



الجمعيّة العلميّة المَلَكِيّة
Royal Scientific Society
For Jordan, since 1970 • في خدمة الوطن منذ ١٩٧٠



Date: December 2020

Tender No: 44/2020

Technical Requirements

**EXCHANGE INFORMATION REQUIREMENTS
(EIR) FOR BUILDING INFORMATION
MODELLING (BIM)**

**BIM for Energy Efficiency in
the Public sector (BEEP)**

Private and Confidential

This project is funded by the EU under the ENI CBC Med Programme

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i. Notice of Tender Invitation

- a) RSS/NERC invite qualified Jordanian Firms to submit their technical and financial proposals.
- b) The Firm will be selected under Quality-and Cost-Based Selection (QCBS) procedures as described in this document.
- c) The Technical and financial proposals shall be submitted via e-mail in two separate document (pdf format) to rss.procurement@rss.jo , where both documents shall indicate the title and number of the Tender (44/2020).
- d) Deadline for proposals submission shall be no later than Monday 24/12/2020 - (14:00 Jordan time).
- e) RSS/NERC reserves the right to reject any of the proposals submitted and/or cancel the tender without any legal or financial obligations.
- f) Any proposal submitted to a different e-mail other than the indicated one (rss.procurement@rss.jo) will be rejected.
- g) All proposals shall be submitted in English Language.
- h) Clarifications shall be submitted via email to eman.shbail@rss.jo and m.tawalbeh@nerc.gov.jo no later than Sunday 13/12/2020 - 14:00 Jordan time.
- i) The answers to the questions shall be submitted by email no later than Thursday 17/12/2020
- j) Proposals must remain valid for 30 days after submission date.

ii. Basic Eligibility Criteria

- a) Specific experience engineering firm accompanying with their consultant(s) CVs
- b) Adequacy of proposed work (Write –up)
- c) Qualification & competence
- d) Reference assignment done in last 3 years along with testimonials, if any

iii. Qualifications and competence of the key staff for the Assignment

- a) Project team leader: Should have minimum 10 years of relevant experience and holding a Bachelor degree in Architectural Engineering.
- b) At least three team members with minimum 5 years of relevant experience and holding Bachelor degree in Engineering. Please see section 2.1 below.



1 INTRODUCTION

1.1 Document purpose

This document provides the Exchange Information Requirements (EIR) for the development of a virtual model of the Guest House of Al Karak Municipality using the Heritage Building Information Modelling (HBIM) process, within the ENI CBC Med project BEEP (BIM for Energy Efficiency in the Public sector) described in section 1.3. In line with the definition of ISO 19650, the EIR is a “tender document setting out the information to be delivered, and the standards and processes to be adopted by the Consultant as part of the project delivery process”. It outlines the Contracting authority strategic approach and it specifies the management, technical, commercial and project information and deliverables required for the project in a way that is specific, measurable, achievable and realistic. All parties must adhere to and follow the EIR.

The project EIR shall accompany the tender documents. Making this information available at tender enables Consultants to make informed decisions in the planning, design and delivery of the digital asset, in readiness for optimal use in the operational phase.

The Consultant is to include a Pre-contract BIM Execution Plan (BEP) in their proposal according to Annex 01, in which it must detail how it proposes to meet the Contracting authority requirements. The completed EIR and subsequent Pre-contract BEP are key documents used to assess the contents and quality of the tender response. Throughout this EIR specific responses are sought from the Consultant through their Pre-contract BEP.

1.2 Responding to this document

The Consultant shall deliver a Pre-contract BIM Execution Plan (BEP) for the project that responds to this EIR. The Pre-contract BEP sections will constitute a direct response to the EIR, and reference numbers for each section of the response should correspond those of the EIR.

If selected, The Consultant shall deliver a Post-contract BEP and review their BEP regularly and additionally when there is any change to their contract.

1.3 General Project Information

This tender concerns the development of a HBIM model of the Guest House of Al Karak Municipality within the ENI CBC MED project BEEP (BIM for Energy Efficiency in the Public sector). The BEEP project aims to enhance the capacity of public local administrations to design, and realise innovative energy rehabilitation interventions on historic public buildings, by the mean of a multidisciplinary and integrated ICT tool (BIM and performance-based design: the Energy Efficient Heritage BIM approach – EE-HBIM). The testing of this emerging technology on built heritage will be performed to demonstrate its scalability to the entire building stock. The project will provide public administrations with a powerful method for the energy rehabilitation of public buildings to be supported with private funds through the Energy Performance Contracting.

The Consultant shall be responsible for enabling, creating and/or delivering a HBIM model of the building in two different stages, corresponding to specific WPs of the BEEP project.

In Stage 1 (identified as WP3 A3.3.2), the required HBIM model should integrate previously collected information on the building that will be further provided to the Consultant (geometric, diagnostic, energy and environmental data), to create a comprehensive documentation of the building's current state.

The Contracting authority will use HBIM model of the first stage as a basis to inform a subsequent energy-environmental improvement concept (WP4 A4.2.2), through energy renovation scenarios that are both compatible with the identified historic buildings and capable of enhancing their energy and environmental performance. The Contracting authority will evaluate the scenarios' energy performance with specific energy software.



In Stage 2 (identified as WP4 A4.2.2), the Consultant shall integrate technical characteristics of each scenarios and its energy performance within the HBIM model (4D - 5D – 6D – 7D), in order to facilitate a ROI analysis and the drafting of EPC.

1.4 Building information

The building was constructed since more than 100 years and used as a municipal building. Around med of the 19th century a new larger building was constructed to be used as the main municipal building, while the old one (the case study) has been used for hosting the guests of the municipality and also used for organizing the main events & different activities.

A deep restoration process & reinforcement intervention was started in 2008 & completed in 2011. This intervention included renew the historic & damaged parts of the building as the facades, windows, & the doors in addition to installing the air conditioners in the building rooms.

The space of the main floor is 350 (m²) separated into rooms & hall, total volume is 1050 (m³).

1.5 Glossary

Unless the context otherwise requires, the following words and phrases shall have the following meanings:

Building information modelling (BIM) - Use of a shared digital representation of a built **asset** to facilitate design, construction and operation processes to form a reliable basis for decisions. Digital representation of physical and functional characteristics of a facility creating a shared knowledge resource for information about it, forming a reliable basis for decisions during its life cycle, from earliest conception to demolition.

BIM Execution Plan (BEP) - Plan prepared by the Consultants that explains how the information management aspects of the appointment will be carried out, in response to the EIR. A BIM Execution Plan (BEP) defines how, why, when and by whom the information modelling aspects of the contract will be carried out. The use of BIM should be clearly agreed with the Contracting authority and specified in the contract.

Pre-contract BEP - The pre-contract BEP is to demonstrate the Consultant's proposed approach, capability, capacity and competence to meet the EIR. It is utilised prior to the appointment of any Consultant.

Post-contract BEP - The post-contract BEP is the document defining standard methods and procedures adopted during the contract in order to meet the objectives and requirements set forth in the EIR. It is utilised following the appointment of project Consultant.

BIM Element Matrix (AIA) - BIM Element Matrix is a key document as it both allocates responsibility for preparation of the Models and identifies the Level of Detail and the properties by Unifomat/OmniClass classification for model elements.

Common Data Environment (CDE) - Agreed source of information for any given project or asset, for collecting, managing and disseminating each information container through a managed process. It is a means of providing a collaborative environment for sharing and coordinating work as information can be transferred through information exchanges and managed through the CDE. Strict operating procedures ensure a consistent approach by all organisations involved.

EIR Exchange Information Requirement - Tender document setting out the information to be delivered, and the standards and processes to be adopted by the Consultant as part of the project delivery process.



Industry Foundation Classes (IFC) - The IFC format is an industry-wide open and neutral data format that is fast becoming the de facto standard for rich data exchange. Further information can be found on the buildingSMART website <https://www.buildingsmart.org/>. The “native format” refers to the original software used for production of models.

Model federation - Creation of a composite information model from separate models. An assembly of distinct models to create a single, complete building information model of an asset.

OmniClass - The OmniClass Construction Classification System, also known as OmniClass™ or OCCS, is a classification system used for the organising and retrieving of information for the construction industry. For more information, see <https://www.csiresources.org/standards/omniclass>

Level of Information Need - The level of information need defines the level of maturity required for a particular information deliverable at a particular plan of work stage. It provides a framework that defines the extent and granularity of information and helps to prevent the delivery of too much information.

Model - Digital representation of part of the physical and/or functional characteristics of the Project.

Project - means the project to which the EIR relates.

2 MANAGEMENT REQUIREMENTS

2.1 Roles and responsibilities

The purpose of this section is to stipulate the allocation of roles and responsibilities associated with the management of the model and project information.

The Consultant indicate the Project Team Members carrying the following roles, indicating their capability and experience to fulfil the requirements of the roles. The same person can fulfil different roles:

Function	Role	Name	Title
Management of the information process	BIM Manager		
Management of the CDE	CDE manager		
Management of the asset	BIM Coordinator		
Information modelling	BIM Specialist		
<i>[others as required]</i>			

2.2 Model uses

The purpose of this section is to define the model uses of the HBIM model to be developed, as listed below:

Phase	Objectives	Uses
Stage 1 (WP3 A3.3.2)	Constructive HBIM model definition	Integration and representation of building geometrical and technical information according to the documentation provided by the



		Contracting authority (geometric survey, drawings, etc.) Definition of building elements Space, areas and volumes analysis
	Management of the knowledge documentation on the historical building	Integration of historical documentation provided by the Contracting authority (information sheets, links, etc.) Integration of diagnostic information provided by the Contracting authority (materials and structure survey, etc.)
	Management of the environmental-energy analysis	Integration of energy and environmental analyses developed by the Contracting authority.
Stage 2 (WP4) A4.2.2	Support of three energy intervention scenarios and of choice of adapted renovation strategies and technologies	Integration of three energy improvement intervention scenarios (short/medium/long term) provided by the design activity of the Contracting authority with data concerning Time, Costs and management (4D, 5D, 6D, 7D)
	Assessment of ROI of the environmental-energy intervention scenarios	Integration of Return of Investment evaluation method based on the intervention costs and energy saves of the interventions
	<i>[others as required]</i>	

The information to integrate in the model, provided by the Contracting authority, will be defined in further detail.

2.3 Level of Information Need

The level of information need defines the level of maturity required for a particular information deliverable at a particular plan of work stage. It provides a framework that defines the extent and granularity of information and helps to prevent the delivery of too much information.

The Contracting authority will define the level of information needs for this project using the BIM Element Matrix, which is a key document as it both allocates responsibility for preparation of the Models and identifies the Level of Detail and the properties by Unifomat / OmniClass classification for model elements.

The BIM Element Matrix will be further provided by the Contracting authority.

2.4 Model federation and data segregation

The Consultant should propose in the pre-contract BEP a federated model strategy, depending on the case study dimension, teamwork, etc.

[The model federation depends on the type of case study and on the energy simulation process. We recommend separating at least: Architectural model; MEP model including terminals and heating and cooling production system– useful for the energy analysis. A separated structural model is more useful with a frame concrete or wood structure]



For Stage 2 (WP4), if awarded, the Contracting authority and the Consultant will agree on a model federation strategy to better represent the three energy improvement intervention scenarios.

2.5 Data sharing and collaboration

[BEEP project will have a common CDE for all the case studies; the Consultant shall use this CDE]

The Contracting authority and Consultant should establish an agreed protocol for coordinating and sharing models, including how they will be controlled for quality and for ensuring security of information. Information may flow both ways.

The Contracting authority will provide a Common Data Environment (CDE) complying with ISO 19650 and ISO 27001, to be used by the Consultant for the management or sharing of data. The Contracting authority will further indicate the access and sharing procedures to be followed by the Consultant. This must facilitate collaboration and information sharing between members of the project team. It is essential that common BIM standards covering detailed processes within each organisation are established and agreed in advance.

The Consultant shall, post contract award, liaise with the Contracting authority to confirm details of personnel and their respective access permissions for the set up and use of the CDE in accordance with the security classifications/standards above.

2.6 Naming convention

For the file naming convention, the Contracting authority will provide a naming specification, to be used for all document types uploaded to a CDE, in line with IEC 82045-1 and BS 1192:2007(A2) 2016.

For the object naming convention, the Consultant shall apply the Omniclass standard, as will be developed in the BIM Element Matrix (see section 2.3.1). The Consultant can integrate the naming convention for specific not supported elements, following the same naming methodology.

2.7 Model quality control

The Consultant Pre-contract BEP shall outline the processes to address model quality control and clash detection.

2.8 Modelling strategy

The Consultant shall define in the pre-contract BEP the main modelling strategy to fulfil the given model uses, to be further developed with the Contracting authority, when awarded.

The modelling process will be based on the provided BIM Element Matrix.

The modelling process shall be based on the geometric and technical information (geometric survey, drawings, etc.) provided by the Contracting authority. Based on the provided information, the model shall represent the constructive system and technological characteristics of the building (vertical and horizontal structural system, materials, etc.) and as accurately as possible within the Level of Information Need. The walls, roofs and floors shall be modelled with their stratigraphy (known or assumed). Decorative elements can have a simplified representation, as long as their constructive system is detailed.

If a point cloud laser scanner survey is provided, the Contracting authority will further indicate the required tolerance from the point cloud, depending on the building complexity. The Consultant shall take advantage of the parametric tools of native software (e.g. system families) as much as possible, avoiding non-parametric tools such as mass modelling. The correct representation of the building technical, constructive and environmental features is paramount, even when leading to simplification of uneven features, typical of historical buildings. If awarded, the Consultant shall develop a simplification strategy (e.g. assuming planarity of walls) together with the Contracting authority.



The Consultant shall incorporate historical and diagnostic information (materials and structure survey, energy analyses, etc.) provided by the Contracting authority in the model. If the information cannot be directly integrated in the elements, it can be linked using reports, sheets, drawings, etc. When awarded, the Consultant shall further develop an integration strategy together with the Contracting authority.

In order to support environmental-energy intervention scenarios, the Consultant must integrate in the model the energy information provided by the Contracting authority (e.g. transmittance values for walls and windows, occupancy data, etc.) Occupancy and uses profiles for each room and/or thermal zones, if not included in the model, shall be linked as external files (reports, sheets, etc.).

Regarding MEP system, the Consultant shall represent HVAC systems terminals and plants. If no specific MEP system is modelled, the room information must include data on plants and terminals. The Contracting authority will provide further requirements on the MEP system later in the process, depending on the energy analysis and scenarios development.

Regarding object insertion and constraints, all objects (walls, roofs, ceilings, floors, HVAC systems, structures, windows, etc.) must be constrained to the corresponding lower and upper level.

3 TECHNICAL REQUIREMENTS

3.1 Hardware infrastructure

Data processing

The Consultant shall describe in the Pre-contract BEP the characteristics of each infrastructure item (computer) that will be used for the project, following the table below:

Infrastructure item	Description
Operating system	
Processor	
Memory	
Monitor	
Graphic	
Storage	

The Consultant shall describe in the Pre-contract BEP the Internet connection type and speed involved in the project.

3.2 Software infrastructure

The Consultant is required to identify in the Pre-contract BEP which software and BIM enabled platforms it will use to carry out the listed uses, following the table below.

It is essential native file formats delivered can be openly shared, and software platform systems can export to IFC (Industry Foundation Classes - latest version) for information extraction, verification, archive and free model viewing purposes.

Activity	Software	Version	Open format compatibility
3D Models			
2D Drawings			
Clash detection			
Code detection			



Visualisations			
Reporting			
Schedules			
Bills of Quantities			

3.3 Data exchange formats

The Contracting authority requires information to be delivered to the file formats as listed below:

Software formats	
Method of Data Exchange	CDE
3D Graphical Data Exchange	IFC (latest version), native (all required)
Format of 2D Graphical Data Exchange	PDF, DXF
Documentation	PDF, RTF

3.4 Common coordinates system

The coordinate system will be provided by the Contracting authority.

Other coordination standards to be defined in the Pre-contract BEP are as follows:

- Units to be used for length [m/cm/mm]
- Units to be used for area [m²/cm²/mm²]
- Units to be used for volume [m³/cm³/mm³]

3.5 BIM experience and competence

The Consultant shall provide in the pre-contract BEP details of projects executed within a BIM-enabled environment in the table below. (Please provide a maximum of five suitable examples).

N.	Year	Project name	Project value	Type of service	Model uses and objectives

4 COMMERCIAL REQUIREMENTS

4.1 Deliverables

The Contracting authority's project specific Data Drops and Project Deliverables are listed below. Consultant should meet these requirements within 45 days after signing the contract.

First Deliverable of Stage 1 – Constructive HBIM model with geometric and technical information

Second Deliverable of Stage 1 – Integration of historical and diagnostic (general conservation state, energy analysis) in the HBIM model



Deliverable of Stage 2: Integration of three energy improvement intervention scenarios (4D, 5D, 6D, 7D) in the HBIM model

4.2 BIM tender assessment

The project tender assessment by the Contracting authority will include assessing:

- The Consultant response to the EIR in the Pre-contract BEP
- The information in the Consultant BIM assessment form

The following evaluation weightings will be used by the client in assessing the tender response and BIM capabilities:

Score	Response	Match to the requirements
0	No response	No answer or totally inappropriate
1	Unacceptable	Significant concerns regarding the response/solution
2	Poor	Some reservations about the response/solution – may require further clarification prior to award
3	Fair	Meets the expected requirements
4	Good	Good response/solution which comprehensibly meets the requirements with an increased probability of meeting the desired outcome

Note: 60% out of 100 will be given to the technical proposal, while 40% will be for the financial proposal.

