KINGDOM OF CAMBODIA
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Ministry of Education, Youth and Sport

Quality Control Guidelines for School Building Construction

July 2012

PREFACE

The Royal Government of Cambodia has placed education development as central to poverty reduction and socioeconomic development, and human resource development has been the first angle of its Rectangular Strategy.

In order to fulfill the government's commitment, the Ministry of Education, Youth and Sport (MoEYS) is highly committed to accelerating progress towards achieving quality education and realizing the goals of the Education for All (EFA) by 2015 through ensuring equitable access to education, improving the quality and efficiency of education services, and institutional and capacity development for education staff for decentralization.

Over the past decade, MoEYS has made significant progress in improving basic education for both girls and boys. Primary net enrollment grew to 96% which has led to the lower secondary gross enrollment rate to double at 58%. Despite these achievements, the education sector is facing several challenges in meeting both the EFA and the Cambodia Millennium Development Goals of universal 9-year basic education due to significant number of students are unable to continue their education to secondary education due to physical distance in rural areas and overcrowding in urban areas. For examples: out of 1,621 communes, 187 still do not have lower secondary schools and in some urban areas, schools operate in double shift and cannot absorb more students. Further renovation of old school buildings and construction new school buildings are obviously necessary.

MoEYS has developed this Quality Control Guidelines for School Building Construction for the purpose of assisting and providing guidance to the Ministry's Construction Department, Municipal and Provincial Office of Education, Youth and Sport (POEYS), school building contractors, engineers, school principals, and school support committees for designing, planning, implementation, and monitoring of school construction in Cambodia and to make school facility safe suitable environments for learning and teaching.

Finally, I would like to extend my profound gratitude to all relevant educational staff, experts, and development partners, particularly the Asian Development Bank (ADB) and the World Bank, for providing technical assistance required to MoEYS's Construction Department for preparing the Guidelines.

Phnom Penh, July 09, 2012

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I. INTRODUCTION

The Guidelines on Quality Control for new School Building Construction contains guiding principles to ensure safety and quality of school building in the country. It outlines key safety security and environment protection measures, specifications and performance requirements for each step of school building construction, and supervision and monitoring mechanism.

It is intended for use by officers and staff of MoEYS and its relevant technical departments, particularly Department of Construction, Provincial Offices for Education, Youth and Sport (POEYS), schools, school construction firms, school support committee (SSC), and other development partners concerned. The guidelines shall be used together with other detail drawings documents of MoEYS's Department of Construction, General Conditions of Contract, Special Conditions of Contracts, and other procurement related principles and procedures.

The overriding principles in developing this guidelines is to ensure that MoEYS and its designated departments and offices, and contractors take full responsibility for their activities and ensuring that all school building constructions in the Kingdom of Cambodia are built in a timely and efficient manner, within budget, and in accordance with agreed quality standards.

The guidelines contained herein are dynamic in nature, and are expected to evolve and be improved over time, as practical experience is gained and lessons are learned through the continued implementation of school construction projects. Users of this guidelines are therefore encouraged, as part of this process, to identify areas requiring revision and to suggest improvements where needed.

II. ENVIRONMENT, LABOUR, AND SAFETY SECURITY

2.1 Protection of Environment

The Contractor shall ensure minimal damage to the environment, existing vegetation, existing structures and utilities as a result of undertaking the contracted works. Where damage has occurred to the environment, existing vegetation, existing structures and utilities or any other aspect of the work site because of work undertaken by the Contractor, it shall be the Contractor's responsibility to ensure that all such damage is repaired or compensated for.

2.2. Labour Standards

The Contractor shall ensure that certain labor provisions of Cambodian labor law and international labor conventions are complied including no employment of underage children or children aged less than 18 in hazardous work, no workers are forced to work against their will, and no discrimination regarding recruitment, wage and compensation. Furthermore, the Contractor must identify risks, take preventive measures to mitigate or minimize as far as possible the risks of occupational injury disease, and provide training to workers.

2.3 Protection of Water Resources

All existing stream courses and drains within, and adjacent to, the site will be kept safe and free from any debris and any excavated materials arising from the Works. Chemicals, sanitary wastewater, spoil, waste oil and concrete agitator washings will not be deposited in the watercourses. In the event of any spoil or debris from construction works being deposited on adjacent land or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land and areas restored to their natural state by the Contractor to the satisfaction of the Supervising Engineer.

2.4 Asbestos Management

The Contractor shall ensure that No Asbestos based materials may be used in the School construction. If Asbestos products such as roofing sheets are found on site, or present in old structures that are to be demolished by the Contractor, they must be removed carefully from site, if possible without breaking, before demolition of the old building, or construction of the new building commences. The Asbestos is to be wetted to prevent dust and if any cutting or abrading is necessary, then the material must be kept wet during working to prevent dust. Any weathered or fragile Asbestos products must be kept wet and removed from the School compound to a location agreed with local authorities. Asbestos products removed from old structures are not to be stored in the school compound. Demolition

methods which could cause these materials to become an environmental concern are prohibited in this project, and the prospective contractors are to make their bids accordingly, or propose control and monitoring techniques that will assure these materials will not become environmental concerns

2.5 Noise and Dust

The Contractor shall ensure that the construction does not create noise or dust hazards. Construction materials shall be stored on site in properly constructed storage areas, and construction equipment such as generators or concrete mixers shall be in good working condition, so that they do not produce excessive noise. Should demolition activities begin to generate visible airborne dust, the contractor(s) will cease the activity(s) which generate the dust: (i) until the dust is controlled with means such as water spray or (ii) another demolition technique which does not generate airborne dust is substituted.

2.6 Disturbance

Nearby offices and residents can be disturbed by prolonged construction. The contractor will perform construction activities within appropriate time frame which does not disturb work of officers or living of local residents.

2.7 Unexploded Ordnance (UXO)

It is the responsible of the school principle to arrange any necessary clearance of UXO's from the construction site. Prior to start of the quotation process, Ministry of Education, Youth and Sport (MoEYS) will coordinate any required mine-clearing with mine clearing agencies or with the police/military. The Contractor will not start construction until the construction site is confirmed to be cleared all UXO's. If UXO's are discovered on site during construction, Contractors must immediately stop all works until the UXO are removed and the site certified as clear. MoEYS will not liable for costs resulting from stoppages or delays caused by UXO's.

2.8 Protection of Historical and Cultural Resources

The Contractors is required to protect sites of known antiquity, by placing barriers and fencing to prevent access or damage to the site. MoEYS will not approve constructions in locations that would cause physical or aesthetic damage to sites of cultural importance or of known antiquity. In the event of unanticipated discover of cultural or historical artifacts (moveable or immovable), or human remains in the course of the work, the Contractors shall take all necessary measures to protect the findings. If continued work would endanger the findings, the work will be suspended until a solution for preservation of the artifacts is agreed. If no such solution is found, the construction will be terminated. The school principle shall not be liable for costs caused by such delays.

2.9 Clean Water and Sanitation Facilities

The contractor shall provide at the site potable (safe from a health standpoint) drinking water for construction worker. The Contractor shall provide a temporary privy facility if there are no existing facilities available at the construction site for the workers. The facility will be dismantled, pit filed and site cleaned to pass inspection of the site and central engineers when permanent privy facilities available for the construction workers are constructed and operational at the site. The privy shall be located more than 30 meters of an existing water supply well or surface water body, unless a lack of available site area or other extenuating circumstance prevents such a safety distance. Alternatives shall be approved by the site and central engineers.

2.10 Monitoring, Supervision and Reporting

The selected contractor(s) must submit their completed work plans to the project prior to initiating the civil works. The Contractor's workplan will incorporate an Environmental Management Plan (EMP), clearly listing:

(a) environmental problems that may occur during construction; and
(b) solutions or what the contractor must do to solve these problems.

The selected contractor(s) will incorporate the Construction EMP implementation as part of its progress payment requests. The central and site engineers will separately review and document adherence to the EMP in the civil works during regular site supervision mission. The sample Environmental Management Plan for School Construction is in Annex.

III. SPECIFICATIONS AND PERFORMANCE REQUIREMENTS

A. ITEMS OF WORK

1. Site Preparation

1.1. Site Clearance

All the vegetation must stripped from the area of construction. This has to done very carefully. The valuable or reusable materials from the demolished construction should keep as the property of the school, entrusted to the school committee, and shall be stored in the storage area provided. The Contractor shall dispose of rubbish remains from the demolition away from the school property.

1.2. Set Out of Works

The Contractor shall set out the location of the works and clearly mark the location of corners with timber pegs. Offset pegs shall also be located at one-meter offsets so that all corner points can be located again after excavation of soil for the correct construction of footings. Storage for construction materials and accommodation for workers will be provided by the contractor. Existing school classrooms cannot be used for this purpose.

2. Foundation

2.1. Description

Generally, in the design shown in the attached plans, the footing can be described as a pedestal footing, which extends to the finished floor level at designated level 0-00. Unless otherwise stated, the pedestal consists of a column, 200 x 200 mm for 0.5, 1.0, 2.5 to 3.5m plinth and 250x250 mm for 4.5m plinth, supported by a 1000 x 1000 x 200mm reinforced concrete pad base for non elevated constructions and 1400 x 1400 x 250 mm reinforced concrete pad base for elevated constructions. Note: Starter columns, size 200 x 200mm from footing to slab (level 0.5, 1.0, 2.5 & 3.5m) Starter columns, size 250 x 250mm from footing to slab (level 4.5m). All columns above the slab level are 200 x 200mm.

2.2. Excavation and Base Preparation

The excavation for the pad footing must be at least 1200mm x 1200mm for non-elevated constrictions and 1600mm x 1600mm for elevated constructions with a depth of 1550mm. Excavation trench, 400mm width and 300mm depth from natural ground for ground tie beams. The size of stone shall be 40 x 60 mm. The thickness of the concrete stone layer shall be a minimum of 100mm. The layer shall be constructed according to the structural details provided.

2.3. Reinforced Concrete Pads

All pad footings shall be constructed from reinforced concrete as shown in the structural details provided in the drawings. The minimum thickness of concrete cover for all steel reinforcement shall be 50mm. The contractor shall inform the Engineer in writing seven days before casting the footings. Steel work and dimensions must be approved by the site and central engineers.

2.4. Formwork for Footing Pads

Timber formwork shall be used for the construction of reinforced concrete footing pads to ensure the construction quality and provide regular and clean side faces.

3. Construction of Retaining Wall (For plinth level 1.5m or less)

The retaining wall in the soil shall be as per the details shown in the drawings. The retaining wall shall be constructed from a double layer of solid brick and extend to a level of 250mm below the finished floor level (0.00). The excavation for the foundation must go until the natural soil. The base shall be constructed to provide a level surface for the foundation of the brick retaining wall around the perimeter of the building. The base shall be constructed from compacted crushed stone and blinding concrete layers. The size of stone shall be 40 x 60 mm. The thickness of the crushed stone layer shall be a minimum of 150mm and the thickness of the blinding concrete layer shall be 30mm. The layer shall be constructed according to the structural details provided.

4. Soil Filling (All designs)

Soil filling required to raise the level of the floor foundation shall be excavated from the location indicated by school principle or community. If no suitable borrow pits are available in the school the contractor will provide the soil required. The borrow pit must be confirmed as clear of UXO. This location will generally be adjacent to any existing pond or the proposed site for a future pond. The area, where is to be filled with the soil, shall be stripped of all vegetation before starting the filling. No soil containing any vegetation or foreign material shall be placed to raise the level of the floor foundation. The soil filling shall be done in uniform layers of no greater than 150mm thickness, which are thoroughly wetted and compacted before another layer is added. After the first layer of soil filling over the whole area has been compacted evenly, the Contractor can then commence to fill the next layer of soil.

5. Floor Slab Base (For plinth level 1.5m or less)

The base must construct from compacted crushed stone and blinding concrete layers. The size of stone shall be 40 x 60 mm. The thickness of the crushed stone layer shall be a minimum of 150mm and the thickness of the blinding concrete layer shall be 30mm. The base shall be extended to a level of 100mm below the finished floor level and shall be constructed as per the structural details provided.

6. Reinforced Concrete Ground Beam (200mm x 250mm) (For plinth level 1.5m or less)

The floor beams shall be constructed from reinforced concrete and have the dimensions of 200 x 250mm. Steel reinforcement shall be as given in the drawings. The overlap between steel bars must be at least 600mm length for straight bars and 400mm for hooked bars. The minimum concrete cover of all steel reinforcement in the beams shall be 25mm. The contractor shall inform the site and central engineers in writing seven days before casting the ground beam. Steel work and dimensions must be approved by the site and central engineers before casting.

7. Reinforced Concrete Ground Beam (200mm x 300mm) (For plinth level greater than 1.5m)

The floor beams shall be constructed from reinforced concrete and have the dimensions of 200 x 300mm. Steel reinforcement shall be as given in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between the steel reinforcement should be a minimum of 600mm. The minimum concrete cover of all steel reinforcement in the beams shall be 25mm. The contractor shall inform the site and central engineers in writing seven (7) days before casting the ground beam. Steel work and dimensions must be approved by the site and central engineers before casting.

8. Reinforced Concrete Floor Beams (200mm x 300mm), (For plinth level greater than 1.5m)

The floor beams shall be constructed from reinforced concrete and have the dimensions of 200 x 300mm. Steel reinforcement shall be as given in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between the steel reinforcement should be a minimum of 600mm. The minimum concrete cover of all steel reinforcement in the beams shall be 25mm. The contractor shall inform the site and central engineers in writing seven (7) days before casting the ground beam. Steel work and dimensions must be approved by the site and central engineers before casting.

9. Reinforced Concrete Floor Beams (200mm x 400mm), (For plinth level greater than 1.5m – beam at front of staircase)

The floor beams shall be constructed from reinforced concrete and have the dimensions of 200 x 400mm. Steel reinforcement shall be as given in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between the steel reinforcement should be a minimum of 600mm. The minimum concrete cover of all steel reinforcement in the beams shall be 25mm. The contractor shall inform the site and central engineers in writing seven (7) days before casting the ground beam. Steel work and dimensions must be approved by the site and central engineers before casting.

10. Reinforced Concrete Floor Slab (For plinth level 1.5m or less)

The slab shall be constructed from reinforced concrete and shall be 60 mm thickness. The slab shall be reinforced with 8mm diameter steel wire fabric with mesh sizes 150x150 mm. The mesh shall be properly tied together with steel tie wire to maintain shape whilst concrete is being poured. The minimum thickness of concrete cover for all steel reinforcement shall be 25mm. The slab shall be finished with a smooth and level surface that is free from any low or high points. To protect the floor finish, the floor will be cast only after the structure has been completed, the roof covered and all plastering finished. The contractor shall inform the site and central engineers in writing seven (7) days before casting the floor slab. Steel work and dimensions must be approved by the site and central engineer before casting.

11. Reinforced Concrete Floor Slab (For plinth level greater than 1.5m)

The slab shall be constructed from reinforced concrete and shall be 100mm thickness. The slab shall be reinforced with 8mm diameter steel wire fabric with mesh sizes 100 x 100mm. The mesh shall be properly tied together with steel tie wire to maintain shape whilst concrete is being poured. The minimum thickness of concrete cover for all steel reinforcement shall be 25mm. The slab shall be finished with a smooth and level surface that is free from any low or high points. The contractor shall inform the site and central engineers in writing seven (7) days before casting the floor slab. Steel work and dimensions must be approved by the site and central engineers before casting.

12. Reinforced Concrete Column

The columns shall be constructed from reinforced concrete and shall be 200mm x 200mm. The steel reinforcement for columns shall be as shown in the structural details in a separate document produced by Department of Construction (DoC) of MoEYS. The steel reinforcement for columns shall be lapped and tied to the exposed steel reinforcement from the footing for a minimum length of 300mm. The steel reinforcement shall be extended for a minimum length of 600mm past the column concrete work to provide for later connection to the over beams. Formwork and form support for concrete columns shall be left in place undisturbed for at least 4 days after placement of concrete. Wall ties for infill brick walls shall be encased into the column at 400mm center to center. The wall ties shall be minimum of 8mm diameter steel rod and shall extend out of column face for a minimum of 500mm. The minimum thickness of concrete cover for all steel reinforcement in columns shall be 25mm. Before casting the concrete column, the area of concrete at the base of the proposed column shall be broken out to a minimum depth of 15mm before placement of column formwork so as to provide a rough surface to provide better connection of concrete column to concrete footing.

13. Reinforced Concrete Over Beam

Over beams are to be cast before the construction of the walls. The contractor shall inform the Engineer in writing seven days before casting the over beams. Steel work and dimensions must be approved by the Engineer before casting.

13.1. Principal Beams (Cross Beams 200mm x 400mm)

The principal beams shall be reinforced concrete beams and shall be 200mm x 400mm in section. Steel reinforcement shall be as shown in the structural details given in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between steel bars must be at least 600mm length for straight bars and 400mm for hooked bars. The thickness of the cover in the beam shall be 25 mm.

13.2. First Set of Secondary Beams (Cross Beams 200mm x 200mm)

The first set of secondary beams shall be reinforced concrete beams and shall be 200mm x 200mm size. Steel reinforcement shall be as shown in the structural details given in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between steel bars must be at least 600mm length for straight bars and 400mm for hooked bars. The thickness of the cover in the beam shall be 25mm.

13.3. Second Set of Secondary Beams (200mm x 200mm)

The second set of secondary beams shall be reinforced concrete beams and shall be 200mm x 200mm size. Steel reinforcement shall be as shown in the structural details in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between steel bars must be at least 600mm length for straight bars and 400mm for hooked bars. The thickness of the cover in the beam shall be 25mm.

14. Reinforced Concrete Supported Roof Beam (150mm x 250mm)

The roof beams shall be reinforced concrete beams and shall be 150mm x 250mm size. Steel reinforcement shall be as shown in the structural details in a separate document produced by Department of Construction (DoC) of MoEYS. The overlap between steel bars must be at least 600mm length for straight bars and 400mm for hooked bars. The thickness of the cover in the beam shall be 25 mm. The contractor shall inform the site and central engineer in writing seven (7) days before casting the roof beams. Steel work and dimensions must be approved by the site and central engineers before casting.

15. Reinforced Concrete Lintel, Above and Under Door and Window (100 x 200mm)

The lintels shall be reinforced concrete and shall be 100mm x 200mm size. The steel shall be of 12mm diameter deformed bar. Overlap between the steel rods shall be a minimum of 500mm length. The thickness of concrete cover of all steel reinforcement in the beam shall be 25mm. The lintels shall be placed above doors and windows. Steel reinforcement shall be as shown in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS.

16. Reinforced Concrete Sill Beams Under Windows (100 x 200mm)

The sill beams shall be reinforced concrete and shall be 100mm x 200mm. The steel shall be of 12mm diameter deformed bar. The overlap between the steel rods shall be a minimum of 500mm length. The thickness of concrete cover of all steel reinforcement in the slab shall be 25mm. The sill beams should be placed under windows. Steel reinforcement shall be as shown in the structural details in a separate document produced by Department of Construction (DoC) of MoEYS.

17. Window Sun Shade

The windows at the rear of the building shall be provided with a 600mm wide reinforced concrete sunshade, which is 2500mm in length and 60mm thickness and constructed as per structural drawings.

18. Concrete Pavement Around the Building

Foundation for the pavement shall be a compacted sand layer of 30mm thickness. The pavement shall be made of concrete. The width of the pavement shall be 1000mm. The finished surface should be smooth and level and free of any deformation and must have a slight slope of 3 degree to allow the drainage of water. The pavement shall be constructed as per the detail drawings in a separate document produced by Department of Construction (DoC) of MoEYS.

19. Quality of Concrete Work

Any reinforced concrete work, which is not constructed with the specified steel, concrete and is not of the given size, shall be demolished and reconstructed as shown in the structural details and described in the specifications. The slab shall be finished with a smooth and level surface that is free from any low or high points. All columns shall be constructed so that they are straight and vertical. All beams shall be constructed to be straight and horizontal. Formwork shall be adequately supported to prevent twisting or bending. The minimum strength grade of concrete for all concrete work shall be 200kg/cm^2.

20. Brick Walls between Columns

A single skin brick wall shall be constructed between columns as wall cladding and also as the internal partition walls. The partition walls shall extend full height to the roof. The brickwork shall be joined by mortar joint of nominal thickness of 15 mm. One end wall as shown in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS shall be double thickness (20cm) up to the height at the secondary beams. The wall shall be connected to the reinforced concrete columns by steel wire ties at 400mm centers along the height of the column. All brickwork shall be constructed in a true and straight vertical plane. All the brickwork shall be constructed by skilled and competent

brick-layers. To allow the floor slab to key into the walls, solid bricks are used at the bottom and gaps are left in the brickwork at the base of each wall.

21. Bricks

Bricks shall be made of burnt clay and be of first quality in strength and appearance. Bricks shall be regular in shape and of size 90mmx90mmx190mm for the hollow brick and 45mmx90mmx190mm for the solid brick. All bricks shall be soaked thoroughly before being placed in the brickwork. If any area of brickwork is found to contain poor quality bricks, the area shall be identified, the portion of brickwork demolished and replaced by the Contractor.

22. Vent Blocks

The mix ratio of the vent blocks shall be 1:3 in volume or 1 part of cement for 3 parts of sand. Sand for cement mortar shall not have particles of clay. After removal from the mold, the vent blocks will be placed in a specially prepared curing chamber on a bed of moist sand and covered with plastic for three (3) days.

23. Plastering for Columns and Beams

All plastering works shall be carried out by experienced/skilled masonry workers. All the plastering works shall be smooth and always straight. The thickness of the mortar finish shall be a minimum of 20mm. If the finishing is found not to be smooth or as per the thickness specified, the finishing will be rejected and the Contractor shall redo and rectify the problem. Concrete will be thoroughly wetted before plastering. All plaster shall be used within 30 minutes of mixing.

24. Wall Plastering

All the wall mortar plastering works shall be carried out by experienced/skilled masonry workers. All the plastering works shall be smooth and always straight. If the plastering is found not to be smooth or as per the thickness specified, the finishing will be rejected and the Contractor shall redo and rectify the problem. All plaster shall be used within 30 minutes of mixing. Plaster will be mixed by machine in a clean mixing area in the quantities required for immediate use. The school floor may not be used for mixing mortar if the final finial has been laid. Any spillage of the floor must be cleaned before hardening. The wall surface is thoroughly wetted before application. Plaster will be applied in two layers, with a total thickness of 20 mm. After hardening it is watered twice per day for two days to prevent cracking

25. Installation Steel Roof Structure

The roof structure shall be constructed as per the details given in the drawings in a separate document produced by Construction Department (DC) of MoEYS. The steel rafters are of **C**-section type with a section of 100mmx50mmx2.3mm. The distance from one rafter to another shall be of 800mm with a slope of 29 degree and the rafters must be

electrically welded and tied down. The rafters are connected to the steel rods that extend out from the concrete beams. The steel battens are **L**-section with a section of 25mmx25mmx3mm. The distance from one batten to another shall be 240mm. If Concrete tiles are used the spacing is adjusted to suit the tiles (usually 340mm). The whole roof structure shall be painted with one coat of red oxide before applying two coats of gray oil paint. All weld points must be repainted after the battens and rafters are welded into place and before the tiles are laid on the roof. The contractor shall inform the site and central engineers in writing seven (7) days before installing the roof structure. Steel type and dimensions must be approved by the site and central engineers before installation.

26. Tile Quality

Roof tiles shall be of first quality, either mechanically pressed and made from clay uniformly baked in an electric or gas fired kiln, or first quality concrete roof tiles in brick red color. The batch of tiles used shall be uniform in appearance, texture and color. The sides and profiles of all tiles shall be straight and regular and free of any undulations. A sample of the roof tile to be used shall be submitted by the Contractor for approval by MoEYS before it is used. The roof tiles used in construction of the building shall be the same type as the sample tile presented. The roof tile to be approved must be branded with the stamp of the manufacturer.

27. Doors

Doors shall be constructed according to the sizes and styles as shown in the drawings in a separate document produced by Construction Department (DC) of MoEYS. Doors shall be constructed from first quality "Duong Chem, Kor Ki, Tnong, Pchek, Sra Lao and Sokrom" timber. Corner joints shall be made square and good with both timber sleeve and dowel pins and a steel corner plate. The steel corner plate shall be set flush with the timber surface and shall be fixed by using 30mm screws. Other joints between doorplates shall be made with a timber sleeve and dowel pins and the joint shall be square and tight. The timber used for the fabrication of all doors shall be seasoned by storage and air-dried for a minimum of 45 days before fabrication. Door handles shall be located at a height of 1,000mm. Doors shall be fitted with locks of lever type, door handle and locking mechanism. The door handle shall be finished in bright chrome plating. Barrel bolts shall be fitted to the top and bottom of the left hand side door in twin door sets.

28. Windows

Windows shall be constructed as per the sizes and styles as shown in the drawings in a separate document produced by Construction Department (DC) of MoEYS. Windows shall be constructed from first quality "Doung Chem, Kor Ki, Tnong, Pchek, Sra Lao and Sokrom" timber. Corner joints shall be made square and good with both timber sleeve and dowel pins and a steel corner plate. The steel corner plate shall be set flush with the timber surface and shall be fixed by using 30mm screws. Other joints between window plates shall be made with a timber sleeve and dowel pins and the joint shall be square and tight. The

timber used for the fabrication of all windows shall be seasoned by storage and air-dried for a minimum of 45 days before fabrication. Window shutters shall be provided with steel handles that are finished in chrome plate. Latches shall be provided on the bottom windowsill to hold the shutters in the open position. Barrel bolts shall be provided at the top and bottom of all window shutters.

29. Doors & Windows Sets

A door set includes all material and equipment required for the operation of a doorway. The door set includes the doorframe, door panels, hinges, handle and locking mechanism, and the barrel bolts to hold the door panel in the fully open or fully closed position. A window set includes all materials and equipment required for the operation of a window. The window sets includes the window frame, window shutter panels, louvers, security, bars, latches, hinges and bottom of window shutters.

30. Doors and Windows Frames

All doors and window frames shall be constructed from first quality "Duong Chem, Kor Ki, Tnong, Pchek, Sra Lao and Sokrom" timber. The timber used for the fabrication of all window and door frames shall be seasoned by storage and air dried for a minimum of 45 days before fabrication. Corner joints shall be rectangular, dovetailed and nailed. The size of frame members shall be as given in the drawings. Window frames shall be fitted with iron rod security grilles. The bars shall be made from 14mm diameter steel round bars and shall be painted with two coats of red oxide rust proofing paint.

31. Doors and Windows Hinges

Where door and window panels are required, they shall be hinged in three locations as shown in the drawings in a separate document produced by Department of Construction (DoC) of MoEYS. Hinges shall be of minimum thickness of 3mm and shall be inserted flush with the surface of the timber. The hinges shall be made of zinc-anodized steel and shall be fixed to the timber with screws of a minimum 30mm length. The hinges shall be straight and the doors and windows shall be hung so that they are true in both open and the closed positions.

32. Barrel Bolts

Barrel bolts shall be provided at the top and bottom of all window shutters. Barrel bolts shall be provided at the top and bottom, of all left hand side door panels. The top barrel bolts shall be 400mm in length and the bottom bolts shall be 140mm in length. Barrel bolts shall be finished in zinc anodized furniture steel. Barrel bolts shall be fixed to the frames by timber screws of 30mm length. A hole to match the barrel bolt shall be drilled in the timber frames and concrete floor so that the bolt can be inserted for a minimum of 20mm.

33. Installation of Hardware to Doors and Windows

Hardware (handles, barrel bolts etc.) shall be installed for fitting purposes then removed before the door and window panels are painted. This action shall prevent painting onto hardware or marking of painted surface during the initial installation of the hardware.

34. Painting of Doors and Windows

All surfaces shall be rubbed down with sandpaper to provide a smooth and clean surface before application of any paint. One layer of primer is painted followed by 2 layers of gray enamel paint. All layers shall be smoothly painted before they can be accepted.

35. Painting of Steel Windows Grill

All surfaces shall be rubbed down with sandpaper to provide a smooth and clean surface before application of any paint. One layer of red oxide is painted on all steel surfaces before painting of 2 layers of oil gray paints. All layers shall be smoothly painted before they can be accepted.

36. Painting

Whitewash: All masonry surfaces to be painted shall be rubbed down to provide a smooth and solid surface free of any loose or foreign material. All surfaces must be clean and dry before any paint coat is applied. The whitewash mix shall be made of gum and limewater. Lime rock and water shall be left standing for 8 hours after mixing to ensure good quality lime putty. The mix ratio shall be 5kg of gum: 100kg of lime. Only first quality gum and quicklime shall be used. Where coloring is required the ochre of the color chosen shall be added to the whitewash mix. The whitewash mix shall be filtered to remove any solid particles before being used for painting. Three (3) applications of whitewash shall be applied by paintbrush to the masonry surface. A minimum of 24 hours shall be allowed between each application of whitewash. The whitewash paint shall be applied by proper tradesman and paint brushed in a uniform manner to achieve an even coverage.

37. Toilets

Toilets shall be constructed as per detail drawings given in the Contract Documents.

B. MATERIALS SPECIFICATIONS

1. Concrete Batching

All concrete used on the project shall be batched by volume in accordance with the mix of materials specified. Volume batching shall be done with a gauge box or bucket. **Shovel batching shall not be used**. Any concrete that is not batched by the correct method shall be rejected.

2. Concrete Mixing

All concrete used for the school construction shall be mixed using a mechanical concrete mixer. The mixing shall continue until a uniform and even mix of materials is achieved. No concrete work shall be done without the use of a concrete mixer.

3. Cement

All cement used for concrete work shall be portland cement M500, or equivalent. The Contractor must specify an equivalent alternative at the time of bidding and it must be been approved in writing by the site and central engineers. It shall be the Contractor's responsibility to provide technical documentation with his/her bid supporting any request to use an alternative type of cement.

Cement must be stored in a dry area, covered from rain, and from due. It is stored off the ground on timber pallets, and not in contact with any walls, with a clear distance of 50cm around the stacks recommended where possible. Stacks should not be stored higher than shoulder height.

4. Sand (Fine Aggregate)

Sand used for producing concrete shall be well-graded, clean, sharp sand. The range of sand particle sizes shall be from 1mm to 5mm. The sand shall not contain any clay particles or organic material.

5. Stone (Coarse Aggregate)

Stone used for producing concrete shall be a clean, hard and durable stone. Stone shall be uniform in size and angular in shape. The sizes of stone shall be 10x20mm. Not dust or small pieces of stone shall be included in the stone.

6. Steel Reinforcement Bar

All steel reinforcement bar and tie wires used in the production of reinforced concrete shall be clean and free of rust scale. **Steel bars that split when bent shall be rejected**. Steel reinforcement bars that are larger in size than 10mm shall be “deformed bar" type of reinforcement. These bigger bars shall not be a smooth round bar but shall have a braised surface. Steel reinforcement shall be strongly tied together and into position so that the steel is not moved when the concrete mix is being vibrated. Mild steel shall have a Yield Strength of 250 N/mm^2 and deformed bars a Yield Strength of 390 N/mm^2 or greater. Steel bars shall not be less than the standard weight per meter given in the following table.

Diameter	**Kg/m**
6 mm Ø	**0.222 Kg/m**
10 mm Ø	**0.617 Kg/m**
12 mm Ø	**0.888 Kg/m**
14 mm Ø	**1.208 Kg/m**

7. Water

The Contractor shall make sure that the correct amount of water is used in the concrete mix**. Too much water will make the concrete weak**. Water used for producing concrete shall be clean and drawn from the city supply and shall be kept free of contamination. **Pond water shall not be used**. In rural areas where supply of clean water is difficult, the cleanest possible water shall be used. Dirty water with a lot of suspended solids shall be stored for a period, in advance of mixing activities, to allow for settlement of solids. Water for concrete mixing shall then be drawn from the top of the storage container.

8. Pouring of Concrete

Before any concrete is poured the surface of the formwork shall be made clean and free of any dirt or loose foreign material. Concrete shall be transported, handled and placed so that segregation, loss or leakage of materials does not occur. Pouring of concrete shall be continuous once started until completed for each component that is to be constructed. For example, once the Contractor has started to pour concrete into a column then that activity shall not be stopped until it has been completed 100%. The Contractor shall not stop pouring concrete for lunch or rest breaks. S/he shall schedule his/her work to avoid any interruptions to the concrete pouring activity. The concrete mix shall be carefully placed to fill every part of the formwork and shall be forced under and around the steel reinforcement without moving the steel. All air bubbles and voids shall be removed.

9. Vibration of Concrete during and after pouring

The wet concrete mix shall be compacted by mechanical vibrators during and after placing. The vibration is to ensure that the concrete mix is placed evenly in all areas of the form and that it fully surrounds and covers steel reinforcement. The equipment to be used is commonly known as a "pencil" vibrator and its length and slender profile allows it to be immersed into all areas inside the formwork. The Contractor shall ensure that the formwork is strongly constructed so that it can withstand the effects of vibrating the concrete mix fully into place. Any concrete work that has not been properly vibrated into place and after stripping is found to contain voids or places without concrete mix shall be rejected, demolished and rebuilt by the Contractor.

10. Curing of Concrete

After concrete work has achieved initial hardening, (has become hard), it shall be covered with a moist fabric for 3 days. This action shall help ensure that cracking due to rapid drying is reduced. A good fabric for this cover sheet would be jute rice bag. The surface of the concrete shall be kept wet for at least three days period.

11. Concrete Mixing

Principles to be used for concrete mixing design the strength grade of concrete for all concrete work shall be 200kg/cm^2. The contractors shall use the following proportion when making concrete mixing. No other concrete mixing shall be used without the written permission of the site and central engineers. The mix for one cubic meter of concrete (1 m^3) shall be as follows:

1. Portland Cement 350Kg
2. Clean Sand 0.50m^3
3. Crushed Stone 10x20mm 0.90m^3
4. Water 220 liters

12. Mortar

The mix ratio of the mortar shall be 1:4 in volume or 1 part of cement for 4 parts of sand. Sand for cement mortar shall not have particles of clay. All brickwork shall be made dripping wet before plaster or mortar is applied, and all mortar must be used within 30 minutes of mixing.

C. APPROVED MATERIALS MAKES

No. material brand

1. Cement K-Cement / Camel / Diamond / Siam / Dragon. (Any brand certified as meeting specification of PORTLAND CEMENT M500 will be approved).
2. Steel Vietnam-Italy Steel (V Brand, V SD390) / Vina Kyoei Steel (VKS) / A Brand/ SD390 Brand / HS Brand. (Subject to meeting strength and weight requirements of the specifications).
3. Paint U-90 /Delux /Jotun Paint /Angkor Paint /Nippon Paint /TOA.
4. Ceramic toilet Karat/Tico/Foshan/Champion
5. Door locks Master/Solex/Solo/Shan-Hvan/Globe/Robson/Daf/Aston/World Ball/ Stanford
6. Roof Tiles CPAC Monier Concrete tiles or any brand of Grade 1 Clay Roof tiles.

D. WATER WELL

1. Location of Well

The Contractor shall implement the drilling and hand pump installation work on locations agreed by the MoEYS/DC, School Support Committee and the Contractor inside the compound of the school. The well shall not be positioned within 25 meters of a latrine without written authorization from MoEYS/DC. The Contractor shall inform the engineer (site and central engineers) in writing a minimum of 7 days before commencing drilling of the well, and shall not fit permanent hand pumps until the well has been tested for yield, physical and chemical quality.

2. Design

The Contractor shall carry out the drilling work as per agreed design and with the appropriate drilling rig and method in agreement with MoEYS.

3. Well diameter

The drilling Well diameter will be 150mm in soil/sediment formations, appropriate for PVC casing with 100mm inner diameter and 100mm in rock formation.

4. Yield and Depth

The Contractor shall continue drilling up to a depth that produces at least the required minimum yield of potable water (minimum 1,000 liters per hour) for hand pump installation. This yield must not fall below the required 1,000 liters per hour during the dry season or at any time during use. No well shall be abandoned without prior agreement with MoEYS's engineer. The minimum depth of a well will be 20m. The Contractor must carry out the pumping test to ascertain the water yield.

5. Hand Pump

A standard brand new best quality Afridev hand pump, including the standard spare parts kit (seals, valves, valve-key, wrench etc.) that are supplied with the pump, will be installed if the well is accepted as successful (with the yield of potable water more than 1,000 liters per hour, Turbidity of the water less than 5 NTU and with no Arsenic content in the water) for hand pump installation. Secondhand pump or returned pumps will not be accepted. The builder must provide a (2-3) hours technical training/demonstration to school support committee representatives on how to properly use the hand pump, how carry out maintenance and how to replace spare parts if necessary.

6. Re-Drilling

If the first attempt at drilling does not succeed, the Contractor, at his/her own expense, can carry out the drilling for a second well in a new location in the same school compound with agreement of the school support committee and site and central engineers. The total contract price will remain the same as for the first drilled well.

7. Depth of Screen

The depth of casing, screening and final depth of well shall be established as per the geological conditions, the quantity and quality of available water and in agreement with the site engineer.

8. Casing and Screens

The casing pipes and screens should be of standard quality and must be acceptable to MoEYS. No screen pipe with hand cut slots shall be used. The diameter of screen pipe

shall be same as of the casing pipe. The bottom of the well must be properly sealed. Casing smaller than 100mm diameter will not be accepted.

9. Log Sheet

The Contractor shall prepare and submit drilling report with water well Log Sheet of each well to MoEYS.

10. Pump Base

The Contractor shall construct a concrete block of (50x50x50) cm size as shown on the drawing for the better stability of the hand pump in a separate document.

11. Contamination of Well during construction

The Contractor shall provide due attention to avoid any physical, chemical and bacteriological contamination of the well water during the construction.

12. Platform

The Contractor shall also construct the reinforced concrete well platform according to the drawing in a separate document produced by Department of Construction (DoC) of MoEYS.

13. Access to Site

MoEYS shall have a full authority to access the drilling site, inspect and monitor the progress of implementation of the Contractor throughout the construction period. No work shall be covered up or put out of view by the Contractor without approval of MoEYS. Any changes in the design, if deemed necessary, must be discussed with and agreed by MoEYS before being implemented. The Contractor cannot claim any payment for changed or extra work, which has no written prior permission from MoEYS.

14. Storage of materials

The Contractor shall be responsible for storage security and preservation arrangements of all construction materials and equipment on site during the entire duration of the contract. The Contractor must take precautions to prevent access of children or of bystanders to well site during drilling. The Contractor must seal any open well to prevent children contaminating the well.

15. No Payment for Dry Wells

If the well does not produce any water or the yield is less than 1,000 liters per hour even after drilling up to a significant depth compared to the required minimum, it will be considered “dry” and shall be abandoned. All abandoned well must be sealed with appropriated concrete plug. No Payment shall be made to the contractor for such dry well.

16. Test for Physical and Chemical Quality

MoEYS shall conduct, if deemed necessary, tests for physical and chemical quality of the drilled well water including turbidity and arsenic content. In case the well water contains turbidity of more than 5 NTU the well will not be accepted and the Contractor must redevelop the well until the turbidity level becomes acceptable (less than 5 NTU). No payment shall be made for well that has turbidity more than 5 NTU. If the well water contains arsenic more than 0.05 mg/l, the well must be abandoned. In such a case the Contractor can claim only for the payment of the drilling work. No Payment shall be made for hand pump and platform construction in such a case.

17. Well Sterilization

The Contractor shall sterilize the well with hypochlorite solution (household bleach) for at least twenty-four hours (24 hrs), after which the well shall be pumped to flush the residual chlorine.

18. Deletion of Items from Work Schedule

MoEYS can delete items of work from the Contract schedule, at any time before commencement of such items of work, should s/he elects to do so for whatever reason. The Contractor shall not be entitled to any financial compensation for deletion of schedule works by MoEYS. It shall be MoEYS's responsibility to inform the Contractor in writing of any such deletion.

19. Practical Completion

The contracted works shall be considered to have attained practical completion when the well is acceptable as per other clause of this contract and produces at least 1,000 liters of water per hour, the Afridev hand pump is installed, the reinforced concrete platform is constructed as per design, technical training/demonstration on spare parts replacement is provided and the works have satisfactorily passed any final test or inspection that may be prescribed by the Contract. MoEYS shall issue a certificate of practical completion to the Contractor that will clearly state the date upon which practical completion was achieved and from which date the maintenance and defects liability period of twelve (12) months for the drilled well as well as the platform shall commence.

20. Maintenance and Defects Period

The contractor shall maintain the drilled successful well and the reinforced concrete platform for a period of twelve (12) months from the date of practical completion of the contract. During this maintenance and defects liabilities period, the contractor shall be responsible for all repairs, corrections and maintenance required to keep the "well" functioning as required. The contractor may have to "redevelop" the well if the yield becomes less than 1,000 liters/hour or the "well" becomes dry. The contractor shall be

responsible to maintain the reinforced platform for this period. All defects, cracks, uneven settlement in the platform shall be rectified by the contractor at his own cost.

IV. SUPERVISION AND MONITORING

Cambodia has not had its national standards or adopted any specific international standards for engineering related materials and testing. To ensure healthy, safe, and environmentally sound school building design and facility conditions, the specifications and performance requirements describe in this quality control guidelines shall be strictly complied by the contractors and systematic supervised and monitored by designated MoEYS's departments, offices and individuals. The following are the summary roles and responsibilities of relevant technical departments and offices of MoEYS at national and sub-national level, contractors and school support commissions.

4.1 Department of Construction(DoC)

As the Department is in charge of Construction, within the Ministry, it is morally responsible for the successful implementation of the guidelines. The Department, through its supervising engineers (central engineers), conducts regular site supervision visits. The supervising engineers for school construction are engineers from the Department. It is the responsibility of the Department to ensure that the supervising engineers are available for timely random quality checks.

The Department is also responsible for final technical checking of the invoices and recommend payments against actual work done by contractor. It will be primarily responsible for the final inspection of the school building when the notification of completion of the building has been submitted by the contractor to MoEYS/DoC.

Besides contract implementation, it is responsible for preparing all designs and drawings of all construction facilities, the bill of quantities and final costing as well as in facilitating the undertaking of appropriate soil testing of the agreed construction sites.

It shall also be responsible for undertaking the arithmetical checks of all the bids submitted and preparing the comparison of bids submitted against the estimates along with critical observations based on the Government's Standard Operating Procedures (SOPs).

The Department will also be represented in all meetings connected with civil works, including the Procurement Review Committee meetings, all bid openings and all progress meetings.

4.2 Supervising Engineers (Central Engineers)

The supervising engineers undertake random site visits at critical stages of construction. They have to visit without fail when the notification of completion is submitted MoEYS to

check that all defects are identified and rectified, so that the “Certificate of Completion” can be issued during the formal handing over ceremony.

It is the responsibility of the supervising engineers for random quality assurance supervision visits as well as to check on the performance of the site engineers in terms of both quality and performance against his/her TORs.

The supervising site engineers, during the site visits of each site, must fill in the prescribed site supervision form (see in the Annexure). This site supervision form must be filled up for each of the site visited and these site visit forms should be accompanied by appropriate photographs. Copies of written instructions issued during the site visits should also be attached and all these should be submitted to MoEYS and DoC, along with a synopsized report of the visit.

The supervising engineers must take all steps to ensure the quality of construction and issue appropriate instructions for the timely construction of the contracts during the site supervision visits.

4.3 Site Engineers

It is vital that full-time site engineers are available. The site engineers are fully responsible for technical supervision of all the construction works from setting out stage of the construction till handing-over of the completed construction after rectification of all defects after the contractor has submitted written notification of the completion of the construction to MoEYS and DoC. For the site engineer to fulfill his/her responsibilities s/he must ensure that s/he is full-time on site from 8:00 am to 12 noon and from 1:30 pm to 5:30 pm on all working days, and even on official holidays and weekends if there are major casting works.

The full-time site engineers shall ensure at all times that the technical drawings and specifications are complied with. Any departure from the drawings and specifications should be rectified immediately through verbal instructions. When the instructions are being ignored by the contractor, s/he should issue written instructions ensuring that all the instructions are maintained in a daily inspection log book so that the complete history of the construction is maintained. S/he should complete the daily supervision form (see in Annexure) at the end of every working day and file this daily report.

At the end of the week, s/he should prepare a short weekly report, with appropriate photographs of the status of construction during the week. These weekly reports shall also be maintained in a separate “Reports” file. This weekly report should be prepared by Thursday evening and submitted and discussed during regular meeting with school principles of the constructed schools, provincial education offices, and supervising engineers of MoEYS and DoC.

All daily supervision reports, weekly or monthly reports should be filed away and should be readily available for inspection by supervising engineers from MoEYS and DoC and other relevant officials.

The site engineers shall strictly comply with his/her Terms of Reference and be fully responsible for ensuring quality of work. Instructions to remedy defects, including demolition of unacceptable work, shall be issued promptly. In the beginning of every working day, s/he should discuss with the supervising engineer and technical supervisors, if any, as well as the skilled workers and explain the technical drawings and specifications of works to be undertaken that day and ensure that mistakes are not committed. The site engineers must understand that capacity building is part of his/her overall responsibility.

When the contractor prepares the invoice for payment with supporting documents indicating the bill of quantities of completed works along with the costing, the site engineers shall check the invoice and supporting documents thoroughly undertaking all necessary measurements to verify the actual quantities of works completed and the costing. The site engineers shall endorse the invoices for payments and submit to supervising engineers. The supervising engineers will check the invoices and recommend for payment by the Director of Construction or designated officials.

When the building is completed, the site engineers should ensure that the building is truly completed and there are no defects to be corrected, and all the sanitation and electrical, if any, fixtures and services have been checked thoroughly, and the site is cleared of all construction debris including necessary leveling around the building. During this process, the school principal and school support commission should also be invited to participate during building inspection. Only then should the contractor submit notification of completion of building. After submission of notification of completion, the site engineer should, along with the school principal, make a last inspection and if defects are noticed, issue written instructions to rectify the defects. After the defects are corrected, the site engineers should forward the notification of completion to supervising engineers, which will forward this notification to the Department of Construction. The department will assign supervising engineers to undertake the detailed inspection of the completed building. If defects are noticed during this site visit by the supervising engineers, written instructions shall be issued and the defects will be duly rectified. Normally, after this process is complete, the contractor shall be paid 90% of the contract.

The site engineers shall also facilitate by interacting with the supervising engineers, school principals, provincial offices for Education, Youth and Sport and MoEYS/DoC for appropriate handing over ceremony, during which the Certificate of Completion will be officially issued and the completed building will be officially handed over to the school and community. At the end of this process, 5% of the retention amount will be released, with the remaining 5% released at the end of the “Defects Liability Period of 1 year”, effective from the date of completion of the school building.

4.4 School Principals and School Support Committee

Since the school construction works are being constructed in the premises of existing schools or community, the school principal and school support committee has an important role to play to ensure that there is ownership of the facility during the implementation stage. They could play role the following roles:

As facilitator, who will render whatever assistance is required by MoEYS and DoC and the Contractor to ensure quality and timely construction of the facility. The principal and members of school support committee need to be fully cognizant of the fact that this facility is being constructed for his/her school, and the community will fully benefit from this additional or upgrading of facilities. Therefore, it is in the interest of the school and community to complete the construction in the quickest possible time so that the disturbance to the school and community during construction is minimized.

Make the construction site and some additional surrounding area available, soonest after contract signing, as per the Special Conditions of Contract (SCC) in the bidding documents, so that the contractor can take possession of the site and store the construction materials; the construction site shall be adequately cordoned off and secured to ensure safety of students, community members, teachers, MoEYS's and DoC's supervising officers, and guests.

Notify the students, teachers, and community members though formal notice, not to enter the construction site without permission so that the constructed work is not disturbed and they are not hurt by steel, nails, brickbats, wooden slivers and other items that are bound to be strewn in the site.

Facilitate connection to main water supply and electrical supply, if any, the charges for which and the usage of which the contractor will be responsible for.

Facilitate the security of the construction site, especially the construction materials, which can be done within the existing school's and community's resources, at no extra cost to the school and community.

Assist in resolving any major problem that is hampering the contract implementation as long as this assistance is within the school's and community's jurisdiction.

4.5 Provincial Office for Education, Youth and Sport (POEYS)

The POEYS, particularly the Director, has an oversight responsibility, as s/he is morally responsible for all activities related to the MoEYS being undertaken in the province. Therefore, s/he needs to be informed of the construction activities at the start of implementation, through regular meetings where s/he is briefed by both written and verbal reports on the progress of the construction by the school principals. All meetings with regard to construction will be attended by the designated site engineer.

The Director will provide assistance in resolving any major problem, which the school and community cannot solve, as long as this falls within his/her jurisdiction.
If during his/her random visit to the institution, s/he or his/her authorized representative notices any irregularity, this will be reported to site and supervising engineers, MoEYS and CD immediately for prompt action.

4.5 Contractor

Overall, the Contractor's responsibilities are given in detail in the Contract, and all the documents comprising part of the Contract, including General Conditions of Contract (GCC), Special Conditions of Contract (SCC), the Specifications, the Priced Bill of Quantities and Technical Drawings.

It is the Contractor's primary responsibility to ensure that s/he complies with the contract especially with regard to the technical drawings and specifications cited in the quality control guidelines as well as in other relevant documents of MoEYS and DoC. S/he must ensure quality of construction and timely completion of the contract. S/he must abide by verbal and written instructions of the full-time site engineers and supervising engineers as well as construction TA and members of the senior management if it is financed by external financed project.

S/he must be fully aware of the penalties which will be imposed in the case of defective works, non-compliance with required specification, equipment and work delays.

S/he must fully comply with all the requirements related to invoice submission and submit all documents and appropriate photographs.

S/he must attend meetings when called by MoEYS and DoC or designated units/officials of MoETYS, if it is financed by external financed project, to discuss specific technical and contract implementation issues.

S/he must be aware that excessive delays, repeated non-compliance of instructions leading to termination will bar him/her from participating in future bidding of civil works under MoEYS and DoC.

ANNEXESE