.
- c. Carry out site inspections and identify deficiencies during the contract defects liability period, monitor the rectification of deficiencies and prepare final acceptance documentation at the expiry of the defect liability period.
- d. Prepare a Project Completion Report on the construction contract, including the as-built drawings.

INPUTS

The Client

- a. Have access to all plans, pictures, reports, topographical surveys, etc. of the proposed works that might be necessary and applicable in the execution of the work required under this TOR.
- b. Access to the project sites,
- c. The client shall provide liaison with other ministries, departments, and authorities, etc. to introduce the consultant. The consultant however shall be fully responsible for collecting data, information, etc. from these agencies,
- d. The client may assign staff to the consultant for training in the various aspects of the work
- e. The client will assist the consultant in obtaining visas, work permits, driving licenses, car registration, etc. and any other formalities found necessary for the consultant’s personnel entering or leaving Saint Vincent and the Grenadines for the purpose of carrying out the services.
- f. The client through MoTW/BRAGSA will make available laboratory facilities and staff for use by the consultant in performing tests, both in the laboratory and in the field to the extent that they are capable of, or have the necessary equipment to undertake such tests.

The Consultant

The consultant will be required to undertake the various activities presented under this TOR. The Consultant will provide the equipment and software required to carry out the assignment and be responsible for obtaining all additional information for the execution of the services necessary for the project.

REPORTING REQUIREMENTS

Contract Level Reporting

During the execution of this contract, the consultant shall provide in addition to deliverables required the following contract management reports:

- Report: Monthly progress reports
Report to present summary of activity and progress, issues encountered and recommended solutions, expected activities during the coming month.

Schedule: Monthly within 5 days after closing the previous month

- Report: Issues affecting contract execution
Contractor shall any significant issues encountered that may affect contractor performance or delivery schedules.

Schedule: As needed report within 1 day of identification of significant issues

- Report: Record of Meetings

The contractor shall maintain a record of all meetings taken during the execution of this contract. Report shall include a summary of meeting activities and discussions including issues addressed and agreed actions, assignment of agreed responsibilities and timeline, List of attendees, affiliation, and contact information.

Schedule: As needed report within 2 days of meeting.

Contract Deliverables

The Consultants shall submit the following deliverables to EPD’s satisfaction:

Table of Deliverables

Phase	Deliverable	Description	Format and Due Date
Phase 1	Inception Report and workplan	Report outlining the understanding of the work to be conducted, detailed description of each step to be taken, activity to be executed, resources needed and the subsequent timelines for completion of this Consultancy Engagement. The Inception Report should include a Gantt chart for review by relevant stakeholders	Within two (2) weeks of contract signing
Phase 1	Task 1 -Data Collection and Analysis of the sites	Summary report detailing findings including topographic surveys, geotechnical surveys and soil tests and analyses, all aimed at characterizing the surface and sub-surface nature of the site.	Within six (6) weeks of contract signing
Phase 1	Task 2: Hydraulic and Hydrologic Analysis	Summary report detailing modeling results and design storm parameters including summary of methodology, analytical results and data collected to be presented separately in a format suitable for use in future analysis.	Within sixteen (16) weeks of contract signing
Phase 1	Task 3 - Environmental, Social, Impact Assessment	Draft Final ESIA for public review and comment Final ESIA within 2 weeks of receipt of comments together with all	Within twelve (12) weeks of contract signing

	and Management plan	<p>presentation materials supporting public meetings</p> <p>Once finalized, the consultant shall provide the Environmental, Social Management Plan (ESMP) for inclusion in contract bidding documents.</p>	
Phase 1	Task 4 - Feasibility Analysis	Report presenting options identified for consideration in bridge design with recommendations	Within fourteen (14) weeks of contract signing
Phase 1	Task 5 - Concept design	Report presenting concept design which will include architectural drawings, site layouts, alignments, and approaches for the three bridges and other findings as required under this task	Within eight (8) weeks from selection of bridge design option under task 3
Phase 1	Task 6 - preliminary Design	<p>Detailed preliminary engineering designs for all bridge structures and roadway improvements. These shall include presentation of the final alignments, detailed drawings for all bridge structures including:</p> <ul style="list-style-type: none"> • Approaches and abutments • All associated bridge elements (girders, decking, superstructure, etc.) • Embankment protections and river training works <p>The preliminary design report is also expected to contain preliminary design drawings and cost estimates.</p>	Within eight (8) weeks from concept approval under task 4
Phase 1	Task 7 - Detailed Final Engineering Design	Complete engineering design and contractor work requirements including specifications, drawings, bill of quantities (BOQ) with separate priced BOQ	Within ten (10) weeks from concept approval under task 4
	Task 8 - Bid documentation and Procurement, including Bid Evaluation	Provide construction drawings, BoQs and technical bidding specifications to the Client for inclusion in World Bank standard bidding documents. Provide advice and support to the Client during the procurement process.	Within four (4) weeks of completion of Task 7, for production of Bid documentation. Variable time for procurement process.
	Task 9 – Contract Documentation	Prepare twelve (12) physical copies of the Contract Documents for	Within two (2) weeks of

		signature by the Contractor and the Client.	completion of Task 8.
Phase 2	Supervision Plan	Report outlining the understanding of the work to be conducted, detailed description of each step to be taken, activity to be executed, resources needed and the subsequent timelines for completion of this Consultancy Engagement. The Inception Report should include a Gantt chart for review by relevant stakeholders This report is to be based on the Construction contractors approved work plan	Within two weeks of receipt of construction contractor's work plan
Phase 2	Monthly Construction Progress Reports	Reports detailing construction activities, observations, issues encountered and notes on contractor performance	Monthly in accordance with the supervision plan
Phase 2	Project Completion Report	Complete end of project summary report with as built drawings. The 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 (3) sets of 'as-built' drawings and electronic copies of all the information contained in the Final Report are to be presented	in accordance with the supervision plan

Deliverable Requirements

Deliverables shall be provided in conformance with the following requirements.

Four (4) hard copies and one (1) electronic copy of all reports are to be submitted to the EPD. Drawings are to be submitted on 16" x 22" paper and in electronic AutoCAD format (AutoCAD 2022 and AutoCAD 2018 Versions).

MANPOWER SCHEDULING AND COSTS

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

- Consultant’s remuneration
- Consultant’s out of pocket expenses
- Support staff services
- Equipment rental
- Communication costs
- Report reproduction costs
- Contract documentation costs
- Supervision costs
- Survey costs
- Accommodation
- Transportation
- Value-added taxes or withholding taxes where applicable

WORKING TEAM MINIMUM REQUIREMENTS

Firms should have experience in building design and supervision with at least two (2) successfully completed similar assignments during the past five (5) years. Firms should have qualified professional staff in the following areas: Civil/Structural Engineering, Architectural, Mechanical (electrical and plumbing) Engineering and Quantity Surveying.

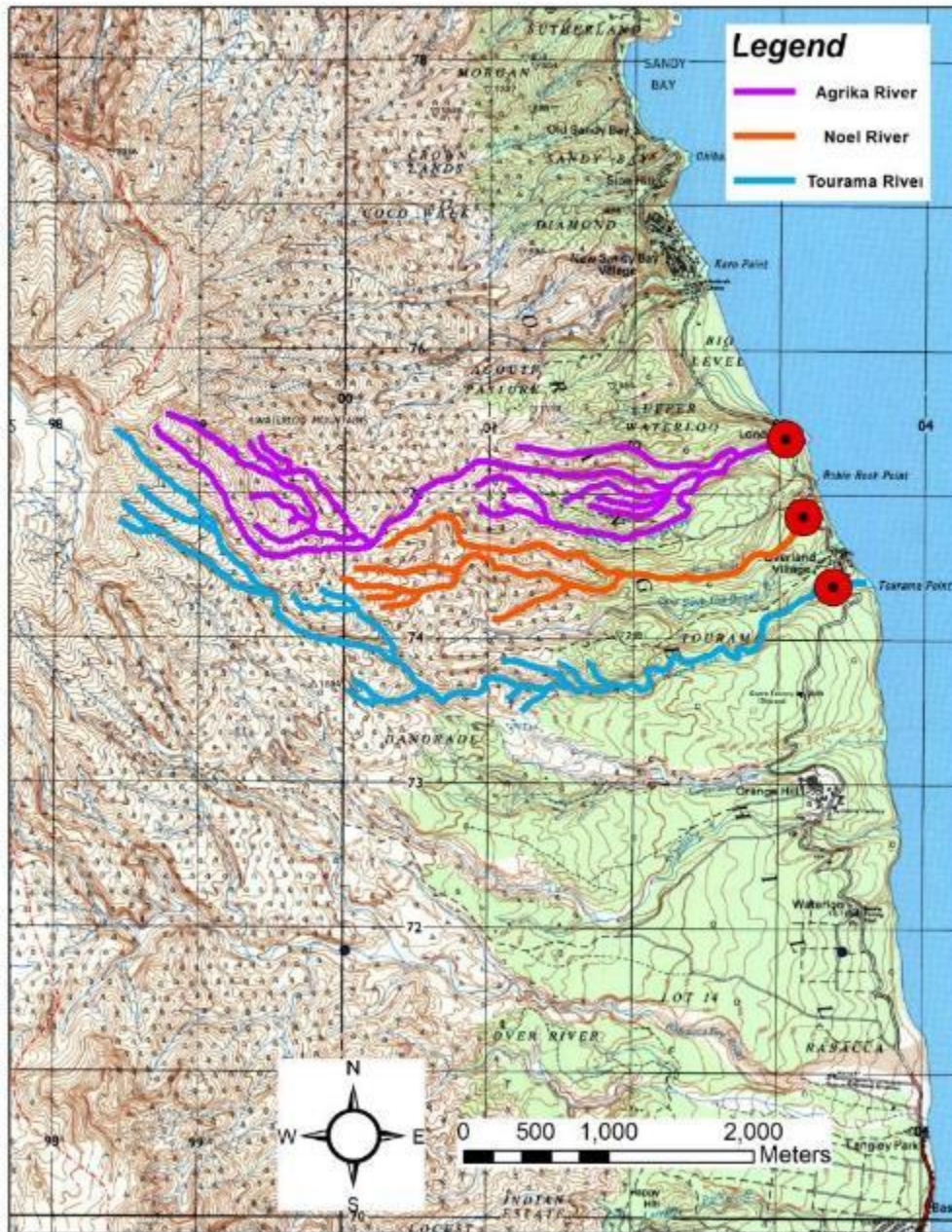
WORK TEAM MINIMUM REQUIREMENTS		
Position	Qualifications	Specific experience
Team Leader/ Civil engineer	BSc in Civil Engineering plus post graduate study in related field.	Advisor, consultant, or management positions in development of projects related to road, bridge and river flood protection works. Experience not less than 20 years. Minimum 15 years’ experience with pre-stressed concrete structures.
Geotechnical Engineer	BSc in Geotechnical Engineering	Experience in bridge foundation design and general experience not less than 10 years.
Structural Engineer	BSc in Civil Engineering	Experience in bridge design. General experience not less than 15 years.
Hydraulics/Hydrology Engineer	MSc in Hydraulics/Hydrology	Experience in scour calculations, river embankment protection. General experience not less than 15 years
Mechanical/Plumbing Engineer	A relevant degree from an accredited university programme.	10 years minimum post-qualification experience with at least 5 years spent in design of infrastructure projects.
Resident Engineer	BSc in Civil Engineering	10 years site experience in road, bridge, and general civil works
Land Surveyor	Licensed Surveyor or BSc in Land Surveying	At least 8 years experience as lead surveyor with experience in road surveys advantageous.

EIA Specialist	BSc. in Natural Sciences or related field	At least 10 years experience in terrestrial and riverine environments.
Quantity Surveyor	BSc in Quantity Surveying	At least 10 years experience in civil and building works and familiar with CESMM

The firm must select and hire other non-key experts (including a Clerk of Works) as required according to the profiles identified in the Organisation & Methodology and/or these ToR. All experts must be independent and free from conflicts of interest in the responsibilities they are undertaking.

ANNEX 1 - Map of Project Sites

PROJECT LOCATIONS



ANNEX 2 - Project Site Photos



Figure 1. Photo showing the London bridge



Figure 2 Photo showing the Noel Ford



Figure 3. Photo showing the Noel Ford



Figure 4. Photo showing the Overland Ford



Figure 5. aerial view of the Overland Ford



Figure 6. aerial view of the London Bridge



Figure 7. aerial view of the Noel Ford

Annex 3
Recommended Format
Environmental. Social Impact Assessment

- 1. Cover page**
- 2. Table of contents**
- 3. List of acronyms**
- 4. Executive Summary** - (not more than 2 pages)
- 5. Purpose and Need (for the Project)**
- 6. Description of the Project**
 - Proposed Project
 - Alternatives considered
- 7. Legal Framework** – (including Applicable Bank Safeguards and relevant St. Vincent national laws and regulations)
- 8. Description of the Existing Environment** – (*relevant to Project activities*)
 - Biological
 - Physical
 - Socioeconomic
- 9. Analysis of project Impacts**
 - Biological
 - Physical
 - Socioeconomic
- 10. Mitigation Analysis and Mitigation Plan**
- 11. Record of consultations**
- 12. List of Preparers**
- 13. References**
- 14. Technical Annexes**