

STATEMENT OF WORKS



UNITED NATIONS DEVELOPMENT PROGRAMME
November 2014

DIVISION 1 - GENERAL REQUIREMENTS

1.1 Scope of Work

The work includes the furnishing of all plants, labor, materials tools, equipments, and other facilities to faithfully and satisfactorily perform all the work necessary for the completion Mulashidi Community Learning Center in Mulashidi village, Putao all in strict accordance with the plans and these technical specifications, subject to terms and conditions of the contract documents.

1.2 Temporary Facilities

The Contractor shall provide for its use during the duration of its contact, a temporary Field Office, warehouse and worker's quarters complete with lighting, water and sanitation facilities. In addition, temporary enclosure /fence, safety signs, project information signage and other similar provisions necessary to the safe and expedition's progress of the work shall be provided.

DIVISION 2 - SITE WORK

2.1 Site Clearing

2.1.1 Clearing and Grubbing

All trees, stumps, bushes, vegetations, garbage, rubbish and other objectionable materials within the site shall, unless otherwise directed by the Engineer, be grubbed and cleared.

2.1.2 Disposal of Materials

All demolished and cleared materials shall be disposed off the site in dumps to be provided by the Contractor and in a manner approved by the Engineer.

2.2 Earthwork

The work includes excavation, backfilling, filling compaction and all related works necessary to complete earthwork.

2.2.1 Excavation

Excavation for foundation footing below the original ground level shall be carried out prior to filling and / or embankment formation to the lines and grades indicated on the Drawings. If, however, unstable soil that is incapable of properly supporting the structure is encountered at the bottom of the excavation such soil shall be removed to the depth necessary to obtain required bearing. Excavated materials suitable for backfilling shall be stored in a sufficient distance to prevent slides or cave-in. Excavated materials however, found to be unsuitable for backfilling shall be disposed off the site.

Excavating shall be by open cut or approved method.

2.2.2 Filling and Backfilling

Materials for filling and backfilling shall be suitable materials, which is capable of being compacted to form a stable fill.

Prior to filling and backfilling operations, all trash, debris and forms shall be removed. Likewise, water shall be removed by pumping or other approved method.

Except as otherwise required, backfill and fill materials shall be placed in layers approximately parallel to the finished grade line. Each layer shall not exceed 300 mm in depth prior to compaction.

2.2.3 Compaction

When necessary, each layer of fill before being compacted shall be processed as required to bring the moisture content sufficiently close to optimum to make possible its compaction to the required density. The material shall be worked as to have uniform moisture content throughout the entire layer.

Each layer of material shall be compacted uniformly by use of adequate and appropriate compaction equipment. Compaction shall be done in such a manner that each section receives equal comp active effort.

DIVISION 3 - CONCRETE

3.1 Scope of Work

This item shall consist of furnishing all the labor, materials, equipments and formworks for the completion of constructing the bridge, all in accordance with this Technical Specifications and plans.

3.2 Cast – in – Place Concrete

Portland cement concrete shall be used and placed in structures as called for in the plans. Portland cement concrete shall consist of a proportional mixture of Portland cement, water, fine and coarse aggregates and shall have a compressive strength of not less than (3,000 psi) when tested at 28 days, unless otherwise specified.

3.2.1 Materials

3.2.1.1. Portland Cement

Portland cement shall conform to the requirements of ASTM C-150 or to the already approved and accepted Portland cement manufactured locally.

3.2.1.2. Fine Aggregate

The fine aggregate shall consist of sand or other approved inert materials with similar characteristics, or a combination thereof, having clean, hard, strong, sound, durable, free from injurious amounts of dust, lumps, or other deleterious substances and shall contain more than three percent of materials passing the 0.075mm (No. 200) sieve by washing not more than one percent of shale. The use of beach sand is prohibited without the written consent of the Engineer.

3.2.1.3. Coarse Aggregate

The coarse aggregate shall consist of crushed or uncrushed stone, gravel or other approved inert materials with similar characteristics, or a combination thereof, having clean, strong, durable uncoated particles, free from injurious amounts of soft, friable, thin elongated or laminated pieces, alkali, organic or other deleterious matter.

The coarse aggregated shall be of uniform grading with maximum size of 37.5 mm and not more than 5 percent shall

pass a 2.36 mm (No. 8) Sieve. It shall be thoroughly washed before use.

3.2.1.4. Water

The water for washing aggregated and for mixing shall be subject to the approval of the Engineer. It shall be free from oil and other impurities that will affect the strength of concrete.

3.2.2. Proportioning of Concrete

All concrete shall be proportionate by volume. The proportions by weight which is converted into equivalent volume of cement, Fine aggregated coarse aggregates and water necessary to produce coarse aggregates and water necessary to produce Concrete of the required strength and the Engineer shall approve consistency. Such approval may be withdrawn at any time, and changes in the proportion may be required.

Trial mixes shall be undertaken prior to actual concreting works. No concrete shall be placed in the works until the result of the 28-day test indicate that the design proportions are test indicate that the design proportions are satisfactory. If the result of trial mix is unsatisfactory, adjustments shall be made. Adjustment of the proportions shall be subject to the following;

- a. If it is found impossible to obtain concrete of the desired placeability and workability with the proportion originally approved, the contractor shall make such changes as necessary subject to the approval of the Engineer.
- b. No change in the source or character of the materials shall be made without due notice to the Engineer and no new materials shall be used until the Engineer has accepted such materials and has approved new proportions based on trial mixes.

The Contractor's attention is directed to the time required to prepare and test trial batches and shall be responsible for production of trials batches at a sufficient early date so that the progress of work is not delayed.

3.2.3 Consistency

Concrete shall have a consistency such that it will be workable in the required position. Its hall is of such a consistency that it will flow around reinforcement steel but individual particles of the coarse aggregate when isolated shall show a coating of mortar containing its proportionate amount of sand.

3.2.4 Mixing

Concrete shall be thoroughly mixed in a mixer of an approved size and type that will insure a uniform distribution of the materials throughout the mass.

The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregates. All water shall be in the drum by the end of the first quarter of the specified time mixing.

The entire contents of a batch mixer shall be removed from the drum before materials for a succeeding batch are placed therein.

All concrete shall be mixed for a period of not less than 1-1/2 minutes after all materials, including water are in the mixer.

When mixing is to cease for a period of one hour or more, the Mixer shall be thoroughly cleaned.

The concrete shall be mixed only in such quantities as are required for immediate use and any concrete that has developed initial set shall not be used. Concrete that has partially set shall not be re-tempered or remixed.

Other methods of mixing such as those by transit-mixers are allowed upon due notice and approval by Engineer.

3.2.5 Handling and Placing Concrete

In preparation for the placing of concrete all sawdust, chips and the construction debris and extraneous matter shall be removed from inside the formwork.

Concrete shall be placed so as to avoid segregation of the materials and the displacement of the reinforcement. The Engineer shall permit the use of long troughs and chute for conveying concrete to the forms only on authorization.

All chutes and troughs shall be kept clean and free from coating of hardened concrete by thoroughly flushing with water, water used for flushing shall be discharged clear of the structure.

The concrete shall be placed as nearly as possible to its final position and the use of vibrators for moving of the mass of fresh concrete will not be permitted.

3.2.6 Compaction of concrete

Concrete, during and immediately after placing shall be thoroughly compacted. Concrete in walls, beams, columns and the like shall be placed in the horizontal layers not more than 30 cm thick except as directed. Each layer shall be placed and compacted before the preceding layer has taken initial set to prevent injury to the green concrete and avoid surfaces of separation between the layers. Each layer shall be compacted so as to avoid the formation of a construction joint with a preceding layer.

The compaction shall be done by vibration using appropriate concrete vibrator. If vibrator is impractical, other methods may be used subject to approval of the Engineer.

3.2.7 Construction Joints

Construction joints shall be made only where shown on the drawing or called for in the pouring schedule, unless otherwise reinforcement shall be used, unless otherwise specified, to transmit shear or to bond the two sections together.

Before depositing new concrete, which has hardened, the forms shall be retightened. The surface of the hardened concrete shall be roughened as required by the engineer, in a manner that will not have loose particle. When directed by the Engineer, the surface of the hardened concrete which will be in contact with new concrete shall be washed with water to his satisfaction and to insure an excess of mortar at the juncture of the hardened and the newly deposited concrete, the cleaned and watered surface, including vertical and inclined surface shall first be thoroughly covered with a coating of mortar of the same proportion of sand and cement as the class of concrete used against which the new concrete shall be placed before the grout or mortar has attained its final set.

3.2.8 Concrete Finish

Immediately following the removal forms, all fines and irregular projections shall be removed from all surfaces except from those which are not to be exposed or are not to be water proofed. On all surfaces, the cavities produced by from ties and all other holes, honeycomb, broken corners or edges and other defects shall be

thoroughly cleaned, and after having been kept saturated with water for a period of not less than three hours shall be carefully pointed and made true with a mortar of cement and fine aggregates mixed in the proportions used in the grade of the concrete being finished.

3.2.9 Curing Concrete

All newly placed concrete shall be kept continuously wet by the application of fresh water (not salty water) for a minimum period of 7 days after the concrete has been placed. Other methods of curing the concrete may be allowed upon due notice and approval by the Engineer.

3.2.10 Sampling and Testing of Concrete

As work progresses, test cylinder shall be fabricated from the concrete samples and tested in accordance with the standard testing of concrete cylinders. At least one set of three cylinders shall be made from each 75 cubic meters of concrete placed or for every amount of concrete poured each day.

3.2.11 Form works

Plywood and lumber shall be used in formwork unless otherwise specified. It shall be sound materials to the satisfaction of the Engineer. Other materials for forms are allowed upon due notice and approval from the Engineer.

3.2.11.1 Formwork Construction

Concrete forms shall be tight, true to dimensions, lines and grades of the structure and with sufficient strength, rigidity, shape, and smoothness so as to leave the finished works true to the dimensions shown on the drawing.

Forms, which will later be removed, shall be thoroughly coated with form oil prior to use. The form oil shall be of commercial quality form oil or other approved coating which will permit the ready release of the forms and will not discolor the concrete.

Concrete shall not be deposited in the form until all work in connection with constructing the forms has been completed, all materials required to be embedded in the concrete have been placed for the unit to be poured, and the Engineer has inspected and approved such forms and materials.

Forms for exposed concrete shall be constructed so that the formed surface of the concrete does not undulate excessively in any direction between studs, joists, form stiffeners, or form fasteners.

3.2.11.2 Removal of Forms and Falsework

Forms and falsework shall not be removed without the consent of the Engineer. The Engineer's consent shall not relieve the Contractor of responsibility for the safety of the work blocks and bracing shall be removed and in no case shall any portion of the wood forms be left in the concrete.

3.3 Concrete Reinforcement

This item shall consist of furnishing, fabricating and placing of steel reinforcement of the type, size, shape and grade required and in conformity with this specifications and shown on the drawing or as directed by the Engineer.

3.3.1 Materials

All materials shall conform to the requirements hereinafter given. Certified tests reports (mil test or other) shall be submitted to the Engineer for all reinforcement steel used. These tests shall show the results of all chemical and physical tests made.

Reinforcement bars for concrete shall be deformed billet-steel bars conforming to the requirements of standard Steel Reinforcement for concrete.

Steel Strength: $f_y = 40000$ psi

3.3.2 Fabrication

Bent bar reinforcement shall be cold bent to the shapes shown on the Drawings or as required by the Engineer. Bars shall be bent around a circular pin having the following diameters (d) in relation to the diameter of the bar ((d)

10 mm Ø to 20 mm Ø-D	=	6d
25mm Ø and 28 Ø -D	=	8d
32 mm Ø and greater -D	=	10d

Bends and hooks in stirrups or ties may bend to the diameter of the principal bar enclosed thereon.

3.3.3 Protection of Materials

Steel reinforcement shall be protected at all times from injury. When placed in the work, it shall be free from oil or other foreign matter. However, when steel has on its surface, easily removable and detrimental rust, loose scale or dust, it shall be cleansed by a satisfactory method.

3.3.4. Pacing and Fastening

All steel reinforcement shall be accurately placed in the position shown on the Drawings or required by the Engineer and firmly held there during the placing and setting of the concrete. Bars shall be tied at all intersection except where spacing is less than 300 mm in each direction, when alternate intersections shall be tied. Ties shall be fastened on the inside.

Distance from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports. Blocks for holding reinforcement from contact with the forms shall be recast mortar blocks of shape and dimensions. Layers of bars shall be separated by precast mortar blocks or by other equally suitable devices. Unless otherwise shown on the drawings or required by the Engineer, the minimum distance between bars shall be 40 mm reinforcement in any member shall be placed and then inspected and approved by the Engineer before the placing of concrete begins.

3.3.5 Splicing

All reinforcement shall be furnished in full lengths indicated on the Drawings. Splicing of bars, except where shown on the Drawings, will not be permitted without the written approval of the engineer. Splices shall be staggered as far as possible and with a minimum separation of not less than 40 bar diameters. Not more than one third of the bar may

be spliced in the same cross-section except where shown on the Drawings.

Unless otherwise shown the Drawings, bars shall be lapped a minimum distance of:

Splice Type	Minimum	But not less than
Tension	40 d	300 mm
Compression	20 d	300 mm

Where d is the diameter of the bar. In lapped splices, the bars shall be placed in contact and wired together. Lapped splices will not be permitted at location where the concrete section is insufficient to provide a minimum clear distance of one and one third the maximum size of aggregate between the splice and the nearest adjacent bar. Welding of reinforcing steel shall be done only if detailed and the Drawing are authorized by the Engineer.

DIVISION 4 - CARPENTRY

This item shall consist of furnishing all the materials, labor equipment, tools all other appurtenances to complete the carpentry work as shown in the Drawings and in accordance with this Specifications.

4.1 Materials

Jungle wood can be used as there; the wood is necessary only on formworks.

All timber whose surface are in contact with masonry and concrete shall be coated with creosote .

4.2 Workmanship

Execute rough carpentry in best, substantial, workmanlike manner. Erect framing true to line, levels and dimension, squared aligned, plumbed, well spiked, and using mortises and tenon joints where practical.

All millwork shall be accurately milled to details, clean cut molding profiles, lines, scrapes, sand smooth, mortise and tenon, spline, join block, nail screw, bolt together as approved in manner to allow free playoff panels, avoid swelling, shrinkage, insure work remaining in place without warping, splitting, opening of joints. Do not install millwork or casework until concrete and masonry work have been cured and will not release moisture harmful to woodwork.

As far as possible, all fastening shall be concealed, where not possible, locate them in inconspicuous places, where nailing is permitted through wood face, conceal nail heads.

Anchors shall be installed, if required to anchor carpentry to masonry or concrete.

DIVISION 5 MISCELLANEOUS

5.1 Miscellaneous

The Contractor shall guarantee that his work and equipment furnished shall be free from all defects for a period of twenty four (24) months after acceptance of the project and shall agree to repair and make goods at his own expense from all defect which may develop in his work during that time if said defect arise due to poor workmanship.

5.2 Quality Control

5.2.1 The contractor must be responsible for standard proper quality of construction materials and workmanship in construction of proposed building.

- 5.2.3 Quality of all construction materials and work must be inspected and approved by authorized personnel from UNDP.
- 5.2.4 All stages of construction will be inspected and approved by authorized personnel from UNDP.
- 5.2.5 All unsatisfactory items must be amended by the contractor without extra charges.
- 5.2.6 Bi monthly progress report and immediate-report if require, must be submitted with attached necessary photo documents to Township and Yangon UNDP.