CHAPTER ONE

1.0 CONSULTANT'S CAPACITY

1.1 PREAMBLE

The Architectural and Engineering Services Limited (AESL) was founded in 1973 under the name Architectural and Engineering Services Corporation (AESC) and was incorporated as a Limited Liability Company in 1995.

AESL is a multi-disciplinary group providing services in Civil, Structural, Electrical, Mechanical, Geodetic, Water and Geotechnical Engineering, Architecture, Planning, Valuation and Quantity Surveying.

AESL is operating in all the ten (10) Regions of Ghana. Our offices are situated in Accra and in all the Regional capitals and manned by architects, engineers, quantity surveyors, land surveyors, clerk of works and other supporting staff.

These technical personnel of AESL would carry out the execution of the project without association with any other consulting firm.

AESL has had extensive experience in Ghana, Togo and Nigeria. It has designed and supervised the construction of considerable number of projects with varying sizes, complexity and values including rehabilitation works.

A copy of our company profile is attached.

1.2 LEGAL STATUS OF COMPANY

The Company was set up in 1973 by NRC Decree 193 as Consultant to the Government of Ghana.

In 1995, the Company was incorporated as a Limited Liability company with a six (6) member Board of Directors. The Company has the capacity to sue and be sued.

1.3 RELEVANT TECHNICAL EXPERIENCE

1.3.1 Summary of Similar Projects

A brief of AESL's experience on similar projects are as follows:

- Construction of four storey Dormitory blocks for Regional Maritime Academy
- Construction of Four storey Girls Hostel at Tamale Polytechnic
- Construction of three storey Girls Dormitory blocks at Suhum Secondary Technical School
- Ditto – Saint Roses Girls Secondary School Akwatia

1.3.2 Project Description

(i) **Dormitory blocks for Regional Maritime Academy**

Type of Facility: Hostel block; it is essentially a reinforced concrete frame structure with infill blockwork and all necessary finishes.

Physical location: Regional Maritime Academy, Nungua-Accra

Number of Storeys: Four (4)

Accommodation Capacity: 760 beds

(ii) **Construction of three storey Girls Hostel at Tamale Polytechnic**

Type of Facility: Hostel block; it is essentially a reinforced concrete frame structure with infill blockwork and all necessary finishes.

Physical location: Tamale, Northern Region

Number of Storeys: Three (3)

Accommodation Capacity: 504 beds

(iii) **Construction of three storey Girls Dormitory blocks at Suhum Secondary Technical School**

Type of Facility: Hostel block; it is essentially a reinforced concrete frame structure with infill blockwork and all necessary finishes.

Physical location: Suhum, Eastern Region

Number of Storeys: Three (3)

Accommodation Capacity: 504 beds

(iv) **Construction of three Storey Hostel Block at Saint Roses Girls Secondary School Akwatia.**

Type of Facility: Hostel block; it is essentially a reinforced concrete frame structure with infill blockwork and all necessary finishes.

Physical location: Akwatia, Eastern Region

Number of Storeys: Three (3)

Accommodation Capacity: 504 beds

(v) **Construction of Four Storey Hostel Block at Cape Coast Polytechnic.**

Type of Facility: Hostel block; it is essentially a reinforced concrete frame structure with infill blockwork and all necessary finishes.

Physical location: Cape Coast, Central Region

Number of Storeys: Four (4)

Accommodation Capacity: 320 beds

(vi) **Construction of Four Storey Hostel Block at University of Education Winneba.**

Type of Facility: Hostel block; it is essentially a reinforced concrete frame structure with infill blockwork and all necessary finishes.

Physical location: Winneba, Central Region

Number of Storeys: Four (4)

Accommodation Capacity: 320 beds

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: Dormitory Block for Regional Maritime Academy</td><td colspan="2">Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
Accra</td><td colspan="2">Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
Regional Maritime Academy</td><td colspan="2">Number of staff:
8</td></tr>
<tr><td colspan="2">Address: Accra</td><td colspan="2">No. of staff months
65</td></tr>
<tr><td>Start Date(Month/Year)
June 2006</td><td>Completion Date
In progress</td><td colspan="2">Approx. Value Of Services (in current (GH¢)
128,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td colspan="2">No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="4">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Anthony Kulekey, design only, co-ordinating activities of professional staff engaged on design</td></tr>
<tr><td colspan="4">Narrative description of project: 4 storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="4">Description of actual services provided by your staff: Pre Contract Services and Post Contract Services</td></tr>
<tr><td colspan="4">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: Construction of 4 storey Girls Hostel at Tamale Polytechnic</td><td colspan="2">Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
Tamale</td><td colspan="2">Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
Ministry of Education</td><td colspan="2">Number of staff:
8</td></tr>
<tr><td colspan="2">Address: Accra</td><td colspan="2">No. of staff months
65</td></tr>
<tr><td>Start Date(Month/Year)
June 2005</td><td>Completion Date
In progress</td><td colspan="2">Approx. Value Of Services (in current (GH¢)
118,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td colspan="2">No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="4">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Anthony Kulekey, design only, co-ordinating activities of professional staff engaged on design</td></tr>
<tr><td colspan="4">Narrative description of project: 4 storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="4">Description of actual services provided by your staff: Pre-Contract Services and Post Contract Services</td></tr>
<tr><td colspan="4">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: Construction of 3 storey Girls Dormitory block at Suhum Secondary Technical</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
Suhum</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
Ministry of Education</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address: Accra</td><td>No. of staff months
30</td></tr>
<tr><td>Start Date(Month/Year)
Feb 2003</td><td>Completion Date
March 2004</td><td>Approx. Value Of Services (in current (GH¢)
24,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Satchmo Atongo, design only, co-ordinating activities of professional staff engaged on design</td></tr>
<tr><td colspan="3">Narrative description of project: 3 storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre Contract Services and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

Assignment Name: Construction of 3 storey Girls Dormitory block at St Roses Girls' Secondary School		***Country***: Ghana
Location within country Akwatia		***Professional staff provided by firm***: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers
Name of client Ministry of Education		***Number of staff***: 8
Address: Accra		***No. of staff months*** 40
Start Date(Month/Year) Feb 2003	***Completion Date*** March 2004	***Approx. Value Of Services (in current (GH¢)*** 18,000
Name of associated consultants, if any **None**		***No. of months of professional staff provided by associated consultants:*** -
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Satchmo Atongo, design only, co-ordinating activities of professional staff engaged on design		
Narrative description of project: 3 storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes		
Description of actual services provided by your staff: Pre Contract Services and Post Contract Services		
FIRM'S NAME: AES LIMITED		

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: Construction of 4 storey Girls Dormitory block at Cape Coast Polytechnic,</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
Cape Coast</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
Ministry of Education</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address: Accra</td><td>No. of staff months
50</td></tr>
<tr><td>Start Date(Month/Year)
June 2001</td><td>Completion Date
Dec 2002</td><td>Approx. Value Of Services (in current (GH¢)
12,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Anthony Kulekey, design only, co-ordinating activities of professional staff engaged on design</td></tr>
<tr><td colspan="3">Narrative description of project: 4 storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre Contract Services and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: Construction of 4 storey Hostel block at University of Education Winneba,</td><td colspan="2">Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
Winneba</td><td colspan="2">Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
Ministry of Education</td><td colspan="2">Number of staff:
8</td></tr>
<tr><td colspan="2">Address: Accra</td><td colspan="2">No. of staff months
60</td></tr>
<tr><td>Start Date(Month/Year)
March 2002</td><td>Completion Date
September 2003</td><td colspan="2">Approx. Value Of Services (in current (GH¢)
12,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td colspan="2">No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="4">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Anthony Kulekey, design only, co-ordinating activities of professional staff engaged on design</td></tr>
<tr><td colspan="4">Narrative description of project: 4 storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="4">Description of actual services provided by your staff: Pre Contract Services and Post Contract Services</td></tr>
<tr><td colspan="4">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: CONSTRUCTION OF DORMITORY BLOCK FOR GHANA POLICE SERVICE</td><td colspan="2">Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
TESANO, GT. ACCRA</td><td colspan="2">Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF FINANCE & ECON. PLANNING</td><td colspan="2">Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td colspan="2">No. of staff months
22</td></tr>
<tr><td>Start Date(Month/Year)
MARCH, 2007</td><td>Completion Date
NOVEMBER 2007</td><td colspan="2">Approx. Value Of Services (in current (GH¢)
13,200</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td colspan="2">No. of months of professional staff provided by associated consultants:</td></tr>
<tr><td colspan="4">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Eric Ansah; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="4">Narrative description of project: ……2-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="4">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="4">FIRM’S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: CONSTUCTION OF 3-STOREY GIRLS' HOSTEL AT NKORAMAN GIRLS' SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
SEIKWA</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINSTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
40</td></tr>
<tr><td>Start Date(Month/Year)
MARCH 2004</td><td>Completion Date
MARCH 2006</td><td>Approx. Value Of Services (in current (GH¢)
18,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Thelma Doku; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 3-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: CONSTRUCTION OF 2-STOREY DORMITORY BLOCK FOR BOSOME FREHO SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
ASIWA</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
GHANA EDUCATION SERVICE</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
22</td></tr>
<tr><td>Start Date(Month/Year)
NOVEMBER, 2007</td><td>Completion Date
On-going</td><td>Approx. Value Of Services (in current (GH¢)
18,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; George Gbinniya; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 2-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: : Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: CONSTRUCTION OF 4-STOREY HOSTEL FOR U.D.S., NYANKPALA</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
NYANKPALA, NORTHERN REG.</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
UNIVERSITY OF DEVELOPMENT STUDIES</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
70</td></tr>
<tr><td>Start Date(Month/Year)
NOVEMBER, 2003</td><td>Completion Date
OCTOBER, 2006</td><td>Approx. Value Of Services (in current (GH¢)
37,800</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; E.J.Y. Aggor; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 4-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF 2-STOREY GIRLS' DORM. BLOCK AT AGOGO STATE SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
AGOGO, ASHANTI REG.</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
GHANA EDUCATION SERVICE</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
22</td></tr>
<tr><td>Start Date(Month/Year)
AUGUST 2004</td><td>Completion Date
FEBRUARY 2006</td><td>Approx. Value Of Services (in current (GH¢)
18,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Eric Osei Tutu Agyeman; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 2-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF 2-STOREY DORM. BLOCK AT EBENEZER SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
ACCRA</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
24</td></tr>
<tr><td>Start Date(Month/Year)
May, 2006</td><td>Completion Date
On-going</td><td>Approx. Value Of Services (in current (GH¢)
27,600</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; William Sackey; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 2-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF GIRLS' HOSTEL FOR ADUKROM SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
ADUKROM, EASTERN REG.</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
18</td></tr>
<tr><td>Start Date(Month/Year)
February, 2003</td><td>Completion Date
On-going</td><td>Approx. Value Of Services (in current (GH¢)
7,800</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Eric Osei Tutu Agyeman; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: Single-Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSRTUCTION OF GIRLS' DORMITORY AT ST. FRANCIS SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
AKIM ODA – EASTERN REG.</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
21</td></tr>
<tr><td>Start Date(Month/Year)
MARCH,2004</td><td>Completion Date
MARCH, 2006</td><td>Approx. Value Of Services (in current (GH¢)
9,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Eric Osei Tutu Agyeman; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 2-Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF 2-STOREY HOSTEL BLOCK AT UNIVERSITY PRACTICCE SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
CAPE COAST</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months</td></tr>
<tr><td>Start Date(Month/Year)
July, 2003</td><td>Completion Date
2006</td><td>Approx. Value Of Services (in current (GH¢)
19,080</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Eric Ansah; design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 2-Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM’S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

Assignment Name: CONSTRUCTION OF 2-STOREY HOSTEL AT FIASEMAN SEC. SCHOOL		***Country***: Ghana
Location within country TARKWA		***Professional staff provided by firm***: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers
Name of client MINISTRY OF EDUCATION		***Number of staff***: 8
Address:		***No. of staff months*** 40
Start Date(Month/Year) MARCH 2003	***Completion Date*** MARCH 2005	***Approx. Value Of Services (in current (GH¢)*** 18,000
Name of associated consultants, if any **None**		***No. of months of professional staff provided by associated consultants:*** -
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Rexford Amoako design, supervision, and co-ordinating activities of professional staff engaged on the project		
Narrative description of project: 2-Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes		
Description of actual services provided by your staff: Pre-Contract and Post Contract Services		
FIRM'S NAME: AES LIMITED		

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF 3-STOREY GIRLS' HOSTEL AT ARCHBISHOP PORTER GIRLS' SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
TAKORADI</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
60</td></tr>
<tr><td>Start Date(Month/Year)
2001</td><td>Completion Date
2004</td><td>Approx. Value Of Services (in current (GH¢)
42,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Dan Seedah, design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 3-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF 3-STOREY HOSTEL FOR ST. CHARLES SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
TAMALE</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
MINISTRY OF EDUCATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
65</td></tr>
<tr><td>Start Date(Month/Year)
April 2003</td><td>Completion Date
Oct 2005</td><td>Approx. Value Of Services (in current (GH¢)
24,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Amui Commey, design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 3-Storey reinforced concrete framed structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF HOSTEL & SECRETARIAT COMPLEX PHASE 1 FOR CIVIL SERVANTS ASSOCIATION AT CAPE COAST</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
CAPE COAST</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
GHANA CIVIL SERVANTS ASSOCIATION</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
12</td></tr>
<tr><td>Start Date(Month/Year)
March 2002</td><td>Completion Date
October 2002</td><td>Approx. Value Of Services (in current (GH¢)
3,420</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Thelma Doku design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: Single Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF 2-STOREY DORM. BLOCK FOR ADANGOMASE SEC. SCHOOL</td><td colspan="2">Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
ADANGOMASE, ASHANTI REG.</td><td colspan="2">Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
GHANA EDUCATION SERVICE (GES)</td><td colspan="2">Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td colspan="2">No. of staff months
20</td></tr>
<tr><td>Start Date(Month/Year)
November 2007</td><td>Completion Date
February 2009</td><td colspan="2">Approx. Value Of Services (in current (GH¢)
18,000</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td colspan="2">No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="4">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Eric Ansah, design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="4">Narrative description of project: 2-Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="4">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="4">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name:
CONSTRUCTION OF BOYS HOSTEL AT WULUGU SEC. SCHOOL</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
NYANKPANDURI, NORTHERN REG.</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client
GES</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months
15</td></tr>
<tr><td>Start Date(Month/Year)
July 1999</td><td>Completion Date
Nov 2000</td><td>Approx. Value Of Services (in current (GH¢)
7,200</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Amui Commey, design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: Single Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM'S NAME: AES LIMITED</td></tr>
</table>

RELEVANT SERVICES CARRIED OUT IN THE LAST FIVE YEARS THAT BEST ILLUSTRATE QUALIFICATION

REFERENCE

<table>
<tr><td colspan="2">Assignment Name: Construction of 2-Storey Girls Hostel Block at School for the Deaf</td><td>Country: Ghana</td></tr>
<tr><td colspan="2">Location within country
CAPE COAST</td><td>Professional staff provided by firm: Architects, Structure; Q.S; Electrical; Mechanical; Geotechnical; Land Survey; Water Engineers</td></tr>
<tr><td colspan="2">Name of client</td><td>Number of staff:
8</td></tr>
<tr><td colspan="2">Address:</td><td>No. of staff months</td></tr>
<tr><td>Start Date(Month/Year)
OCTOBER 2005</td><td>Completion Date
NOVEMBER 2006</td><td>Approx. Value Of Services (in current (GH¢)
19,500</td></tr>
<tr><td colspan="2">Name of associated consultants, if any

None</td><td>No. of months of professional staff provided by associated consultants:
-</td></tr>
<tr><td colspan="3">Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed; Bob Ampaw, design, supervision, and co-ordinating activities of professional staff engaged on the project</td></tr>
<tr><td colspan="3">Narrative description of project: 2-Storey reinforced concrete structure with sandcrete blockwork partitions and all the necessary finishes</td></tr>
<tr><td colspan="3">Description of actual services provided by your staff: Pre-Contract and Post Contract Services</td></tr>
<tr><td colspan="3">FIRM’S NAME: AES LIMITED</td></tr>
</table>

1.4 CONSULTANTS, FACILITIES AND EQUIPMENT TO BE USED FOR EXECUTING PROJECTS

The consultant would make the following facilities and equipment available for the project.

1.4.1 Office Equipment

Computers and Accessories

The computers of the Consultant's Head Office would be at the disposal of the project. These would be used for all works in connection with the project. One advanced desktop computer Pentium IV with 40 GB hard disk space would be provided for Storing and analyzing data collected. The following office equipment as listed below would also be made available

Desktop Computer	-	5No.
Laptop Computer	-	5No.
Roland Pen Plotter	-	1No.
Hewlett Packard (HP) A1 Plotter	-	1No.
Laser Printer	-	3No.
Canon photo Copier	-	2No.
Comb Binders	-	3No

All the personal desktop computers are fitted with AutoCAD 2006 software and the firm has experienced AutoCAD technicians to operate these.
Also specialized software packages such as Microsoft Project, Epanet, WaterCAD and StaadPro 2000, Land Development, MGE Terrain Modeller, Thorn Lighting Design Software would be used for the analysis and design.

1.4.2 Survey Equipment

The following survey equipment would be available for the assignment

Sokkia Power Set (Total Station) with accessories	-	1No.
Sokkia Set 2c II Total Station with accessories	-	2No.
GPS Equipment	-	1No.

1.4.3 Geotechnical Equipment

The following equipment would be available for geotechnical investigations

Drilling Rigs

Percussion Rigs (4No.)

EDECO – Pilcon 1500 – (3No.)

Capable of making 150mm & 200mm diameter holes

Rotary Coring Rig (1No.)

EDECO STRATA DRILL H40 --- (2NO)

(Skid mounted winch unit, powered by Lister diesel engine, via belt drive)

(Care size NX and AZ)

Hand Augers (200mm 150mm 100mm)

Penetrometer (DCPT)

Other in-situ testing equipment

Laboratory basic equipment / instruments for Civil Engineering Testing in Construction

1.4.4 Facilities to be provided by the Client

The Consultant expects the assistance of the Client in gaining access to all available data relevant to the project and in obtaining copies of such data if and when required.

1.5 TRANSPORTATION

In order to enhance movement of the project staff, AESL would make available the following vehicles; (Refer attached documents for year of Manufacture of Vehicles etc.)

1. 1No. Nissan Patrol
2. 1 No. Land Cruiser Prado
3. 2 No. Nissan pick-up

1.6 COMMUNICATION

The Consultant's Head Office is equipped with telephones, fax lines and Internet Facilities, which makes communication with its Regional Offices very easy. The Eastern Regional Office is also equipped with the same communication devices.

STAFFING

DISCIPLINE	QUALIFICATION ACADEMIC	NUMBER
	PhD. with Professional Qualification	1
ARCHITECTURE	MSc only	-
	BSc only	-
	MSc. with Professional Qualification	20+
	BSc. with Professional Qualification	NIL
	PhD.	1
STRUCTURAL ENGINEERING	MSc only	1
	BSc only	5
	MSc. with Professional Qualification	2
	BSc. with Professional Qualification	1
QUANTITY SURVEYING	MSc only	-
	BSc only	6
	MSc. with Professional Qualification	2
	BSc. with Professional Qualification	8
SERVICES ENGINEER	MSc only	1
	BSc only	3
	MSc. with Professional Qualification	1
	BSc. with Professional Qualification	1
WATER ENGINEERING	MSc only	2
	BSc only	-
	MSc. with Professional Qualification	-
	BSc. with Professional Qualification	-
GEOTECHNICAL ENGINEERING	MSc only	**1**
	BSc only	1
	MSc. with Professional Qualification	1
	BSc. with Professional Qualification	-
GEODETIC ENGINEERING	MSc only	-
	BSc only	
	MSc. with Professional Qualification	1
	BSc. with Professional Qualification	2

CHAPTER TWO

2.0 COMMENTS AND SUGGESTION ON TERMS OF REFERENCE (TOR)

The following are the consultants' comments and suggestions on the Terms of Reference.

a ***Scoring System***

i. The consultant is of the view that the scheme should have made provision for other professionals such as:

- The geotechnical engineer who might be needed for soil investigations or foundation studies in relation to any new construction or existing walls which might be showing signs of failure
- The land surveyor who would be needed for site surveying and also checking profiles

iii Even though the TOR never mentioned submission of sketches, the consultant has attached preliminary sketches with the proposal.

b ***Maintenance Schedule***

The Terms of Reference (TOR) is silent on the provision of a maintenance schedule. We suggest that the client eventually expands the scope of services to be rendered by the selected consultant to cover this.

c ***General Project Execution***

i. The nature of the project requires that competent contractors be engaged for job execution. The consultant has therefore proposed prequalification as part of his methodology to ensure that good and proven contractors are allowed to enter the tendering process.

ii. Because of the heavy expenditures that the client may be called upon to effect when work begins, the client is being advised to source for the necessary funds before embarking on the project to avoid any delays resulting in cost over runs We predict the final construction cost as **GH ₵ 3,000,000.00**

CHAPTER THREE

3.0 DESCRIPTION OF THE METHODOLOGY AND WORK PLAN FOR PERFORMING THE ASSIGNMENT

3.1 INTRODUCTION

This proposal has been prepared in response to a letter of invitation dated 20th December, 2007 addressed to five consultants including Architectural and Engineering Services Limited from Koforidua Polytechnic. The consultants would be expected to provide services for the design and supervision of a 500-bed capacity hostel. Architectural and Engineering Services Limited hereby presents its proposals as follows.

3.1.1 Site visit and project Appreciation

The Consultant has done some works for the Koforidua Polytechnic and has also visited the site to acquaint itself further with the conditions under which the assignment would be carried out. The consultant is therefore very much familiar with the site conditions.

3.2 PROJECT OBJECTIVES

The main objectives of the project are to provide:

Residential facilities for students (guest rooms and ancillary facilities).

Two-in-a room

Four- in a room

3.3 SCOPE OF THE CONSULTANCY SERVICES:

The scope of services of the consulting firm would include but not limited to the following.

i. To design and supervise an appropriate four storey 500 Bed hostel taking into consideration the existing structure in the immediate environment/neighbourhood
ii. To produce a programme of works and time schedule for the execution, monitoring and the evaluation of the project

iii. To determine the cost of the project and completion time
iv. To assist in organising the tendering procedures/processes of the project
v. To supervise the project.
vi. Any other services required for the smooth execution of the project
vii. Access and certify the quality control of materials to be used.

3.4 WORK METHODOLOGY FOR DESIGN

The methodology for the design phase is outlined below:

Staff mobilization

The consultant's Head Office and its Regional Office in Koforidua would be used to handle the project both as a collection and collation point for all field data and reports. The project staff would use the offices as well as all the necessary equipment required for the performance of the services.

Coordination meeting and site inspection

A coordination meeting would be held between the consultant and the client. The role of each individual would be carefully defined and channels for communications would be established. A coordinator to represent the client would be introduced to the consultant.

The meeting would also discuss further the scope of the works, the work plan and methodology for undertaking the consultancy services. The client would be expected to make available all documents still in their possession relating to the project including the provision of any other requirements that may not have been taken into account in the earlier brief.

The client would conduct the consultant round the site and formally defined their boundaries.

3.5 SUBMISSION OF INCEPTION REPORT

After the site inspection, the consultant would do a general site survey including Geotechnical studies to ascertain the soil conditions.

The consultant would then examine its sketch design submitted with this proposal into details taking into account any comments he may have received from the client and make a resubmission in the form of an inception report three weeks from the date of commencement of the assignment.

The inception report would highlight the following:

(i) General Site levels

(ii) The soil conditions

(iii) Any new changes envisaged by the client to be incorporated in the existing sketch designs

(iv) The inception report would also contain an implementation plan for the assignment.

3.6 DRAFT ARCHITECTURAL WORKING DRAWINGS

Meeting with client to discuss Inception Report

The consultant would meet the client to discuss the proposal outlined in the Inception Report within One (1) week after its submission. Comments made by the client on the inception report would be taken into account in the review of the existing drawings

- *Preparation Of Draft Architectural Working Drawings*

  The consultant would review the existing architectural drawings and make such modifications as would be agreed upon. These would be presented as draft architectural working drawings for the approval of the client.

- *Design Consideration*

  In reviewing the existing sketch design drawings, on-site data, design standards and local building regulations requirements would be used in allocating space to facilities within the building. Some of such considerations are as follows:

  - Sanitation requirements. The number of sanitary installation to be provided would depend on the number of users. Provision would be made for the physically challenged
  - Staircase (including escape staircase): If the distance between the door of the most distant room and the main staircase is found to be more than the acceptable distance, steps would be taken to maintain standards.
  - Minimum dimensions for the corridors usually not less than 1.2metres and room heights usually 2.8 metres for cubicles would be adhered to.
  - Openings for the cubicles to enhance ventilation and day lighting and to avoid direct sun light into the cubicles
  - Distances of building lines from fence walls along main roads and neighbouring plots of 5.0m and 2.5m respectively would be considered.
  - Accessibility and movement in the structures by the physically challenged would be provided

  Upon receipt of the client's approval of the draft working architectural drawings, the consultant would proceed to produce the draft final bidding documents.

Establishment of Quality Assurance Plan and Standards

The Consultant would adopt its company's quality approach procedures for the performance of all works. The procedures cover all the requisite planning, controlling and documentation process mainly:

- Planning – the objectives, goals, authority and responsibility relationship of each activity area to be defined and understood
- Controlling – measures would be instituted to ensure the meeting of the goals and objectives and the taking of corrective action to avert problems.

- Documentation to facilitate feedback on how well the quality management system is performing to satisfy the client's needs and what changes may be necessary.

A quality system is defined by the ISO 9000 standards as the "organisational structure, procedures and resources needed to implement quality management'.

It thus consists of all arrangements made regarding quality for the operation of the company and provision of its services.

In the case of Architectural and Engineering Services Limited (AESL) the quality system has always been guided by the rules of the ISO9001 standard.

This approach has three beneficial objectives in terms of quality assurance:
Firstly, it provides confidence to our clients. Secondly, it gives us the necessary motivation and confidence in reaching quality standards; thirdly it provides the guidelines for optimizing the management of employees' welfare.

It is thus essential that our responses to invitations to tender be carried out under pre-established and systematic conditions, the record of which must be kept and whose application must be demonstrated in the preparation of project quality plans.

Our quality manual describes the whole organisational set up regarding quality assurance and this is reviewed annually at a yearly management review meeting where quality objectives are set to the following year.

At the inception of the project, a project quality plan (PQP) is drawn. The PQP states the practices, resources and sequence of the quality-related activities peculiar to the project. The project quality plan mainly relies on the initial technical proposal, but it must be updated continuously according to the project development and especially the requirements of the client.

In the PQP, the team leader (the project manager) is the person directly in charge of the achievement of the project objectives. In terms of the quality system, the team leader is

usually a permanent staff member of AESL who generally manages a team of several persons temporarily grouped together for the project duration. The AESL quality system provides that a project director is assigned to each project. The project director in the PQP is the experienced executive (necessarily a permanent AESL staff member) who is entrusted with the project supervision responsibility by the company. The project director prepares the project quality plan and makes sure that it is implemented properly.

Topographical Survey

Detailed topographical survey would be undertaken to determine the slope of the terrain and to establish the actual limits of the site. All other adjoining roads, drains and services lines would be mapped out. The topographical details would have bearing on the general review process of the substructure and external works.

Geotechnical Investigations

The geotechnical investigation aspect would comprise of:

- Assessment of the soil in terms of its strength, settlement and bearing characteristics.

In order to achieve the above objectives, the following methodology would be adopted:

a) Field assessment of the soil

Boreholes would be sunk at the site to about 6m each using the percussion drilling method. The locations and number of the boreholes would depend on the site conditions. In the course of boring the bole, the standard penetrating test would be performed at relevant depths to assess the relative density of the subsoil.

The soil profiles revealed by the boreholes would be examined, logged and sampled. Both undisturbed and disturbed soil samples would be taken for laboratory testing.

The entire sampling and handling operations would be carried out under the control and supervision of the geotechnical engineer and appropriate measures would be taken to ensure that the samples arrive in the laboratory with minimum amount of moisture loss.

Ground water, if encountered, would be sampled and subjected to chemical analysis to determine any harmful substances that may be present and any appropriate measures to be adopted to counteract their effect. The fluctuation of the ground water levels in the boreholes would also be monitored.

b) Laboratory testing

All soil samples recovered from the boreholes and the trial pits would be subjected to various laboratory testing. With our experienced knowledge of the subsurface conditions existing in the project area and experience with such problems, a prudent laboratory testing programme would be established to accurately confirm the classifications of the soils and also determine pertinent engineering parameters for analysis and design. We anticipate the laboratory testing to include the determination of;

- Natural moisture content
- Atterberg limits
- Particles size distribution
- Swell pressure
- Un-drained shear parameters for the calculation of the allowable bearing capacity of the soils
- One dimensional consolidation to determine the probable settlement likely to occur.
- Ground water aggregation (if any)

All the laboratory testing would be conducted in accordance with relevant British Standards BS1375-1979 for the testing of soils for civil engineering purposes.

c) Results from the investigation

The result obtained from the field and laboratory tests would be analysed by the geotechnical engineer who would give appropriate recommendations for the review of the design of the foundation.

The analysis and recommendations would be incorporated into a report, which would also contain:

- Appraisal of the ground conditions
- Reference to the desk study
- Description of work done
- Boreholes logs
- In-situ test records
- Laboratory test result

3.7 PREPARATION OF CONSTRUCTION DRAWINGS AND SPECIFICATIONS

The draft final working drawings and bidding documents comprise of:

- Architectural drawings (either original or as amended and accepted)
- Structural and civil engineering drawings
- Electrical engineering services drawings
- Plumbing and mechanical engineering services drawings
- Bills of quantities cost estimation
- Draft bidding documents

Architectural Drawings

Based on the approved architectural working drawings, final architectural working drawings comprising of plans, sections, elevations, detailed blown ups would be produced. Information on floor finishes, wall paints or tiling, doors and windows, roofing, ceiling, fixtures and fitting would be provided and that they technically comply with all the statutory standards. All dimensions on the drawings including the setting out drawings would be provided.

Structural/Civil Engineering

With the approval of the draft architectural working drawings by the client, the Structural Engineer would design the various structural members of the building – beams, columns, staircase, floor slab and roof members. The Engineer would also supervise the production of the structural drawings.

The structural design of the building would be carried out by modelling and analyzing for the induced stresses with the use of integer super stress analysis suite, a computer application programme.

This would enable an optimum sizing of the structural members such as beams and columns to ensure a cost effective design.

The BS.8110 Code, Ghana Building code, National Building Regulations 1996-LI 1630 and all other relevant code of practice would be employed in the structural review or redesign.

The design would ensure the adequacy of fire protection and also the durability of the building. Based on the soil report from the Geotechnical Engineer, and the column loads calculated, the Engineer would design a suitable foundation for the building if necessary.

The Engineer would design a suitable drainage system to blend into the existing system on the compound. If however, it is found that the existing system is inadequate, the client would be advised on measures to adopt for effective drainage of the compound.

Electrical and Allied Services

Based on design

The design of electrical and other allied services for the Hostel block would be based on British Standards and Codes of Practice, as well as other local regulations as stipulated by the Ministry of Energy and the Electricity Company of Ghana (ECG).

In particular, wiring would comply with the sixteenth (16^{th}) edition of the Wiring Regulations of building issued by the Institution of Electrical Engineers (IEE). Services to be covered by this proposal would be as follows:

- Internal normal lighting
- Internal emergency lighting
- Conduits and trunking system
- Power sockets for portable appliances
- Power sockets for personal computers
- Power sockets for air-conditioning units
- Fire alarm system
- Burglar alarm system
- Telephone communication system
- Low voltage distribution system
- Power supply system
- External lighting system
- Equipotential earthing
- Local area network data system
- Satellite communication system

Internal Normal Lighting

The normal lighting system for spaces in all buildings would be reviewed or redesigned on the basis of the minimum illuminance levels impairment of vision discomfort glare. The illuminance levels considered for the various spaces are as follows:

- Internet café cubicles - 500lux
- Corridors/lobbies/circulation areas - 200lux
- Toilets - 100lux

Types of fittings

The fittings for each space would depend on the visual task to be undertaken within the space. With the advent of computers, the fittings to be specified would be such that glare due to reflection from the screens of Video Display Units (VDU) is reduced to a minimum. This

could be achieved by using fittings with semi-secular diffuses which are constructed to achieve this objective. For other areas such as lobbies and corridors where non-intensive visual tasks would be undertaken, fittings with aluminium reflectors would be specified.

Types of Lamps

Modern lighting design places emphasis on luminous efficacy and optimal energy consumption. This concept would be taken into account in the review.

Switching of fittings

Control of lighting fittings in all areas would be such as to achieve optimum energy conservation by use of selective switching especially in large areas.

Conduits and Trunking System

Conduits and trunking materials would be of high impact polyvinylchloride (UPVC) material. All services on ceiling slabs and their control points would be concealed conduits. Services on walls such as power and communication outlets would also be in concealed UPVC pipes in floor slabs with adequate provision being made for future expansion for these services.

Power Sockets for Portable Appliance

Under this classification are 13A switch socket outlets for lower power consumption for the cubicles, etc. In all areas these outlets would be installed flush on walls.

Power and Data Signal Outlets for Personal Computers

All cubicles would be provided with power sockets and data signal outlets for personal computers. These outlets would be installed flush on walls and the cables would be segregated from other services to reduce interference to the minimum level.

Power Socket for Air-Conditioning Units – Internet Café

Power socket for split or window air-conditioning units would be 20A double pole switches which would be installed flush on walls. Where central or similar air-conditioning system would be installed, bulk power switch in the form of a switched fused or fused switch,

depending on the capacity of the air-conditioning unit, would be provided at locations to be decided by the air-conditioning Engineer.

Fire Alarm System

The building would be provided with an automatic fire detection and alarm system in accordance with BS.5499. Automatic detection would be provided by optical smoke detectors in all offices and corridors. Alarm signalling would be provided by audible bells installed at such locations as to alert all occupants in the event of any fire outbreak. Alarm signalling can also be initiated by means of manual break glass devices installed close to exit points. Installations in the building would be grouped in zones and connected to a central control panel which would be located at the reception or any other location which would ensure easy access when necessary.

Burglar Alarm System in Internet Café

The nature of this facility does not require installation of comprehensive burglar alarm system. On the contrary, however, should such a system be put in place as a precautionary measure, then it would comprise ultrasonic motion detectors, passive infrared detectors, magnetic contacts on exterior doors, audible electronic sirens installed indoors and motorized horn installed outdoor. The central control panel would be located in the security office.

Telephone Communication System

Internal communication within the building as well as external communication would be provided by Electronic Modular Private Automatic Branch Exchange (PABX) equipment which would have adequate facility for any anticipated exchange trunk lines as well as the required number of internal lines extensions. Extensions would be programmed to achieve the following:

- unrestricted access to trunk lines
- Semi restricted access to trunk lines
- Restricted access to trunk lines

Low Voltage Distribution System (Primary Low Voltage System)

Primary low voltage distribution would be installed underground employing four score cables with steel wire armour. In paved areas and interior of buildings, cables would be run in PVC sleeves. Cables feeding the buildings would emanate from a low voltage distribution cabinet located in the distribution sub-station.

Power Supply System

Normal power supply would be taken from the public supply system and the supply voltage would be determined by the total demand load of the building. Standby power supply would be provided by a generating set which would be rated at 100% of demand load.

External Lighting

General lighting for the exterior would be provided by wall mounted fitting using low energy consumption high pressure sodium lamps. The fittings would be manufactured from corrosion resistant materials preferably aluminium or glass fibre. Control for all exterior lights would be automatic employing a photo-electric cell and switch contactor. Provision would also be made for manual over-ride of the automatic switching system.

Lighting Protection

Lighting protection for the building would be provided by a system comprising solid electrolytic copper air terminals, down conductors and earth terminations. Air terminals would be installed on the roof at such locations as to provide lighting cover for the building. Down conductors would run from each of the air terminals to the ground floor level on the roofs and walls. The down conductors would be 3mm x 25mm copper tape saddled by DC chips. The earth termination would be 16mm diameter, 1800mm long copper bonded earth electrodes. To facilitate testing of the lighting prevention system test would be provided on walls of each building at a level of 1000mm from the exterior finished ground level.

Equipotential Earthing

To ensure that exposed non-current carrying metalwork of switch gears in the building are at the same potential, an equipotential copper conductor would be installed to cover the entire

centre to link all buildings. Main circuit protective conductor of each building would be bonded to the equipment conductor.

Local Area Network Data System

The local area network data system (if required) would comprise the server, data cabling and data outlets. Wiring would be carried out in UPVC trunking installed on walls to facilitate future expansion. Data cabling would be Cat.5 construction and would be run radically from the server to each data outlet. Data outlets be RJ45 type and would be installed flush on the UPVC.

Satellite Communication

Satellite communication equipment (if required) would be installed and connected to the local area network system, using interface devices, to achieve a wide area network(WAN) which would be independent of the public telecommunication system. The system to be installed would be capable of handling both voice and data communication.

Rainwater Harvesting/Plumbing and Mechanical Engineering Services

The mechanical installation for the proposed four-storey hostel block would consist of the design of all mechanical installations comprising of the internal plumbing, fire fighting installation, air conditioning and ventilation and external plumbing works. The mechanical Engineer would prepare design drawings and the Bills of Quantities, where necessary.

Proposals would also include rainwater harvesting, which will involve pipes taking rainwater from the roof of the building and being stored in tanks for use. Prior to the storage in these tanks, the water would be treated.

Internal Plumbing Installations

This would consist of sanitary appliances in the various washroom and the connections to the cold water lines as well as soil and waste water lines. The internal plumbing system deals with all plumbing works internally with all vertical stacks normally 100mm diameter for soil lines and 50 to 75mm diameter for waste lines. The consultant would adopt a combination of both direct and indirect cold water supply systems.

Fire Fighting Installations

Fire fighting installations for the **block** would consist of fire hose one on each floor all connected to a hose reel pump set mounted in the plant room that would be provided on the roof top.

The building reels would be connected to a pump by means of a 50mm diameter galvanized iron pipe with all fittings and an automatic air release valve at the end. The hose reel pumps would be fully automatic and operate on turning the valves.

Portable fire extinguishers would also be fixed on the walls on the various floors. These would be the Carbon Dioxide type and the Dry powder type.

Air Conditioning and Ventilations

The air-conditioning system proposed for the project would be the water chillier system. This system allows for one outdoor mounted condensing unit coupled to multiple indoor mounted fan coil units. In this regard we would have a fewer condensing units as compared to the normal single or double circuit systems commonly employed in the design of air-conditioning systems. The power consumption is less since the outdoor units are reduced.

Ventilation of the toilets allows for fresh air through the washrooms. This also enables a better fresh air distribution through the lobbies and corridors. It would be done through vertical galvanized ducts to the roof and connected to either an in-line mounted fan or the curb mounted fan depending on the Architect's detail. The washroom doors would be fixed with doors grillers.

External Works

Depending on the site conditions the existing external works design would be reviewed.

3.8 BILLS OF QUANTITIES, COST ESTIMATION AND PROGRAMME OF WORKS

Bills of Quantities

The quantities of the work item would be taken off from the amended detailed drawings, schedules and other forms of information assembled. These would then be assembled into the Bills of Quantities. The Bills of Quantities would be prepared in accordance with the Standard Method of Measurements for Building Works (fifth edition) as issued by the Royal Institution of Chartered Surveyors, UK and as amended for use in Ghana. The Bills would follow the order of the standard method.

The Bills of Quantities would form part of the Tender Documents and would form the basis for inviting tenders, placing the contract and in the administration of the contract. It would also be used in the cost estimation.

Cost Estimation

In order to arrive at a fair and reasonable cost estimate of works the consultant would undertake a unit price analysis for each work item. Each unit price would take into account the following cost estimate:

- Quantity and cost of materials required
- Gross hourly cost of construction labour and labour output
- Operating hourly cost of construction plant/equipment and plant/equipment output
- Supervision
- Overheads and
- Profit

In establishing unit cost of materials, plant/equipment hourly operating cost and gross hourly cost of construction, labour for the price analysis, the following would be accounted for where applicable:

- The market price of local materials
- CIF or FOB prices for imported materials and plant/equipment
- Landing cost, duties and taxes

- Insurance of construction plant/equipment
- Cost of spare parts and maintenance of plant/equipment
- Consumption and cost of fuel for plant/equipment
- Official wages or salaries for various categories of construction labour and the social benefits to be paid by the contractor taking into account all incidental labour cost regarding the relevant labour laws and regulations.

Having established the appropriate unit cost of materials, labour and plant/equipment, the unit price for each work item would be calculated by means of detailed analysis. The price analysis would show for each unit price the foreign currency, local currency and tax components and their breakdown. The unit prices so obtained and the quantities established in the Bills of Quantities would be used to calculate the cost estimates.

Cost of general items which would also form part of the Bills of Quantities would be established. The specified percentage for contingencies would be added to the estimated total cost.

Programme of works and time schedule of execution

The consultant would prepare a schedule of all the likely activities to be encountered in the construction works and would allocate specific times for each of the activities based on previous work studies. The consultant would then use Microsoft project planning and monitoring software to produce the programme of works and subsequently determine the likely completion period. The completion period would be stated in the tender document for the contractors to know the time of completion required by the client.

3.9 TENDER DOCUMENT

Draft Bidding Documents

The Draft Tender Documents would be prepared in accordance with the Standard Bidding Document for works (smaller contracts) issued under the new Procurement Law of Ghana and would comprise the following:

Volume I - Notice Of Invitation to Tender
- General Regulations
- Instruction To Tenderers
- Tender Evaluation Criteria
- Procedural Rules

Volume II - Tender Form
- Form of Tender Bond
- Form of Performance Bond
- Model of Guarantees

Volume III - General Conditions of Contract
- Conditions of Particular Application
- Contract Form

Volume IV - Bills of Quantities
- Technical Specifications
- Notes On Methods Of measurements
- Unit price schedules

Volume V - Drawings (working drawings)

Volume VI - Report (if any, on materials, etc)

The consultants would ensure that the attention of tenderers is drawn to any special local law or decree which the client wishes the tenderers to note. The consultants would also advise on the amount and form of any tender or performance security which may be required.

Instruction to Tenderers

The instructions would be based on the general requirements of the new procurement law of Ghana.

Information Data

This would be supplemental to the instruction to tenderers and would be drawn up with the particular requirement of the contract in mind. A list of any additional data required would be compiled in consultation with the Koforidua Polytechnic such as tender validity period and completion date. The consultants would prepare a format to be issued to tenderers to provide equal opportunity and assist uniformity of response.

Conditions of Contract

The conditions of contract would be the General conditions of works and contracts as listed in the Ghana Procurement Law. The special conditions applicable to the works would be drafted in close consultation with the Koforidua Polytechnic. The consultant would include under the special conditions of contract, any rules and regulations concerning restrictions on working and construction at the site.

Technical Specifications

Technical specifications for all trades would be written to cover all aspects of the work making use of acceptable existing practices. The construction would take particular care in ensuring that the scope of the works, as well as the quality of materials and standards of workmanship are adequately described.

Drawings

The consultants would prepare all drawings required and for the purposes of tendering these would be read in conjunction with the Specifications and Bills of Quantities. Specifically, the consultant would prepare additional drawings as may from time to time be required for the proper execution of the works. The works would be described in sufficient detail to ensure that contractors could respond adequately in their tenders.

Final Working Drawings and Tender Document

Upon receipt of the comments of the client on the draft final working drawings and Bidding documents, the consultant would modify the documents incorporating all the revisions suggested. The resulting final working drawings and bidding documents would be submitted to the client, thus bringing the consultant's design work to an end. The next state would be selection of contractors.

3.10 SELECTION OF CONTRACTORS AND PREPARATION OF CONTRACT DOCUMENTS

Pre-Qualification

During this stage of the project, pre-qualification dossiers would be sent to eligible contractors for pre-qualification. The purpose of this exercise is to assist the consultant and employer in selecting suitable contractors who may be formally invited to bid.

Draft Pre-Qualification Documents

A draft pre-qualification would first be submitted to the client for comments. This is to ensure compliance with any rules and regulations that may be in existence within the client's establishment.

The information which would be requested from the contractors would include but not limited to the following:

- Name of Bidders
- Place of registration
- Principal place of business
- Total annual volume of construction work performed in the last five years
- Work performed as prime contractor on works of a similar nature and volume over the last five years
- Items of contractors equipment essential for carrying out the works, including make and age, condition and whether owned, leased (from whom) or to be purchased

- Qualifications and experience of key personnel proposed for the administration and execution of the contract, showing position, name, years of experience in general and years of experience in proposed position
- Financial reports for the last five years, balance sheets, profit and loss statements, auditors report etc
- Evidence of access to financial resources to meet the qualification requirements, cash in hand, lines of credit
- Name, address and telephone, telex, fax numbers and e-mail address of the Bidders Bankers who may provide reference if contacted by the employer
- Information on any current litigation in which the Bidder is involved indicating the other party or parties, cause of dispute and amount involved
- In the case of joint ventures, the information requested would be provided by each partner of the joint venture.

Final Pre-Qualification Documents

Upon receipt of the client's comments on the draft pre-qualification document, the consultant would make the necessary modification and produce the final pre-qualification documents.

Invitation to Pre-Qualify

Contractors would be invited through newspaper advertisement to obtain and after completion, submit the pre-qualification documents for pre-qualification. Contractors who respond successfully to the advertisement would be pre-qualified. A pre-qualification evaluation report would be prepared by the consultant and submitted to the client.

Letter of Invitation to Tender

Invitation letters would be sent to pre-qualified bidders to submit sealed bids within a specified time frame to be agreed upon with the client.

Site Visit and Pre-Bid Meeting

Following discussion with the client, the consultant would advise regarding site visit by tenderers. Instructions concerning site visits would be clearly defined as to the number of such

visits, the travelling arrangements to the site and the accommodation, as well as the cost borne by the tenderers.

Instruction concerning pre-bid meetings would be clearly defined as to the date, time and venue of the meeting.

Minutes of the pre-bid meeting as well as any addendum to the bid document would be circulated to all bidders within reasonable time to enable them incorporate all revisions in their tenders.

Tender Evaluation

The tenderers would be required to submit their tenders at the time and place to be determine by the client. The client would open the tenders in the presence of tenderers' representatives who choose to attend at the time and place to be specified in the tender documents.

The consultant would assist the employer during the opening session. He would prepare a formal record of the session and list of relevant bid results, including the tenderers' name, the tender price, and the total amount of each tender, any discount, tender modifications and withdrawals, the presence or absence of tender security and such other details as the Employer may consider appropriate would be announced at the opening.

The consultant would assist in the examination, evaluation and comparison of tenders. The evaluation of tenders would take place in two steps:

Step 1 - Examination of Tenders and Determination of Responsiveness

The consultant would determine whether each tender

- Meets the eligibility criterion on the new procurement law
- Has been properly signed
- Is accompanied by the required securities
- Is substantially responsive to the requirement of the tender documents

Any tender that does not conform to all the terms, conditions and specification of the tender documents without material deviation or reservation would be considered as not substantially

responsive and would be rejected and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

Step 2 - Detailed Evaluation and Comparison Of Bidders

The consultant would determine tenders which are substantially responsive and would evaluate them. Evaluated Bid Prices would be determined by adjusting the tender prices as follows:

- Making any corrections for errors. Excluding provisional sum and contingencies in the summary bills of quantities, but including day works where priced competitively.
- Making appropriate adjustment for any other acceptable variation, deviations or alternative offers from bidders.
- Checking on unbalanced prices in terms of sensitivity for variation in quantities
- Requesting for clarification from bidders, if necessary

Bid Evaluation Report

The consultants would prepare a Bid evaluation report with award proposal, based on evaluated bid sums and including indications of remaining doubts to be removed in contract negotiation, if any. The report would contain a description of the bid evaluation process.

The consultant would assess and, if necessary, discuss comments of the client and incorporate them in the final report and evaluation.

Negotiation and Award of Contract

The consultant would assist the client in negotiations with the successful Tenderer. Taking into account all additions and/or modifications agreed upon by the client and the contractor.

3.11 CONTRACT DOCUMENT/PROJECT DOCUMENT

The consultant would prepare the contract documents for signature of the client and the successful bidder. The consultant would prepare the draft of the letter of acceptance to be issued to the successful bidder.

The contract document/project document would comprise:

- All drawings/specifications for the retrofit option including the relevant calculations
- Priced Bill of Quantities
- Letter of Acceptance
- Conditions of contract/special conditions

This document would first be submitted by the consultant in a form of draft for client's comments. Any comments received would be embodied in the final project document.

3.12 WORK METHODOLOGY FOR SUPERVISION

The methodology for carrying out the assignment is as follows

- Works supervision
- Defects liability period and final taking over

Works supervision

As soon as practical, after the issuance of letter of acceptance by the employer to the contractor and prior to the issuance of the Notice of commencement, preparatory activities would be undertaken by the consultant and the contractor and to a lesser extent, the employer. Aside of conveying the employer's acceptance of the contractor's offer to him (which forms the contract price) and the completion date, the letter of acceptance seeks to remind the contractor of certain obligations required to be performed by him prior to the commencement of work on site. These obligations include such issues as the submission of performance security, programme of work, cash flow estimate, method of statement, breakdown of lump sum items and a reminder to the contractor to initiate action on the procurement of the various insurances demanded by the contract before the start of work on site. The services to be provided would take diverse forms among which are the following:

A *Pre-Commencement Meeting*

A1 Coordination meeting with client

A coordination meeting would be held between the consultant and the client. The role of each individual would be carefully defined and channels for communication would be established. A coordinator to represent the client would be introduced to the consultant. The meeting would also discuss further the scope of the works, the work plan and methodology for undertaking the consultancy services.

A2 Pre-Commencement Meeting with contractor

To enable the consultant to perform his role of supervising, investigating and co-ordinating all project information effectively, he would arrange the pre-commencement meeting which is the first official meeting prior to the possession of site involving empowered representatives of the contractor, sub-contractor(s) if any, the consultant and the employer (if he wishes to attend).

This preliminary meeting would be chaired by the consultant and would be held in the office of the consultant (as site structures may not be ready yet). All members mentioned above (and any others invited most probably providers of utility services) would receive details of the meeting such as the place, date and time with a proposed agenda. A recognised format of taking and corrections of minutes would also be adopted.

The agenda would cover a wide range of issues including the following;

(i) *Introduction*

Self-introduction of all present at the meeting stating name, company, represented and position within set-up, role in the contract and function

(ii) *Mobilization*

Discussions on the contractor's site facilities and schedules of resources, i.e. equipment schedule, staff schedule, labour requirement schedule and schedule(s) of subcontractor's work if any.

(iii) *Communication procedure*

Discussions on the procedure for the distribution of all correspondence, consultants' instruction and number of copies. The status of oral instructions given on site by consultant's site representative to contractor's site engineer would be clarified.

(iv) *Delegation of responsibility*

Where powers are to be delegated to other persons, these powers would be clearly defined and appropriate notices given in writing.

(v) *Subcontractors*

The name and address of known subcontractor (if any) would be passed on to the contractor for his comments. If the contractor also intends employing his own (domestic) subcontractors he would submit a list to the consultant for approval.

(vi) *Insurances and securities*

The contractor would be reminded of his obligations under the contract to initiate action on the procurement of relevant securities (performance and advance mobilization) as well as all necessary insurance covers prior to commencement of work on site. If these are ready at the meeting, they would be checked against specifics in the contract document.

(vii) *Contract particulars*

The consultant would confirm the employer's acceptance of the contractor's offer (as per letter of acceptance) type of contract, completion time, commencement and completion dates (if contract is already signed and notice given to commence).

(viii) *Site meetings*

Discussions and agreement on dates for the first and all future site meetings including place, time, and length of notice required, frequency and who should be invited to attend.

(ix) *Measurements*

Dates for site measurements for work done for the whole contract period would be discussed and agreed. Also method of dealing with day works, fluctuations, preliminary items, (breakdown of lump sum items) and others such as value added tax and discount (if applicable) would be discussed and agreed upon.

(x) *Any other business*

All present would be at liberty to introduce relevant matters for discussions, ask questions or provide additional information relevant to the project but not covered in any of the previous items on the agenda.

B Review and Approval of Contractor's Construction Programme for Monitoring and Evaluation

Within a specified period after the issuance of the letter of acceptance, the contractor is required to submit his programme of work which the consultant would evaluate, agree with the contractor on critical areas and make appropriate recommendations to the client for approval. Relevant issues to look out for in the programme are identifiable work items (or operations) timing and duration of operations, dates for delivery of material and components, labour and equipment resource requirements and subcontractors (if any) site commencement and completion date.

The programme should also identify the critical path. When the programme is accepted, it then becomes the "cornerstone" for management of the contract and the basis for all progress reporting and contract delay considerations.

If at any time during the currency of works the consultant is not impressed with the progress of the works as compared to the approved work schedule he would request the contractor to submit a revised programme. This procedure would continue throughout the contract period but the originally agreed programme forms the basis for contractual time-keeping.

The consultant's site representatives would in the course of the works request the contractor to produce for approval monthly, weekly and daily programmes conforming to the overall programme.

C **Review and Approval of Cash Flow Estimates**

Shortly after award of contract, the consultant's Quantity Surveyor would carry out analysis of the tender by breaking down the contract price into distinct sections of the works for easier appreciation by the employer. In furtherance of this, the consultant would request the contractor to submit for his information, a detailed Cash Flow Estimate.

The Cash Flow forecast would be prepared from the contractor's master programme (by using the work values in Bills of Quantities) and this gives an indication of all payments and their timing so the employer may have an advance knowledge of this financial commitments to enable him make the appropriate financial arrangements to meet the contractual obligations accordingly.

D **Review and Approval of Construction Methods**

The consultant would request the contractor to submit for his information, a construction method document giving a general description of the arrangements and methods which he proposes to adopt for the execution of the works.

This involves concerting the drawings and Bills of Quantities into a number of construction operations (in a descriptive form), tasks or activities and detailing a suitable method of carrying out every operation and their durations. This should correspond in all respect to the contract programme (which is pictorial).

The consultant would thoroughly examine the method statement to assure himself that the equipment and labour schedules presented are adequate. The consultant would also satisfy himself of the adequacy, suitability and safety of all site operations and methods of construction to be adopted by the contractor.

E **Possession of Work Site**

Since the master programme is the basis of cash flow forecast, it goes without saying therefore, that at any time when the consultant requests for a review of the work programme, the cash flow forecast should also be reviewed.

Before handing over the site to the contractor (on behalf of the employer) the consultant would ensure that the site is free from all encumbrances as would hinder the commencement of works on schedule.

Certain data would also have to be provided to the contractor.

Setting Out

The consultant would provide(in writing) for the use of the contractor all necessary geodetic survey data and ground survey controls to enable the contractor to set out the works and the contractor would be responsible for setting out all necessary reference points and their maintenance throughout the contract period including Defects Liability Period.

The contractor would be wholly responsible for the accuracy of such reference points, unless such error is based on incorrect data supplied by the consultant. The consultant would issue amended drawings or instruction for correction of any error detected by the contractor in respect of data supplied by the consultant.

Handing Over Of Site

As provided for by the contract, the consultant is required to issue the contractor with the notice to commence work within a specified period after the issuance of the letter of acceptance by the employer.

As part of the notice to commence work, the consultant would be empowered to hand over the site of the work to the contractor to commence work as well as give him access.

The consultant would, on behalf of the employer hand over the whole of the site at a go or if specified by the contract hand over portions (or sections) to the contractor for execution and completion within specified times.

F Control of the Works

The nature of the work requires effective supervision. The consultant would assign a very experienced Clerk of Works to the construction site. The level of experience of the Clerk of Works would be such that he can take independent decisions on site without necessarily waiting for the team leader or other members of the key personnel staff.

The Clerk of Works would supervise the day to day work activities at the site and submit weekly report to the Project Manager. The Project Manager would visit the site every week.

The team leader would schedule regular visits of all the consulting team members who would be called upon to move to site at very short notices should the clerk of works require any assistance.

The consultant expects that the contractor would provide adequate site office for the consultant's clerk of works.

During the execution of the works, the consultant would supervise by imposition of managerial technical and fiscal controls on the performance of the contractors on the site on a day to day basis to ensure the execution of the works in compliance with the contractual stipulations.

The tasks which would be performed by the consultant to achieve the above stated objectives may be classified under two major headings, namely

- Field control
- Administrative and managerial control

Field Control

- Quality control
- Quantity control

The contractor's site Engineer would be required to submit to the consultant a "report for inspection". The clerk of works after the inspection would report his findings to the Project Manager for his information. Copy of the decision would be sent to the contractor's site engineer.

In these inspections and measurements, the clerk of works would consult the technical specification, Bills of Quantities, the civil engineering standard method of measurement and relevant material testing manuals.

Quality control

- Materials quality control
- Workmanship control
- Geometric and topographical control

Material quality control

This would be carried out to ensure that the materials proposed by the contractor's are suitable and satisfactory. The stockpiles would also be subjected to the same quality assurance before being approved for incorporation in the works.

Workmanship control

This aspect of the quality control is to ensure that the finished products of the contractor's work meets the standards specified in the contract. Examples of the workmanship control test comprising of laboratory and fields test are;

- Degree of compaction achieved in the construction of the various aspects of the work, such as hardcore filling,
- Concrete mix test such as slump test and water content of the mix
- Concrete cube strength tests

The results of the workmanship control test would be submitted by the clerk of works on site to the project manager with appropriate recommendations to enable him to decide whether to accept or reject the work.

Geometric and Topographical Control

The third aspect of quality control is the geometric control which is required to check compliance with specified dimensions and tolerance. Examples of these tests are;

- Setting out of the buildings
- Depth and width of excavated footings

The consultant would check and verify the basic horizontal and vertical controls set out by the contractor.

The project manager would instruct the clerk of works to carry out series of duties pertaining to quality control in order to:

- Supervise continuously the contractor's technicians in carrying out specified sampling, testing and reporting
- Instruct the contractor where to take representative samples and ensure frequency of sampling and testing in accordance with the specifications.
- Ensure that all test records on materials and field operations are correctly summarized in daily reports and maintain the contractor's record of all such reports and test data.
- Submit a weekly summary of all test results to the project manager, together with recommendations regarding approval or rejection of materials and work, based on the test data and observation.
- Carry out independently from the contractor's technicians, any sampling and testing for the purpose of confirming the test results submitted by the contractor.

Quantity Control

Quantity control is necessary to ensure that a good record is kept of the actual quantities of work executed. This is because the effects of variations which are directed by the consultant have to be accurately recorded.

The consultant's quantity surveyor and his technical supporting staff would monitor all works executed by the contractor and record and treat appropriately any variation instructed by the engineer. In this respect the quantity surveyor would:

- Keep up to date quantity records including field measurements
- Carryout quantity measurement in the field

- Assist the project manager in completing weekly and monthly reports evaluated variations and rates submitted by the contractor.
- Prepare the forecast of final construction cost and revise it from time to time

Administrative and Managerial Control

General

The importance of administrative and managerial control in the supervision of any construction project cannot be over emphasized.

The daily, weekly and monthly monitoring of the activities on site to ensure adherence to the programme and the cost projections and therefore the early completion of the works have always been of great concern to Architectural and Engineering Services Limited.

Cost control and payment

Cost control involves the process whereby a construction project cost is intentionally managed in every way possible to ensure that there are no cost over-runs which would give shocks to the project. The process, therefore, calls for the formulation of a financial plan for the future against which to monitor and measure performance by a continuous comparison of actual with planned expenditure and taking such remedial action towards the rectification of divergences from planned expenditure.

To ensure the realization of these objectives the consultant would address the following issues;

- ***Cash flow forecast***: immediately before or shortly after commencement of work on site the consultant would give the employer a clear knowledge of his/her financial outlay as to when payments are due and how much is involved.

  The consultant would, therefore prepare a cash flow forecast (or project budget) from the contractor's master programme (by using the values of the work items in the bills of quantities).

The consultant would examine the forecast to ensure that an optimum expenditure pattern is achieved so that the employer does not commit too much resource in the initial stages of production or at the tail end of the construction process.

- ***Interim payment statement***: The appropriate method to be adopted in the preparation of interim payment statement is likely to be mixture of payment relating to time and payment by elements of work completed (otherwise known as stage payments, milestones on payment schedule).

  The consultant and the contractor would agree on the time (likely to be the end of each month) as well as the defined stages of construction which qualify for inclusion in the interim statement. This would have to be agreed on before the signing of the contract. The likely defined stages of constructions are:

  - Substructure (up to and including concrete bed)
  - Super structural walls and concrete elements including gables
  - Roof structure and covering
  - Doors and windows completed with all ironmongery and other fittings
  - Plumbing and electrical installation
  - Finishes (i.e. all floor, wall and ceiling finishes as well as painting and decorating)

  The consultant and the contractor would agree on the method of dealing with the preliminary items, whether they be distributed evenly over the contract period in the normal way or separated into fixed and time related items.

  In order to forestall any dispute arising, the consultant and the contractor's quantity surveyors would jointly undertake the inspection of the works to determine which stages have actually been completed as at the agreed time. The interim payment statement would incorporate the following items;

  - The value of the completed defined stages of work
  - The value of materials on site
  - The value of price fluctuations

- The amount of authorized variations (if any)
- The value of any dayworks (if any)
- The amount of plant/mobilization advance credited to the contractor as well as repayments of advance (debited to the contractor)
- Any other sum to which the contractor may be entitled under the contract otherwise (i.e. claims if any)

Materials on site

The consultant would, base on the recommendation of the Clerk of Works, allow in the interim payment certificate an amount to cover materials intended for the works but not yet incorporated in the works.

Before allowing such materials to be included in the interim statement the consultants site representative would satisfy himself that the following have been complied with;

- That the materials/components are actually intended for incorporation into the works and are in conformity with the specification.
- That ownership right have been established in a written contract for their supply and that when paid for the ownership of the material/components transfers to the client,
- The materials/component are adequately insured, stored and protected.

Variations

This is a very important link in the cost monitoring process. During the construction phase of projects, variations do arise in one or more of the following situations;

- The wish of the client or consultant to vary sections of the original design and/or specification
- Discovery of ambiguity in the contract document and consequent clarification
- Discovery of any omission or error in the contract drawings, bills of quantities or specification
- An action taken to meet statutory requirements under the orders of building inspectors, district surveyors or other persons with a statutory right control
- Reduction of cost owing to financial constraints

The consultant would carefully study the contract conditions with a view to determining the machinery for financial adjustment of the effects of the variations.
The consultant's quantity surveyor would ensure that he acts expeditiously to facilitate the provision of an effective cost management by valuing variations within the shortest possible time. The consultant's quantity surveyor would provide information on the financial implications of any variations anticipated before a decision is taken by the consultant or client.

The consultant's quantity surveyor would follow the procedure for pricing variations as given in the condition of contract.

Day works

Day works normally arise as a result of the consultant's instructions varying sections of the works.

The Consultant's Quantity Surveyor would carefully study the contract conditions to determine the most appropriate method for pricing variations. Where it is not possible by any means to value any variation then the consultant would instruct that it be carried out on a day work basis.

Before any work executed under daywork is included in any interim statement, the consultant's quantity surveyor would satisfy himself that the following requirements have been met;

- Work involved is backed by a written instruction from the clerk of works or the project manager/architect
- All daywork sheets have been signed by the clerk of works or the project manager/architect
- Daywork is the correct method of valuing the work
- The prime cost rates are correct and the percentage additions claimed agree with that contained in the bills of quantities
- There are no inconsistencies regarding quantities of labour, materials and plant

Retention Money

The normal allowance for retention is 10% of the value of work done up to a limit of 5% of the contract sum. The consultant would certify the release of the first moiety of the retention money upon the issuance of the taking over certificate. The consultant would certify the release of the second moiety of the retention money on the issuance of the Defects Liability Certificate. In some cases the contractor would produce a guarantee to cover the release of the second moiety of retention on the issuance of the taking over certificate. The consultant would vet the guarantee and advise the employer accordingly.

Price adjustment

The consultants would presume that the contract is not a firm price contract and the contractor would be duly reimbursed financially for any increase in the cost of materials, wages and plant. The general formula to be used for price adjustment would take the following form as given in the conditions of contract; Pc = Ac + Bc (Imc /Ioc) where;

Pc is the price adjustment factor for the portion of the contract price payable in a specific currency "c"

Ac and Bc are coefficients specified in the contract data representing the non-adjustable and adjustable portions respectively of the contract price in that specific currency.

Imc is the index prevailing at the end of the month being invoiced and Ioc is the index prevailing 28 days before bid opening for inputs payable both in the specific currency.

The consultant would agree with the contractor before the signing of the contract on the weightings or coefficients of the adjustable and non-adjustable portions respectively of the contract.

The consultant would expect the contractor to have submitted base cost indices for the adjustable and non-adjustable portions respectively of the contract including dates.

The consultant would stress that where a contractor supplies base cost indices which are provisional, these would be reviewed before the contract is signed.

Financial statement

The consultant's quantity surveyor would prepare period cost reports (as part of the monthly progress report) to appraise the client of the financial status of the project at any particular time during the currency of the works. The report would be composed of the total value of variations to date, cost of unconfirmed variations, fluctuations, possible contractor's claims for direct loss and/or expense and adjustment of provisional sums (if any). The consultant would endeavour to predict the financial effect of variations and contractor's claims and thus, make the client aware of his future financial commitments. The financial report is the sole consumption of the client. Consequently the consultant would include a disclaimer caution to dissuade the contractor from using the information contained in the report to justify a contractual claim.

Contractual Claim

The consultant would examine all claims submitted and where he deems it justified include whatever amount is due to the contractor in the payment certificate.

Interim Payment Certificate

On receipt of the contractors monthly statements of the estimated value of the work executed, the consultant would check the statement and certify the amount to be paid to the contractor. The consultant would adjust the payments due to the contractor by deducting for advance payments and retention. The consultant would draw the attention of the employer to effect payment of the amount certified within the period stipulated in the contract failing which the employer would be required to pay interest on delayed payments.

Time and Progress control

The consultant would obtain from the contractor, a detailed work programme which would have details of the plant, equipment and labour for the work. The consultant would monitor the progress of the work closely to ensure adherence to the programme.

The progress of the work and the programme would be scrutinized critically at every monthly meeting and where the rate of progress is found to be inadequate, the contractor would be advised to take steps to expedite the works. The contractor would also be written to by the consultant to be mindful of the liquidated damages which would be applied should they fail to complete the works as scheduled. In the event of the contractor not being able to meet the timing, the consultant would write to them to submit a revised work programme. The employer would be notified immediately, should the consultant find that the contractor is unable to complete the works as scheduled. The progress of the works would be determined by comparing the quantum as well as the cost of work done against those indicated on the work programme.

Routine Site Meetings

The consultant would hold monthly meetings with the contractor and all the relevant stakeholders to review the progress of work, cash flow projections and issues pertinent to the site. This would ensure that where lapses are observed, quick remedial measures are put in place to correct them. The agenda to consider at meetings include the following;

- Comments on minutes of last meeting
- Progress status
- Technical matters
- Financial matters
- Contractor's staff
- Contractor's equipment
- Material on site
- Administrative matters
- Variations
- Claims
- Any other matters

The consultant would hold technical meetings with the contractor alone to resolve technical and other issues that may hinder the progress of the works. All the minutes of

the meetings held would be correctly documented and copies distributed to all participants before the next schedule meeting and also produced in the monthly progress reports

Safety, Security and Environmental Control:

The safety, security and environmental control aspect of the work would be given an equally important consideration by the consultant. It is the view of the consultant that the contractor should ensure:

- The safety of all workers on site and other persons within and around the project area. The consultant would therefore ensure that appropriate safety apparels like hard hats, gloves and shoe are used by all personnel.
- The security of all personnel, materials, plants and equipment, develop for the works
- The protection of the environment (both within and outside the work area) from acts resulting from the works being undertaken.

The consultant would inspect locations selected for the disposal of excavated materials and other materials not required for the works. The disposal points would be inspected to ensure there are no hazards before approval is given to the contractor for its use. The consultant would ensure that the noise level would be controlled and no work would be allowed at night

G ***Claims and extension of time***

Claims

Claims constitute a dark spot in the administrative and managerial control of a project and may eventually (if not handled with care) take all the parties to the courtroom. The consultant would familiarise himself with all situations which give rise to claims, including disputes over quantities, delay in issue of drawings or instructions, delay in payment by the employer etc. The consultant would also familiarize with the three main types of claims so that they would know how to approach claims problem if one should arise. The three main classifications of claims are contractual, extra-contractual and ex-gratia claims.

The consultant would consider, assess and determine all contractual and extra contractual claims because these are considered to be legally enforceable. The consultant would leave ex-gratia claims to the employer to deal directly with the contractor because ex-gratia claims do not have a legal basis and are paid at the discretion of the employer.

The consultant would assess any claim to ascertain whether they have reasonable grounds and are acceptable.

Procedure for dealing with claims

If the contractor wants to make a claim, then, within a period of 28 days of an event necessitating that claim, the contractor would notify the consultant (in writing) who would duly acknowledge receipt of the notice and assign a claim number to it. The consultant would then bring the notice to the employer, the possibility of additional cost that may arise and that the contract sum may change. The consultant would instruct the contractor to take action to modify or reduce the effects of the claim e.g. by attending to other works in the programme not affected by the event in dispute.

The consultant would investigate and study contemporary records including supporting data on site including photographs, if any. He would ensure and advise the contractor to keep adequate records such as labour, materials, plants (including standing and broken down) time and inclement weather.

Within 28 days (or such other reasonable time as may be agreed by the consultant) of giving notice, the contractor would send to the consultant an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based.

Examination of Contractor's Claim

In examining the contractor's representation, the consultant would look out for the following;

a) A statement of the contractors contractual reasons for his stance that the employer is liable for the extra cost, etc
b) a statement of the relevant events giving rise to the claim including a statement of how circumstances have changed from those the contractor would reasonably have foreseen
c) copies of all relevant documents including original tender programme and mark-up of all major bills of quantities rates which are necessary to substantiate the amount of the claim
d) a detailed calculation of entitlement claimed by the contractor with copies of relevant substantiating information, records, invoices etc

Assessment of Claims

When the consultant receives the detailed particulars of the claim from the contractor, he would first decide whether the claim has reasonable grounds to be acceptable in principle. If he considers it unacceptable he would inform the contractor promptly in writing that his claim has been rejected giving reasons for rejection. If he needs further data and ground to reach a reasoned judgement, he would request for further information and/or explanation to enable him to assess and determine the amount of the claim.

Negotiation of Claims

When the claim has been accepted in principle, the consultant would evaluate and determine promptly such amount which he deems the contractor is entitled to. In certain situations where a clear-cut solution cannot be achieved, the consultant may set out a working group comprising nominated member from the consultant's and contractor's outfits to negotiate and agree on the disputed points of the claim.

Where a settlement is reached, the consultant would include the amount arrived at in the interim certificates. If an agreement cannot be reached, the consultant would nevertheless

determine the amount which he considers the contractor is entitled to and the contractor can resort to arbitration (if he so wishes). In all his dealings with the contractor, the consultant would act in an independent and impartial manner in settling the claim.

Failure to comply

Should the contractor fail to notify the consultant in respect to any claim which he seeks to make, the consultant would nevertheless assess the amount which he considers the contractor is entitled to having regard to information verified by contemporary records.

Standard form of claim

Much as the World Bank conditions of contract do not give a standard form for claim, the consultant would design a format suitable for the purpose which incorporates all the information required by the conditions.

Extension of time

The contractor would notify the consultant within 28 days of the event necessitating the extension of time occurring and the consultant would evaluate the request and seek the necessary approval from the employer before granting the extension of time.

When evaluating the contractor's request for extension of time, the consultant would determine if the event is of a critical nature and would directly influence the overall completion of the project. The consultant would also consider the financial effect the extension would have on the contract, having regard to liquidated damages or possible aggregate additional consequential cost. Much as the consultant is under obligation to seek clearance from the employer when granting extension of time, he would approach the exercise in an impartial manner.

H Taking Over of the Works

The consultant would upon notification by the contractor that the works are substantially complete, issue instruction to the contractor specifying all the works necessary to be completed prior to the substantial completion inspection.

The consultant would carryout the substantial completion inspection jointly with the client, contractor and other relevant bodies and compile a list of all defects /outstanding works observed during the inspection. This list would be agreed and signed by the inspecting parties. The consultant would then issue a taking over certificate. The taking over certificate would confirm that the works have been substantially completed, stating that the certificate is subject to the completion of the attached list of defects/outstanding works within 4 weeks. The certificate would also establish the date on which the substantial completion was achieved and the work taken over by the client. The defects liability period would commence with the issue of the taking over certificate. The consultant would prepare a certificate for release of part of the retention fund having regard to the relative value of completed sections in accordance with the conditions of the contract.

I **Records**

The consultant, knowing that good record keeping and documentation are very essential in the monitoring and management of a project, and also in dealing with claims, would keep detailed records of works activities, rate of progress, weather conditions, verbal and written instruction given to the contractor among others. The following are types of records which would be kept;

Project Daily Diary

The consultant would keep a site diary to enable him keep daily records of works activities including mistakes made by the contractor, the progress of the work and any other relevant activities that would be useful in negotiating of variations, verifying or rejection claims for extra works or delays.

Photographs

The consultant would take photographs at regular intervals to indicate the general progress of work. Photographs of subjects requiring particular attention which include changed condition, damaged equipment or materials, defective work, block access to site, flooding, landslide etc would be taken as and when necessary. The photographs would be dated and the location and subject noted. The photographs would be kept in a series of albums.

As Built Drawings

The consultant would indicate on a copy of the drawings, details of all changes done in the works. This would be done progressively during the execution of the works in order not to loose any details when preparing the as built drawings. As-built drawings are essential for future operation and maintenance of the facilities and subsequent rehabilitation works.

Measurement Book

The consultant would keep records of all measurement taken jointly with the contractor in the measurement book. The consultant would also keep records of receipt and use of materials to enable him certify that specified amounts of various materials have been incorporated in the works.

Minute of Meetings

The consultant would record and prepare minutes of all meetings held in connection with the project. Copies of these would be submitted to the employer for his information.

Other Documents

The consultant would keep records of all other documents on the project. The documents include certificates, quality control records, survey records, variations, claims and correspondence required under the conditions of contract.

3.11 DEFECTS LIABILITY PERIOD AND FINAL TAKING OVER

The consultant would ensure that the contractor carries out the works listed in the substantial taking over report within a specified period during the defects liability period. The consultant would agree with the contractor, the type and extent of maintenance during the defects liability period to ensure that the works are adequately protected throughout the period.

The consultant would also conduct regular inspection and ensure that the contractor makes good any defects that require immediate attention. The consultants together with the contractor

would inspect the project at the expiration of the defects liability period, prepare a schedule of defects to be made good by the contractor.

The consultant would prepare reports concerning any defects discovered during the inspection. The contractor would then be requested to programme the execution of the outstanding works and defects for a final inspection of the works with the employer. Should the need arise, the consultant would assist the employer with the rectification of defects which are not deemed to be the contractor's fault.

After successful execution of the defects, a final certificate would be issued together with a certificate for release of the residue of retention fund with the employer's approval. The consultant and the contractor would prepare and agree on final account which would be submitted to the employer for payment.

The consultant would recommend to the employer the release of all outstanding bonds and guarantee, etc provided by the contractor under the terms of the contract.

At the end of defects liability period, the consultants would submit a project completion report and as built drawings to the client. The project is thus deemed completed and taken over.

Reports

The consultant would prepare reports covering the works. All reports would be submitted to the employer with an information copy to the contractor.

The reports and documents to be presented are:

- Inception report
- Monthly reports
- Substantial completion report
- Final construction report

Inception Report

An inception report would be submitted to the client two weeks after the commencement of the works contract. The report would comprise the following:

- All activities relating to the handing over of sites
- Consultant's impression and recommendations on any major change in the original design
- Guidelines for administering, monitoring and evaluating the project and quantity assurance plan

Monthly reports

The consultant would prepare monthly, a progress report on the work activities performed on the site, physical progress during the month, cumulative progress and target dates. The report would show targeted progress as well as actual progress and variation. Reasons for any short fall in the progress would be included in the report. The reports would contain among others the following:

- Description of the consultant's and contractor's activities
- Construction progress bar chart (i.e. summary of network schedule) showing planned and actual progress
- An updated estimate of final construction and engineering cost compared to funds still available
- List of important letters, instructions and variations orders issued to date
- Contractor's and consultant's staffing during the period
- Consultant's and contractor's equipment in use during the period
- Permanent materials delivered during the period
- Pending questions and problems
- Any unusual or special circumstances occurring during the report period
- Weather conditions and their effect on progress and project photographs
- The minutes of all meetings that take place with the contractor during the reporting period

In addition to the monthly progress report and charts, the following would be reported;

1. Contract data: showing contract name, employer, contractor, consultant, commencement and completion dates
2. Financial Summary: showing a brief abstract of the last payment certificate including certificate number, date issued etc
3. General site information: incorporating weather conditions on site, rainfall figures, temperature, and variation orders issued during the quarters, visitors to site indicating organisations they represent and their mission to the site. Site accidents would also be recorded indicating date and time of accident. All correspondence concerning the project received on site within the period would be recorded with date and subject matter. These would include correspondence from residential engineer, correspondence from the contractor and those from the employer. Any extension of time granted within the period indicating the reasons for granting the extension of time would be recorded. New designs and drawings submitted during the period. Laboratory tests conducted including site sampling and testing of aggregates. Appendices showing the consultant's and contractor's operatives and supervisory staff, vehicles, plant and equipment on site would be recorded.

The monthly reports would be submitted within seven (7) days after the end of the respective month being reported upon. Three (3) hard copies and one soft copy of the monthly reports on each site would be submitted.

Substantial Completion Reports

The substantial completion report which would be prepared at the end of the substantial completion of the project would detail out the following:

- State of works at completion and list of defects and outstanding works
- Programme for making good the defects
- Demobilization and programme for the defects liability period
- As built drawings (to be issued within thirty days of issuing substantial completion certificates)
- Three (3) hard copies and one soft copy of the substantial completion report on each site would be submitted.

Final Construction Report

The project final report would be prepared at the end of the defects liability period. The final report would compare the original implementation plan and actual progress, initial budget and final cost and would contain the following:

- Summary of work performed by the contractor
- Project records
- Itemised summary of payments made to the contractor and consultants
- Analysis of the quantities of work items
- Final account
- Project photographs and video documentary
- A description of any significant occurrence with a bearing on the construction contract.
- Three (3) hard copies and one soft copy the final construction report would be submitted

CHAPTER FOUR

4 TEAM COMPOSITION, TASK LIST AND STAFFING

4.1 INTRODUCTION

The terms of reference requires the following output from the consultants:

- High quality of workmanship
- Excellent collaboration of all stakeholders

In this technical proposal, we present the proposed organisation for carrying out the project and indicate the experts we propose and the assigned tasks.

The services of the consultant's team will be performed to the highest professional standards to the utmost satisfaction of the clients. The detailed organogram is shown in CHART 1.

At the head of the chart is the Project Manager. Below him are members of his Design and Construction supervision team which includes Architect, Structural/Civil, Electrical, Mechanical, Water Engineers, Land Surveyor, Quantity Surveyor, and Clerk of Works. The Team reports directly to the Project Manager. Members of the Team also have horizontal relationships.

4.2 THE TEAM

A team headed by a Principal Consultant of Architectural and Engineering Services Limited would undertake the assignment.

All members of the team would come from the Head office of the company and the Regional Office at Koforidua. There would be regular interaction with the Clients i.e. Koforidua Polytechnic.

4.3 THE PROPOSED TECHNICAL TEAM MEMBERS

DESIGN TEAM

- Anthony Kulekey … Project Manager
- J. k. Ofori-Sarpong … Structural Engineer
- Adolf Djirackor … Electrical Engineer
- Dan Kuse … Mechanical Engineer
- Kwadzo Hohoabu … Quantity Surveyor,
- Eric Osei Tutu … Architect, Koforidua
- Y. Asamoah-Twum … Water Engineer
- E. S. Nyamekye … Geotechnical Engineer
- Nii Lante Lamptey … Land Surveyor

CONSTRUCTION TEAM

- Anthony Kulekey … Project Manager
- J. k. Ofori-Sarpong … Structural Engineer
- Adolf Djirackor … Electrical Engineer
- Dan Kuse … Mechanical Engineer
- Kwadzo Hohoabu … Quantity Surveyor,
- Eric Osei Tutu … Architect, Koforidua
- Y. Asamoah-Twum … Water Engineer
- E. S. Nyamekye … Geotechnical Engineer
- Nii Lante Lamptey … Land Surveyor
- Augustus Fynn-Essien … Clerk of Works

THE PROJECT MANGER – ANTHONY KWEKU AMEY KULEKEY

The Project Manager will be responsible for the overall coordination and direction of the assignment. He will specifically coordinate the activities of the various staff of the team, organize and supervise arrangements for all field and office works and general operational activities and program of the project Team. He will also offer quality assurance to the reports before submission to the client and also has the power of attorney to liaise with the client and other relevant agencies on all aspects of the project.

The consultants propose to appoint Mr. Anthony Kweku Amey Kulekey for the position of Project Manager. Mr. Kulekey has over thirty years experience in professional activity, about twenty-five of these in senior supervisory capacity.

He has on many occasions supervised and coordinated similar projects, as a regional consultant in the Volta Region, and also as a principal consultant of the AESL at the Head Office.

His qualification as an Architect, in addition to his function as a Project Manager, where necessary will compliment the work of the Architect of the Project Team.

THE PROJECT ARCHITECT – Eric Osei Tutu

The Project Architect will be responsible for ensuring that all Architectural Services required under the TOR i.e., the task of organizing for the required checking and collection of relevant information particularly drawings, details of buildings, site instructions, site measurement, materials etc are adequately addressed. He will also verify compliance with tender documents, specifications and check the quality of work completed and review/prepare schedules of requirements for design, etc, where necessary.

The Consultants propose Mr. Eric Osei Tutu as the Project Architect. Mr. Osei Tutu has vast experience in the fields of Architectural Design, Contract Administration and Supervision and Project design.

He is a successful architect who has handled a large number of varied projects ranging from housing schemes to hostel/dormitory designs and others. He is also familiar with the terrain since he is stationed in Koforidua

CIVIL/STRUCTURAL ENGINEER – JOSEPH KWAKU OFORI – SARPONG

The Structural/Civil Engineer will perform the task of reviewing and checking all design calculations, drawings and specifications engineering reports, site instructions issued, site measurement of existing, certificates issued and payments made etc.

In particular, he will carry out site inspection and verify soil condition, check the structural soundness of all construction works, review existing infrastructure and make proposals for redesign where necessary.

Mr. Kwaku Ofori – Sarpong holds a B. Sc Civil Engineering from U. S. T. (1976) with over 26 years experience including management and supervision of rehabilitation works at the Kumasi Sport Stadium, design and supervision of extension works of Okomfo Anokye Teaching Hospital and the design and supervision of SSNIT Guest House in Kumasi. He is currently the head of Civil/Structural Department of A. E. S. Limited.

THE COST EXPERT/QUANTITY SURVEYOR – EGBERT KWADZO HOHOABU

The Quantity Surveyor will be responsible for all aspects of the project dealing with construction costs, financial administration of construction contracts and in general the efficient use of construction resources. He will in particular be concerned with advising on cost estimates and the preparation of a budget for completion, undertake joint measurement of completed work for the preparation of contractor's application for payment, check contractor's claim for work done for certification etc.

Mr. E. K. Hohoabu is a Quantity Surveyor with over 17 years professional experience at senior level at the A. E. S. Limited. He has been involved in pre and post contract service for a large number of major projects.

WATER ENGINEER – YEBOAH ASAMOAH – TWUM

The Water Engineer will carry out the preparation of water supply drainage and sewerage works to the proposed office project, undertake quality assurance of work output from the various parties involved in the project etc. Mr. Yeboah Asamoah – Twum has over eleven years of experience in the field of Civil Engineering in the design and construction of water systems, water treatment systems and drainage.

He was the project civil engineer responsible for the design of the four -storey Supreme Court Building and is currently involved in the design of small scale irrigation dams in Wogu, Jang, Takpo, Kanyine Sombo and Karko in the Nadowi District of the Upper West Region.

He holds a masters degree in Water Resources Engineering, University of Dar es Salaam Tanzania (1999) and Bachelor's degree in Civil Engineering U. S. T., Kumasi Ghana (1996). Mr. Asamoah is currently the Head of the Water department of A. E. S. Limited.

MECHANICAL ENGINEER – DANIEL KOKU KUSE

The Mechanical Engineer will provide technical assistance in all installation aspects of the works, including notifying and meeting all relevant agencies (ECG, GWCL, Telecom, DA, Urban Roads and E P A) to solicit their collaboration in the works.

Mr. Daniel Kuse is a Mechanical Engineer with over 25 years post qualification experience. Has designed and supervised the installation of mechanical equipment outfit for schools, workshops garages, pump stations and air condition systems for many organizations in Ghana Togo and Nigeria.

Mr. Kuse has a degree in Mechanical Engineering B. Sc (1972) from U. S. T., Kumasi, Ghana.

ELECTRICAL ENGINEER – ADOLF DJIRACKOR

The Electrical Engineer will provide technical assistance in all electrical aspects of the works, including notifying and meeting all relevant agencies (E C G, Telecom, etc) to solicit their collaboration in the works.

Mr. Djirackor holds a MSc. Electrical Engineering Degree from the Belarus Polytechnic Institute, Minsk, and has gained over 21 years professional experience in design and supervising Electrical Installation works in Ghana.

PROJECT SURVEYOR – NII LANTE LAMPTEY

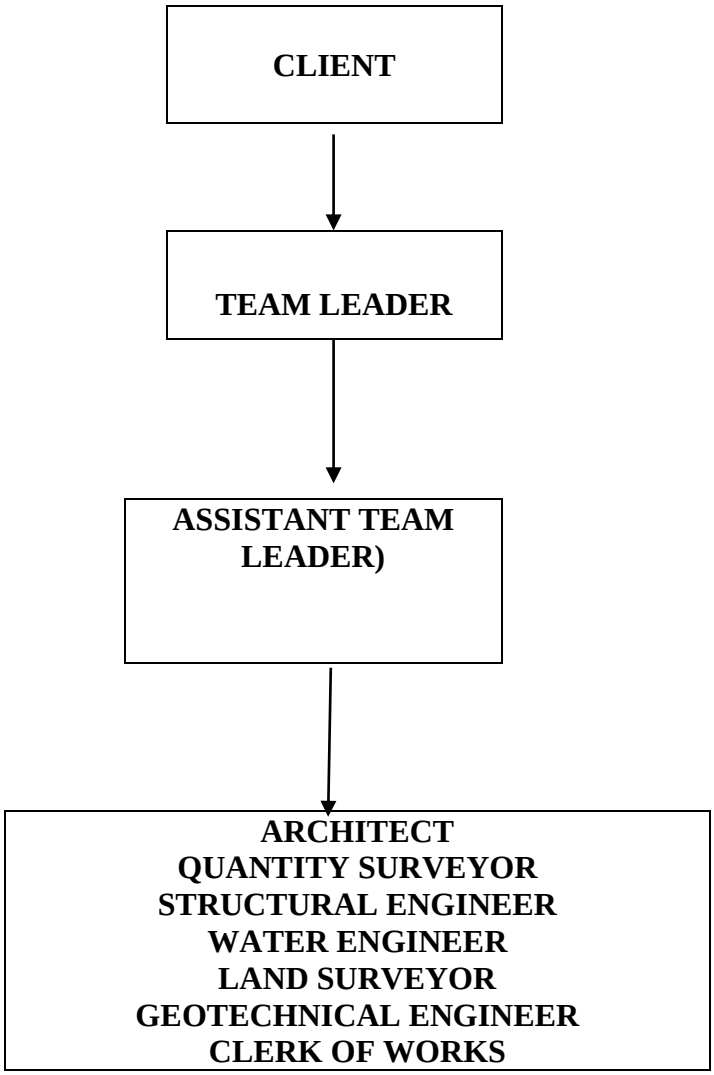
The Project Surveyor will provide technical assistance in all surveying aspects of the works. Mr. N.L Lamptey holds a BSc Geodetic Engineering Degree and Post Graduate Diploma in Cartography with over eighteen (18) years post graduate working experience in Topographic, Cadastral Engineering, Hydrographic surveying and general Survey office practice.

PROJECT CLERK OF WORKS – AUGUSTUS FYNN-ESSIEN

Mr. Fynn-Essien is a Clerk of Works with over 18 years' post qualification experience. Since joining AES Limited, in 1990, Mr. Essien has been involved in a wide range of building construction projects including the constructions supervision of hostels, schools, office complexes and simple bungalows as well as multi-storey blocks of flats. Now as a senior Clerk of Works in AESL, he has oversight responsibility for a lot of the supervision construction jobs in the Eastern Region.

**Refer Table 1 for duties of the Project staff*

ORGANIZATIONAL CHART



TEAM COMPOSITION

CHAPTER FIVE

5. WORK PLAN AND ORGANIZATION

5.1 WORK PLAN

A well developed work plan which covers the entire scope of the consultancy services is shown in various Bar Charts in the appendix.

The overall parameters of the project and the individual team member activity levels have been indicated.

5.2 ORGANISATION

The Architectural and Engineering Services Limited (AESL) would have a contractual responsibility to the Koforidua Polytechnic. The Architect would be responsible for the architectural services. The Civil/Structural/Geotechnical Engineer and the Quantity Surveyor would provide specialist services on aspects of the assignment in their respective fields.

The team would meet and analyse design solutions and alternatives. The team leader would be responsible for the consultant team in the collation of reports and the liaison with the Koforidua Polytechnic.

WORK PLAN

PHASE ONE

ACTIVITY 1	DESIGN AND PREPARATION OF NEW DOCUMENTS … … … …	6 MONTHS
ACTIVITY 2	TENDERING … … … …	1 MONTH
ACTIVITY 3	REPORT WRITING AND AWARD … … …	1 MONTH

PHASE TWO

ACTIVITY 4	CONSTRUCTION … … … …	18 MONTHS
ACTIVITY 5	DEFECTS LIABILITY PERIOD … … …	6 MONTHS
ACTIVITY 6	CLOSING MATTERS … … …	1 MONTH