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**MATRIC\_NO: 18/ENG02/015**

**COURSE TITLE: Engineering society**

**COURSE CODE: ENG 284**

**> ALFA-BELGORE HALL REHABILITATION  
PROJECT**

**SCOPE OF WORKS**

**BACKGROUND**

Studies were carried out to establish the CHP container handling capacity short and long term. Ojo's Preliminary Design Report dated January 28th, 2020 details the requirement. From those studies, ABUAD has identified a phasing scenario that will allow the current Hall Operator to pursue its activities. This scenario contains various phases, one of which is to carry demolition work of various buildings, and ancillary works such as fencing, sewage holding tanks etc.

**Project Objectives**

ABUAD desires to contract with an experienced Consultant for the services as described in this Schedule of Requirement (SOR) at Afe Babalola University, Ado-Ekiti, and Ekiti State, Nigeria.

The objective of this Schedule of Requirement (SOR) is to select an Engineering Consulting Firm that will review the pertinent documents, visit the site and provide a drawing and specifications (D&S), so that ABUAD may prepare a Drawings & Specifications to solicit a Contractor to carry out the demolition work and the container yard reconstruction.

The D&S shall be specific on the following point:

- Health and Safety as per ABUAD requirements and international standards;
- Respect of environmental standards;
- The contractor has to haul out the demolition products and dispose of it in accordance with local regulations;
- There shall be no sale of salvaged material within the Hall's property limits.

**Description of Consultant Services**

The successful Consultant will perform the work set out in this SOR, and is also expected to be ABUAD's advisor throughout the build. ABUAD will assume the site supervision during the build. Accordingly, the Consultant may not be associated in any way, including an overlap of principal subcontractors as determined by ABUAD, with any entity or team that submits an offer/proposal on the execution of the work. By making a submitting an offer/proposal, a Consultant agrees to this separation.

Tasks to be performed or arranged by the Consultant include but are not limited to:

- ❖ Provide a complete review and assessment of the required elements based on the recent studies;
- ❖ Execute a detailed topographical survey, compile the data, update the existing topographical plan and calculate the offset from WSP's topographical survey;

- ❖ plan and calculate the street from topographical survey;
- ❖ Review of relevant available information to characterize the anticipated subsurface conditions. (A geotechnical study is currently under way and the result will be made available to the Consultant);
- ❖ Provide detailed Drawings & Specifications to allow ABUAD to initiate the tendering process for the actual reconstruction works;
- ❖ Provide a Bill of Quantity (BOQ) as well as a Class "B" estimate;
- ❖ The Consultant is to generate a detailed project schedule in conjunction with ABUAD that will be incorporated into the SOR. The schedule will include key milestones for the complete project delivery;
- ❖ Coordination and the cooperation of the Consultant with ABUAD will be paramount for the implementation of this project;
- ❖ The SOR document will clearly identify ABUAD and the Consultant's responsibilities, i.e. communication protocols and expectations, defined project teams, etc. ;
- ❖ The SOR documents will include criteria to ensure that the design and construction will meet and exceed applicable codes and standards, as well all ABUAD specific technical standards, health & safety and environmental requirements;
- ❖ The Consultant will work with ABUAD procurement professionals in preparing the non-technical aspects of the SOR;
- ❖ The SOR documents prepared by the Consultant will be in publishable form.

### **Assist in the Evaluation of the Tender**

The Consultant will assist with the evaluation of the offers/proposals in response to the tender;  
The Consultant will assist with Clarification from potential suppliers/bidders of the tender to be launched, as and when requested by ABUAD

### **Reconstruction Works**

The reconstruction works shall be carried out in such a way to protect existing building/infrastructures external to the zone e.g. lighting, storm drainage, road structure and pavement, etc.  
The reconstruction work will also include provision for utilities reconnection. The method shall not cause prejudice to the other buildings and related services.

The following item have been identified as to be carried out within the area identified above:

- a) Reconfiguration of the main gate (Sliding vs. Swinging)
- b) Replacement of concrete slab (main entrance and maneuvering area)
- c) Pavement repair (service road)
- d) Sewage holding tanks (Security building and Gate security buildings)
- e) Lighting High Mast and associated conduit/wiring
- f) Street light removal
- g) Construction of the access road (to container Yard)
- h) Construction of the access road (to the APN Administrative area)
- i) Underground wiring (various)
- j) Storm drainage improvement and repair/cleanup of existing
- k) Small punctual demolition to accommodate construction works.

### **Special considerations:**

- ❖ A detailed topographical survey of the area and its surrounding areas in required prior to the design process
- ❖ Three (3) permanent benchmarks shall be established. They will be established at location selected by ABUAD within the Hall property and will be installed in such a way to be usable throughout the overall Hall rehabilitation project. Localization of an

exploitable existing benchmark in town is the Consultant's responsibility.

- ❖ Please consult the existing drawings to identify and avoid potential damages to the underground network. Include clauses for the identifications prior to work and repair/modifications as applicable.
- ❖ The fencing definition requirements are included and must be detailed according to the types available under a separate contract. ABUAD has contracted a separate fencing contract where the contractor is required to execute on an "as requested basis. The fence work will be carried out under that contract but must be defined within this detailed design.
- ❖ Signage shall be using composite materials
- ❖ The existing grated open channels shall be used to establish the reference level to adjust to.
- ❖ While the gate is being modified from swinging to sliding, 24/7 armed security is to be provided
- ❖ Throughout the reconstruction phase, two (2) diesel light towers shall be operating from 1900 hrs to 0600 hrs. (10 meters tower, 4 x 1000w flood lights minimum). Rental, labor and consumables shall be at the contractor's cost.
- ❖ The main gate shall remain operational during the execution of the reconstruction. Proper phasing is to be proposed.
- ❖ Sewage holding tanks shall be fitted with covers designed to safely withstand anticipated vehicle loads, including impact.
- ❖ The removal of the street light posts shall be done in such way not to disrupt the electrical feed to the remaining poles (eastward)
- ❖ The Lighting High Masts are to be base hinged in order to be capable to lower them for maintenance and in case of unfavorable wind conditions (hurricane) Mast manufacturer is to be responsible to design the bases, erect the mast and lighting equipment, supply the appropriate independent hydraulic cylinder counterbalance unit.
- ❖ Two options are to be provided for the Lighting High Mast (Rhea floodlights 8 x AL5216 / 1000W SON-PT High Pressure Sodium) or (AAA-Lux LED floodlights 7 x AL60 / 1375 W).The construction tender document shall require a cost for both options.
- ❖ The Contractor may suggest other High Masts/Lighting fixtures however it must be supported by an appropriate photometry study respecting the minimum lighting and average lighting level levels. Folding High Mast are mandatory.
- ❖ Direction of the folding mast once lowered must be proposed before actual construction works.
- ❖ Electrical feeds to the buildings are shallow and in the axis of the street light pole. Care shall be taken not to damage. In case of damages, the Contractor is to repair to resume services.
- ❖ Electrical pull boxes shall be set flush to the finished level and compliant to AASHTO M306 (H2O loading) and sized according to Code.
- ❖ The firefighting sea water loop will be pressure tested to 150 psig. Leak testing shall be in accordance with DINEPA's Technical Referential.
- ❖ Hydrants outlets shall be compatible with the Fire Department equipment.
- ❖ Minimal size of the firefighting sea water loop is 150mm (PVC DR 18).
- ❖ The fencing and gates construction will be carried out under a separate contract, however must be specified using the existing Fencing & Security Drawings & Specifications documents.
- ❖ Care must be exercised to direct storm runoff away from the existing administrative building. Pavement correction overlay is permitted.

### **Benchmarks establishment**

Three (3) permanent benchmarks will be established within the Hall's property limits. The location will be selected by ABUAD so that they be reliable (undisturbed) during the Hall rehabilitation project. They will be referenced to a known benchmark. Offsets measurements to WSP's benchmarks are to be established in order to unify previous survey and provide a sound database for future work phases.

### **Vehicle Storage yard**

- ❖ Sea water firefighting underground piping and hydrants (2).
- ❖ Lighting High Mast and associated conduits and cabling.
- ❖ Underground electrical distribution to feed the two existing Hall Administration Building.
- ❖ Perimeter drain connected to existing surface channels.
- ❖ Parking surface structure with granular top surface.
- ❖ Cast in place perimeter curbs as required. (regular and vehicular passage)
- ❖ Fencing and gates.

### **Main Gate**

- ❖ Modification works to the northern half of the gate to change it from swinging to sliding via a properly sized operator. Gate operation shall be via remote control and hard wired control.
- ❖ Demolition and reconstruction of the circulation area from the boulevard to the Gate house area.
- ❖ Installation of underground electrical conduit network to allow future feed of the existing building.

### **Storm drainage improvement and repair/clean-up of existing**

- a) There are three (3) storm channel within the work area. Channel #1, #2, and #3 as illustrated on WSP's drawing SK003 (WSP's Report April 2020). The channels are at places covered with either prefabricated concrete or cast iron grates. These channels are also obstructed with debris and sediments.
- b) The scope of work is to clean the channels (within the work zone), repair as necessary and replace damaged or missing grates.

### **Street Lighting**

Removal of the street light post from the main gate to beyond the intersection of the Container yard road.

### **High Mast and Street lights poles**

This Work Program calls for one (1) High Mast. The overall project however calls for three (3) High Masts. Since the shipping cost is likely to be significant for only one, we may elect to acquire all three and store the remaining two on site. Therefore a separate price will be required for one (1) or three (3) complete with all accessories including lighting fixtures.

#### **Deliverables**

### **Reports and Communications**

- ❖ When the Consultant's work is 50% complete, a draft D&S will be submitted complete with supporting documentation (concept drawings, assessment report that identifies installation, etc.) to ABUAD for preliminary review. A teleconference discussion will take place between the Consultant and ABUAD that provides an overview of the documentation. Minutes of the meeting shall be published by the Consultant. Revision comments from ABUAD will be provided to the Consultant one week after receiving the 50% D&S document.
- ❖ When the Consultant's work is 90% complete, a draft SOW will be submitted complete with supporting documentation to ABUAD for final review. A teleconference discussion will take place between the Consultant and ABUAD that provides details of the content contained within the 90% SOW. Minutes of the meeting shall be published by the Consultant. Revision comments from ABUAD will be provided to the Consultant one week after receiving the 90% D&S document.
- ❖ The Consultant shall include provisions for bi-weekly teleconference project meetings with ABUAD project management throughout the project duration and generate the

with ABUAD project management throughout the project duration and generate the corresponding meeting minutes.

- ❖ The Consultant shall provide the Final D&S to ABUAD in a PDF, DWG and DOCX formats.
- ❖ The documents (Specification, drawings, Bill of material, survey results, calculations, notes, etc.) are to be sealed by U.S. licensed professionals or equivalent to be approved by the client. (Accreditation to be submitted with your offer).

### **Others**

- ❖ All work done onsite will be subject to ABUAD safety rules and protocols, including training. The Consultant is to factor in these costs within their offer/proposal. ABUAD Safety Rules are available and will be provided to the Consultant.
- ❖ ABUAD may ask the Consultant to provide services on an as-needed basis, during the execution phase... Consultant must also supply a schedule of hourly rates for its consultancy.

### **Reasons for Site Selection**

#### ❖ PURPOSE OF BUILDING

This is the most important factor to consider before purchasing or selecting a site for residential purpose. The site was selected keeping in view the general scope or the purpose of building and on the basis of extent or privacy required.

#### ❖ SHAPE & SIZE

Area of the plot of land should be such that when the hall is constructed, keeping in view the restrictions of the local authority, would meet the requirements of the owner, preferably with possibilities of future extensions.

#### ❖ TERRAIN CONDITION

The site was situated on an elevated place and also leveled with uniform slopes from one end to the other so as to provide good and quick drainage of rain water.

#### ❖ TYPE OF GROUND SOIL

The ground soil of the site was good enough to provide economical foundations for the intended building without causing any problems. Generally, for most satisfactory constructions, the site should have rock, sand or dense soil below 60 to 120 cm layer of light soil or even black cotton soil.

#### ❖ NATURAL LIGHT & AIR

The location of the site was selected so as to ensure unobstructed natural light and air.

#### ❖ ENVIRONMENTAL CONDITION

The site was available in an area where natural beauty and man-made environment create healthy living and working conditions.

#### ❖ LEGAL & FINANCIAL ASPECTS

The legal and financial aspects, which dictate upon ownership rights and the costs were right consideration before the purchase of a plot.

### **Construction Site Personnel Team**

## Site manager

The site manager is the senior construction company representative on site. The site manager will generally be responsible to an office-based 'contracts manager'.

The site manager's role is the supervision and management of all site-based staff employed by the company to ensure that the project is delivered within their contractual obligations. The major responsibilities of the role are to:

- ❖ Advise and assist in overall planning.
- ❖ Plan and coordinate resources.
- ❖ Monitor and control progress and quality.
- ❖ Communicate with the consultant team.
- ❖ Provide feedback and reports to the client.
- ❖ Ensure that all aspects of the project are carried out in accordance with statutory requirements.
- ❖ Ensure that all aspects of the project are carried out in accordance with company policy.

### Other site staff

The contractor's site-based staff will consist of some or all of the following personnel:

- ❖ General foreman.
- ❖ Site foreman.
- ❖ Trade foreman.
- ❖ Ganger.
- ❖ Operatives.
- ❖ Site engineer.
- ❖ Site supervisor.
- ❖ Planner.

### Other support staff:

- ❖ Bonus surveyor.
- ❖ Contractor's cost controller.
- ❖ Buyer.
- ❖ Clerical staff.

## > Gantt Chart

ALFA-BELGORE REHABILITATION PROJECT TIMELINE		
PROJECT TITLE	START	PROJECT DURATION
ALFA-BELGORE REHABILITATION PROJECT	09/21	in days
PROJECT MANAGER	END	254
NNEJIFEANYI DANIEL	06/01	

TASK NAME	STATUS	START DATE	END DATE	DURATION in days
Planning	Complete	09/21	09/30	10
Demo Prep	Complete	10/01	10/06	6
Excavation	Complete	10/25	10/29	5
Concrete	Complete	11/01	11/13	13
Pre backfill	Complete	11/13	11/15	3
Framing	In Progress	10/25	12/05	42
Roof	In Progress	11/19	12/10	22
Plumbing	In Progress	10/29	12/09	42
Windows	On Hold	11/22	12/15	24
HVAC	In Progress	11/29	12/20	22
Electrical	In Progress	12/10	12/22	13
A/V	Complete	12/10	12/15	6
Insulation	In Progress	12/03	12/21	19
Drywall	In Progress	01/03	01/23	21
Exterior stone	In Progress	01/03	01/17	15
Exterior case work	Not Started	01/04	01/13	10
Hardwoods	In Progress	01/19	03/10	51
Tile	On Hold	02/03	02/14	12
Plumbing -hang sinks	In Progress	02/16	02/23	8
Interior doors	Complete	02/25	03/09	13
Millwork	Complete	02/15	02/17	3
Interior painting	In Progress	02/28	04/14	46
Stone Counters	In Progress	03/21	03/31	11
Schedule Buffer	In Progress	02/28	03/10	11
Decks	In Progress	02/28	03/18	19
Interior doors- hang & hardware	Complete	05/03	05/13	11
Plumbing	In Progress	05/02	05/05	4
Electrical	In Progress	05/03	05/11	9
FINAL Inspections	In Progress	05/02	05/02	1
Wrap up	In Progress	05/09	06/05	28
Complete	In Progress	06/10	06/10	1

STATUS
Not Started
In Progress
On Hold

**BILL OF QUANTITY (BEME) FOR THE REHABILITATION OF ALFA-BELGORE HALL, ABUAD**

ESTIMATE AMOUNT ₦.- 15,000,000

**CIVIL WORK**

	item	Unit	QUANTITY	Rate	Amount (In ₦.)
	Brick work with bricks of class designation 100A Brick work in				

6.3A	superstructure above plinth level up to floor V cumb	cub			
			7.1	341.7	2426.07
13.11.4	12 mm Cement plaster of mix 1:6 (1 cement : 6 Coarse sand	sqm			
			213.61	72.1	15401.28
14.1	Repairs to plaster of thickness 12 mm to 20 mm in patches of area 2.5 sqm and under including cutting the patch in proper shape and preparing and plastering the surface of the walls complete including disposal of rubbish to the dumping ground within 50 meters lead.	sqm			
			189.59	124.5	23603.96
25.9.3	Providing and laying in situ seven course water proofing treatment with APP (Atactic Polypropylene) modified Polymeric membrane over roof consisting of first coat of bitumen primer @ 0.40 Kg per sqm, 2nd, 4th & 6th courses of bonding material @ 1.20 Kg/sqm, conforming to IS:702, 3rd and 5th layers of roofing membrane APP modified Polymeric membrane 2.0 mm thick of 3.00 Kg/sqm weight consisting of five layers prefabricated with center core as 1 Omicron HMHDPE film sandwiched on both sides with polymeric mix and the polymeric mix is protected on both side with 20 micronHMHDPE film. 7th, the top most layer shall be finished with brick tiles of class designation 100 grouted with cement mortar 1:3 (1 Cement:3 fine sand) mixed with 2% integral water proofing compound	sqm	800.22	440.4	352416.89
13.40	by weight of cement over a 12 mm layer of Providing and applying plaster of Paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete	sqm	1516.15	63.8	96730.37
13.74	Removing white or color wash by scrapping and sand paper in and preparing the surface smooth including necessary repair scratches etc. complete.	sqm	1326.56	3.3	4377.65
13.78.2	Applying one coat of cement primer of approved brand and	sam			

	manufacture on wall surface: Distemper primer	'	92.33	21.3	1966.63
13.77A. 1	Distemping with oil bound wash bled distemper of approved brand and manufacture to give an even shade: Two or more coats on new work	sqm	1515	26.3	39844.50
10.5	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size with top and bottom rail of T-torn 40x40x6 mm with 40 mm dika steel pulleys complete with bots and nuts locking arrangement stoppers handles including applying a priming coat of approved steel primer.	sqm	5.2	3225.7	16773.64
9.82.2	Providing and fixing M.s. grills of requirement pattern in frames of windows etc. with M.S. flats, square or round bars etc. all complete fixed to openings/wooden frames with raw plugs screws etc.	kg			
			3000	83.4	250200.00
24.1	Providing and fixing anodized aluminum work for doors and windows and ventilators and partitions with extruded built up standard tubular and other sections of approved make conforming to IS : 733 and IS : 1285, anodized transparent or dyed to required shade according to IS : 1868,(Minimum anodic coating of grade AC 15), fixed with raw plugs and screws or with fixing clips , or with expansion hold fastners including necessary filling up of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt etc.Aluminium snap beading for glazing/paneling, C.P. brass/stainless steel screws, all complete as per architectural drawings and the				
	Directions of Engineer-in-charge. (Glazing and				0.00
24.1.1	Fix portion	Kg	293.41	343.4	100756.99
	For shutters of doors and windows & ventilators including providing and fixing hinges/pivots and making provision for fixing of				

24.1.2	making provision for fixing of fittings wherever required including the cost of PVC/neoprene gasket required (Fittings shall be paid for separately.)	Kg			
			260.8	360.42	93997.54
12	Providing and fixing glazing in aluminum doors and windows ventilators (5.5 mm) thick	sqm			
			72.27	701.4	50690.18
9.88	Supply fixing and finishing Saal Wood work in charkha	cum	0.17	62638.1	10648.48
9.4	Providing and fixing paneled or paneled and glazed shutters for doors, windows and clerestory windows including black enameled M.S. butt hinges with necessary screws excluding. Paneling which will be paid or separately.	sqm			
			4.39	2022	8876.58
9.5	Providing and fixing and fixing paneling or paneling and glazing in paneled of paneled and glazed shutters for doors, windows and clerestory windows (area of opening for panel inserts excluding portion inside grooves or rebates to be measured) paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick.	sqm			
			2.2	1836.3	4039.86
13.82.4	Painting with ready mixed paint of approved brand and manufacture in all shades to give an even shade: Old wood work (one more coats)	sqm			
			231.65	32.5	7528.63
13.81.1	Applying priming coat: with ready mixed pink or grey primer of approved brand and manufacture on wood work (hard and softwood)	sqm			
			152.89	18.9	2889.62
10.16.1	Steel work in built up tubular trusses including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, welded and bolted including special shaped washers etc. complete Hot finished welded type tubes	kg			
			16537	77.7	1284924.90
13.81.3	Applying priming coat: With ready mixed zinc chromate yellow primer of approved brand and manufacture on steel work (second coat)	sqm			
			1150	8.4	9660.00

13.82.1	Painting with ready mixed paint of approved brand and manufacture in all shades to give an even shade: Old wood work (one more coats)	sqm	1150	32.5	37375.00
21	(A) Cost of window A.C	No.	2	20000	40000
	(B) Exhaust fan	No.	7	2000	14000
	(C) Ceiling Fan	No.	14	1500	21000
	Carriage of materials				0
	(A) Cement	Bag	50	8.55	427.5
	(B) Coarse Sand	cum	8.11	503	4079.33
	(C) Bricks	No.	3507	0.39	1367.73
	Extra cost of material				0

## **THEORY ANSWERS**

1. BEME: Bill of Engineering Measurement and Evaluation (BEME) also referred to as "Bill"; is a tool used before, during and post-construction to assess and value the cost of construction works. This includes the cost of materials, labor, equipment, and any/all other resource(s) required for the success of any construction endeavor based on a pre-determined scope and determination.
2. DEFECT LIABILITY PERIOD: The defects liability period (or 'DLP') is a fixed period of time, starting from the date of practical completion, during which the contractor has an express contractual right to return to the site to rectify defects
3. LEAD CONSULTANT: The lead consultant is the consultant that directs the work of the consultant team and is the main point of contact for communication between the client and the consultant team, except for on significant design issues where the lead designer may become the main point of contact.
4. PROJECT LIFE CYCLE: A project life cycle is the sequence of phases that a project goes through from its initiation to its closure.
5. ENVIRONMENTAL IMPACT ASSESSMENT: Environmental assessment is the assessment of the environmental consequences of a plan, policy, program, or actual projects prior to the decision to

move forward with the proposed action.