ENGINEERING CONSULTANCY ASSIGNMENT

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ENG 284

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TITLE OF PROJECT: REHABILITATION OF ALFA BELGORE

SCOPE OF WORKS

1. **INTRODUCTION:** This project is essentially a rehabilitation project earmarked to increase the seating capacity of Alfa Belgore Hall. It has become necessary to upgrade the seating capacity in order to cater for rising demand for the usage of the auditorium necessitated by increase in the population of the students.

   1.1. This document establishes the Scope of Work (SOW) for each aspect of the project and the responsibility of each project team member.

2. **PROJECT OVERVIEW:** This project encompasses preliminary assessment and studies to determine feasibility of the project, appointment of consultants, architectural and engineering design, project management and implementation.

   2.1. The Lead consultant shall be the Architect, who shall appoint other consultants to come on board. They are: Structural Engineer, Mechanical & Electrical Engineers, Quantity Surveyor (QS) and the Builder.

   2.2. The team of consultant shall jointly carry out preliminary Technical Site Assessment and studies in order to identify critical requirements for the design of the project.

3. SCOPE OF WORKS

3.1. THE SCOPE OF SERVICES FOR THE PRIME CONSULTANT

3.1.1. PREPERATION OF ARCHITECTURAL DESIGN AND DRAWING:

3.1.2. PRELIMINARY ARCHITECTURAL DESIGN.

- Obtaining client's briefing and requirements, visiting, appraising, and analyzing the site vis-a-viz client requirements.
- Advising, guiding the client on the need to take any major decision required and receiving appropriate approval.
- Preparing appropriate design scheme(s) consisting of drawings and outline specifications sufficient to indicate spatial arrangements, material usage and design configuration with site arrangement and Architectural massing.
- Presenting a report on the scheme, including cost implication and program for the project etc.

3.1.3. PREPARATION OF DETAILED ARCHITECTURAL WORKING DRAWINGS, SPECIFICATIONS AND DETAILS.

The Architect shall be required to prepare all relevant working drawings and contract documents, including designs/technical specifications of which are:

- Detailed site plan showing the design orientation and configuration.
- Overall plan(s) of the scheme for the gallery including roof plan(s).
- Detailed section, elevations, wall and floor finishes, construction details and levels.
- Working details, window and door schedules, ironmongery schedule fittings and fixtures.
- Detailed material specification book and painting schedule for the scheme.
- Co-ordination and reconciliation of all the drawings and inputs of other consultants and specialists.
- Providing appropriate information and drawings and specifications for preparation of BEME.
- Reconciling all Structural, Architectural, Mechanical, Electrical and other specialists' drawings and their specifications with the Architectural design to ensure that there is no conflicts or discrepancies.

3.1.4. PLANNING APPROVAL

The Prime/Lead consultant (Architect) shall collate all drawings from the consultants and shall apply for approval to the regulatory authority for all necessary approval.

3.2. THE SCOPE OF SERVICES FOR THE STRUCTURAL, MECHANICAL & ELECTRICAL ENGINEERS

3.2.1. PREPERATION OF ENGINEERING DESIGN AND DRAWING:

3.2.2. PRELIMINARY ENGINEERING DESIGN.

- Seek brief from, and discuss with the Client/Lead Consultant on his role and relationship with other consultants.
- Prepare questionnaire for the Client for clarification of his/her requirements.
- Advise the Client on limitations caused by topography, public access to the site during and after construction (rehabilitation).
- Develop the Client's requirements into a definitive brief for the project in connotation with the client and other consultants and consider alternative outline solutions to the project etc.
- Assess and prepare scheduled of power, heating and cooling loads as applicable.

- Review and agree on the thermal performance standards for the facades and roof with other consultants.
- Provide the approximate weights and size of any item affecting the structural/architectural designs respectively. E.g. ducts.

3.2.3. PREPARATION OF DETAILED ENGINEERING WORKING DRAWINGS, SPECIFICATIONS AND DETAILS.

The Engineers shall be required to prepare all relevant working drawings and contract documents, including designs/technical specifications of which are:

- Develop the design of the project in collaboration with other consultants and prepare detailed calculations, detailed construction and working drawings and detailed specs to facilitate the preparation of tender documents for the project.
- Co-ordinate dimensional analysis and similar requirements, providing for building services and any special provisions for the fixing of non-structural cladding and other components.
- Notify the client of the completion of the developed design of the project.
- Prepare calculations and details that are required for submission to appropriate statutory authority and monitor other consultants as regards statutory approvals in respect to the project.

3.3. THE SCOPE OF SERVICES FOR THE QUANTITY SURVEYOR

3.3.1. PRELIMINARY AND FINAL BUDGET ESTIMATING:

The Project Quantity Surveyor shall be required to render the following services:

- Inspection of the site together with other consultants to ascertain site conditions
- Preparation of Budgetary Estimate based on Gross Floor Area or other “Unit Method”.
- Preparation of preliminary Estimate based on preliminary Design/Drawings prepared by other consultants.
- Cost checking of alternative designs and specification and schedules prepared by other consultants.
- Preparation of Detailed estimate & BEME based on detailed drawings, design, specifications and schedules prepared by other consultants.
- Preparation of articles of Agreement.
- Preparation of Form of Tender.
- Collation of specifications and contract conditions and advice on Tendering Procedure
- Preparation of schedule of Day Works.

- Preparation of Preliminary items of works
- Advice on specification and contract conditions to other consultants.
- Pricing of Bills of Quantities with a view to comparing with Tenders
- Collating the full Tender Documents comprising Article of Agreement, Contact conditions, Preliminaries, Specifications/Preambles, BEME, Form of Tender and Schedule of Works.
- Co-operate with other consultants on the preparation of the list of contractors and subcontractors.
- Send out of the full Tenders to the bidders.

3.3.2. CONTRACT ADMINISTRATION:

The Project Quantity Surveyor shall be required to further render the following services:

- Tender evaluation, analysis and reporting.
- Preparation of contract documents for the project, ready for signature (at least five copies)
- Check and confirm suitability and adequacy of Bonds.
- Advice on Advance payment and list of materials to be covered
- Site measurement and preparation of Interim Valuations for the works on monthly basis or agreed intervals.
- Measurements and adjustment of variations in the scope of works (variation etc.)
- Management of cost implication of contractual issues, advice on management of cost implication on non-contractual issues.
- Preparation of final accounts for the project.

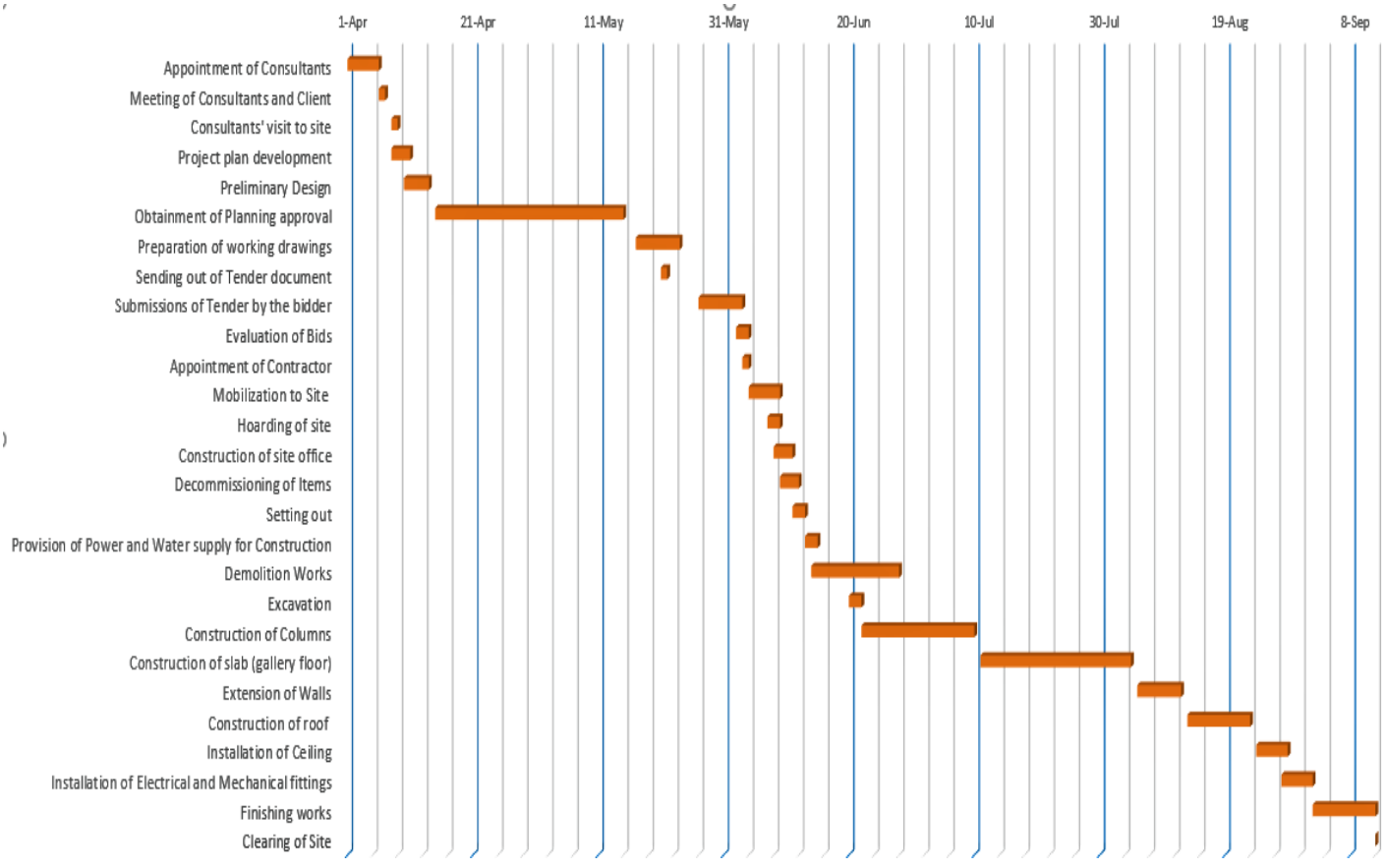
3.4. THE SCOPE OF WORKS FOR THE CONTRACTOR (BUILDER)

The scope of works of the contractor shall cover: Mobilization of all required equipment, materials & work-force, construction which entails an upgrade of the seating capacity of the hall and finally, handing over of works associated with the rehabilitation of the hall to Afe Babalola University.

- The contractor shall exercise all due care, diligence, and competence as regards this project.
- Setting out of the project which involves marking out the points that require changes.
- Procurement of Insurance for the site as well as the staff involved in the construction.
- Construction of site office where meetings shall be held as well as storage of construction materials.

- Decommissioning of Items in the hall that could be damaged in the process of construction e.g. Air conditioners, Windows, Doors, Sound Equipment, Chairs, etc.
- Demolition works involving: Removal of roof and ceiling, supporting elements as required, disconnecting power & water supply to the building.
- Provision power and water required for the construction.
- Excavation works for the construction of columns which involves: Formworks, reinforcement & Casting of concrete.
- Construction of the new slab (gallery) also involving: Formworks, reinforcement & Casting of concrete
- Raising/Extension of Walls
- Reconstruction of roof and ceiling
- Installation of Mechanical and Electrical fittings
- Finishing works involving: Plastering walls, floor tiles, Painting walls, Installing Windows & Doors.
- The contractor shall also be required to clear and cart away items that aren't required on the site after construction such as; waste from construction materials and demolition.

4. GANTT CHART FOR THE PROJECT



5. BEME

BILLS OF ENGINEERING MEASUREMENT AND EVALUATION						
NOTE: IT IS ASSUMED THAT TOTAL COST IS #11,000,000						
Item	Description	Unit	Qty	Rate	Sub-Total	Total
					NGN	NGN
1	Mobilization of Equipment/Transport at 12% TEC	L.S	1	1,200,000	1,200,000	
2	Site Prepartion and Clearing at 5% TEC	L.S	1	500,000	500,000	
3	Demolition Works	L.S	1	300,000	300,000	
4	Excavation Works	m3	1	500,000	500,000	
5	Column construction	m3	1	1,000,000	1,000,000	
6	Slab Construction	m3	1	1,500,000	1,500,000	
7	Construction of Block Walls	m3	1	500,000	500,000	
8	Electrical and Mechanical fittings	L.S	1	500,000	500,000	
9	Finishing Works	L.S	1	500,000	500,000	
10	Consultancy Fee at 15% TEC	L.S	1	1,500,000	1,500,000	
11	Profit at 20% TEC	L.S	1	2,000,000	2,000,000	
12	Miscellaneous as 10%	L.S	1	1,000,000	1,000,000	
						11,000,000

6. PAYMMENT SCHEDULE

STAGE	DESCRIPTION	MILESTONE	PERCENTAGE 0F TEC	AMOUN NGN
1	1st Payment	at mobilization	30%	3,000,000
2	2nd Payment	at 50% completion of project	30%	3,000,000
3	3rd Payment	at completion and hand over	30%	3,000,000
4	Final Payment	after DLP of 6 months	10%	1,000,000

7. HUMAN RESOURCES REQUIRED FOR THE PROJECT

- Architect (Lead Consultant)
- Civil (Structural) Engineer
- Mechanical Engineer
- Electrical Engineer
- Builder and His Team including:
  - Masons
  - Electricians
  - Carpenters
  - Miscellaneous workers

8. DESCRIPTION OF BEME (Bill of Engineering and Evaluation)

BEME can also be referred to as 'Bill'. It is a tool used before, during and post-construction to assess and value the cost of construction works. This includes the cost of materials, labour, equipment and all/any other resource(s) required for the success of any construction endeavour based on a pre-determined scope and specification.

It is usually presented in a tabular form and prepared in work packages or categories by a process of "taking-off" which involves identifying and breaking down all elements of a construction work that is measured; including their respective cost. The Bill should be simple, as brief as possible, all items should be covered by the bill and prepared such that would be understood by a layman as much as possible.

A BEME has some objectives (stated below). In order to attain these objectives, the bill is often itemized such that the proposed work is broken into classes of work with sufficient details for distinguishing between the classes, and between different works of the same class carried out at different locations or in different circumstances.

The objectives of a BEME are to;

- To provide sufficient information during construction planning, for tendering and contracting purposes or for the purpose of knowing the estimated cost of the proposed project (If the estimated cost is greater than the available funds to execute the project, then attempts are made to reduce the estimated cost by reviewing the scope and/or specification).
- To provide priced Bill of quantities for use in the periodic evaluation of Works executed for the purpose of payments and project control, during and on completion of a project for disputes and compensation or to determine if the project was completed on budget or otherwise.
- To facilitate the comparison of rates and prices between bidders.
- To enable the Clients to assemble actual tendered rates and prices to prepare for future estimating and budgeting.
- To provide rates and prices which can be used in the variation of additional works instructed by the Clients.

9. DEFECT LIABILITY PERIOD

A defects liability period is a period of time following practical completion during which a contractor remains liable under the building contract for dealing with any defects which become apparent. Depending on the form of contract you are reading, it may also be referred to as a rectification period or defects correction period.

A defects liability period is usually a period of around six or 12 months but it can vary depending on the contract used. Any defects or faults which arise during this period (for example - due to defective materials or workmanship) must be put right by the contractor at its own expense.

For example, under a JCT traditional building defects are notified to a contractor by the Contract Administrator, not later than 14 days after the end of the defects liability period. A contractor is then provided a reasonable amount of time to correct those notified defects. Provided that it does so, the Contract Administrator will then issue a 'Certificate of Making Good' which triggers a contractor's entitlement to the remainder of any retention money which has been withheld by the employer. The situation is similar in other standard forms of contract, although the terminology may differ and the time periods can vary (especially the NEC ECC).

The inclusion of a defects liability period in a contract arguably benefits both the contractor and the employer. For the employer, it provides an opportunity to request that the contractor return to site and remedy a defect, while for the contractor it is usually cheaper to return and remedy a defect itself than to be asked to pay for the employer's losses in arranging for someone else to remedy that defect. Having a practical contractual remedy can therefore save the parties' time and cost compared to adjudication or litigation.

It should be noted, however, that defects liability periods will only arise if they are included in the contract. Contractors therefore need to be aware that they do not have an automatic right to return to site to rectify a defect. Employers, on the other hand, need to carefully consider the wording and requirements of defects rectification provisions if they are considering hiring another contractor to fix the original contractor's mistakes, or else they risk being found to have failed in their duty to mitigate their losses.

It is also worth noting that a defect which is not discovered until after the defects liability period has expired is still a breach of contract for which the contractor is liable (subject to limitation arguments). In this circumstance, the contractor has no right to return to the site to repair the defect but is liable to the employer for damages.

10. LEAD CONSULTANT

The lead consultant is the **c**onsultant that directs the work of the consultan**t** 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.

Lead consultants have hands-on roles which involve the day-to-day running of continuing client projects. They are team leaders, analysing and reviewing proposals from the team, providing appropriate solutions to problems, and making decisions on the way forward by acting as liaisons between the client and the consultancy team. Their work involves directly dealing with the client to clearly understand its needs, and to provide possible solutions for the client's consideration. The team receives and works on the client's information from the lead consultant.

11. PROJECT LIFE CYCLE

A project life cycle is the sequence of phases that a project goes through from its initiation to its closure. The number and sequence of the cycle are determined by the management and various other factors like needs of the organization involved in the project, the nature of the project, and its area of application. The phases have a definite start, end, and control point and are constrained by time. The project lifecycle can be defined and modified as per the needs and aspects of the organization. Even though every project has a definite start and end, the particular objectives, deliverables, and activities vary widely. The lifecycle provides the basic foundation of the actions that has to be performed in the project, irrespective of the specific work involved.

Project life cycles can range from predictive or plan-driven approaches to adaptive or change-driven approaches. In a predictive life cycle, the specifics are defined at the start of the project, and any alterations to scope are carefully addressed. In an adaptive life cycle, the product is developed over multiple iterations, and detailed scope is defined for iteration only as the iteration begins.

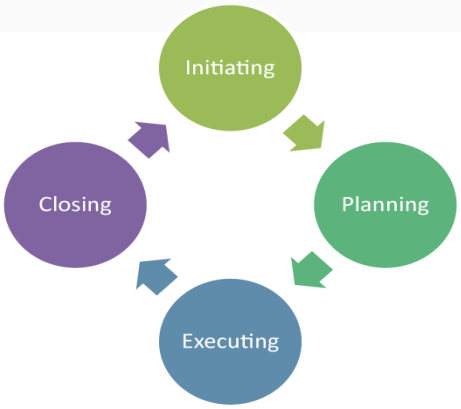
Although projects are unique and highly unpredictable, their standard framework consists of same generic lifecycle structure, consisting of following phases:

1. **The Initiation Phase:** Starting of the project

2. **The Planning Phase:** Organizing and Preparing

3. **The Execution Phase:** Carrying out the project

4. **The Termination Phase:** Closing the project



1. **The Initiation Phase:** The initiation phase aims to define and authorize the project. The project manager takes the given information and creates a Project Charter. The Project Charter authorizes the project and documents the primary requirements for the project. It includes information such as:

- Project's purpose, vision, and mission
- Measurable objectives and success criteria
- Elaborated project description, conditions, and risks
- Name and authority of the project sponsor
- Concerned stakeholders

2. **The Planning Phase:** The purpose of this phase is to lay down a detailed strategy of how the project has to be performed and how to make it a success.

   Project Planning consists of two parts:

- Strategic Planning
- Implementation Planning

   In strategic planning, the overall approach to the project is developed. In implementation planning, the ways to apply those decisions are sought.

3. **The Execution Phase:** In this phase, the decisions and activities defined during the planning phase are implemented. During this phase, the project manager has to supervise the project and prevent any errors

from taking place. This process is also termed as **monitoring and controlling**. After satisfaction from the customer, sponsor, and stakeholder's end, he takes the process to the next step.

4. **The Termination Phase:** This is the last phase of any project, and it marks the official closure of the project.

12. ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a project. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made". EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts.

13. SECURITY OF SITE

Sites are secured (hoarded) mainly for health and safety reasons. However, separating the general public from the construction site to prevent unauthorised access improves site security. In addition, having secure fencing along your site perimeter allows controlled access to the site for contractors. However, as well as separating the public from the potentially hazardous building works, they can also be used to communicate health and safety information. The panels used in hoarding provide the perfect backdrop for warnings about hazards or threats which are essential to safety and compliance regulations.