LIBERIA: PROPOSED EFA-FTI CF PROJECT

CIVIL WORKS COMPONENT REVIEW

CONSULTANT ARCHITECT'S REPORT
MAY 2010

LIBERIA: PROPOSED EFA-FTI CF PROJECT

CIVIL WORKS COMPONENT REVIEW

CONSULTANT ARCHITECT'S REPORT
MAY 2010

Contents ii

INTRODUCTION

General

The Consultant visited Liberia between May 14th and May 26th 2010.

Terms of Reference

The Consultant was to focus on the ECD construction component and to work with the consultant responsible for the preparation of the CF-FTI project Implementation Manual on the construction component of the project.

Meetings

Meetings were held with:

- the newly appointed Minister of Education; the Deputy Minister for Administration; the Deputy Minister for Planning and Research; the Director for Early Childhood Development and the Director of the Division of Educational Facilities;
- the project manager, project architect and EMIS expert of the EU-funded ECSEL project;
- the education programme manager of Save the Children; the World Bank ECD consultant;
- the senior programme manager, early childhood programme, Open Society Foundation;
- the architect/project manager and the contractor for the UNICEF-funded primary/junior secondary school in Ganta, Nimba County;
- the World Bank consultant preparing the project implementation manual; the local World Bank education specialist and the World Bank procurement specialist
- and the locally-based consultants supervising the construction component of the ECSEL project.

Visits

Visits were made to:

- the Rehab Community Primary School on the outskirts of Monrovia being constructed under the ECSEL project (see Annex 4);
- the UNICEF primary/junior secondary school being constructed at Ganta, Nimba County (see Annex 4);
- B W Payne Pre-School in central Monrovia;
- and to the headquarters of the Children's Assistance Programme to see a newly constructed annex to the Centre's kindergarten (see Annex 4).

MAIN REPORT

CRITICAL PROJECT PREPARATION ACTIVITIES

The activities that are critical to the implementation of the construction components of the proposed EFA-FTI CF project were discussed with the Minister and staff members of the Ministry of Education. The most critical issues are to:

- agree with the World Bank the final composition of the construction component of the project especially whether any of the proposed Basic Education Schools are to be included in the construction programme and if so the number and size of these schools;
- finalise the criteria for the selection of sites for the project schools at all levels;
- select the sites for all of the project schools when the final composition of the construction component and the site selection criteria have been agreed (at a meeting with the EMIS expert working on the ECSEL project, he stated that the EMIS section had enough school data to provide a realistic basis for the selection of school sites);
- finalise the terms of reference for the construction consultants who are to be engaged to manage and supervise the construction component;
- finalise the terms of reference for the NGO (s) to provide community development services and support to the community committees who are to manage the construction of the small primary schools to be constructed by communities in remote rural villages

It should be remembered that the 2010 rainy season has already started and that, if any significant amount of construction is to be achieved in the next dry season that will start in October this year, all of the above activities must be completed and the construction consultants and the NGO (s) must be in place before the end of the rainy season.

CLASS and CLASSROOM SIZES

At a meeting with the newly appointed Minister of Education and the Director of Educational Facilities, the target class sizes that will be included in the new Education Act and on which classroom sizes will be based, for primary, junior secondary and senior secondary schools were agreed. These were:

- forty four (44) students at primary school level;
- 40 (40) students at junior secondary school level
- and 30 (30) students at senior secondary school level.

Students at primary and junior secondary school levels will use double desks and chairs and students at senior secondary school level will either use single desks and chairs or chairs with writing arms.

Given these class sizes, the classroom sizes for both junior and senior secondary schools can be reduced and the same structural grid (10' 0") as for primary schools can now be used. This should reduce the cost of the junior secondary schools to be constructed under the project.

It should be noted here however that, if the new Minister could be persuaded to omit from the primary schools the library/reading rooms that his predecessor insisted on including, then the size of the standard primary school classroom could be increased by 9% to the same size as a junior secondary school classroom and 'book corners' could then be included in every primary school classroom.

See Annex 1 for further details.

EARLY CHILDHOOD DEVELOPMENT COMPONENT

At a meeting held with the Minister of Education and the newly appointed Director of Early Childhood Development the issue of what to spend the relatively small amount of funding available for the ECD centres was discussed. The consultant suggested using the money to fund the provision of dedicated ECD stores, toilets and water supplies at 10 existing rural markets so that they could be used as pre-schools and mother-and-child centres when the markets are not operating. The Director was not happy with this suggestion as, as she pointed out, most markets are situated away from village centres and close to main roads.

It was eventually agreed that the MOE would identify 10 rural villages where ECD centres already exist that could benefit from some minor renovations. This will probably be best done in collaboration with NGOs such as Save the Children and Plan International who are already working on ECD provision in the selected areas.

It should be noted that the sum of US$15,000 per location that has been included in the project budget for 'light construction including water supplies and sanitation' is very small and will only cover very minor renovations.

See Annex 2 for further details.

BASIC EDUCATION SCHOOLS

At a meeting with the Minister of Education, he stated that he wanted to move away from the government's focus on primary education and focus more on basic education ie grades 1 – 9 rather than just grades 1 – 6. He therefore wishes to establish what he calls 'basic education schools' which will be combined primary and junior secondary schools. This in fact will formalise what has been happening at many existing primary schools where additional classrooms have been constructed to accommodate junior secondary age students but without any of the necessary specialised facilities.

The Minister asked the World Bank team to consider therefore whether it would be possible to combine some if not all of the junior secondary schools included in the CF-FTI project with primary schools to form basic education schools.

A decision needs to be made fairly quickly as to whether any of these basic education schools are to be included in the project in order that 1) suitable sites large enough for the schools can be found and 2) the TORs for the consultants who are to manage and supervise construction can be finalised.

See Annex 3 for details of the proposed Basic Education Schools.

SCHOOL CONSTRUCTION and SUPERVISION

The progress of the schools being constructed under the Pooled Fund was reviewed with the Director of Division of Facilities and a meeting was held with the project architect responsible for the school construction being carried out under the European-funded ECSEL project. One of the primary schools being constructed under the ECSEL project, Rehab Community Primary School at Pipeline which is on the outskirts of Monrovia off the main road to the airport, was visited and a visit was also made to the UNICEF-funded school being constructed at Ganta to review the design of the buildings and the progress of construction.

A number of concerns were raised by the implementation of all of these projects and lessons should be learned from these for the implementation of the EFA-FTI CF project.

The conclusions that can be drawn and the lessons that can be learned from the implementation of the above projects include:

- Contracts with management and supervision consultants must be drawn up so that the extent of their duties is clearly explained and agreed and the timeframe for carrying out their duties is adequate for the construction programme that is envisaged.
- Experienced construction and management and supervision consultants must be engaged to manage and supervise the school construction programme as there is not the capacity to do this in-house in the DEF in the MOE (and this should not anyway be one of DEF's tasks; see previous reports for the suggested role of DEF);
- Management and supervision consultants must not be allowed to use inexperienced local staff to supervise construction contracts. Staff must be properly trained before construction starts and adequately supervised during the construction process in order to ensure that they are carrying out their duties properly.
- Management and supervision consultants must ensure that: buildings to be constructed by local contractors are simple to construct using materials that the contractors and their workers understand; the contract documentation is easy to understand; schedules of materials are used in the contract documentation rather than bills of quantities in order that contractors can easily price and order materials and that contractors are given adequate supervision and on-the-job training (including in managing their finances) as necessary in order that the buildings are constructed in accordance with the drawings and specifications.
- Contractors should be pre-selected in order to ensure that they have the financial and technical capacity to carry out the jobs that they bid for.

For more details of the meetings and school visits see Annex 4.

ANNEX 1: CLASS and CLASSROOM SIZES

At a meeting with the newly appointed Minister of Education and the Director of Educational Facilities, the target class sizes that will be included in the new Education Act and on which classroom sizes will be based, for primary, junior secondary and senior secondary schools were agreed. These were:

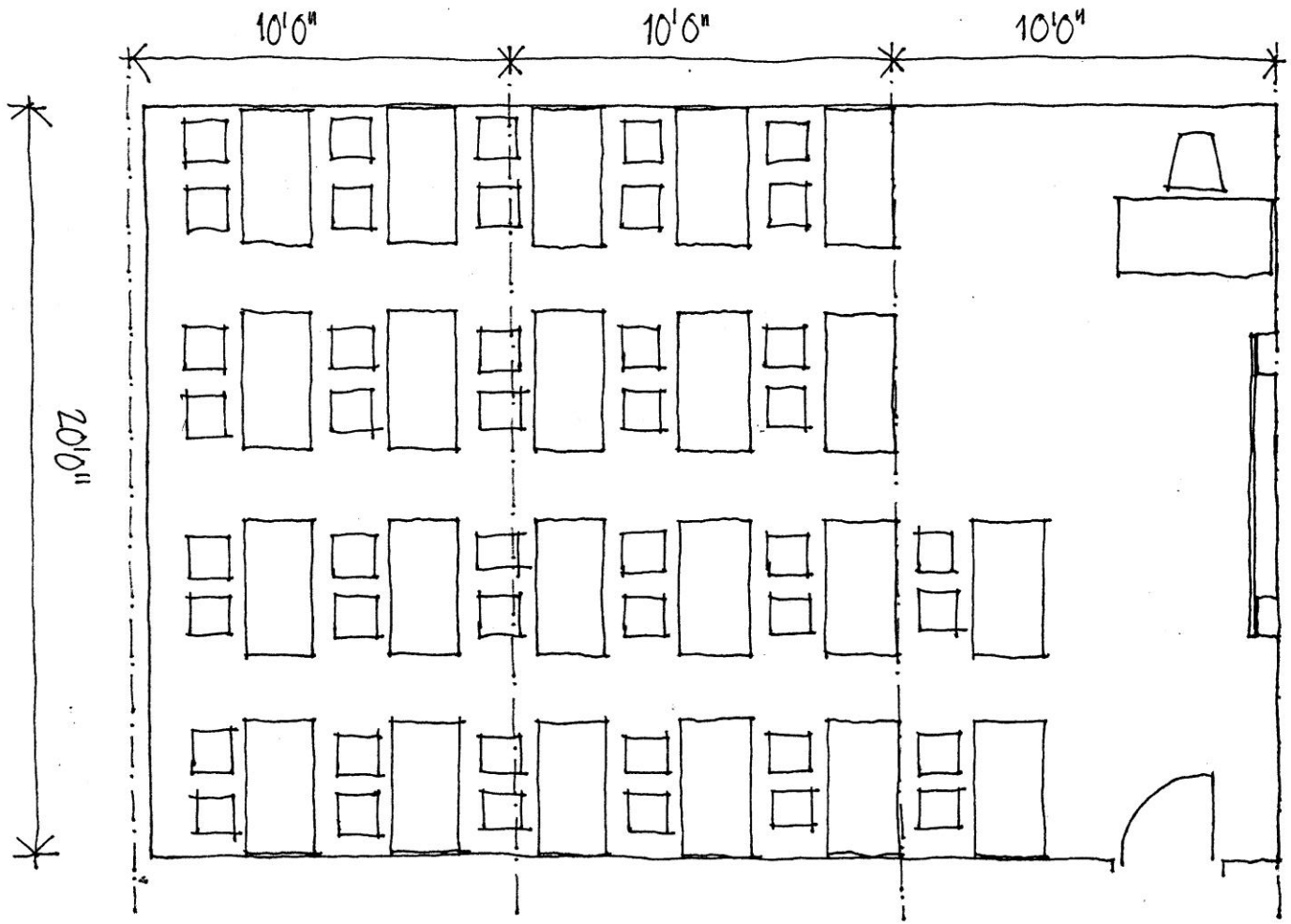
- forty four (44) students at primary school level;
- 40 (40) students at junior secondary school level
- and 30 (30) students at senior secondary school level.

Students at primary and junior secondary school levels will use double desks and chairs and students at senior secondary school level will either use single desks and chairs or chairs with writing arms.

The size of the primary school classroom to be used in CF-FTI project will stay the same at 20' 0" x 29' 6" and the reduction in class size at junior secondary school level will enable a reduction in classroom size from 31' 0" x 22' 0" to 29' 6" x 22' 0". The size of the senior secondary school classroom will be the same as that for the junior secondary schools but the space per student will be increased as the numbers of students per class is smaller. The rationalising of the classroom sizes will enable the same structural grid (10' 0") to be used for schools at all three levels. Only the width of the rooms will vary. See attached classroom/furniture layouts.

It should be noted here however that, if the new Minister could be persuaded to omit from the primary schools the library/reading rooms that his predecessor insisted on including then the size of the standard primary school classroom could be increased by 9% to the same size as a junior secondary school classroom and 'book corners' could then be included in every primary school classroom.

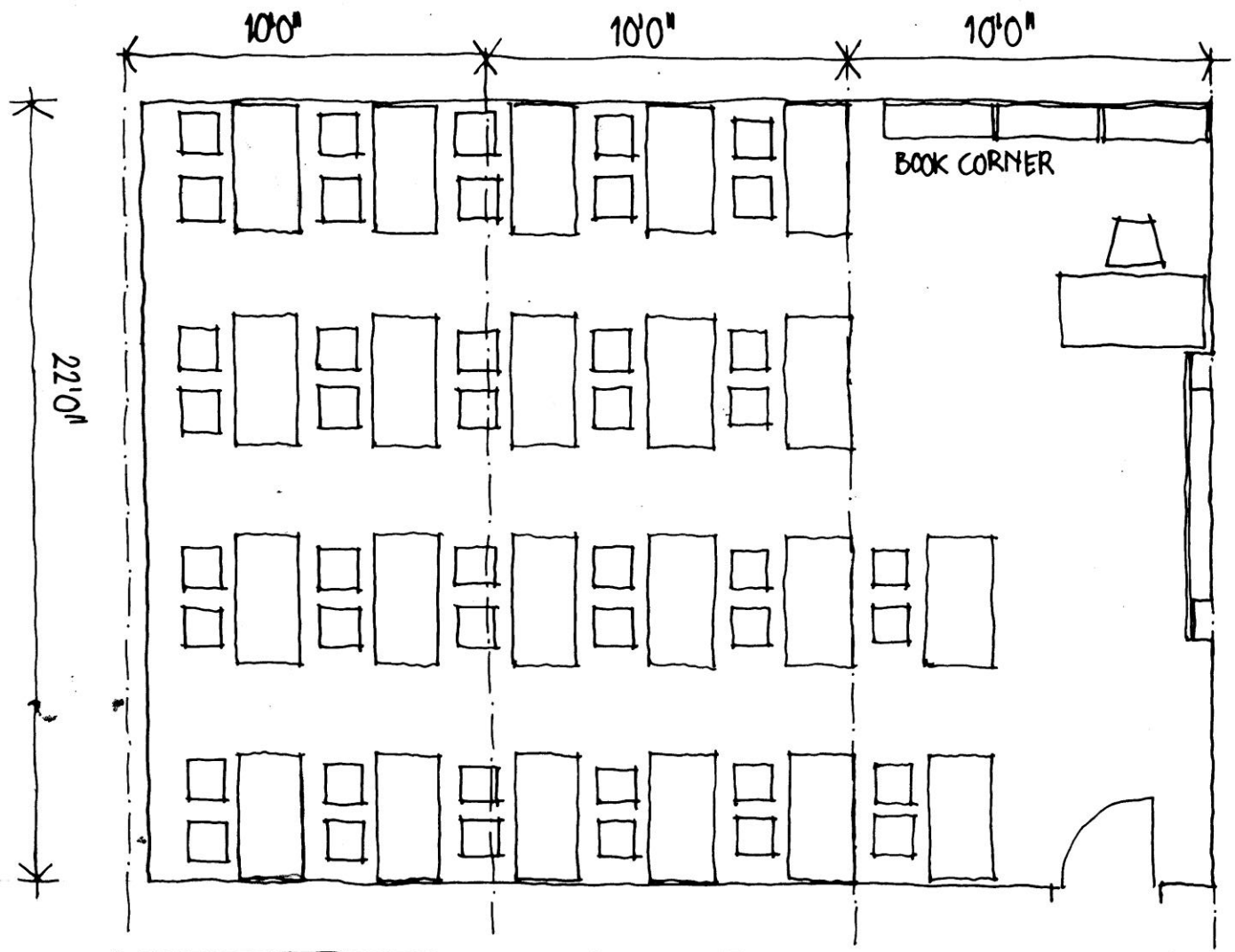
Research in many countries has found that the provision of book corners is much more effective in improving reading levels among primary school students than the provision of libraries or reading rooms. The increase in the size of the classrooms and the omission of the library/reading rooms should also slightly reduce the overall construction cost of a 6-classroom primary school through the omission of one door, one cross wall and two window openings even though the overall floor area will remain much the same. It would also reduce the cost of furnishing the school and there would of course be no need for a 'librarian'. This latter point is very important given the scarcity of trained primary school teachers.



PRIMARY [LOWER BASIC] SCHOOL CLASSROOM

29'6" x 20'0" = 590ft² [54.63m²]

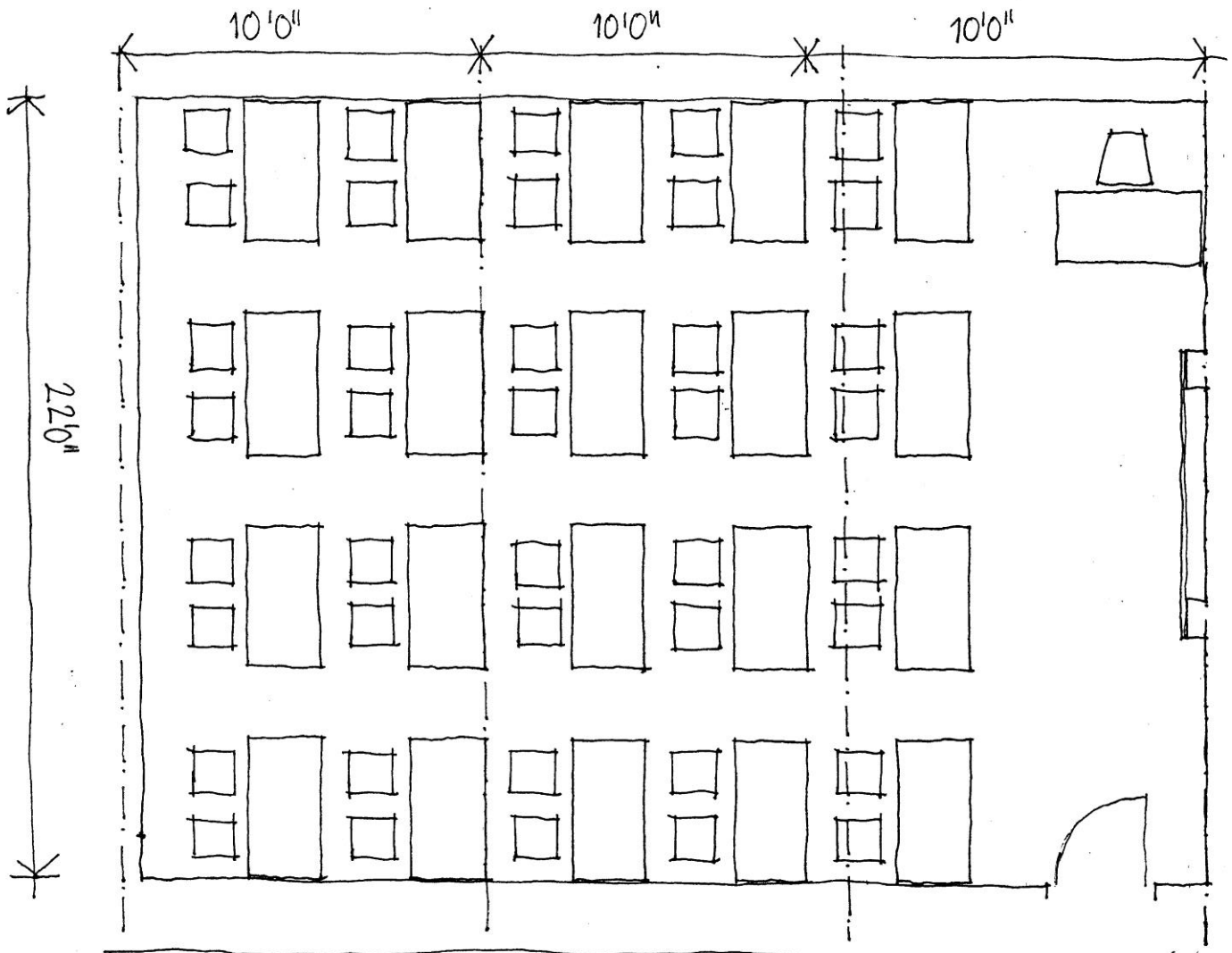
44 STUDENTS AT DOUBLE DESKS = 13.41 ft²/STUDENT [1.24 m²/STUDENT]



PRIMARY [LOWER BASIC] SCHOOL CLASSROOM WITH BOOK CORNER

29'6" x 22'0" = 649ft² [60 m²]

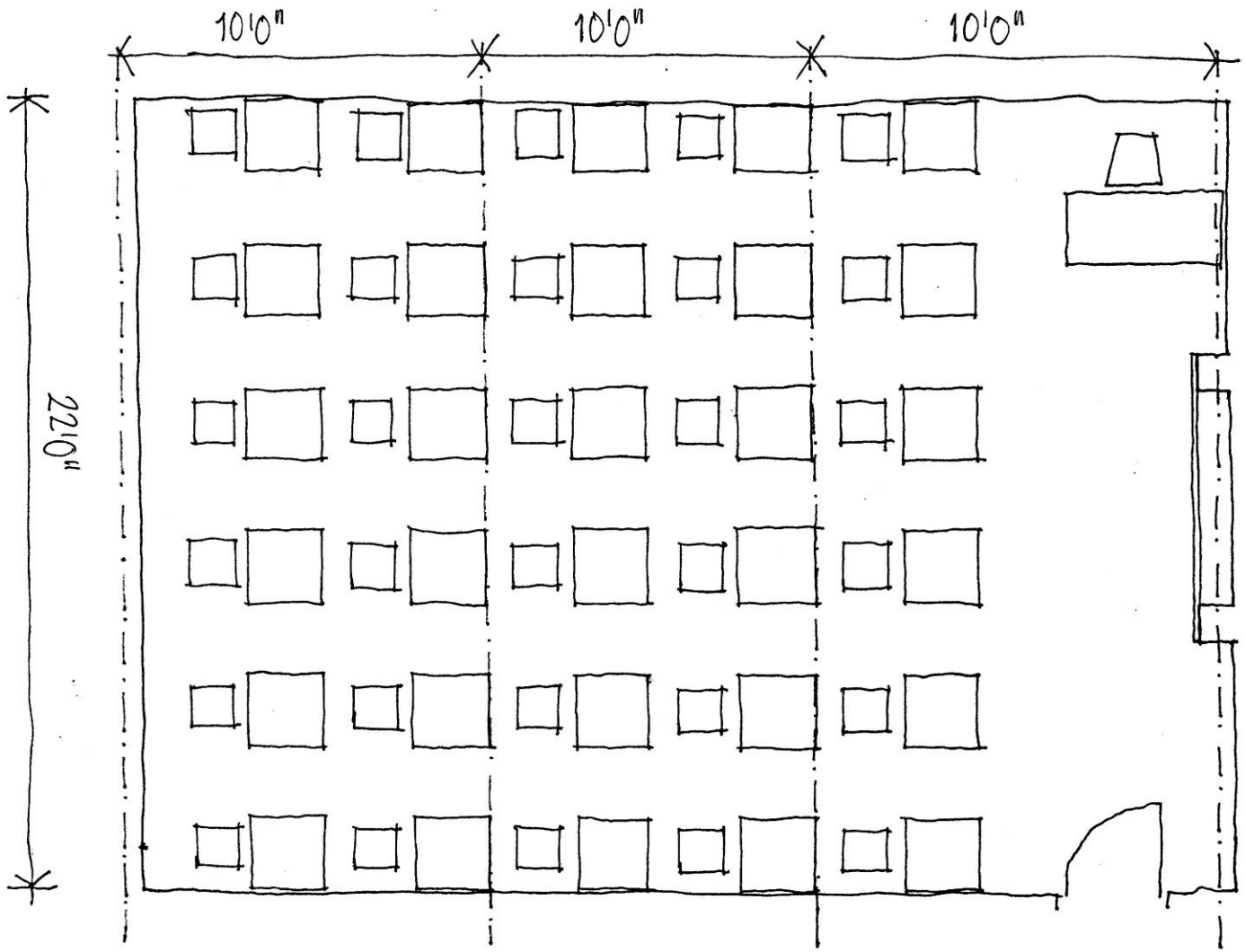
44 STUDENTS AT DOUBLE DESKS = 14·75ft²/STUDENT [1·36 m²/STUDENT]



JUNIOR SECONDARY [UPPER BASIC] SCHOOL CLASSROOM

29'6" x 22'0" = 649ft² [60m²]

40 STUDENTS AT DOUBLE DESKS = 16.23ft²/STUDENT [1.5m²/STUDENT]



SENIOR SECONDARY [SECONDARY] SCHOOL CLASSROOM

29'6" x 22'0" = 649ft² [60m²]

30 STUDENTS AT SINGLE DESKS = 21.63ft²/STUDENT [2.0m²/STUDENT]

ANNEX 2: EARLY CHILDHOOD DEVELOPMENT COMPONENT

General

The project PAD states that the project will support the development of an ECD strategy through the design and implementation of a cost-effective ECD model for rural areas. It also states that the project will support up to 10 community-based ECD centres in upgraded rural markets and low-cost structures in villages through the provision of equipment, materials and training and minor renovations. The centres will be located in rural areas with strong community demand for ECD services and sufficient numbers of underserved 3 – 5 year old children. The sum of US$15,000 per location has been included in the project budget for 'light construction including water supplies and sanitation'.

Meetings and Visits

At a meeting held with the Minister of Education and the newly appointed Director of Early Childhood Development the issue of what to spend the relatively small amount of funding available for the ECD centres was discussed. The consultant suggested using the money to fund the provision of dedicated ECD stores, toilets and water supplies at 10 existing rural markets so that they could be used as pre-schools and mother-and-child centres when the markets are not operating. The Director was not happy with this suggestion as, as she pointed out, most markets are situated away from village centres and close to main roads.

It was eventually agreed that the MOE would identify 10 rural villages where ECD centres already exist that could benefit from some minor renovations. This will probably be best done in collaboration with NGOs such as Save the Children and Plan International who are already working on ECD provision in the selected areas.

Following the meeting the Consultant met with the education programme manager of Save the Children UK and discussed their ongoing ECD programme in Montserrado, Bong and Grand Geddeh Counties. They are currently constructing some very low-cost structures (cost US$4,000) that have a concrete floor, wattle and daub walls and corrugated steel roofs and some medium-cost structures (cost US$9,000) that have a concrete floor, steel mesh windows, cement-stabilised soil block walls and corrugated steel roofs for ECD centres. They have just completed one of the latter buildings that has two activity rooms and an office in Botota in Bong County. Save the Children provided 20% of the materials including the roof sheets and the cement plus transport and the community provided the labour, the sand, aggregate and made the blocks. There was unfortunately not enough time available to visit this centre but given

the very low cost of the building it is probable that the standard of construction is low and that the useful life of the building will be comparatively low.

A visit was however made to the headquarters of the Childrens' Assistance Programme (CAP) to assess the annex to their kindergarten that has just been constructed at a cost of US$8,000. The annex consists of two rooms each approximately 21' 6" x 16' 6" with a small front veranda. The building has been constructed on an existing foundation and floor slab with walls built of timber framing with plywood panelling externally, no internal lining and a light timber roof with very poor quality corrugated steel roof sheets. Windows are plywood shutters (two per room) and the doors are poor quality plywood flush doors. The rooms only have two shutters each and are thus poorly lit and have no cross ventilation. This together with the lack of ceilings will make the rooms very hot and uncomfortable. The building is poorly constructed and will probably have a short useful life. The roof is badly constructed and could possibly blow off and the timber frame and plywood cladding have not been treated against termites. This is not a good example of a low-cost building!

Plate 1: CAP Centre: front of annex

Plate 2: CAP Centre; internal view of activity room

Plate 3: CAP Centre: close up of roof construction

ANNEX 3: BASIC EDUCATION SCHOOLS

General

At a meeting with the newly appointed Minister of Education, he stated that he wanted to move away from the government's focus on primary education and focus more on basic education ie grades 1 – 9 rather than just grades 1 – 6. He therefore wishes to start the establishment of what he calls 'basic education schools' which will be combined primary and junior secondary schools. This in fact will formalise what has been happening at many existing primary schools where additional classrooms have been constructed to accommodate junior secondary age students.

The Minister asked the World Bank team to consider therefore whether it would be possible to combine some if not all of the junior secondary schools included in the CF-FTI project with primary schools to form basic education schools.

A decision needs to be made fairly quickly as to whether any of these schools are to be included in the project in order that 1) suitable large sites can be found and 2) the TORs for the consultants who are to manage and supervise construction can be finalised.

Basic Education Schools

A basic education school would be a combined primary and junior secondary school with all facilities constructed on the same site. This will have implications for site selection as the site will have to have enough space for the facilities required for both primary and junior secondary students including adequate space for recreation and future expansion as well as being located in an area that has sufficient children aged 6 – 14 to populate the school. The number of streams provided in the basic education schools will depend upon the number of children of the right age range in the catchment area. Given the fairly high drop out rate between grades 6 and 7 there should also be sufficient other primary schools within the catchment area of the school to make up the estimated numbers of drop outs from the grade 6 classes on the site of the basic education school.

While there will be a reduction in the facilities that are required in a basic education school vis-à-vis the equivalent primary school plus junior secondary school as both sections of the school can share facilities such as the library and the administration offices and in the smaller schools at least, the primary school staff room and well could be omitted as well as some toilets, the actual savings in terms of construction costs will be minimal. This is because the primary schools

will probably be constructed by small contractors with very low overheads and profit margins while the basic education schools will have to be constructed by much larger construction firms, possibly from the region, whose overheads and profit margins will be higher and whose construction costs will also therefore be higher. There will however be savings to be made in furnishing and running the schools as economies will be made in staffing by for instance only having one principal. Another advantage will be that the primary section of the school will have access to facilities not normally provided at primary schools such as a much larger library, a laboratory/workshop and an IT room.

Basic Education School Accommodation

1-Stream Basic Education School

Lower Basic School Accommodation (264 students):

- 6 classrooms

Upper Basic School Accommodation (120 students):

- 2 General Classrooms
- 1 Large General Classrooms
- 1 General Purpose Laboratory/Workshop/Prep Room
- Library Resource Centre
- Principal's Office
- Store/Waiting
- Admin Office
- 2 Stores
- Staff Room
- VIP Latrines: 5 boys, 5 girls and 4 staff
- Well and Pump

2-Stream Basic Education School

Lower Basic School Accommodation (528 students):

- 12 general classrooms

Upper Basic School Accommodation (240 students):

- 4 General Classrooms
- 2 Large General Classrooms
- 1 General Purpose Laboratory/Workshop/Prep Room
- Library Resource Centre/IT Room
- Principal's Office, Vice Principal/Registrar's Office

- Store/Waiting
- Admin Office
- 2 Stores
- Staff Room
- VIP Latrines: 10 boys, 10 girls and 6 staff
- 2 x Wells and Pumps

3-Stream Basic Education School

Lower Basic School Accommodation (792 students):

- 18 general Classrooms

Upper Basic School Accommodation (360 students):

- 7 General Classrooms
- 2 Large General Classrooms
- 1 General Purpose Laboratory/Workshop/Prep Room
- Library Resource Centre/IT Room
- Principal's Office, Vice Principal/Registrar's Office
- Store/Waiting
- Admin Office
- 2 Stores
- Staff Room
- VIP Latrines: 15 boys, 15 girls and 8 staff
- 2 x Wells and Pumps

ANNEX 4: SCHOOL CONSTRUCTION and SUPERVISION

Pooled Fund Primary School Construction

The progress of the schools being constructed under the Pooled Fund was reviewed with the Director of Division of Facilities. While over half of the schools being managed by [redacted] have been completed, none of the schools being managed by [redacted] have been completed and work on these schools seems to have stopped. This appears to be because [redacted] contract, which was time limited, is finished and they are no longer managing the work or processing payments to the contractors who cannot therefore continue with the work. [redacted] have asked the MOE to sign a new contract with them in order that they can manage the completion of the work on all of their sites even though they have so far received well over 20% of the cost of the construction work in fees. One of the problems with all of the construction contracts seems to be the system of providing the contractors with large advances at the beginning of the contract. The contractors do not seem able to manage their finances and much of these advances seem to be squandered leading to further financial problems later. The other major problem seems to be the inability of small contractors to price a bill of quantities realistically which also leads to financial problems during construction (see also below).

ECSEL Project Primary School Construction

A meeting was held with the project architect responsible for the school construction being carried out under the European-funded ECSEL project. A local firm of contractors/consultants has been commissioned to manage and supervise the construction of 18 primary schools and 6 Education Resource Centres that is being carried out by local contractors. The contracting/consulting firm is managed by 2 expatriates but the work on the sites is being supervised by local engineers. It should be noted that the bids for the schools were evaluated and accepted by the EU Commission before the arrival of the project architect and all of the contract prices seem to be very low raising concerns as to whether the contractors will be able to complete the work within the contract prices. One contractor has been awarded the contracts for 6 schools which also raises concerns as to his technical and financial capacity to carry out the work at all sites at the same time.

Construction has only recently started and work at most sites is at the excavation of foundations stage. One of the primary schools being constructed under the project, Rehab Community Primary School at Pipeline which is on the outskirts of

Monrovia off the main road to the airport, was visited and a number of concerns were raised during this visit:

- The areas of the buildings inside the foundation trenches for instance had not been cleared of top-soil, vegetation and rubbish as they should have been and there is now the possibility that when the foundation walls are complete the area inside the foundation walls will be backfilled without the top-soil, etc being removed (as has happened in the LACE and UNOPS schools; see previous reports). This seems to be normal practice in Liberia but should not be allowed to continue as the vegetation that is left under the floor slabs will eventually rot and the floor slabs, not being reinforced, will eventually crack and collapse requiring expensive repairs.
- The foundation trenches are very shallow in parts which could lead to undermining of the foundations in future.
- A tree root had been left in one foundation trench and the intention seemed to be to cast the concrete footing on top of this root which could cause serious foundation problems in the future.
- No allowance seems to have been made in the contract documents for the excavation of rock in the foundations and the VIP latrine pits. Rock has been uncovered in both and the break up and excavation of the rock will now be an extra cost to the contract.

See photos attached for details of the construction.

UNICEF School and Community Centre, Ganta, Nimba County

A visit was made to the UNICEF-funded school being constructed at Ganta to review the design of the buildings and the progress of construction. The school consists of a primary school, a secondary school and a community centre comprising a clinic and a covered auditorium that will be open at the sides. The school was designed for UNICEF by 2 expatriate architects who came from the US NGO, Architecture for Humanity. One of these architects has left the project leaving the remaining architect to supervise the construction work.

The contract which is worth approximately US$700,000 (of which the solar power installation is worth approximately US$100,000) was signed last April and should have lasted 18 weeks. Over a year later the buildings are still not complete and probably will not be completed for another 2 months or so. The main problem seems to be a lack of capacity on the part of the contractor to manage a contract of this size. The owner of the contracting firm is now based on the site but his lack of capacity, especially to manage the contract finances has meant that the project architect, in order to get the buildings completed has had to take over the management of the finances (with the full agreement of the contractor) and she is

now paying the workers, paying for materials, etc which would normally not be part of her work.

Another factor that has probably delayed progress is the complexity of the design. All buildings have steel frames supporting in the case of the school buildings mono-pitch and double-pitch roofs with top vents. In the case of the community centre the roof construction is, for Liberia very complicated with steel columns supporting heavy timber trusses that in turn support roofs of profiled steel sheets that are cranked into a number of different planes. The buildings with mono-pitch roofs have a further problem in that the walls under the high sides of the buildings have no solar protection for the windows.

The standard of construction is quite good (as it should be with a full-time expatriate architect on site) but there are still some problems. Walls are constructed of 'hydraform' cement-stabilised blocks with fit into each other and are laid without a mortar bed and therefore with very little tolerances. To work properly the foundation or floor slab on which they are laid has to be completely level and the block layer has to be quite skilled at laying the blocks. Unfortunately in many cases neither of these conditions has been met and the blocks are neither level nor properly aligned.

All in all this is a very ambitious project (probably too ambitious for Liberia at this stage of its reconstruction) and the school will be very impressive when complete. Some thought however should probably be given to simplifying both the design and construction methodology if, as it is proposed a further two schools are to be constructed in other parts of the country.

See photos attached for details of the construction.

Conclusions

A number of conclusions can be drawn and lessons learned from the implementation of the above projects that should be taken into account in the design and implementation of the EFA-FTI CF project and these include:

- Contracts with management and supervision consultants must be drawn up so that the extent of their duties is clearly explained and agreed and the timeframe for carrying out their duties is adequate for the construction programme that is envisaged.
- Experienced construction and management and supervision consultants must be engaged to manage and supervise the school construction programme as there is not the capacity to do this in house in the MOE (and this should not anyway be one of DEF's tasks; see previous reports for the suggested role of DEF);

- Management and supervision consultants must not be allowed to use inexperienced local staff to supervise construction contracts. Staff must be properly trained before construction starts and adequately supervised during the construction process in order to ensure that they are carrying out their duties properly.
- Management and supervision consultants must ensure that: buildings to be constructed by local contractors are simple to construct using materials that the contractors and their workers understand; the contract documentation is easy to understand; schedules of materials are used in the contract documentation rather than bills of quantities in order that contractors can easily price and order materials and that contractors are given adequate supervision and on-the-job training (including in managing their finances) as necessary in order that the buildings are constructed in accordance with the drawings and specifications.
- Contractors should be pre-selected in order to ensure that they have the financial and technical capacity to carry out the jobs that they bid for.

Plate 1: Rehab Community Primary School showing very shallow foundations

Plate 2: Rehab Community Primary School showing root in foundation trench

Plate 3: Rehab Community Primary School showing vegetable matter and topsoil that has not been stripped off the area of the buildings and rock in the foundation trenches.

Plate 4: Ganta school showing the two types of classroom building. Note sun on walls and windows of building with mono-pitch roof.

Plate 5: Ganta school showing steel framing and complex roof to community building