

BHUTAN: HYDROMET SERVICES AND DISASTER RESILIENCE REGIONAL PROJECT – Sub-component B

Design, Build and Equipping a National Emergency Operations Centre

Terms of Reference (DRAFT will be finalized at the time of issues of RFP)

Abbreviations and Acronyms

ARG	Automatic Rain Gauge	ARG	Automatic Rain Gauge
AWOS	Aviation Weather Observation System	AWOS	Aviation Weather Observation System
AWS	Automatic Weather Stations	AWS	Automatic Weather Stations
BCR	Benefit-Cost Ratio	BCR	Benefit-Cost Ratio
BWDIRP	Bhutan Weather and Disaster Risk Management Improvement Project	BWDIRP	Bhutan Weather and Disaster Risk Management Improvement Project
CAP	Common Alerting Protocol	CAP	Common Alerting Protocol
CAS	Country Assistance Strategy	CAS	Country Assistance Strategy
CBA	Cost-Benefit Analysis	CBA	Cost-Benefit Analysis
CBDRM	Community Based Disaster Risk Management	CBDRM	Community Based Disaster Risk Management
CCA	Climate Change Adaptation	CCA	Climate Change Adaptation
CPF	Country Partnership Framework	CPF	Country Partnership Framework
CSO	Civil Society Organization	CSO	Civil Society Organization
DA	Designated Account	DA	Designated Account
DDM	Department of Disaster Management	DDM	Department of Disaster Management
DHMS	Department of Hydromet Services	DHMS	Department of Hydromet Services
DM	Disaster Management	DM	Disaster Management
DMIS	Disaster Management Information System	DMIS	Disaster Management Information System
DPA	Department of Public Accounts	DPA	Department of Public Accounts
DRM	Disaster Risk Management	DRM	Disaster Risk Management
DRR	Disaster Risk Reduction	DRR	Disaster Risk Reduction
EMF	Environmental Management Framework	EMF	Environmental Management Framework
EOC	Emergency Operations Center	EOC	Emergency Operations Center
ESMP	Environmental and Social Management Plan	ESMP	Environmental and Social Management Plan
EU	European Union	EU	European Union
EWS	Early Warning System	EWS	Early Warning System
FM	Financial Management	FM	Financial Management
FMS	Financial Management Specialist	FMS	Financial Management Specialist
GAAP	Governance and Accountability Action Plan	GAAP	Governance and Accountability Action Plan
GDP	Gross Domestic Product	GDP	Gross Domestic Product
GEO	Group on Earth Observations	GEO	Group on Earth Observations
GFDRR	Global Facility for Disaster Reduction and Recovery	GFDRR	Global Facility for Disaster Reduction and Recovery
GIS	Geographic Information System	GIS	Geographic Information System
GLOF	Glacier Lake Outburst Flood	GLOF	Glacier Lake Outburst Flood
GNHC	Gross National Happiness Commission	GNHC	Gross National Happiness Commission
GPS	Global Positioning System	GPS	Global Positioning System

GRS Grievance Redress Service
GTS Global Telecommunications System
HFA The Hyogo Framework for Action 2005-2015
IBRD International Bank for Reconstruction and
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ICB International Competitive Bidding

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1.0 Context

The World Bank has provided a grant to improve weather services and strengthen capacity of Disaster Risk Reduction (DRR) and Emergency Management (EM) systems in Bhutan through the Bhutan Hydromet Services and Disaster Resilience Regional Project (HSDRRP). The HSDRRP seeks to strengthen the Royal Government of Bhutan's capacity to provide weather and hydrological forecasting services including delivery in priority sectors and disaster related early warning systems and improve national and district level capacity for disaster preparedness and response.

At the national level, the institutional beneficiaries of the project are the (i) National Center for Hydrology and Meteorology (NCHM), which is mandated to provide weather and climate information and services; (ii) Department of Disaster Management (DDM), which is the overall coordinating agency for Disaster Risk Management (DRM) in the country; (iii) Department of Agriculture (DOA), which is mandated to improve livelihood in terms of crops production and disseminating information to facilitate the agriculture-dependent population.

Improved meteorological and hydrological services will also benefit users in a wide range of sectors including disaster management, civil aviation, agriculture, water infrastructure design, subnational government agencies and local communities, particularly those responsible for supporting climate-sensitive sectors. In this particularly, the aviation sector will greatly benefit which will also increase the safety of air travelers. At the economy-wide level, improved weather and hydro-met services will benefit Bhutan's general public and key weather and climate-sensitive sectors.

Similarly, strengthened preparedness and response capacity for disaster management would benefit the entire nation. Under this project, particularly the Royal Bhutan Helicopter Services Limited will benefit which will establish an air search and rescue capacity in the country as well as emergency medical evacuation and aerial forest fire suppression capacities.

The Project seeks to strengthen the capacity of NCHM, DDM, DOA and RBHSL yielding benefits both at national and regional levels. National benefits include improved weather and climate services and strengthen disaster early warning systems and response capacity. Below are the three (3), A through C, main components of the project and their sub-components:

Component A: Hydromet Services Improvement. The main objective of this component is to strengthen the capacity of NCHM to improve accuracy and provide timely weather services in priority sectors. It will be implemented by the NCHM and will have 2 sub-components as follows:

- Sub-component A1: Strengthening Forecasting and Services.
- Sub-component A2: Institutional Capacity Strengthening, Project Management, Regional Collaboration and Monitoring and Evaluation (M&E).

Component B: Disaster Preparedness and Response Capacity Improvement. The main objective of this component is to strengthen capacity for disaster preparedness and response. It will be implemented by the DDM and will have two subcomponents as follows:

- Sub-component B1: Establishment of critical emergency infrastructure.
- Sub-component B2: Institutional Capacity Strengthening, Regional Collaboration, Project Management and Monitoring and Evaluation

Component C: Design of an agromet decision support system. This component will fund the design of an agromet decision support system and generation of agromet information products and

dissemination to two Dzongkhags. It will also support capacity building of the Department of Agriculture to carry out the above task.

Note that this Terms of Reference (ToR) is for Sub-component B1 of the Bhutan HSDRRP.

2.0 Rationale and Objectives for Sub-component B1 of the Bhutan WDIRP

Establishing a functional National Emergency Operations Centre (NEOC) is a requirement identified in the Disaster Management Act 2013 to be fulfilled by DDM and has been made a national priority by the Royal Government of Bhutan (RGOB). A national EOC is the lynch pin in any national effort to respond to a disaster that affects the country in whole or in part. The current NEOC exists, for functional purposes, in name only. Working with the UNDP, DDM has made important strides to create a, multi-functional one storey office building which includes a large boardroom that may serve as a transitional NEOC. Even with a transitional NEOC structurally established, DDM requires assistance in developing Standard Operating Protocols, including check-in/out procedures, work/rest cycles, organizational structure, etc., to make the NEOC functional. Further, closer relationships with NCHM and other ministries with hazard-specific expertise will be required to ensure 24/7 situational awareness and early warnings of potential events. This project will provide funding for the establishment of a fully operational NEOC through the following three phases:

- a. Design phase - The primary output of this phase will be an actionable blueprint to enable construction of the facility to proceed. The DDM will provide technical design support to the consultant. The structure will be designed to withstand known hazards and will be capable of 24/7 operation for an extended period even during major disasters affecting the immediate area.
- b. Build phase – The primary output of this phase will be the structure itself, exclusive of the equipment required for an EOC to function. This will include any site hardening required to ensure the safety and integrity of both the site and the structure.
- c. Equip phase – Once the building phase is complete, the building will be supplied with the appropriate equipment to enable the full functionality required for disaster response coordination, even during times when the immediate area is directly affected. This may include monitor and projection systems, map displays, multi-layered telecommunications equipment (landline, mobile, satellite, radio), initial food and water stock, security systems, etc.

Establishing the NEOC necessarily includes the design, build and equipping of the NEOC as well as the development of standard operating procedures. To operationalize the NEOC, the Government of Bhutan will also need to create several new permanent, full time positions, in particular NEOC Duty Officers, to ensure continuous presence 24 hours a day, 365 days a year. Further, these permanent staff and other government staff that may fill functional roles in the NEOC during times of disaster must also receive training in NEOC standard operating procedures and the fundamentals of disaster response functional organization structure such as the Incident Command System.

This Terms of Reference is created for the purposes of engaging a qualified Consulting Firm with proven expertise and background on Emergency Operations Centre design and construction supervision to address Sub-component B1, Phase A (Design) as well as the supervision of Phase B (Build) and Phase C (Equip). The hiring of Contractor Firms for the second and third phases of Sub-Component B1 will be issued through separate procurement processes at a later date once Phase A has started.

3.0 Expected Outcomes and Results Monitoring for Sub-component B2 of the Bhutan HSDRRP

Regular monitoring of project implementation will be performed based on the Results Monitoring Framework (Appendix A). Progress of the project will be evaluated based on the results indicators identified below for the project. A mid-term review at mid-way of the project implementation will be carried out to assess the overall performance of the project against the Project Development Objectives (PDO). This review will inform any appropriate actions regarding the future success of the operation, including significant project restructuring if needed. An evaluation after the project execution period will also be carried out.

The overall expected outcome of this project sub-component is to establish a fully functional National Emergency Operations center (NEOC) that may also be used as a model for other SAARC nations. For this ToR, success will be measured along two performance criteria using their associated indicators and baseline values:

1. **Completion of the NEOC design:** As the overall goal of this activity is to enable a fully functional emergency operations centre at the national level, the project should first be able to produce a complete design for the facility. The design and associated documentation should be comprehensive and sufficient to enable construction. It should also account for the necessary ICT systems and resilient infrastructure that will ensure all equipment will be functional once installed and that the facility will operate despite catastrophic events.
 - **Indicator 1.1** – All necessary permits have been obtained from appropriate authorities such that construction is fully enabled and the project can be considered “shovel ready”.
 - *Indicator 1.1 Baseline*– There are currently no draft or approved designs, blueprints, permits and/or construction approvals available that are associated with the development of the National Emergency Operations Centre.
 - **Indicator 1.2** – All approvals from DDM, as implementing agency for the RGoB, have been obtained to demonstrate government agreement with the design and associated facility systems to ensure full government alignment prior to starting construction.
 - *Indicator 1.2 Baseline* – There are currently no approvals or discussions ongoing regarding the design of the NEOC.
2. **Supervision of the NEOC construction and equipping:** With design completed and Indicators 1.1 and 1.2 fulfilled, the project will be positioned well for transition to supervision of the construction and equipping phases of Sub-component B2.
 - **Indicator 2.1** – All structural elements and internal systems, e.g. security access, HVAC, electrical, plumbing, communications, etc., have passed all required inspections by the appropriate statutory authorities and formalized reports of these formal inspections has been provided by the appropriate statutory authorities.
 - *Indicator 2.1 Baseline* – At project initiation the indicator baseline will be nil as construction has not been initiated.
 - **Indicator 2.2** – After all inspections have been successfully completed, a final facility walk-through has been completed with DDM to ensure the NEOC Building is ready for transition to Phase C (Equip).
 - *Indicator 2.2 Baseline* – At project initiation the indicator baseline will be nil as no construction has been initiated.

- **Indicator 2.3** – All equipment, including furniture, information management systems, computer hardware and software, appliances, audio/visual, etc., has been installed and tested to ensure full functionality for DDM staff occupancy and daily operational cycles.
 - *Indicator 2.3 Baseline* – At project initiation the indicator baseline will be nil as all equipment within the NEOC building will be newly acquired.

In addition to the above indicators, the Consultant may choose to develop additional specific performance indicators (both quantitative and qualitative) and establish associated benchmarks at the onset of the project to further increase the comprehensive measurement of annual progress over the three-year project performance period.

4.0 Requirements for Sub-component B, Phase A (Design) and Supervision of Phase B (Build) and Phase C (Equip)

4.1 General Requirements

- 4.1.1 The project will be completed within three years of project initiation.
- 4.1.2 The general approach to development and associated timelines as noted by the Thimphu city planning department is described below:
- a. A Land User Right Certificate is made available by DDM (available from DDM).
 - b. A Site Plan that outlines the physical characteristics is prepared by the Thimphu City Corporation and provided to DDM (Appendix B)
 - c. The Thimphu city infrastructure division provides service locations for use in the design process upon request from the owner or those working on the owner’s behalf.
 - d. An architectural firm, including engineering expertise, is engaged to develop the NEOC design and, once approved, provides the design to Thimphu City Corporation for review and approval.
 - e. The Thimphu City Corporation completes review of the proposed NEOC building design and grants approval for construction. The review typically will take 2-3 months.
- 4.1.3 The preliminary design for the NEOC building should consider a three floor, 7500 sq. ft. structure. This structure would include NEOC focused elements on the ground and middle floor with DDM office space on the top floor to accommodate staff currently occupying the old building at the top end of the DDM site.
- 4.1.4 During the project, the Consultant shall arrange a minimum of one meeting per month with the DDM project focal person for coordination and planning purpose starting from the project initiation date to the completion of NEOC Building construction. The Consultant’s Team Leader, along with other necessary Team Members, shall attend these meetings. The Team Leader, or designate, will take the note of the meeting and issue minutes after first providing opportunity for review and approval by the DDM project focal person.
- 4.1.5 The Consultant shall create an office that is located near the project site such that the Consultant has rapid access either by foot or vehicle. The office will include key personnel/experts performing works associated with design, engineering, project management, site supervision, regulatory compliance and quality control functions.

- 4.1.6 The Consultant is encouraged to associate with other firms to enhance their capability and capacities related to the specialized skills and experience required in the design and construction of emergency operations centres.
- 4.1.7 All drawings and blueprints shall be approved from the appropriate statutory authority as required for the completion of the project and a copy provided to the DDM project focal person.
- 4.1.8 The Consultant shall be responsible to obtain any certificates and approvals required by the appropriate statutory authority from start to completion of the project. Original copies of obtained approvals/certificates shall be submitted to the to the DDM project focal person and a copy shall remain with the Consultant in the local office. Any necessary fees/ taxes required to be deposited in the statutory bodies for obtaining the same will be borne by DDM and coordinated by the Consultant.
- 4.1.9 The project is funded through the World Bank and executed by the RGoB through DDM. As such, the Consultant is required to consider and act upon the suggestions, recommendations, and direction given by the RGoB throughout the project until completion.
- 4.1.10 The Consultant shall provide detailed architecture layout and design of all interiors including all furnishing and fittings, and all special purpose interiors. The Consultant shall use best design structure and specifications available in the modern building industry in coordination with best practices for establishment of emergency operation centers. The Consultant is expected to supervise the procurement and installation of the furnishings, equipment, communications systems, etc. during Phase C of the project.
- 4.1.11 The Consultant shall prepare all necessary reports, documents, drawings and designs required for clearance from all statutory authorities.
- 4.1.12 The Consultant shall prepare all documents to be submitted for Environment Impact Assessment (EIA) approvals to gain the environment clearance from all levels of government with legislative or regulatory interest in environmental protection.
- 4.1.13 The Consultants shall carryout the detailed designs and prepare working drawings of the NEOC Building for the foundation, structure, doors and windows, roof, walls, thermal insulation, floors, water supply, internal and external drainage system, sewer system, electrical system, IT and communication networking, audio/visual system, furniture and fixtures, flooring, false ceiling and false partitioning, workstations, office working space, lobby, reception, circulating area, conference room, controls room, service area, document storage system, toilets and shower facilities, pantry and other services, security system, fire security system, elevators and ramps, internal and external lighting, waterproofing, parking, landscaping, boundary walls, and any other features as required by DDM and statutory authorities for the purpose of the building.
- 4.1.14 The Consultant shall prepare the social and environmental analysis and mitigation plan for pre, during and post construction of the NEOC building as per World Bank guidelines.
- 4.1.15 The Consultant shall prepare interior designing of the NEOC Building and suggest suitable furniture and fixtures for the buildings in consultation with the DDM project focal person. The locations of these features shall be given in the reports and also shown in the drawings. However, as noted above, the procurement and install of furniture is beyond the scope of

the current assignment as the Consultant shall be responsible only for supervision of works under Phase B (Build) and Phase C (Equip).

- 4.1.16 The Consultant shall ensure minimum land disturbance within the site and its surroundings, efficient storm water drainage, adequate segregation of pedestrians and vehicular traffic during the design and construction process.

4.2 Requirements for Sub-component B, Phase A (Design)

- 4.2.1 In addition to the specifics guidance notes below, ASTM E2668-10 Standard Guide for Emergency Operations Centre (EOC) Development should be followed. Where the RGoB agrees through documented discussion with the Consultant, certain elements of this standard guide may be bypassed as those elements may have already been completed by various RGoB ministries (e.g. geotechnical study), or condensed to better align with project timelines .
- 4.2.2 In addition to the Consultant's own EOC design experience, consideration should also be given to a variety of international guidance in this specialized sub-field of design and construction, such as the United States Department of Defense Unified Facilities Criteria for Emergency Operations Center Planning and Design.
- 4.2.3 The NEOC Building site will be the 20m x 19m (380 m² approximate) space at the lower end of the DDM land. This area is currently being used as parking space for DDM personnel. An official engineering survey of the site is available in Appendix B of this ToR
- 4.2.4 A municipally-approved site plan for the associated DDM lands will be made available to the successful Consultant.
- 4.2.5 The NEOC building should be a minimum of three levels, with higher ceilings on the level that houses the control centre of the NEOC.
- 4.2.6 The primary documents for use in building design and engineering are the following but not limited to:
- a. Bhutanese Architectural Guidelines (http://www.gcc.bt/uploads/legal_documents/Policies_and_Guidelines/Bhutan_Architecture_Guidelines_2014.pdf);
 - b. Bhutan Building Rules (https://bhutan.eregulations.org/media/bhutan_building_rules_2002.pdf);
 - c. Development Control Regulations (https://bhutan.eregulations.org/media/development_control_regulations_2.pdf), and;
 - d. India Building Standards (<https://law.resource.org/pub/in/bis/S03/is.sp.7.2005.pdf>)
- 4.2.7 The NEOC Building should be able to respond to the aims and functions of the NEOC with the exception of an Emergency Information and Media Centre which will be housed in available space within an existing DDM building directly adjacent to the NEOC Building site.
- 4.2.8 The exterior of the building should be designed to depict elements from traditional Bhutanese architecture, building design and decoration. However, the interior design of the

building including shall be as per modern architecture with a focus on resilient materials and making maximum use of daylight.

- 4.2.9 The NEOC Building should be designed to be as energy efficient as possible, aligning with relevant national efficiency standards.
- 4.2.10 The NEOC Building should be designed in such a way that all structural elements exceed requirements such that integrity is assured beyond the spectrum of expected hazard event probabilities. Prior to development of the design concept, the consultant should obtain hazard information from the appropriate government planning source through the designated project focal person in DDM.
- 4.2.11 The NEOC Building should adhere to national building code and municipal/city by-laws as a minimum guideline for design. Where required, the design should surpass existing code and by-laws for the purpose of hazard-specific structural resilience.
- 4.2.12 The NEOC Building should be designed in such a way that staff and visitor parking should be addressed either in the NEOC building design or addressed as recommendations for increasing parking with the larger DDM site.
- 4.2.13 All services design and drawings related to plumbing, sewerage, drainage, firefighting, fire alarm, HVAC, internal and external electrification, etc. shall also be included for discussion with the government through the project focal person in DDM.
- 4.2.14 The NEOC Building shall be responsive to local climatic conditions in structural design and site planning. This includes, but is not limited to, ensuring maximum natural lighting and ventilation; solar passive designs including high R-factor insulation; minimization of energy requirements for air-conditioning, heating, lighting, services, ventilation; and using fittings and materials to save energy as part of the essential services in the building.
- 4.2.15 The NEOC Building design shall demonstrate and adhere to principles of universal design identified in selected international design standards to maximize accessibility for all people.
- 4.2.16 The NEOC Building systems shall ensure a healthy indoor environmental quality that provides a comfortable indoor environment (light/ temperature/ ventilation) that supports the productivity and well-being of the occupants, even when primary electricity and water supply services are disrupted.
- 4.2.17 The NEOC Building shall have high water efficiency that addresses economy of distribution, usage and discharge of water; maximum conservation and reuse of water; incorporation of waste water treatment techniques, rain water harvesting, water efficient landscaping, etc.
- 4.2.18 The NEOC Building shall have efficient and proper disposal of waste (including solid, liquid), preventing contamination of soil, water and air of the site and its surroundings by providing sewage treatment onsite, if required as per government building requirements.
- 4.2.19 The NEOC Building is the focal point of all disaster mitigation and management related activities. In addition to its primary function as the NEOC, the building will also will be the head office of the Director of DDM and shall ensure adequate office space and related facilities, e.g. washrooms, kitchen, dining area, meeting space/boardrooms, quiet room / rest area, etc.

- 4.2.20 Design should ensure adequate capacity for video conferencing, real time data exchange, video calling and facility-wide Wi-Fi as well as future connectivity-dependent ICT systems.
- 4.2.21 The NEOC Building design should account for placement and size of furniture, video display, such that upon completion of Phase B (Build), the equipment procured and installed in Phase C (Equip) will be uncomplicated. The operations room video display should include a large video wall display that allows for simultaneous viewing of multiple information sources, such as news media, social media, hydromet and other hazard monitoring, response resource tracking, etc.
- 4.2.22 The NEOC Building should be designed with resilient systems, including redundancies to ensure uninterrupted power supply, water supply, waste removal and multi-modal communication systems including satellite phone/data, HAM radios, surface lines and mobiles.
- 4.2.23 The NEOC Building shall include a specialized GIS area that will enable collection and processing of applicable spatial data, mapping and associated analysis.
- 4.2.24 All the facilities should be designed to the highest levels of occupational safety according to local requirements and international standards.
- 4.2.25 The facilities within the NEOC Building should be ergonomically adapted to long duration functioning and usage, uninterrupted power, water, communication and internet facilities along with healthy, highly flexible, and efficient places of work.
- 4.2.26 The Consultant shall be responsible for changes in the design and drawings, as required at any stage of the project, throughout all project phases regardless of the supervisory role or circumstances.
- 4.2.27 The NEOC Building should be designed to include both passive and active security considerations to address requirements for physical hardening and digital/electronic communications sensitivity.
- 4.2.28 Draft and final designs for the NEOC Building shall include working drawings with details, including landscaping, external cultural elements, lamps and lighting fixtures, and equipment for all aspects of daily and emergency response works to enable tenders/bids/quotations to be called wherever required and during the time of construction and equipping.

4.3 Requirements for Supervision of Sub-Component B, Phase B (Build) and Phase C (Equip)

- 4.3.1 A listing of local construction firms that could be utilized for building the NEOC, in partnership with the selected architectural/engineering/project management firm, can be found on the RGoB Construction Development Board's website:
<http://www.cdb.gov.bt/web/listofcontractors?CdbRegistrationNo=&ContractorId=&Proprietor=&CmnDzongkhagId=a1a67f99-c6e6-11e4-b574-080027dcfac6&CmnContractorCategoryId=8afc0568-a2b7-11e4-b4d2-080027dcfac6&CmnContractorClassificationId=e19afe94-c3ea-11e4-af9f-080027dcfac6&Type=2&FromDate=&ToDate=&Limit=All>
- 4.3.2 The ISO Occupational Health and Safety Management Standard (18001), or its replacement ISO 45001, and the General Rules and Regulations on Occupational Health and Safety (OHS)

in Construction, Manufacturing, Mining and Service Industries, 2006 shall apply to the construction site at all times and be assured by the Consultant. Where national and/or local requirements for occupational health and safety exceed these ISO standards, the local requirements and guidance shall be followed.

- 4.3.3 Regular inspections of construction materials shall be completed to ensure structural integrity and design elements are being met according to design and engineering requirements. The Consultant shall work with the DDM project focal person to ensure an agreed-to minimum number of joint inspections with DDM. In addition, DDM may participate in any inspection being conducted by the Consultant with minimal notice.
- 4.3.4 The Consultant shall prepare tender documents for different parts/component of the NEOC Building with detailed specification, drawings and estimated costs associated with each component to the satisfaction of DDM. The Consultant shall also obtain DDM approval and assist in bidding or inviting quotation from Construction Contractors for executing the construction in Phase C (Build) and shall prepare all documents for completing the project.
- 4.3.5 The Consultant shall prepare tender documents for the full suite of equipment required for NEOC operations with detailed specification, drawings and estimated costs associated with each component to the satisfaction of DDM. The Consultant shall also obtain DDM approval and assist in bidding or inviting quotation from Equipment Contractors for executing the various aspects of Phase C (Equip) and shall prepare all documents for completing the project.
- 4.3.6 The Consultant shall oversee and ensure completion of the NEOC Building, including equipment and any required site modifications and landscaping, with the structure and landscaping completed prior to closure of the project.
- 4.3.7 The Consultants shall prepare detailed estimates for quantities and project cost for the entire project based on IS codes and market rate for the inputs. The estimation of quantities shall be based on detailed design of all the components of the projects.
- 4.3.8 The Consultant shall make detailed analysis for computing the unit rates for the different items of works. The unit rate analysis shall duly take into account the various inputs and their basic rates. The unit rate for each item of works shall be worked out in terms of manpower, machinery and materials.
- 4.3.9 Preparation of technical specifications, cost estimate/DOM and bills of quantities (BOQ) for all building works which includes civil works; electrical, mechanical, plumbing, HVAC services, IT & Networking/Communications, IBMS, Acoustics etc. and prepare acceptable tender/bid documents in accordance to The World Bank procurement guidelines.
- 4.3.10 Preparation of technical specifications, cost estimate/DOM and bills of quantities (BOQ) for all external development and landscape works (which includes civil works; electrical, mechanical, plumbing services, sewage management, generator system, Horticulture, etc.) and prepare acceptable tender/bid documents accordance to The World Bank procurement guidelines
- 4.3.11 Preparation of technical specifications, cost estimate/DOM and bills of quantities (BOQ) for all equipment to be installed inside and outside the building which includes electrical equipment, mechanical equipment, HVAC, "green" services equipment, IT &

Networking/Communications, IBMS and prepare acceptable tender/bid documents accordance to The World Bank procurement guidelines.

- 4.3.12 Preparation of technical specifications, cost estimate/DOM and bills of quantities (BOQ) for all interior works (which includes all fittings and furnishing, acoustic services, special purpose interiors and the like) and prepare acceptable tender/bid documents accordance to The World Bank procurement guidelines.
- 4.3.13 The supervisory duties of the Consultant in Phase B (Build) and Phase C (Equip) will be to properly supervise the works and approve the materials and workmanship of the works in cooperation and in consultation with DDM to ensure timely completion of the project. The Consultant will administer both the construction and equipping works contracts and will ensure that the contractual clauses, whether related to quality or quantities of work, are respected. The Consultant shall have no authority to relieve the contractors of any of their duties or obligations under the contracts or to impose additional obligations not included in the contracts. The supervisory duties of the Consultant will also include issue of decisions, certificates and orders as specified in details in the construction and equipping contract documents developed during procurement of construction and equipping contractors.
- 4.3.14 The Consultant shall advise on and contribute to DDM payment decisions related to contractors undertaking the construction and equipping works as requested by DDM.
- 4.3.15 The Consultant shall ensure the principal supervisory responsibilities outlined in Appendix D once the project transitions to Phase B (Build) and Phase C (Equip).

5.0 Scope of Work

The Scope of Work provides the critical tasks, their sequencing, and the expected deliverables associated with each task. The scope of work consists of the following two phases with related tasks, to be delivered in a sequential approach. The Consultant should manage development of both phases for the entire three-year project period. The first year of the project, Phase A, begins at the time of hire and will focus on establishing sound project management and addressing key elements of NEOC Building design. The supervision of Phase B and C combined will last two years and will see the initiation and completion of the NEOC Building construction, as well as the installation of all required equipment to ensure full functionality of the operations centre. All deliverables are due to the DDM project focal person and World Bank project representative and should be provided in English. A representative timeline of the phases, tasks and their associated outputs and deliverables can be found in Appendix C.

5.1 Phase A – Detailed Scope of Work

5.1.1 Phase A – Task List

The following tasks are required:

Task A.1: Complete a Comprehensive Hazard Identification and Probability Assessment.

This assessment is aimed at a) understanding the historical, current and future hazard conditions that may result in emergencies and disasters within Bhutan and the larger geographical region; and

b) ranking the probability of occurrence for various hazard severities using geospatial information, e.g. return period for various riverine flood levels, cyclone strengths, etc. Ideally, these rankings shall be quantitative and data driven, however in the absence of sufficient data, the rankings may be approximated using qualitative and/or anecdotal evidence. In either case, the methodology and information sources used shall be noted by the Consultant.

Task A.2: Complete a Site Exposure Assessment.

Once hazards are identified, the NEOC Building site should be assessed to determine exposure to the identified hazards in Task A.1. This exposure assessment shall be used by the Consultant to ensure the site and building design are sufficient to withstand the most severe hazard events to which the building may be exposed. The NEOC Building should be designed for redundant protections from the hazards to which it is exposed such that no single structural mitigation is exclusively relied upon for hazard resilience.

Task A.3: Complete NEOC Building Capacity Assessment

The Consultant will work with DDM and World Bank representatives to identify the vision and mission for the NEOC. In addition, the Consultant will also examine the intended facility occupancy during routine monitoring and full activation periods as well as the potential uses of the facility during these periods. During this assessment, the Consultant will also work identified representatives to define the critical and desirable needs for the NEOC Building and the existing capacity within DDM for emergency preparedness and response activities, with a focus on early warnings and coordination of disaster response operations.

Task A.4: Complete preliminary NEOC Building design.

The Consultant shall complete the conceptual NEOC Building design based on the preceding Tasks as well as other discussions with DDM as necessary to inform the design. A geotechnical and geophysical study and site contour map is available for the construction site. The counter map is attached in Appendix B. The geotechnical study and municipal site plan will be made available to the selected Consultant. The results of Task A.3 and A.4 shall be the primary means of information sharing in the following Task. Building upon the information available in Appendix A and B, the sub-tasks within Task A.4 include, but are not limited to, the following:

- Prepare and submit conceptual design, 3D views from all directions and drawings with reference to the requirements given and in accordance with the standards of the concerned building, rough cost estimate, report giving details of useful area, circulation area, plinth area, ground coverage, Floor Area Ratio, services and broad specification etc.
- Provide detailed presentation as and when required by the client/employer until final approval in Task A.6.
- Provide alternative construction methods with all merits and demerits. The Consultant shall present the details of these alternative methods so that most feasible option can be adopted.
- Submit the conceptual design and drawings to the DDM project focal person.

Task A.5: Form NEOC Design Advisory Team.

The Consultant will work with the DDM project focal person form an inclusive design advisory team focused on the design elements of the operations suite within the NEOC Building. This team should

include other RGoB ministries, such as the Road Safety and Transport Authority, the Ministry of Health, etc., that may be required in the NEOC during disasters. With a high percentage of critical infrastructure ownership in the hands of the private sector, business entities such as mobile phone service providers and electricity generation and distribution companies should also be considered for the Team. Finally, significant non-governmental organizations such as the Bhutan Red Cross Society and UN-OCHA should be requested to contribute, either in person or virtually, given the important relief role of these organizations during national disasters.

Prior to engaging these partners, the Consultant should establish a clear team structure, identify appropriate information resources for team use, set a meeting schedule and be prepared to chair the meetings in person through the Team Lead or an identified proxy within the Consultant's project team. Any information shared with the NEOC Design Advisory Team shall be checked for private and/or government confidential information and this information removed from any shared documents and/or correspondence prior to distribution. The results of Task A.3 and A.4 shall be the primary means of information sharing for this Task. While consensus is not required as part of gaining advice from the various parties of the team, a collaborative approach to gaining and considering feedback from the participants is expected.

Task A.6: Complete preliminary NEOC Building design.

The Consultant shall revise the concept drawings and associated reports based on feedback from DDM and shall consider feedback from the NEOC Design Advisory Team as well. The revised design shall be considered as the preliminary design until such time as the necessary approvals are received from the appropriate statutory authorities. Task A.6 shall be considered complete once Output A.3 has been submitted and detailed presentations to DDM, and the NEOC Design Advisory Team if required, have been completed. Sub-tasks associated within Task A.6 include, but are not limited to, the following:

- Prepare and submit preliminary drawings, designs, types and quality of material, analysis of rates, detailed estimate specifications of items, material, fixtures and component as well as their testing procedure.
- Prepare space allocation and utilization plans as well as equipment and systems layout.
- Prepare data and drawings as may be appropriate for the project including specially designed items or elements to indicate the finished appearance and functional operation.
- Carryout the detailed design for all features and major components as indicated in Section 4.1 and 4.2. However, there may be situations wherein it has not been possible to strictly adhere to the design standards due to the existing site conditions, restrictions and other considerations. In these cases, the Consultant should clearly identify the situation and provided associated details and the standards adopted.
- Provide 3D views from all directions, including overhead aerial views of the proposed NEOC Building.
- Provide the Technical Specifications for all major systems and components of building.
- Submit all drawings as good as 'good for construction'.
- Prepare all drawings of different components, including cross sections of each floor, lay-out plans and the building master plan. The drawings set should also include detailed working drawings for individual structures/components, detailed working drawings for furnishings

fixtures and interiors, details of each utility systems, e.g. plumbing, sewage, electrical, telecommunications, etc., drawings for furnishing items, furniture, flooring pattern, 3D views of building, etc. All drawings will be prepared in suitable size and scale, shall be easy to read and should have clarity. The format for plan, cross-section and profile drawings shall be finalized in consultation with DDM.

- Prepare a debris management plan with proper material source and proper material disposal location including estimation of quantities with drawings and approval from the appropriate statutory authorities.

Task A.7: Complete final NEOC Building design.

Once the RGoB has approved the preliminary design and associated plans, the Consultant shall prepare and submit required number of copies of drawings to the appropriate statutory authorities and obtain their approval as necessary according to the appropriate acts, laws and regulations etc. Any changes requested or required by these statutory authorities shall be made by the Consultant without any extra cost and will be resubmitted until their approval is obtained. The Consultant shall also obtain the necessary approvals and certificates to enable the start and completion of construction. Any necessary fees/ taxes required to be deposited in the statutory bodies for obtaining the same will be borne by DDM and coordinated by the Consultant. No specific and separate charges will be paid to the firm for obtaining the above except statutory payment to local and other statutory bodies. Sub-tasks associated with Task A.7 include, but are not limited to, the following:

- Prepare detailed architectural, structural, and services drawings including drawings showing details of all utilities and internal and external services and specifications after incorporating all revisions to preliminary drawings.
- Updating and revising all content prepared in Task A.6 based on feedback and requirements communicated by DDM and with consideration to feedback from the NEOC Building Design Advisory Team.
- Provide and submit modifications, if required, after approval of statutory authorities from time to time and make necessary changes for the duration of the project through Phase B.
- Prepare and submit the model of the NEOC Building to a suitable scale. The cost of the model shall be borne by the Consultant.

5.1.2 Phase A – Output List

Unless expressly stated otherwise, all outputs are required both digitally and in hardcopy. The following outputs and deliverables are required:

Output A.1: NEOC Project Initiation Report.

The report shall describe the understanding of the objectives and tasks, the design and construction approach, detailed project schedule including critical path, staffing plan, project management approach, and the quality control method to ensure the project reaches its goals. This is due within three (3) months of project initiation. Due within three (3) months of project initiation.

Output A.2: NEOC Risk Assessment and Conceptual Design Report

The report shall capture and communicate all findings from Task A.1 through A.4. The Report shall be representative of the Consultants approach to the NEOC Building and demonstrate initial consideration of the requirements noted in Section 4.1 and 4.2. Due within nine (9) months of project initiation, the report shall be accompanied by a presentation to DDM.

Output A.3: NEOC Preliminary Design Report

Due within twelve (12) months of project initiation, the report shall be accompanied by a presentation. The report shall include, but not be limited to, the following:

- Executive summary, including project background, consultant role, identification of RGoB contact, etc.
- Summary of advice, and anonymized minutes from, the NEOC Design Advisory Team meetings.
- Recommendations on resilient structure and systems and how the preliminary design addresses those considerations.
- Summary of expected NEOC services.
- Detailed note of how all design considerations noted in Section 4.1 and 4.2 have been addressed.
- Time and Cost Analysis
- Social and environmental analysis
- Analysis and summary of materials to be used in major items
- Summary briefs on architectural design, structural design, utility systems design, landscape and parking design, etc.
- Debris management plan.
- Construction cost estimates for identified stages and for significant components.
- All preliminary drawings along with topographical survey plan, master plan and 3D views.
- Construction schedule of project with detail analysis and risk management plan to ensure project completion within the identified timeframe.

Output A.4: NEOC Final Design Report

Same as A.3 with adjustments based on RGoB/MoHCA/DDM comments and including copies of all appropriate construction permits and approvals to enable commencement of Phase B. Due within eighteen (18) months of project initiation, the Report shall include, but not be limited to, the following:

- Updates and finalized versions of the content generated and presented in the NEOC Preliminary Design Report (Output A.3).
- Outline of the construction schedule.
- Approved drawings from statutory authorities and any associated approvals of certificates required to initiate construction.
- Model of appropriate size and scale for the NEOC Building

5.2 Supervision of Phase B and C – Detailed Scope of Work

5.2.1 Supervision of Phase B and C – Task List

Unless expressly stated otherwise, all outputs are required both digitally and in hardcopy. The

following outputs and deliverables are required:

Task B.1: Revise Output A.1

The Consultant shall update the NEOC Project Initiation Report (Output A.1) based on information available through completion of Phase A and looking forward to implementation of Phase B and C. The Consultant will add specific detailed information related to Phase B and C, with a particular focus on the construction and equipping timeline, any project risks that may delay or impair timely completion of construction and the proposed mitigations for each risk. In addition, the revisions shall include an Appendix that includes a Construction Supervision Manual outlining routines and procedures to be applied in contract management, construction supervision and administration. The routines and procedures will be in accordance with the requirements of statutory authorities and Section 4.3 of this document. The Consultant shall engage with the DDM project focal person to ensure that DDM has the necessary information to ensure situational awareness related to the commencement of the NEOC Building construction, including the potential pedestrian and vehicular traffic disruptions to the site and local area.

Task B.2: Initiate supervision of NEOC building construction and equipping

The Consultant will begin supervising the construction and equipping of the NEOC Building per the identified timeline. Monthly briefings will be provided by the Consultant to the DDM project focal person with additional on-site briefings provided as necessary, including site tours. The Consultant will work with the DDM project focal person to develop an access plan to the construction site while still allowing regular business to be conducted by DDM at its preexisting office and storage space adjacent the NEOC Building site.

Task B.3: Progress tracking

The Consultant will provide regular construction and equipping progress updates to the DDM project focal person including:

- On-site briefings to demonstrate project advancement, discuss any deviations from the construction timeline and mitigating actions required, work site safety and ensure general situational awareness. These briefings and associated short report shall occur monthly.
- Quarterly Construction and Equipping Progress Reports (Output B.3) will provide a detailed, written account of work completed over the last quarter and work forecasted to be completed in the following quarter. An explanation will be provided by the Consultant for any deviation from the identified project timeline. These briefings and associated report shall occur every three months.
- Quarterly Work Site Safety Reports (Output B.2) will provide a detailed, written record of worker safety through the entirety of Phase B. These briefings and associated report shall occur every three months.
- Ad-hoc meetings as requested by either DDM or the Consultant to address critical construction and equipping issues as they arise such that the overall project timeline is not compromised.

Task B.4: Ensure completion of construction and transfer management and operations to DDM

The Consultant will, upon completion of NEOC Building construction and equipping, and after receiving a passed inspection report from the statutory authority, complete a full walkthrough of the

NEOC Building, with a primary focus on the operations centre and structural mitigations to known hazards. The DDM project focal person shall work with the Consultant and the statutory authority to identify and list any deficiencies that need to be corrected prior to the NEOC Building being handed over to the RGoB.

5.2.2 Supervision of Phase B and C – Outputs and Deliverables

The following outputs and deliverables are required:

Output B.1: Phase B Initiation Report

The report shall be an update of Output A.1 and confirm the project understanding. It shall include details of the of the Phase B and C objectives and tasks, NEOC building design, construction and equipping approach, updates to detailed project schedule including critical path for construction, equipping staffing plan, project management approach, and the quality control method to ensure the project reaches its goals while maintaining a safe working environment. This report is due within two (2) months of the start of Phase B and the submission of the NEOC Final Design Report (Output A.4) and shall be accompanied by a presentation to DDM.

Output B.2: Construction Supervision Manual

The Construction Supervision Manual, due within two (2) months of the start of Phase B, shall outline routines and procedures to be applied in construction contract management, construction site supervision, quality assurance metrics to be tracked weekly and general administration. In addition, the manual shall include the methods that the Consultant will use to ensure occupational health and safety on and around the construction site, including pedestrian and vehicular traffic management. The manual shall also include, but not be limited to, the following:

- The quality standards that apply to the project, with reference to the technical specifications and relevant construction codes and guidance.
- Quality control, quality assurance and process improvement approaches for the project.
- Quality control tools and techniques that will be applied during construction.
- An accountability matrix that clearly demonstrates accountability and responsibility assignments, including who will be involved in managing quality, when and what their specific duties will be.
- The metrics that shall be used to measure quality and how this data will be collected, analyzed, stored and shared.
- Check lists for inspection of material and processes.
- Flow chart of processes to detect potential quality problems.
- Scope for periodic quality audits completed by the Consultant in collaboration with the DDM project focal person and DDM engineer.

Output B.3: Quarterly Work Site Safety Report

The Consultant shall provide quarterly reports on construction site safety, including any near accidents, actual accidents and minor and major sustained injuries. The report shall indicate for each noted event how the Consultant has addressed the causal factor and made improvements to prevent recurrences. The Consultant shall be available to discuss these reports with DDM or other statutory authorities upon request. The reports shall continue to be submitted quarterly until the

NEOC Building construction is complete, including full operational testing of all systems and equipment.

Output B.4: Quarterly Construction Progress Report

The Consultant shall provide quarterly reports on the progress of the NEOC Building construction in relation to the project plan identified in the Phase B Initiation Report. In the event of forecasted construction delays and/or cost overruns, the Consultant shall provide a detail plan on how these will be mitigated to ensure successful completion of the project. The Consultant shall be available to discuss these reports with DDM upon request. The reports shall continue to be submitted quarterly until the NEOC Building construction and equipping is complete.

Output B.5: NEOC Building Maintenance Guide and Schedule

To ensure the NEOC Building is maintained at a high state of resilience, the Consultant shall develop a technical guide for DDM building maintenance staff. This Guide shall minimally include details on the utility and resilient systems included in the NEOC Building. Within the building envelope this may include systems such as HVAC, primary and secondary electrical, plumbing, etc. and externally this may include painting requirements to ensure concrete maintains its integrity, clearance of any rain water drainage systems, landscaping maintenance, etc. The Guide will also include technical specifications for the systems equipment used in the building, such as HVAC, generators, etc. as well as the model number, parts and services supplier and the warranty information associated with the equipment. This Guide is due within eighteen (18) months of the commencement of Phase B.

Output B.6: NEOC Building Design and Construction Final Report

The report shall provide details on the execution of the NEOC Construction (Design, Build and Equip) project, its achievements and accomplishments, its hazard resilience and environmental sustainability, its maintenance plan, its construction safety record and overall accomplishments. The final report should include a summary decade-long schedule for maintenance. As well, the report should highlight the collaborative nature of the NEOC development with both internal and external agencies. This Report is due within eighteen (18) months of the commencement of Phase B and will represent the final project output. It will serve as the identifying output that signifies the completion of the project.

6.0 Implementation Arrangements

The Consultant will work closely with the DDM project focal person. Reports generated as per this ToR and submitted to DDM will also be shared with the World Bank in parallel for review. The Consultant is expected to join meetings and other occasions as and when needed and coordinated by the DDM project focal person.

The Consultant should constitute a Project Working Group (PWG) composed of the DDM and representatives from the various RGoB ministries, municipal authorities and construction companies and tradespeople to coordinate the design and building of the NEOC.

After the inception stage, the Consulting Firm shall prepare a detailed schedule and task-flow diagram, as described in the NEOC Project Initiation Report (Output A.1) above, which depicts the interrelationship of various tasks in the assignment leading to the completion of the design and build project phases. This will be maintained, regularly updated and shared with the DDM project focal person by the Consultant throughout the project's duration.

A focal point will be identified at project inception that will be the Consultant's lead representative responsible for coordination and all interfaces with the Consultant. The Consultant's Team Leader will be identified as this focal point and principal contact and will be expected to be readily available throughout project implementation. The Consultant shall be responsible for all aspects of performance of services as set forth in the preceding sections of this ToR.

During the supervision of Phase B and Phase C, the Consultant will report to, and seek prior permission from, DDM before taking any of the following actions, unless construction site security or worker safety will be immediately impaired:

- (i) Consenting to the subcontracting of any part of the works.
- (ii) Certifying additional cost determined necessary for continuity of construction or equipping works.
- (iii) Ordering suspension of work.
- (iv) Issuing the Notice to commence the work.
- (v) Approving an extension of time.
- (vi) Issuing a variation except if such variation would be within the limits as indicated in the civil contract document.
- (vii) Approving new rates either for existing items of work, which arises from variation quantities beyond the limit, defined in the contract or fixing rates of non-priced works involving any extra item and certifying any additional cost determined under the provisions of contract.
- (viii) Issuing the order for special tests not provided for in the contract and determining the cost of such tests, which shall be added to the contract price.
- (ix) Issuing/approving the Technical Specification, if not provided for an item of works in the Construction Contract.

7.0 Selection Procedure and Form of Contract

The firm will be selected following the World Bank's Guidelines: Selection and Use of Consulting Firm by the World Bank for Operational Purposes and form of contract would be Complex Lump Sum Contract for scope A and time based for scope B and C.

Minimum qualifications of the firm to be selected for the required assignment include:

- a. More than 10 years of experience in the field of architecture, engineering and construction, including experience with governments in developing countries, and including prior successful engagements in the design and construction of emergency operations centres.
- b. The consulting firm should have a minimum annual financial turnover of USD \$ 300,000 .
- c. Demonstrated competency in conceptualization, formulation, and execution of resilient

structure construction techniques of similar nature as the one specified here.

- d. Consulting firm should bring among its team demonstrated expertise in the following fields: architectural design, structural engineering, disaster/emergency management (especially EOC operations), construction trades, culturally-sensitive design, urban development, earthquake engineering and construction supervision.
- e. Competency in business administration, management consulting or equivalent.
- f. Transparent and audible procurement and documentation tracking system.

The Consultant Firm can be international, domestic or a strategic partnership, must demonstrate familiarity with international best practices for disaster and emergency preparedness and response operations and must tailor the NEOC design to enable these practices. Amongst others, these standards of practice include ISO 22320, NFPA 1600 and the Incident Command System.

The Consultant Firm shall have experience with developing and obtaining specific performance data (both quantitative and qualitative) to establish benchmarks at the onset of the project and to measure progress.

8.0 Duration of Assignment

Duration of the contract is three (3) years from project initiation. The first year will involve the conceptualization and design of the NEOC, including approvals for all designs and blueprints for the structure. The second and third year will involve the construction of the NEOC based on the approved designs. The phased approach will be followed as outlined above in Section 5 – Scope of Work.

To reduce risk associated with project timeline delays, the DDM project focal person shall arrange approval on all sketches, drawings, reports and recommendations and other matters and proposals submitted for decision by the Consultant in a reasonable time frame, generally understood to be no more than fifteen (15) working days.

9.0 Staffing Requirements

The Consultant is encouraged to use the expertise available in Bhutan to the extent possible. However, international experience will be necessary to carry out the assignment due to its highly-specialized nature. The Consultant is free to propose a staffing plan and skill mix necessary to meet the objectives and scope of the services. However, a strong competency in project management applications is expected. The skill sets expected for this project include architectural design, structural engineering, project management, site supervision, specialist expertise in EOC design, disaster management and physical security, regulatory compliance, construction trades and quality control functions. If all the required skills are not available within the firm, the Consultant is encouraged to form joint ventures with other firms.

As part of the proposal, the Consultant Firms should identify the following indicative members of the project team, including where these roles are intended to be filled full-time throughout the project or engage on an as-needed basis. For each role, the Consultant shall identify the expected person-

months required from each role, including which project phase involvement is expected and whether the involvement will be full-time or intermittent and the expected monthly rate for each position:

1. NEOC Project Team Lead
2. NEOC Project Manager
3. Design Team Leader
4. Supervision Team Leader
5. Architect
6. Disaster and Emergency Management/EOC Specialist
7. Physical Security Expert
8. Structural Engineer
9. Civil Engineer
10. Electrical Engineer
11. IT Systems Expert
12. Interior Design Expert
13. On-site Supervisory Foreman
14. Occupational Health and Safety Expert

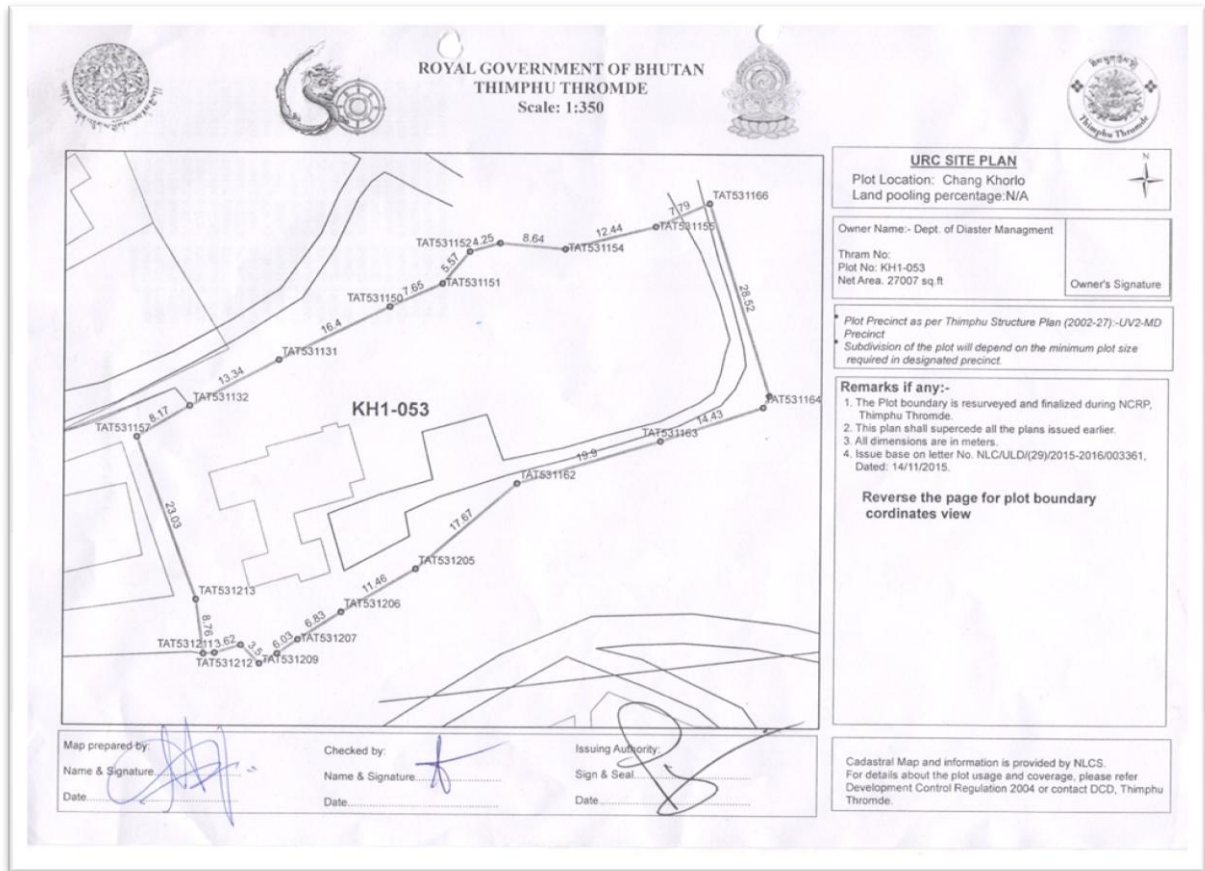
10.0 Appendices

Appendix A: Sub-component B Results Monitoring Framework

sl	Month/Work(2017)	Days	Apr	May	June	July	Aug	Sept	OCT	NoV	Dec
1	Finalise EoI/ToR	0		15 th							
2	Expression of Interest	21		16 th	6 th						
3	Evaluation of EoI& Shortlist consultants	30			7 th	7 th					
4	Draft Request for proposal	14				28 th					
5	Opening of Technical proposal	28				29 th	24 th				
6	Evaluation of technical proposals	30					25 th	25 th			
7	Opening of financial reports/minutes	14						26 th	12 th		
8	Combined Evaluation Report and draft Negotiated Contract	21							13 th	4 th	
9	Notification of intent of award	14								18 th	

sl	Month/Work(2018)	Days	Jan	Feb	Mar	April	May	June			
10	Design by consultant	90									
11	Review by Thimphu Thromde	30									

Appendix B: NEOC Building Site Plan (Thimphu Municipal Planning Department)



Appendix C: Summary of Project Outputs

ToR stage	Output Number	Output Title	Frequency	Due Date	No. of Hard Copies	No. of Digital Copies
NEOC Design (Phase A)	A.1	NEOC Project Initiation Report	One time	Within three (3) months of project initiation	3	1
	A.2	NEOC Risk Assessment and Conceptual Design Report	One time	Within nine (9) months of project initiation	3	1
	A.3	NEOC Preliminary Design Report	One time	Within twelve (12) months of project initiation	3	1
	A.4	NEOC Final Design Report	One time	Within eighteen (18) months of project initiation	3	1
Supervision of Build (Phase B) and Equip (Phase C)	B.1	Phase B and C Initiation Report	One time	Within two (2) months of Phase 2 commencement	3	1
	B.2	Construction Supervision Manual	One time	Within two (2) months of Phase 2 commencement	10	1
	B.3	Quarterly Work Site Safety Report	Every three (3) months	Every three months after Phase 2 commencement until end of	3	1

				project		
	B.4	Quarterly Construction Progress Report	Every three (3) months	Every three months after Phase 2 commencement until end of project	3	1
	B.5	NEOC Building Maintenance Guide and Schedule	One time	Within thirty-six (36) months of project initiation / eighteen (18) months of Phase 2 commencement	3	1
	B.6	NEOC Building Design and Construction Final Report	One time	Within thirty-six (36) months of project initiation / eighteen (18) months of Phase 2 commencement	3	1

Appendix D: Principal Responsibilities for Supervision During Phase B (Build) and Phase C (Equip)

In addition to the tasks and outputs identified in Section 5, the principal responsibilities will be generally to carry out all the duties of the Consultant as specified in the construction and equipping contract documents, within the limitations specified therein, but not limited to the following. In case of any disparity, the stipulations made in the construction and equipping contract documents will prevail in the order of precedence mentioned therein:

- (i) To approve the Contractor's key superintendent personnel, construction mobilization programs, temporary land to be occupied by the Contractor.
- (ii) To approve the contractor's work program including activity scheduling and resource programming.
- (iii) Give the order to commence the work.
- (iv) Ensure that the construction works are in accordance with the technical specifications and other stipulation of construction contract documents and the construction methods proposed by the contractor are in compliance with the above stipulations particularly, in relation to Contractor's construction equipment and other resource deployment.
- (v) To approve setting out of the works.
- (vi) To verify and if necessary order correction of the drawings submitted by the Contractor.
- (vii) Ensure a system of Quality Assurance of works, approve materials, sampling and testing procedure and Quality Control measures to ensure required standard and consistency in quality, at the commencement of item.
- (viii) Check the laboratory and field tests carried out by the Contractor and develop a mechanism in consultation with DDM to carry out an adequate number of independent tests other than the regular testing done by Contractor laboratory personnel.
- (ix) Order special tests of materials and/or completed works, order removal and substitution of improper materials and/or works as required.
- (x) To make independent measurements and check all quantity measurements and calculations required for payment purpose and ensure that all measurements and calculations are carried out in a manner and at the frequencies specified in the contact documents.
- (xi) To issue a working drawing or modify the existing drawing (preferably within one month on request of the Contractor) or to supply a new/supplementary drawing which is not included in the contract, wherever required and to give appropriate associated instructions to the Contractor.
- (xii) To control and appraise the progress of the works, to order suspension of works and to authorize with DDM's approval, extensions of the period of completion of works.
- (xiii) To monitor and check the day-to-day quality control and quantity measurements of the works carried out under the contract, keep all measurement records (in measurement books- MB's) as per the directions of DDM and issue payment certificates per agreed-to payment schedules, as identified in contract documents, when the quality of the works is satisfactory and the quantities are correct;

- (xiv) To direct the Contractor in all matters concerning construction safety and care of the works and if required, to request the Contractor to provide any necessary lights, guards, fencing and watchmen, etc. to ensure a safe environment.
- (xv) To direct the Contractor to carry out all such works or to do such things as may be necessary in his opinion to avoid or to reduce the risk in any emergency affecting the safety of life or of adjoining property.
- (xvi) To direct the Contractor to take all necessary steps including those mentioned in the construction contract to protect the environment on and off the site which arise due to construction operations
- (xvii) To inspect the works, during the construction period and at proper interval during an agreed-to defects liability period and to issue defects liability certificates after the rectification, by the Contractor, of possible defects and issue final payment certificates
- (xviii) Issue interim certificates for monthly payments to the Contractor, and specify completion of parts of the totality of the works, details of progress. Payments are to be recorded in the measurement book (MB's) before issue of interim certificate.
- (xix) To verify and correct the as-built drawings supplied by the Contractor.
- (xx) To direct the Contractor to take all necessary steps to maintain the rate of progress of works as per the approved programme of the Contractor on monthly basis.
- (xxi) To provide adequate supervision of the Contractor's work carried out in more than one shift thus matching the working hours to be the same as that of the Contractor(s);
- (xxii) To ensure timely completion of the project without diluting the quality standards envisaged and be fully accountable to DDM in this regard.
- (xxiii) Provide assistance to DDM in respect of contract implementation, claims and other matters.
- (xxiv) Advise and assist the Client/Employer with respect to arbitration, litigation related with this project, if so required, during contract period or after the contract period.
- (xxv) Review and ensure continuity of the Contractor's services in approved formats.
- (xxvi) Update cost estimate in each six month or at quarterly completion (50 percent, 75 percent and 100 percent) of the project phase whichever takes place early; or as required by DDM.
- (xxvii) Maintain records of all plan labour and material used in the construction and equipping of the works.
- (xxviii) Regarding interim and final payments to the Contractor: The Consultant will process interim and final payments to the Contractor. Interim monthly payments shall be based on interim payment certificates processed by the Consultant following claims filed by the Contractor. The Consultant will be responsible for ensuring that all measurements are taken as per specifications and drawings for the works and are recorded in presence of the representative of the Contractor and are countersigned by him. All measurements (100%) will be taken by the Consultant. In processing contractual payments, the Consultant will certify that at least 50% and 15% respectively, of the measurements and quality control tests have been satisfactorily completed.

Additional supervisory responsibilities of the Consultant will be to carry out all such duties which are essential for effective implementation of the construction and equipping contracts, including but not limited to, the following:

- (i) Assist/advise DDM on advance actions required to be taken for handing over of site and in achieving different milestones for completion of projects as per schedule.

- (ii) To verify the quantities of all items in the BOQ and suggest modifications to the same if necessary as per the prevailing site conditions, for the approval of DDM.
- (iii) Assist DDM in proper monitoring/progress of works and implementation of project through computer aided project management technique and management information systems.
- (iv) To write a day-by-day project log which shall record all events pertaining to the admission of the contract, requests from and orders given to the Contractor, any other information which may at a later date be of assistance in resolving queries which may arise concerning execution of the works.
- (v) To advise DDM on all matters relating to execution of the works, claims from the Contractor and to make recommendations thereon, including the possible recourse to arbitration
- (vi) To prepare detailed recommendations to DDM for contract change orders and addenda, as necessary, to ensure the best possible technical results are achieved with the available funds.
- (vii) To assist DDM in taking over from the Contractor of each section, in particular by preparing lists of deficiencies which need to be corrected, and assisting with monitoring of the performance of the works during the defects liability period
- (viii) Assist DDM in providing clarifications/explanations to observations made, from time to time, by the and statutory authority or auditing body.
- (ix) Assist DDM in co-ordination of works with different agencies and hold meetings for proper and timely implementation of the project. Prepare and circulate the meeting minutes after receiving approval from DDM.
- (x) Preparation of revised estimate, etc., if required.
- (xi) Modifications in design and drawings.
- (xii) To carry out any other duties relevant to the project agreed during the negotiations.
- (xiii) The Consultant shall review findings from any independent safety audits and incorporate feasible minor modifications in final drawings and BOQ.
- (xiv) Any other important direction given by DDM to complete the project in taking view of good engineering and EOC equipping/operational practices.