

**BOSNIA AND HERZEGOVINA ENERGY EFFICIENCY PROJECT-
FEDERATION OF BOSNIA AND HERZEGOVINA**

TERMS OF REFERENCE FOR COMBINED CONSULTANCY SERVICES

PERFORMING DESIGN, TECHNICAL MONITORING (before and after), WORKS SUPERVISION

**Contracts No:
BEEP-P143580-CQ-08-CS-18-FBIH**

1. Background:

The Government of Federation of Bosnia and Herzegovina has received financing from the World Bank towards the cost of an Energy Efficiency Project. The project development objective is to demonstrate the benefits of energy efficiency improvements in public sector buildings and support the development of scalable energy efficiency financing models.

The project will consist of three components:

(1) An investment component: This component will support energy efficiency investments ('subprojects') in schools, hospitals and clinic centers. A small number of other public facilities (e.g., elderly homes, orphanages, other administrative buildings) may also be included. The component will finance energy efficiency upgrades,¹ as well as related technical consultancy services (e.g., energy audits, technical and social monitoring and evaluation, technical designs, supervision and subproject commissioning). The selection and implementation of subprojects will be conducted in three annual batches. The public buildings will be selected based on the payback period of energy efficiency investments (i.e. payback periods less than 8 years) and/or the significant energy savings potential, which were both identified as part of audits conducted;

(2) A component to support the development of scalable financing mechanisms and build capacity: This component will support the development of sustainable energy efficiency financing mechanisms in the public sector, strengthen implementation capacity and help to increase public awareness on energy efficiency;

(3) A component for project management: This component will ensure effective project management by the Project Implementation Unit (PIU) through financing additional experts, trainings for PIU staff, and covering incremental operating costs.

The PIU within the Federation Ministry of Physical Planning (FMPP) will be responsible for the preparation, coordination, management and implementation of the project, including procurement,

¹ Eligible measures include upgrades to reduce the energy use of public buildings, including building envelop measures, heating and cooling systems, lighting, upgrading of electrical network if capacity is increased, and other financially viable energy efficiency measures.

contracting, and payments of all goods, works and services related to the project. This Terms of Reference (ToR) define the nature and detailed scope of an assignment to provide combined engineering services, which will include: preparing designs for energy efficient retrofits, supporting preparation of bidding documents for civil works, supervision of civil works; and technical monitoring before and after implementation of energy efficiency measures.

2. Objectives

For the preparation and implementation of energy efficiency investments in public buildings (financed under Component 1 outlined above) in 2018, the PIU on behalf of the FMPP ('the client') intends to hire a Consultant Company ('the consultant') who will perform all of the following services: performing design, performing technical monitoring and evaluation (before and after) the implementation of energy efficiency measures in the selected buildings, conducting supervision and commissioning of civil works.

The objective of the energy efficiency investments financed as part of the project is to demonstrate the benefits related to energy efficiency (EE), including reduction of energy consumption in selected buildings, demonstration of the economic viability of investments, including reduced recurrent energy costs and associated public expenditures. In addition, the energy efficiency improvements are expected to generate demonstrable co-benefits, such as reduced CO2 emissions and improved indoor comfort levels.

3. Description and Scope of Services:

3.1 GENERAL DEFINITION OF SERVICES

The services will be performed for the public buildings listed in Annex 1 of this ToR. The services to be provided by the Consultant are described in detail in section 3.2. The assignment will be executed in three (3) tasks whereby the Tasks 1 and 2 will be compensated on the basis of the Lump-Sum contract provisions.

The realization of the required tasks is the subject to availability of credit Funds to be obtained by the relevant Canton from the Federal Ministry of finance.

3.2 DETAILED SCOPE OF WORK

Task 1. Design

The Consultant will be responsible for preparation and delivering the documentation related to the Design to the FMPP.

The Consultant shall:

- Based on (i) detailed review of the existing energy audits (Annex 2), (ii) visit of public buildings selected, (iii) and in coordination with public buildings administrators and local authorities, recommend acceptance or revisions, if necessary, of the energy saving measures originally proposed by the Client for the selected objects with clear justifications (e.g. cost-effectiveness, technical considerations, etc.); if there are substantial changes to the measures recommended in the energy audit, the Consultant is expected to update the results of the recommended investment package in terms of energy savings, fuel savings (MJ), CO2 reductions, payback, NPV, IRR, energy cost savings, etc.
- Prepare lay-outs, drawings, technical specifications, detailed technical design and bills of quantities as for the retrofitting measures recommended based on the Detailed Energy Audit, as agreed with the Client (e.g. any revisions that were agreed upfront), and in accordance with FBH regulations.
- The drawings will include the details that are usually produced in Federation of BH and will be issued at the scales required by the Federation of BH norms and standards. For technical requirements that will be linked to new equipment or equipment not included by the FBH standards, the Consultant shall follow the EN standards or other recognized international standards;
- The design (and technical part of the bidding documents) shall also take into account FBH regulations on environmental protection, any environmental management plans for public buildings and the Environment Management Plan provided by the Client (see Annex 3); the Consultant shall stipulate in the bidding documents the use of environmentally friendly materials, equipment and technologies;
- Prepare technical parts of bidding documents (including bills of quantities) for various procurement categories, i.e. works for reconstruction and/or building retrofit, supply and installation of equipment (including list of goods to be supplied and installed, and a cost estimate of goods and other related contractor services for installation). In the bidding document, a provision should be included that contractors shall provide training about operation and maintenance of new equipment and installations. The bidding documents shall be prepared in a format that meets the World Bank requirements (NCB procurement method) and Client requirements (template will be provided by the Client). In case of differences between local and the Bank procurement rules and requirements, the Bank one shall prevail (e.g. avoiding mentioning of manufacturer name, product brand name, etc.);
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- Provide assistance to the Client for obtaining all necessary approvals from local authorities with regards to detailed technical designs and in order to start civil works in accordance with the regulations and standards in FBH; this requires close coordination with canton/municipalities to prepare required technical documentation as well as active and continuous cooperation with the Consultant responsible for the Audit of design during preparation of design documents and their audit;
- Prepare draft plan for execution of construction works in cooperation with administration of public buildings selected to accommodate their needs and work schedule;

The consultant shall also provide the assistance with evaluation of bids from construction companies, including the following:

- Assist the client, as required, with review of bidder's inquiries prepare draft answers and clarification on bidder requests during the bidding process for consideration and follow-up by the Client.
- Assist the Client, as required, with evaluation of bids received under all the tenders' procedures for which the lay-out designs were developed by the Consultant and in accordance with the qualification information, criteria and procedures stipulated in the bidding documents;
- Verify compliance of technical responsiveness of the bids with requirements set out in the bidding document, including deviations and missing information as well as issues concerning quality of goods, materials and technology proposed;
- Analyse responsiveness of the bids with the Norms and Standards specified in the bidding documents.

The objects, for which development of Design is required, are mentioned in Annex 1.

Task 2. Technical monitoring (before and after) implementation of energy efficiency measures

In the framework of task part "Technical monitoring (before and after) implementation of energy efficiency measures), the Consultant shall:

- Collect the information and data monitored during heating season before and after the building is retrofitted, i.e. during the winter 2018/2019 to collect data before implementation of energy efficiency measures and during the winter 2018/2019 to measure/monitor results after retrofitting of the building. This task will include:
 - Metering of heat consumption in public sector buildings on a hourly basis for at least three weeks before and after the energy saving investment is implemented, and collecting the metered data at least on a monthly basis (see monitoring protocol and organization of data collection under Task 2);
 - Measurement of the outside temperature and the building inside the air temperature and humidity or temperature only in at least 3 different rooms carefully selected as representative. All measures needs to be collected on an hourly basis, during at least three weeks before and after the energy saving investment is implemented, for each site. These measurements will have to be collected during the heating season;
 - For buildings equipped with an individual boiler, fuel consumption will have to be determined at a minimum on a monthly basis;
 - Metering/collection of data on electricity consumption for the whole building, and for the specific use of lighting whenever new lighting will be included in the energy saving measures; these data will be collected on the basis of a manual, at the minimum monthly reading over the year
- Analyze the data and prepare the report for each public sector building individually, and summarize the results in graphs and conclusions for all buildings with minimal requirements:
 - Determine the real energy savings (kWh) by comparing data of energy consumption before and after building retrofit;

- Determine the real fuel savings (MJ) by comparing data of energy consumption before and after building retrofit;
- Determine the real GHG savings (CO₂) by comparing data of energy consumption before and after building retrofit;
- Determine observed energy costs (BAM) by comparing data of energy consumption before and after building retrofit;
- Measure the difference among the average indoor temperatures before and after building retrofit, and in conjunction with climatic variation, adjust the gross energy saving in order to define savings for the normative heating season and average inside air temperatures;
- Assess the comfort improvement in terms of temperature and functional improvement;
- Assess the effectiveness of the implemented energy savings measures such as room temperature control, reduction of air infiltration through windows, control of the air humidity through the natural ventilation, satisfaction of users;
- Assess the effectiveness of the new lighting (if lighting system is changed/improved) compared to the old one in terms of energy savings, quality of light (flickering effect of electromagnetic ballast), quantity of light (Lux) and satisfaction and comfort of users.

TME (before and after) is required to be completed for 5 objects from Annex 1 list which will be defined in the later stages-

Task 3. Works Supervision

Consultant's service must be done in accordance with local law, national standards and regulations. The works supervision ensures that the measures are implemented in accordance with the technical designs and specifications in satisfactory precision and quality and in accordance with the Client's requirements. This task covers duties and responsibilities of the Project Manager described in the general and particular conditions in the standard bidding documents for ICBs small works². This includes inter/alia:

- Verify technical documentation developed by the works contractor(s) to determine whether there are any modifications suggested compared to the original technical and bidding documentation;
- Coordinate with the relevant stakeholders (the Client, building administration, canton/municipality, and, as applicable, the relevant line Ministry) and the civil works contractor(s) on the detailed works plan and schedule;
- Coordinate and provide on-the-job training to the designated municipal/cantonal energy manager(s) for public buildings;
- Carry out the supervision of all works, and the supply and installation of goods, including quality control of materials, equipment and installations, and their compliance with the technical design requirements, regulation and environmental requirements (including the Environmental Management Plan/check list provided in Annex 3) in the Federation of Bosnia and Herzegovina;
- Visit the buildings once per week or more frequently if required by the Client and based on the needs and progress of works at each building. The Consultant will prepare a short report (Progress Report) after each visit on the work progress, including compliance with the work plan and technical documentation, the Environmental Management Plan, time schedule, quality assurance

² <http://siteresources.worldbank.org/INTPROCUREMENT/Resources/SBDSmworks-EN-Apr2015.pdf>

(including quality of works and materials/equipment delivered on the work site) and taking into account relevant standards and norms of the Federation of Bosnia and Herzegovina that could be affected by the energy efficiency works. Building visit reports will also include photographs providing a good view of the works progress, and highlight any issues or problems at the worksite.

- Sign regularly erection diaries and construction books and verify installed goods and materials as well as performed works;
- Verify payment certificates submitted by the Contractors, based on verified statement of works and contract requirements;
- Address problems that may occur, such as delays of delivery and installation, and bring issues to the Client's attention and recommend solutions to address the issues and avoid delays;
- Prepare requests to the Contractor to remedy all defects, to replace the non-adequate equipment and to install the goods in accordance with the technical requirements;
- Seek the Client's and the beneficiary's approval for any additional works required or modifications to be introduced prior to performance of such work; if agreed modifications were introduced by the Contractor with prior written approval of consultant, the client and the beneficiary, the consultant shall verify the final technical documentation and detailed technical design (after the work completion); the consultant should not approve any extended or additional works prior to obtaining a written approval of the Client;
- Be responsible for design revisions required as per site conditions during the implementation of the project in the minimum possible time;
- Obtain (if necessary) approvals of the relevant authorities to the modifications in detailed technical designs during contract implementation;
- Be responsible for (i) supervising the training provided by the works Contractor to the beneficiaries' maintenance staff (as included in the contract for equipment suppliers/works contractors), (ii) ensuring gathering attests, certificates and guarantee/warranty documentation from the contractor on the works and installed equipment, and providing the Client with the technical specification of the goods and equipment, the operation manuals and the maintenance protocols and schedules, and (iii) providing the Client with all necessary information on the newly installed equipment and materials;
- Organize and manage commissioning and testing of the works and site handover; this includes managing acceptance and commissioning procedures and verifying formal agreements on the successfully implemented works and their completion, managing any follow-up activities required for formal acceptance of the works (if there remain any deficiencies requiring repeated commissioning), ensuring adequate technical documentation of the accomplished works, verifying final commissioning of the work sites, and verifying final payments invoices, including report of the client on payment of retention.

There will be negotiations of technical and financial proposals of the consultant. The negotiations will be held with the Consultant's representative(s) who must have written power of attorney to negotiate and sign a Contract on behalf of the Consultant. The Client shall prepare minutes of negotiations that are signed by the Client and the Consultant's authorized representative.

Negotiations may include discussions of the Terms of Reference (TORs), the proposed methodology, the Client's inputs, the special conditions of the Contract, and finalizing the "Description of Services"

part of the Contract. These discussions shall not substantially alter the original scope of services under the TOR or the terms of the contract, lest the quality of the final product, its price, or the relevance of the initial evaluation be affected.

The objects, for which the Works Supervision is required, are mentioned in Annex 1.

4. Output/Deliverables and Time Schedule:

The deliverables include the following documents for each building separately:

Task 1:

The deliverables include the following documents:

- Final technical documentation (including lay-out, drawings, detailed technical design, bill of quantities and cost estimate) of retrofitting measures to be implemented in each building (including supply and installation goods, and implementation of works), in compliance with local norms and standards; the final documentation takes into account comments received from the Client and the Beneficiary and adequately addresses these. The technical documentation is expected to be submitted in local language in four (4) hard copy and one (1) copy on CD ROM (MS Word, Excel, AutoCAD (.dwg) for drawings); for the first 3 objects, translation in English is requested Task shall be completed and submitted to the Client for final approval within 75 days starting from Contract signature.
- Technical part of bidding documents for selected buildings, as described in Task 1, arranged in procurement packaged and in a format that meets the World Bank and the local requirements (template will be provided by the Client). The technical part is expected to be provided in local language; for the first 3 procurement packages, translation in English is requested. Documents shall be submitted by email and in in one (1) copy on CD ROM (MS Word, Excel). Task shall be completed and submitted to the Client within 10 days starting from Client approval of proposed technical documentation.
- Review and update of the detailed energy audits is expected to be provided in local language. Documents shall be submitted by email and in in one (1) copy on CD ROM (MS Word, Excel). Task shall be completed and submitted to the Client within 20 days starting from Client approval of proposed technical documentation.
- Draft answers to bidder's inquiries (in local language and per email) and technical (written) inputs on responsiveness of bids in accordance with criteria agreed with PIU and defined in Bidding Documents in a format to be agreed with the Client (local language). Written clarifications concerning the potential bidders' enquiries on the bidding documentation shall be submitted to the Client within three (3) days from receipt of such request. The report on compliance of bidders' proposals with the qualification requirements of bidding documentation shall be submitted to the Client within five (5) days from receipt of such proposals. Wherever any proposal is found to be technically non-responsive the report shall explain in details the reasons of such deviations.

Task 2:

The deliverables include the following documents for each building (5 objects from Annex 1 list):

Technical Monitoring Reports (before and after) shall be submitted in one (1) hard copy and one (1) electronic copy (PDF) and Excel or other (for calculations) in English language. Tasks shall be completed in nine (9) weeks, where the measuring shall last three weeks, and finalization of Technical monitoring before and after report six weeks.

Task 3:

- Consultant's Detailed Works plan and Schedule; Revised plans, if any revision done;
- Progress Reports, on a two weeks basis including all the detailed mentioned above (local language);
- Verified interim and final payment certificates based on verified construction books (monthly);
- Environmental Check-List Report;
- Final acceptance and commissioning report for each building certifying the quality of the works, materials and equipment including final technical documentation after the work completion in compliance with local regulations;
- Other reports as relevant (e.g. final technical documentation in case of any modifications made as approved by the Client and relevant authorities during construction).

Progress Reports shall be submitted in one (1) copy on CD ROM (MS Word, Excel) in local language every fourteen (14) days.

Verified interim and final payment certificates in six (6) hard copies in local language and shall be submitted to the Client by 10th of every month

Environmental Check-List Report in one (1) hard copy and one (1) copy on CD ROM (MS Word, Excel) in local language and shall be submitted to the Client within fifteen (15) days after acceptance on the successfully implemented works;

Final acceptance and commissioning report in three (3) hard copies and one (1) copy on CD ROM (MS Word, Excel) in local language. Translation in English will be required for the first 3 buildings and shall be submitted within twenty (20) days after commissioning;

The perceived Works duration is:

Works for Zenica-doboj canton: 4 months (supervision services 5 months, 15 days before/after the Works) – expected period: May – August 2018.

Works for Sarajevo canton: 4 months (supervision services 5 months, 15 days before/after the Works) – expected period: June – September 2018.

Works for Herzegovina-neretva canton: 3 months (supervision services 4 months, 15 days before/after the Works) – expected period: July – September 2018.

5. Qualification requirements and basis for evaluation

The Consultant should be a qualified firm or joint venture of firms (up to 3 companies for a joint venture) that have demonstrated experience in conducting technical monitoring and evaluation of energy efficiency measures, and supervision of works (of several sites at the same time). The firm must propose a team capable of successfully carrying out all aspects of the ToR with in-depth experience in executing similar consultancies. The Consultant shall demonstrate his capability to mobilize enough skilled staff for carrying out the project activities within the allocated timeframe and include all necessary engineering specialists as part of the proposal by including in the technical proposal the Curriculum Vitae of the proposed key staff, including educational background, relevant working experience in similar projects, and by confirming their availability during the period of the contract.

Interested consultants must provide information indicating that they are qualified to perform the services by fulfilling following requirements:

- Company information: name, registration, address, telephone number, facsimile number, year of establishment, contact person for the project, fields of expertise;
- Confirmation on no obligations relating to the payment of direct and indirect taxes in accordance with the relevant laws of Bosnia and Herzegovina (may not be older than three (3) months);
- Hold a license from Federation Ministry of Physical Planning for Design;
- Balance sheet and income statement for the previous 3 (three) years;
- Proof or statement of financial capability from the Bank whose client is a Consultant firm (may not be older than one (1) month);
- Details of experience in minimum five (5) similar assignments undertaken in last five (5) years for Task 1, minimum five (5) similar assignments undertaken in last five (5) years for Task 2 and minimum five (5) similar assignments undertaken in last five (5) years for Task 3, including value of consulting services and value of works, location, name of the Client, type of services provided, contract period of execution;
- Curricula Vitae (short version, specifying experience in similar assignments, eight (8) CVs of key personnel from various professions requested under such services) of key staff who will be working on the assignment(s) with minimum:
 - Team Leader, responsible for managing/overseeing the entire consultancy contract implementation; University degree (Master's equivalent) in architecture, mechanical, electric or civil construction engineering or related field; minimum seven (7) years of experience in relevant field, including project management of similar assignments;
 - Responsible key staff for managing/coordinating supervision of civil works; university degree (Master's equivalent) in architecture or civil engineering and at least seven (7) years of work experience in relevant field;
 - At least two (2) graduate architect and/or civil engineers with competency exam passed and at least five (5) years of work experience in relevant field;
 - At least two (2) additional graduate architect and/or civil engineers;
 - At least one (1) graduate mechanical engineer with competency exam passed and at least seven (7) years of work experience in relevant field;
 - At least one (1) additional graduate mechanical engineer;

- One (1) administrative assistant (support personnel, not needed CV).
- Form of association (sub-contractor/joint venture up to three members) for the execution of the contract, if the case may be, and identification of the leading company. Same information shall be submitted for the leading company and the associate companies except holding license from Federation Ministry of Physical Planning for Design which is obligatory for leading company;
- Detailed work schedule and methodology for all tasks/activities of this TOR, taking into account simultaneous implementation of tasks to be performed and allocation of number of staff, their qualifications and their man hours.

ANNEXES

Annex 1 – Draft List of selected public buildings

Annex 2 – Detailed Energy audits for selected public buildings

Annex 3 - Environmental Management Plan/check list

Annex 1 – Draft List of selected public buildings

This annex includes the draft list of selected public buildings and might be a subject to change.

No .	Building Name	Can ton	Locatio n	Selected scenario (ENG)	Heat ed area	Total investm ent	Desig n (Task 1)	TME (Task 2) 5 objects which will be defined later	Supervisio n (Task 3)
#					m2	BAM with VAT			
1	JU „VI osnovna škola“, Mostar	HN K	Alekse Šantić a 10 88000 Mostar	Scenario II: M1 - Partial replacement of existing joinery; M2- Thermal insulation of facade; M3- Thermal insulation of Ceiling Construction and Flat Roofs; M4- Installation of thermostatic valves; M5- Installation of heating / calorimeter measurements; M6- Replacement of boilers.	2.269	321.834			
2.	OŠ Ivana Gundulića Mostar	HN K	Rudarska 87, Mostar	SCENARIO IV (S4): M1 - Replacement of joinery; M2 - Thermal insulation of external walls; M4 - Replacement of boiler and energy source with replacement of circulating pumps; M5 - Installation of thermostatic valves on radiators; M6 - Installation of the meter for the heat energy consumption.	1.980	433.785			

3.	OŠ AB Šimića Mostar	HN K	Kraljice Katarine 38, Mostar	Scenario III (S3): M1 - Thermal insulation of external walls; M2 - Thermal insulation of the ceiling above the unheated basement; M3.1. - Thermal insulation of flat roof covering with additional thermal insulation; M3.2. - Thermal insulation of the ceiling with additional thermal insulation; M4 - Replacement of joinery; M5 - Replacement of equipment and improvement heating system; M6 - Improvement of the Electricity Consumption System.	3.585	877.118			
4.	JU SŠ Gimnazija "Muhsin Rizvić"	ZDK	Ulica šehida 32, Kakanj	Scenario 2: M-2.1. External wall insulation; M-2.2. Flat and pitched roof thermal insulation M-2.3. Replacement of exterior openings with thermally high quality openings	2.240	142.609			
5.	Mješovita srednja škola Stjepan Radić	ZDK	M4, Usora	Scenario 2: 1. Installation of a new boiler on biomass; 2. Replacement of roof windows; 3. Installation of motion sensors; 4. Installation of the daylight sensor.	2.162	58.522			

6.	JU Druga osnovna škola Zavidovi ći	ZDK	Ul. 8.Mart, Zavido vići	SCENARIO II (S2): 1. Partial replacement of existing joinery of poor thermal characteristics; 2. Thermal insulation of ceiling of the building; 3. Replacement of the boiler on the fuel oil with pellet boilers; 4. Partial replacement of the lighting;	2.726	148.186			
7.	JU "Gimnaz ija" Visoko	ZDK	Musala 23, Visoko	Scenario 2: M-1. Thermal insulation of external walls; M -2. Sanation of ceiling and flat roof; M- 3. Replacement of the heating system.	1.858	157.481			
8.	JU Osnovn a škola“ Vladimir Nazor“	ZDK	Ul.Sar ajevsk a 20, Zenica	Scenario 2: 1. Thermal insulation of facade; 2. Replacement of the openings; 3. Thermal insulation of ceiling construction; 4. Partial Replacement of the lighting; 5. The transition to the two-tariff electricity meters;; 6. Installation of thermostatic valves; 7. Installation of Heat Recuperation; 8. Installation of automatic heating system regulation.	2.444	671.581			

9.	JU OŠ „Izet Šabić“, Vogošća	SK	Donji Hotonj bb, Vogošća	SCENARIOS I (S1): M1 thermal insulation of external walls; M2 thermal insulation of roofs; M3 replacement of façade joinery; M4 installation of thermostatic sets; M5 installation of frequency regulated circulation pumps; M6 installation of control valves; M7 installation of the control system and operation of the heating installation; M8 replacement of glow bulb of power of 60 W with fluorescence bulbs of 26 W power; M9 Incorporating reactive energy compensator.	2.530	346.167			
10.	JU „Peta osnovna škola“, Ilidža	SK	Sokolovići, Ilidža	Scenario 2: 1. Replacement of joinery; 2. Partial replacement of the lighting; 3. Installation of heat pumps with heat accumulator; 4. Installation of thermostatic valves.	2.887	298.285			
11.	JU „Srednja elektrotehnička škola“, Sarajevo	SK	Ul. Safeta Zajke br.2, Novi Grad	Scenario 3: 1. Replacement of the openings; 2. Thermal insulation of external walls; 3. Thermal insulation of the roof of the school and the gym; 4. Boiler replacement; 5. Installing a Calorimeter.	4.495	341.696			

Annex 2 – Detailed Energy audits for selected public buildings

Annex 3 - Environmental Management Plan/check list

Environmental Management Plan (EMP)

General

During the Works the Contractor is obliged to follow the relevant laws and legislation as relevant to the scope of works, and that are valid at the level of the Municipality, Canton or FBIH that deal with physical planning and construction, environmental protection and health and safety at work.

The tables below set forth the environmental protection measures as associated with potential impacts, during the different phases of the project development. At all times, the contractor shall abide by the provisions set forth in this Environmental Management Plan, while the supervisor and/or members of the Project Implementation Unit shall reserve the right to supervise proper and complete implementation of all measures.

Environmental Management Plan (EMP)

Phase: Design				
Environmental Impact	Mitigation Measure	Mitigation Costs	Institutional Responsibility	Comments
Review of the final design documentation	Ensure that the activities in the design documentation are in line with the Environmental Management Plan	Part of the project activities, included in operational costs	Contracted design consultant together with the project implementation unit or team	

Phase: Construction				
Environmental Impact	Mitigation Measure	Mitigation Costs	Institutional Responsibility	Comments
Old equipment or waste that can be reused	Try to reuse or recycle all generated wastes as much as possible; in the event that reuse is not possible, dispose of wastes at designated landfill sites. It is forbidden to burn or use for fuel all wastes, including painted wooden parts of doors and windows. Long-term stockpiling of such wastes in the proximity of the site is also not permitted.		Construction contractor and end-user of building	
Construction waste	Separation of all types of waste streams, reuse and recycling wherever possible Disposal of wastes that cannot be reused or recycled, transport and disposal of wastes at designated landfill site and in cooperation with the local waste management company; no open burning or illegal disposal of wastes. Hazardous wastes (smaller quantities of paints, oils, etc.) will be stored separately, in accordance with relevant legal requirements, following labeling procedures and will be handed over to the designated and authorized company or agency. Avoid long-term stockpiling of wastes on site.		Construction contractor or sub-contractor	To be defined within the design documents
Removal of materials that may contain asbestos (or other hazardous materials, such as mercury-containing light-bulbs)	Removal of materials that contain asbestos will be carried out in line with the local legislation, including construction standards, work safety issues, air borne emissions of hazardous pollutants and disposal of waste and hazardous waste (in the event that there is no local legislation, the Directive 2003/18/EC of the European Parliament will be used, that amends and supplements Directive of the Council 83/477/EEC on worker protection from workplace asbestos exposure risks: threshold values of airborne dust particles is 0.1 fiber/cm ³ ;	Separate sub-contract during works, if needed. Additional costs may be substantial, depending on the amounts of material to be	Construction contractor	The contractor needs to train their workers on how to assess presence of asbestos containing materials and to establish a procedure of its safe removal using proper protection equipment,

Phase: Construction				
Environmental Impact	Mitigation Measure	Mitigation Costs	Institutional Responsibility	Comments
	also use the Good Practice Note: Asbestos: Health Issues at Workplace and Community; World Bank). Mercury containing light bulbs will be collected separately, ensuring their intactness, and will, as such, be handed over to a company or agency that is licensed for their collection and safe disposal.	removed.		storage without breaking in air-tight containers and management by an authorized agency or company (registered with entity environment ministries).
Chance findings	In case of chance finds or other significant discoveries during excavation works stop all works and inform relevant authorities prior to proceeding.		Construction contractor	
Noise generation	Limit works to daytime intervals that are in accordance with the local legislation Ensure non-interrupted use of building to other users or tenants Use machinery with appropriate attests No idling of machinery or vehicles on site	Negligible costs Contractor costs	Construction contractor	
Dust generation	Suppression of dust with water or covering materials and working areas that can generate dust; decrease speed in transport of such materials Demolition dust can be minimized through use of adequate covers for working areas, workers should use suitable protection equipment Use of chutes to remove waste from higher floors	Contractor costs	Construction contractor	
Setting up of construction site and removal of site upon completion of works	Plan to decrease disturbance to surroundings and neighbors (including plans to ensure proper traffic management on access roads to site) Fencing off the site or access to site with proper safety signs After completion of works, site will be restored to previous conditions and all	Negligible costs Contractor costs	Construction contractor	Will be further defined with specifications in the design documents

Phase: Construction				
Environmental Impact	Mitigation Measure	Mitigation Costs	Institutional Responsibility	Comments
	wastes will be cleared in line with the provisions of this EMP, all machinery will also be removed from site. All scaffolding, cranes and other auxiliary equipment will be set up in a manner to ensure safety of workers but also safety of passer bys. All working sites shall be clearly labeled with limited access rights. Workers will have and use adequate personal protection equipment.			

2. Environmental Supervision and Monitoring Plan

Phase: Construction				
WHICH Parameter should be monitored?	WHERE Should the parameter be monitored?	HOW Should the parameter be monitored?	WHEN Should the parameter be monitored? (frequency of sampling)	WHO is responsible for monitoring?
Works are carried out in line with all relevant legal requirements (and permits if necessary)	At construction site	Part of regular supervision	During works, in line with local permitting or legal requirements	Supervisor and inspectorate
Waste management (including construction and hazardous)	At construction site	Visually to ensure waste is stored and regularly transported Review of documentation for waste handover, in particular for hazardous wastes	Weekly	Supervisor to confirm implementation Contractor to implement measures
Presence of asbestos or other harmful and hazardous materials on site	At construction site	Visually	Weekly, in case of chance discoveries workers should inform supervisor immediately	Supervisor to confirm implementation Contractor to implement measures
Noise and dust	At construction	Sensory	At start of works and	Supervisor to

emissions	site	Following complaints received	then every 30 or 60 days	confirm implementation Contractor to implement measures
Signs and safety notification	At construction site	Visually	Before start of works and then regularly during construction works	Supervisor to confirm implementation Contractor to implement measures