



# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR

## TECHNICAL SPECIFICATIONS

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



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# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

### ANNEX I

#### CIVIL & ARCH SPECIFICATIONS

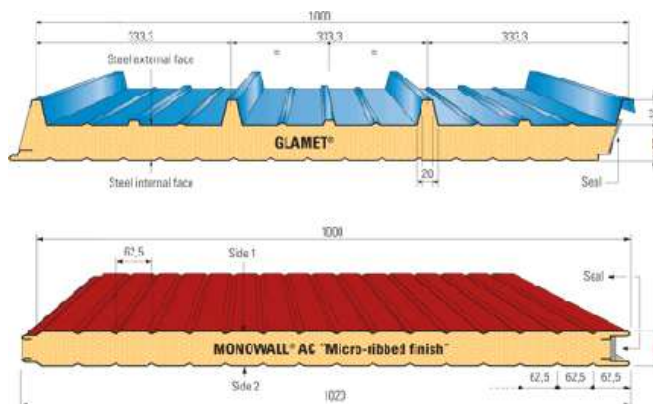
##### I. PURPOSE

THE PURPOSE OF THIS WORK IS TO SUPPLY AND INSTALL THE REQUIRED MATERIAL TO MAKE THE OFFICES READY FOR USE AT THE NEW ROOF FLOOR APARTMENT LOCATED IN THE SAME MAIN STREET OF THE UNDP.

##### II. SPECIFICATIONS

###### 1. Sandwich Panel

- The Sandwich Panel shall be 100mm thickness.
- The Core shall be made of stiff, Freon-free, self-extinguishing PUR foam with very good thermal insulation properties.
- Stiff polyurethane foam, thermal conductivity rating  $\lambda = 0,022 \sim 0.023$  W/m.K and density  $\rho = 40$  kg/m<sup>3</sup>.
- Steel sheets cover the Both Sides with minimum thickness of 0.5mm.
- The steel sheet layers are hot dipped galvanized and polyester coated, all sandwich sheets panels shall be painted with reflective, anti-dust and durable electrostatic paint from both sides.
- The Roofing Panels shall be Corrugated Sheets from the External Side. And shall be offset from the existing Roof by 30 cm from each side.



- The Slope of the Roof shall be according to the Existing Roof Inclination.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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- The Roofing and Walls shall be Water Tight, and the Roof shall be provided with the Storm Water Gutter as specified in the Drawings.
- The Structures for the Roof shall be supported with the required Steel Structure to make the Roof Steady and Safe for Operation.
- Additional Columns Steel Tubes shall be used in the Corners and where required for other Components such as Doors and Windows.
- The Gutters shall be drained probably to the nearest Drain Point.
- The Contractor shall use Specialized Company for Fabrication and installation the Sandwich Panels. **AND** shall ensure the Water Tight for all the Roof and Walls.
- For the Sandwich Panel Walls, the Internal Walls shall be covered after installation with Gypsum Board.
- The Ceiling shall be supported with adequate Steel Structure (Purlin 80x40x4mm).
- Where required, the Contractor shall extend the existing Steel Purlin, Columns or linking them to the existing Concrete Columns or Slab.

### 2. Gypsum Boards

- The Gypsum Boards will be used in the Partition walls, and to cover the Internal side of the Sandwich Panel Walls, False ceiling in the Corridors.
- Gypsum Boards are manufactured with aerated gypsum core & covered with special paper liners. Gypsum Boards shall be manufactured according to DIN 18180 or any equivalent Standards.
- Regular Boards with 12.5 mm (+/- 0.5 mm) thickness, Tempered (T/E), OR Beveled (B/E)
- Tiles 60 x 60 cm. to be used where indicated in the Drawings in the center of the corridor as a full size tile.
- The Carrying Steel Structural of the Walls every 40 cm in both directions and 60 cm for Ceiling.

### 3. Cement Boards

- The Cement Boards will be used in the Partition walls of the Bathrooms, and where indicated in the drawings.
- Minimum Thickness = 9mm.
- Average Compression Strength = 2.6 N/mm<sup>2</sup>.
- Apparent Density = 1355.8 kg/m<sup>3</sup>.

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## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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- Approx. Thermal Conductivity = 0.14 W/m.<sup>°k</sup>.
- Moisture content = 6-8%.
- Water Tightness: No water droplets at the underside.

### 4. Wooden Doors

- Timber used for joinery shall be of good approved quality and shall be well seasoned, Cut Square, free from excess wane, from Sweden wood dead knot or other defects.
- Wooden doors shall be 50 % minimum filled of Sweden wood pallets and the main frame width around the door shall be 8 cm minimum.
- All timber for carpentry, joinery, rough frame work, backings, grounds, fixing strips and the like shall be treated with an approved wood preservative and the Contractor shall strictly observe the manufacturer's instructions for using this material. The maximum permissible moisture content in timber shall be in accordance with the relevant British standards.
- All workmanship shall be of the best quality. Scantlings and boarding shall be accurately sawn and shall be of uniform width and thickness throughout. All carpenter's work shall be left with a sawn surface except where otherwise specified. Work shall be framed together and securely fixed in the best possible manner and with properly made joints. The Contractor shall provide all brads, nails, screws, plugs, pins, etc., as necessary and as directed. All work is to be properly shouldered, wedged, pinned, braded, etc. and properly glued with the best quality glue.
- All timber brought to the site shall be subjected to anti-termite treatment.
- All joinery shall be finished off in a proper manner, planed and sand papered as required.
- Use of nails shall not be permitted. Fixing of members shall be done by using screws or round brads, heads of which shall be properly punched in ends of timber, built into walls, and shall have air space left between themselves and the walls.
- All exposed faces of woodwork shall be sand papered once before erection. The coloring or other preservatives shall not be applied without prior approval of the Supervision Team.
- The Contractor shall provide frames for doors with Mild Steel holdfasts made of 40mm x 3mm thick flats 200mm long and fixed into jambs M-15/10 P.C.C. 1200mm high frames with 6 Nos. and frames above 2000mm with 8 Nos. holdfasts. Each holdfast will be fixed to the frame with 3 Nos. 50mm GI screws.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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- For fixing timber frames to concrete, rawl plugs and screws of 16 gauge shall be used wherever specified. Rawl plugs and screws of gauge 16 shall also be used for fixing rawl rough grounds, framing, hangers, hat hooks, curtain rails etc. Unless otherwise specified, screws used for the work shall be galvanised.
- All timber surfaces coming into contact with masonry or concrete shall be given two coats of wood preservative or solignum approved by the Supervision Team.
- Paneled and glazed shutters, styles and rails shall be as shown in the drawings, moulded and mortised together. The shutters shall be square and free from twist.
- All glazing is to be of sheet glass of selected quality and approved by the Supervision Team. It shall be clear and free from defects. It shall be cut to the required size and fixed to frame either with spring clips, with approved quality, or with teakwood beading as per details.
- All surfaces of timber resting on or bedded in masonry or concrete shall be well coated with coal tar.
- All fixing holes shall be pelleted and concealed from view.
- Fixtures: All doors shall be provided with best quality fixtures as specified in the drawing. Samples of all fittings shall be submitted to the Supervision Team, for approval. Unless otherwise specified, hinges, tower bolts, aldrops, handles, baby latches, etc. shall be of best quality brass oxidized of specified size. Mortise lock, hydraulic closer and other fixtures shall be of approved make. All the fittings shall be fixed with brass screws.
- Painting shall be carried out only after the joinery has been inspected and approved by the Supervision Team. The surface preparation and applying of primer coats of paint and final coats of paint shall be carried out as per specifications for painting. Unless otherwise specified a minimum of 2 coats of primer paint and 3 coats of final paint to be applied.
- Where polishing or varnishing is specified, the surface to be varnished or polished shall be protected from contamination such as inadvertent painting and surface damage. The polishing or varnishing shall be according to the specifications for varnishing or polishing under the section Painting.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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### 5. Ceramic Tiles

- Tiles shall conform to the relevant British standards or any equivalent. Tiles that are cracked, chipped or warped shall not be used for the works.
- Preparation of surface: All masonry faces shall be cleaned thoroughly by removing dirt, loose mortar, efflorescence etc. The concrete surfaces shall be brushed to remove all laitance and roughened to provide a bond for the bedding.
- Fixing tiles: The masonry and concrete faces shall be given a coat of cement plaster 12mm thick (in proportion 1:4). The surface of the plaster shall be scarified with wire brush for getting a good bond between the tiles and the bedding.
- The tiles shall be soaked in clean water for about half an hour before using. The back of the tile shall be buttered with 1:2 plastic cement mortar to a thickness slightly in excess of the finished thickness required and the tile pressed to the wall and tapped back in position. Alternatively a rich fatty mortar shall be applied on the bedding and the tile pressed into it, care being taken to ensure that the keys of the tile are buttered up with mortar. Joints shall be uniform, even, straight and as thin as possible in any case not more than 3.0 mm. After the surfaces of tiles have been fixed, the joints shall be cleaned of gray cement and refilled with cement paste of the same shade as that of the tiles. The tiled surface shall be left wet for a period of 7 days.
- The Contractor shall provide the glazed rounded corner convex or concave, as necessary. After the completion of the work, the Contractor shall ensure that the surface is cleaned of all stains.
- Where to installed: Bathroom Flooring, Bathroom walls.
- All Ceramic tiles Flooring shall be Anti-Slip. The Color and Finishing to be determined by the Supervisor Engineer for his Approval; Submittal is required.
- European Made or any equivalent for Bathroom Tiles.

### 6. Artificial Granite Tiles

- The Same Specifications as Ceramic Tiles, in addition to the followings:
- Where to installed: Corridor where indicated in the drawings, and at the Roof Terrace area.
- UAE, Indian or any equivalent.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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### 7. Steel Works

- Contractor shall provide all materials, labor and equipment required to complete the works in every respect, whether such materials are required as part of the permanent structure or a temporary one. These are such that shall be required for fabrication or erection or maintenance including specifically structural steel plates, flats, bars, welding rods, rivets, bolts and nuts, paint, welding sets in the shop and at site. Contractor shall provide all workshop facilities, derricks, cranes, pulley blocks, wire ropes, hemp or manila ropes, winches, erection cleats and temporary braces or supports and all other materials required to deliver the Works completed in every respect.
- The Contractor shall prepare all the necessary fabrication shop drawings and these shall be submitted to the Supervisor Engineer for approval before fabrication is commenced. All such drawings shall show the dimensions of all parts, method of construction, welding and bolting. Also, the Contractor shall submit for approval a list of all material along with the samples and the test certificates.
- The Contractor shall comply with all safety requirements for erection of structural steelwork. For all the works, workmanship shall be of first class quality, through true to line, level and dimension as shown in the drawings or instructed by the Supervision Team.
- The welding electrodes shall be of the best quality and of an appropriate grade. All welding electrodes shall be stored properly and kept dry. Any electrode, which has part of its flux coating broken away or is damaged, shall be rejected.
- Bolts and nuts used for the works shall, unless otherwise specified, be black bolts and nuts manufactured by an approved manufacturer.
- For all the works, workmanship shall be of first class quality, through, true to line, level and dimension as shown in the drawings or instructed by the Supervision Team. The Contractor shall submit for approval a list of all material along with the samples and the test certificates. Comply with all safety requirements for erection of structural steelwork
- All parts assembled for bolting shall be in close contact over the whole surface and all bearing stiffeners shall bear tightly at top and bottom without being drawn or caulked. The component parts shall be so assembled that they are neither twisted nor damaged. Drilling done during

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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assembling shall not distort the metal or enlarge holes. The butting surfaces at all joints shall be so cut and milled so as to butt in close contact throughout the finished joints.

- Hand flame cutting and punching of holes will not be permitted.
- All welding for the works shall be carried out by first class welders. The Supervisor Engineer may at his discretion order periodic tests for the welder and /or of the welds produced. The Contractor shall carry out all such tests at his cost.
- As much as possible, the welding work shall be done in the shop. The pieces shall be manipulated to ensure down hand welding for all shop joints as far as possible. All parts to be welded shall be arranged so as to fit properly on assembly. After assembly and before the general welding is to commence, the parts are to be tack welded with small fillet or butt welds as the case may be. The tack welding must be strong enough to hold the parts together but small enough to be covered by the general welding. The welding procedure shall be so arranged that the distortion and shrinkage stresses be reduced to a minimum.
- All members of trusses and lattice girders shall be straight throughout their length, unless shown otherwise on the drawings, and shall be accurately set to the lines shown on the drawings. Sheared edges of gussets or other members to be straight ended and dressed where necessary.
- The Contractor shall be responsible for checking the alignment and level of foundation and correctness of foundation bolt centers, well in advance of starting erection work, and shall be responsible for any consequences or for non-compliance thereof. Discrepancies, if any, shall immediately be brought to the notice of the Supervisor Engineer.
- Contractor shall be responsible for accurately positioning, leveling and plumbing of all steelwork and placing of every part of the structure in accordance with the approved drawings and to the satisfaction of the Supervision Team. All stanchion base, beam and girder bearings etc. shall be securely supported on suitable steel packs. All reference and datum points shall be fixed near the work site for facilitating the erection work.
- All steelwork shall be erected in the exact position as shown on the drawings. All vertical members shall be truly vertical throughout and all horizontal members truly horizontal, fabrication being such that all parts can be accurately assembled and erected. No permanent bolting, welding or grouting shall be done until proper alignment has been obtained.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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### 8. Painting

- The Contractor shall apply the coverage of paint as per the manufacturer's data for the type of paint to be used and the coverage rate approved by the Supervisor Engineer. All materials shall be applied strictly in accordance with the manufacturer's recommendations. Any additions of thinner must be made under the supervision of the Supervisor Engineer, and as permitted by the manufacturer. Samples of all materials used for the painting work shall be approved by and deposited with the Supervisor Engineer.
- The Contractor shall provide all the equipment required for the paint works, including scaffolding, access platforms, compressors, etc. Brushes, rollers, spray guns and the likes used for carrying out the work shall be kept clean and free from foreign matter, at all times.
- Paint shall not be applied when the relative humidity is 80% or more for both internal, as well as external applications.
- Paint shall be brought to the site in the sealed, labeled containers, stating:
  - Manufacturer's name
  - Date of manufacture
  - Type of paint
  - Color
  - Instructions for thinning, mixing and applying
- Paint shall be stored in sealed containers, according to the manufacturer's recommendations. The paint shall not be subjected to extreme temperatures. Paint shall be used within its stated shelf life or within 18 months, whichever is less.
- Acrylic, Non Smell Paint to be used; Jotun or any equivalent.

### 9. Steel Work Painting

- All steelwork to be painted shall be first cleaned of rust, scale, loose paint, oil, and all deleterious matter before applying primer. The cleaning shall be carried out by approved means, using power driven tools, followed by steel wire brushing and dusting, wherever necessary.
- Metal primer, for application to steel surfaces, shall be either zinc chromate or red oxide-based primer of an approved make.
- Primer for application to galvanized surfaces shall be a suitable metal primer of approved make.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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- Priming of surfaces shall be carried out immediately after the preparation of surface. Second coat of primer shall be applied without exposing and as per manufacturer's recommendations.
- One undercoat of oil paint, of approved color, shall be applied to the primed surface. Putty shall be applied at the same time, wherever possible. All edges, angles and projections shall have a stripe undercoat applied as soon as the first coat is dry.
- Priming and undercoats shall be lightly rubbed down with fine sandpaper before subsequent coats are applied.
- Surfaces for painting must be dry and free from dust, dirt, rust, efflorescence or condensation.
- The minimum dry film thickness of the paint coating, including rust protection should be 200 microns. At least two coats of primer and finish paint, each, must be applied.
- Timber used for joinery shall be of good approved quality and shall be well seasoned, Cut Square, free from excess wane, from Sweden wood dead knot or other defects.
- Wooden doors shall be 50 % minimum filled of Sweden wood pallets and the main frame width around the door shall be 8 cm minimum.
- All timber for carpentry, joinery, rough frame work, backings, grounds, fixing strips and the like shall be treated with an approved wood preservative and the Contractor shall strictly observe the manufacturer's instructions for using this material. The maximum permissible moisture content in timber shall be in accordance with the relevant British standards.
- All workmanship shall be of the best quality. Scantlings and boarding shall be accurately sawn and shall be of uniform width and thickness throughout. All carpenter's work shall be left with a sawn surface except where otherwise specified. Work shall be framed together and securely fixed in the best possible manner and with properly made joints. The Contractor shall provide all brads, nails, screws, plugs, pins, etc., as necessary and as directed. All work is to be properly shouldered, wedged, pinned, braded, etc. and properly glued with the best quality glue.
- All timber brought to the site shall be subjected to anti-termite treatment.
- All joinery shall be finished off in a proper manner, planed and sand papered as required.
- Use of nails shall not be permitted. Fixing of members shall be done by using screws or round brads, heads of which shall be properly punched in ends of timber, built into walls, and shall have air space left between themselves and the walls.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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- All exposed faces of woodwork shall be sand papered once before erection. The coloring or other preservatives shall not be applied without prior approval of the Supervision Team.
- The Contractor shall provide frames for doors and windows with Mild Steel holdfasts made of 40mm x 3mm thick flats 200mm long and fixed into jambs M-15/10 P.C.C. 1200mm high frames with 6 Nos. and frames above 2000mm with 8 Nos. holdfasts. Each holdfast will be fixed to the frame with 3 Nos. 50mm GI screws.
- For fixing timber frames to concrete, rawl plugs and screws of 16 gauge shall be used wherever specified. Rawl plugs and screws of gauge 16 shall also be used for fixing rawl rough grounds, framing, hangers, hat hooks, curtain rails etc. Unless otherwise specified, screws used for the work shall be galvanised.
- All timber surfaces coming into contact with masonry or concrete shall be given two coats of wood preservative or solignum approved by the Supervision Team.
- Paneled and glazed shutters, styles and rails shall be as shown in the drawings, moulded and mortised together. The shutters shall be square and free from twist.
- All glazing is to be of sheet glass of selected quality and approved by the Supervision Team. It shall be clear and free from defects. It shall be cut to the required size and fixed to frame either with spring clips, with approved quality, or with teakwood beading as per details.
- All surfaces of timber resting on or bedded in masonry or concrete shall be well coated with coal tar.
- All fixing holes shall be pelleted and concealed from view.
- Fixtures: All doors shall be provided with best quality fixtures as specified in the drawing. Samples of all fittings shall be submitted to the Supervision Team, for approval. Unless otherwise specified, hinges, tower bolts, aldrops, handles, baby latches, etc. shall be of best quality brass oxidized of specified size. Mortise lock, hydraulic closer and other fixtures shall be of approved make. All the fittings shall be fixed with brass screws.
- Painting shall be carried out only after the joinery has been inspected and approved by the Supervision Team. The surface preparation and applying of primer coats of paint and final coats of paint shall be carried out as per specifications for painting. Unless otherwise specified a minimum of 2 coats of primer paint and 3 coats of final paint to be applied.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX I - CIVIL & ARCH SPECIFICATIONS

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- Where polishing or varnishing is specified, the surface to be varnished or polished shall be protected from contamination such as inadvertent painting and surface damage. The polishing or varnishing shall be according to the specifications for varnishing or polishing under the section Painting.

### 10. General Installation procedure

- Accessories:
  - Use manufacturer's brackets and accessories where these are available and suitable for the mounting substrate.
- Protection:
  - Deliver fixtures to site protected from damage under site conditions by coatings, coverings and packaging. Remove only sufficient protection to permit installation.
- Inspection:
  - The contractor shall check, review the drawings and visit the site and give sufficient notice so that inspection may be made of the following.
- Submissions:
  - Samples
    - Submit nominated samples for approval of the Engineer.
    - If it is intended to incorporate samples into the works, submit proposals for approval. Only incorporate samples in the works which have been approved.
    - Do not incorporate other samples.
    - Keep endorsed samples in good condition on site, until practical completion.
  - Shop Drawings
    - Submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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### ANNEX II SECURITY MEASURES SPECIFICATIONS

#### I. PURPOSE

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THE PURPOSE OF THIS WORK IS TO DO SECURITY MEASURES AT THE NEW ROOF FLOOR APARTMENT LOCATED IN THE SAME MAIN STREET OF THE UNDP COMPOUND (ANNEX 2 BUILDING).

#### II. SPECIFICATIONS

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##### 1. Emergency Staircase

- The Existing Emergency Staircase will be extended to the Roof, the Emergency Landing will be in the Third Floor and in the Roof.
- The Contractor shall demolish the Parapet by the size of the Emergency Landing, without damage of the existing structures, and repair the Parapet to proper appearance by the acceptance of the Supervisor Engineer.
- Supply and install Emergency Staircase Made and fabricated from Metal Tubes and Steel Structures.
- The Staircase is shown and detailed in the drawings *\_referred in the drawing ST-100\_*.
- The Staircase shall have a handrail with height of 150-190cm. and shall be provided with Balustrade of Steel Tube SHS 25x25x2.5mm. The Handrail shall be made of SHS 40x40x3mm.
- The Contractor shall make real measurements before Fabrication the Steel, the Height of the Treads shall be between 18-22 cm.
- The Treads shall be made of Galvanized **CHECKERED-PLATE** with 3mm thickness.
- All Steel Works shall be painted by Epoxy with two layers and shall be cleaned and prepared well before painting.
- All Steels shall be free of rust and debris before welding.
- The Landing shall be fixed and anchored with building Slab by using 250x250x10 Steel Plate. and shall be supported on the 100x100x5mm tubes.
- The Work shall include modifying by Extending the Landing of the Existing Staircase at the Second Floor and Demolishing the Verandah Parapet of the Third Floor and Roof Floor. And renovate the appearance of the Parapet.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- The Quantity will be calculated as a weight of kg. The concrete base will be embedded in the price of the Steel weight.
- For Detailed Information about Fabrication, installation and Painting, refer to **ANNEX I – Section.4+6**
- Approx. Qty = 2,350 kg.

### 2. Aluminum Windows

- All Existing Aluminum Windows (**W-1, W-2, W-3, W-4, W-5, and W-6**) *\_referred in the drawing SE-100, SE-101 & SE-102\_* shall be prepared for pasting the SRF by cleaning and remove any debris on the whole area of the glass.
- These Windows shall be maintained for operation well before using SRF.
- All these Windows shall be covered with double layer of Shelter Resistant Film (SRF) (Thickness = 200 micron) in the vice- versa installation shape.
- All the SRF installation shall be free of bubbles and according to the Manufactures instruction and recommendations.
- All Existing Windows shall be equipped with Frame Catcher with 20mm Dia steel bar as specified in the drawings. *\_referred in the drawing SE-101 & SE-102\_*
- The Quantity will be calculated as a square meter (m<sup>2</sup>).
- Qty = 12.5 m<sup>2</sup>.
- All the New Windows (**W-7**) *\_referred in the drawing SE-100, SE-101\_* shall be made of high quality aluminum profiles with single layer glass windows. With the same glass thickness of the Existing Windows. The glass color shall be as the existing one.
- The Accessories shall be European made and suitable for the selected profile.
- The New Windows shall be provided with screen mesh with proper size and adjusted horizontally and vertically well.
- The same SRF mentioned in the above paragraph of the Existing will be applied here.
- All the New Windows shall be equipped with Frame Catcher with 20mm Dia steel bar as specified in the drawings. *\_referred in the drawing SE-101\_*.
- The Quantity will be calculated as a real square meter of the Window without any addition for Screen mesh.
- Qty = 7 m<sup>2</sup>.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- New Window Awning Type for Bathroom shall be installed (**W-4**) *\_referred in the drawing SE-100, SE-102\_*. Single Layer of Diffused Glass 4mm thickness. Size = 400x400mm
- The Quantity will be calculated as a number.
- Qty = 1.

### 3. Aluminum Doors

- The Existing Aluminum Door “Glass Door” (**GD-1**) *\_referred in the drawing SE-100, SE-105\_* shall be prepared for pasting the SRF by cleaning and remove any debris on the whole area of the glass.
- This Door shall be maintained for operation well before using SRF.
- This shall be covered with double layer of Shelter Resistant Film (SRF) (Thickness = 200 micron) in the vice- versa installation shape.
- All the SRF installation shall be free of bubbles and according to the Manufactures instruction and recommendations.
- This Door shall be equipped with Frame Catcher with in front of the Aluminum Frame of the Door with SHS 50x50x5mm as specified in the drawings. *\_referred in the drawing SE-100 & SE-105\_*
- The Quantity of SRF will be calculated as a square meter (m<sup>2</sup>). While the Frame Catcher will be calculated as weight of kg.
- Qty for SRF = 3.5 m<sup>2</sup>.
- Qty for Steel = 96 kg.
- The New Aluminum Door “Glass Door” (GD-2) shall be made of high quality aluminum profiles with single layer glass windows. 4mm glass thickness. The glass color shall be as the existing one.
- The Accessories shall be European made and suitable for the selected profile.
- The New Door shall be provided with screen mesh with proper size and adjusted horizontally and vertically well.
- The same SRF mentioned in the above paragraph will be applied here.
- This New Door shall be equipped with Frame Catcher with in front of the Aluminum Frame of the Door with SHS 50x50x5mm as specified in the drawings. *\_referred in the drawing SE-100 & SE-105\_*
- The Quantity will be calculated as a real square meter of the Window without any addition for Screen mesh.
- The Quantity of SRF will be calculated as a square meter (m<sup>2</sup>). While the Frame Catcher will be calculated as weight of kg.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- Qty for Aluminum = 7.5 m<sup>2</sup>.
- Qty for SRF = 7.5 m<sup>2</sup>.
- Qty for Steel = 192 kg.

### 4. Shatter Resistant Film (SRF)

- Material : PET 200 microns
- Adhesive : acrylic polymer 25 gr/m<sup>2</sup>
- Liner : siliconized PET 23 microns
- Color : Transparent
- Breaking Load : 17,5 da N/cm
- Elongation at Break : 100%
- UVA Transmission : 5%
- For Quantity, refer to where indicated in the previous sections.

### 5. Main Apartment Wooden Door

- This door (D1) will use the existing door *\_referred in the drawing SE-100 & SE-103\_* with the dimension of approx. (920x2,000mm) and shall be reinforced with 4mm metal sheet from the inside, and adequate with the technical specification and the drawings. The door shall be provided with removable metal tube (RHS 800x400x4mm) *\_referred in the drawing SE-103\_*; the door shall also be provided with 4 heavy duty Hinges, and two high quality locks.
- The Door shall also be provided with Auto Door Closer and Electric Lock with a high quality, and shall be installed as manufacture recommendation and instructions.



*Auto Door Closer*

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- The door shall be spray painting from the outside with the required maintenance, and Epoxy painting three layers from the inside at the steel sheet. The steel shall be presentable at the finishing.
- For More Information, refer to ANNEX I – Section.7
- The quantity will be calculated as a lump sum one item.
- Qty = 1.

### 6. Emergency Exit door

- This door (D5) *\_referred in the drawing SE-100 & SE-104\_* with the dimension of approx. (920x2,000mm) and shall be made of steel structure as the drawings with SHS 50x50x5mm and covered with steel sheet 6mm from each side of the door, and adequate with the technical specification and the drawings. The door shall be provided with Manual Door lock bar (L-shape 10mm Dia), *\_referred in the drawing SE-104\_*; the door shall also be provided with 4 heavy duty Hinges, and Metal Door Handle with Lock.
- The Door shall also be provided with Auto Door Closer with a high quality, and shall be installed as manufacture recommendation and instructions.
- The door shall be painted with Epoxy three layers. The steel shall be presentable at the finishing.
- For More Information, refer to ANNEX I – Section.4+6
- The quantity will be calculated as a number.
- Qty = 1



*Manual Door lock bar (L-shape 10mm Dia)*

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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### 7. Safe Haven Doors

- This door (D4) *\_referred in the drawing SE-100 & SE-104\_* with the dimension of approx. (1,060x2,200mm) shall be made of steel structure as the drawings with SHS 50x50x5mm and covered with steel sheet 6mm from each side of the door. It also shall be fabricated as Sliding Pocket type and hangs with heavy-duty rollers (The quantity of the rollers shall be to carry the door weight with 50% safety) and adequate with the technical specification and the drawings. The door shall be provided with Manual Door lock bar (L-shape 10mm Dia), *\_referred in the drawing SE-104\_*; Metal Door Handle.
- The door shall be painted with Epoxy three layers. The steel shall be presentable at the finishing.
- For More Information, refer to ANNEX I – Section.4+6
- The quantity will be calculated as a number.
- Qty = 2.

### 8. Office Wooden doors

- The Interior Wooden Doors for the Offices (D2) – *\_referred in the drawing SE-100 & SE-103\_* shall be provided with high quality hinges and accessories and shall be made from Solid Wood 50% minimum Filled, in addition to one layers of wood sheet 6mm for each side. And with Plain appearance; The Color shall be as specified by the Supervision.
- The Doors shall be provided with high quality locks for internal use only. Each door shall be supported with 3 hinges made of high quality products.
- The Doors shall be spray painted after cleaning and polishing the wooden surface.
- For More Information, refer to ANNEX I – Section.7
- The quantity will be calculated as a number.
- Qty = 5.

### 9. WC Wooden Doors

- The WCs doors (D3) *\_referred in the drawing SE-100 & SE-102\_* shall be as specified above in addition to be provided with Aluminum Grill wooden appearance with the size 400x200mm, and provided also with high quality bathroom locks from the inside. Each door shall be supported with 3 hinges made of high quality products.
- The Doors shall be spray painted after cleaning and polishing the wooden surface.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

- For More Information, refer to ANNEX I – Section.7
- The quantity will be calculated as a number.
- Qty = 2.

ALL THE QUANTITY HERE ARE ESTIMATED AND ACTUAL BOQ WILL BE CALCULATED WHEN THE CONTRACTOR SUBMITTED THE WORKS TO THE SUPERVISION TEAM.

### 10. Fire Alarm System

- The Fire Alarm System will consist of the Smoke Detectors located as mentioned in the drawings, Heat Detector in the Kitchen, and Manual Push Button and Siren with Strobe Light in the Corridor as indicated in the Drawings.
- The FACP will be located in the Guard Room in the Ground Floor and Siren with Strobe Light.
- For Detailed Drawings *\_referred in the drawing FA-100\_*.
- Qty ; Smoke Detectors = 11  
Heat Detectors = 1  
FACP = 1
- For Detailed Specification refer to the ***Below Specifications.***

#### Detailed Fire Alarm Specifications

- All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system.
- All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- All Equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.
- Equipment shall be manufactured by an ISO 9001 Certified Company.
- Conduit shall be in accordance with The National Electrical Code (NEC), local and state requirements.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- Conduit fill shall not exceed 40% of interior cross sectional area where three or more cables are contained within a single conduit.
- Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
- Wiring for 24 volt control, alarm notification, emergency communication and similar power limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
- Conduit shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
- Conduit shall be 3/4-inch (19.1 mm) minimum.
- Wiring shall be in accordance with local, state and national codes (e.g., NEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
- All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
- Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation as indicated in NFPA 70 (e.g., FPLR).
- Wiring used for the multiplex communication loop shall be twisted and shielded and installed in conduit unless specifically excepted by the fire alarm equipment manufacturer. The system shall permit use of IDC and NAC wiring in the same conduit with the communication loop.
- All field wiring shall be completely supervised.
- All boxes and cabinets shall be UL listed for their use and purpose.
- The Fire Alarm Control Panel shall be connected to a separate dedicated branch circuit, maximum 20 amperes. This circuit shall be labeled at the Main Power Distribution Panel as FIRE ALARM. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG. The Control Panel Cabinet shall be grounded securely to either a cold water pipe or grounding rod.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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### – MAIN FIRE ALARM CONTROL PANEL:

- The FACP shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: addressable detectors, addressable modules, printer, annunciators, and other system controlled devices.
- The control panel shall provide, or be capable of expansion to 318 addressable detectors and 318 monitor or control modules (636 addressable devices).
- The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit, 80-character Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the Field Programming and control of the Fire Alarm System.
- All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
- The FACP shall provide the following features: Maintenance Alert to warn of excessive detector dirt or dust. Detector sensitivity read/test information and System Status Reports to display or print. Smoke Detector Alarm Verification. Pre-signal, meeting NFPA 72 requirements. Rapid manual station reporting (under 3 seconds). Periodic Detector Test, conducted automatically by the control panel every two hours. March time, temporal (ANSI Cadence) and California Code coding options. Walk Test will check for two detectors set to same address.
- The main CPU shall contain Form-C relay contacts rated at 2.0 amps/30VDC for the following: Alarm, Trouble, Supervisory.
- The CPU shall contain two Class B or A (NFPA Style Y or Z) programmable Notification Appliance Circuits.
- The Microprocessor shall communicate with, monitor, and control all external interfaces with the control panel. It shall include EPROM for system program storage; non-volatile memory for building-specific program storage; and a "watch dog" timer circuit to detect and report microprocessor failure.
- The Microprocessor shall contain and execute all programming for specific action to be taken if an alarm condition is detected by the system. Such programming shall be held in

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- non-volatile programmable memory and shall not be lost if both the system primary and secondary power failure occurs.
- The Microprocessor Unit shall also provide a Real- Time Clock for time annotation of system displays, printer, and history file.
  - 4The Microprocessor Unit shall contain flash memory capabilities for easy upload/download for upgrades of software.
  - All clock, date and history files shall be maintained during power loss.
  - The Display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
  - The Display shall include status information and custom alphanumeric labels for all Addressable Detectors, Addressable Modules and Software zones.
  - The Display shall provide a 80-character backlit alphanumeric Liquid Crystal Display (LCD). It shall also provide 9 Light-Emitting-Diodes (LEDs), consisting of and not limited to the following: AC POWER, FIRE ALARM, SUPERVISORY, SYSTEM TROUBLE, MAINTENANCE, ALARM SILENCED, DISABLED, BATTERY, and GROUND.
  - The Display shall provide a 25-key touch key-pad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
  - The Display shall include the following operator switches: ACKNOWLEDGE/STEP ALARM SILENCE, DRILL, and SYSTEM RESET (also serving as a lamp test switch).
  - The SLC (Signaling Line Circuit) Interface shall provide power to, and communicate with, all of the Addressable Detectors and Addressable Modules over a single pair of wires. This SLC Loop shall be capable of NFPA Style 4, Style 6, or Style 7 operation.
  - The SLC interface shall receive information from all Addressable Devices. This information shall be processed to determine whether normal, alarm, or trouble conditions exist for each detector. This information may also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.
  - The Signaling Line Circuit shall be capable of distances of 10,000 feet (@ 12 AWG, twisted). For retrofit applications, the system shall support up to 3,000 feet of untwisted, unshielded wire. (Loop 1 only)

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- An EIA-232 interface between the Fire Alarm Control Panel and UL Listed Electronic Data Processing (EDP) peripherals shall be provided. The EIA-232 interface shall allow the use of printers, or for an interface to an off-line PC programmer.
- An EIA-485 port shall be available for the serial connection of optional remote led-type annunciators. EIA-485 in terminal mode shall allow serial connection of optional LCD, English language remote system displays. LED (per zone or point) annunciators shall also be provided. The maximum distance to the furthest annunciator shall be 3,000 feet. The system shall support a maximum of 32, remote annunciators on a single twisted, shielded pair. The maximum distance to the furthest annunciator shall be 6,000 feet.
- A PS2/PC keyboard connection shall be provided to support the connection of a PC keyboard for local programming of the fire alarm system.
- The control panel shall be housed in a UL listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected.
- The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators.
- An optional semi-flush trim ring shall be available for a neat cabinet dress.
- All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.
- Optional plug-in modules shall be provided for NFPA 72 auxiliary and remote station fire alarm systems as well as a Digital Alarm Communicator Transmitter for NFPA 72 Central Station systems. The DACT shall meet all current UL requirements for delayed AC fail reporting and shall be capable of reporting individual signals for all 636 points.
- The Power Supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP.
- A 240 VAC, 50 Hz version shall be available where required.
- It shall provide a minimum of 6.0 amps of usable Notification Appliance power.
- It shall provide a battery charger for 24 or 60 hours of standby using dual-rate charging techniques for fast battery recharge.
- It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults on sensitive addressable modules.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- It shall be power-limited using fuse-less, quick-acting electronic circuitry meeting the latest UL requirements.
- Operators Controls
  - Acknowledge Switch:
    - Activation of the control panel Acknowledge switch in response to new Alarms and/or Troubles shall silence the local panel piezo electric signal and change the Alarm and Trouble LEDs from flashing mode to steady-ON mode. If multiple Alarm or Trouble conditions exist, depression of this switch shall advance the 80-character LCD display to the next Alarm or Trouble condition.
    - Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
  - Signal Silence Switch: Activation of the Signal Silence Switch shall cause all programmed Notification Appliances and relays to return to the normal condition after an alarm condition. The selection of Notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit, auto-silence timers, and an option to silence horns and keep strobes flashing.
  - System Reset Switch: Activation of the System Reset Switch shall cause all electronicallylatched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition. Holding the RESET switch shall perform a Lamp Test function.
  - Drill (Evacuate) Switch: Press and hold of the Drill switch shall activate all Silenceable Notification Appliance circuits. The Drill function shall latch until press of Signal Silence or Reset.
- Field Programming
  - The system and its respective devices (i.e. smoke detectors and modules) shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- All programming may be accomplished through the standard FACP built-in keypad. As well through using a PC keyboard (connection provided on UNIMODE-9600 main circuit board.)
- All field-defined programs shall be stored in non-volatile memory and shall not be lost if AC mains and/or battery is lost.
- The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.
- Program edit shall not interfere with normal operation and fire protection. If a fire condition is detected during programming operation, the system shall exit programming and perform fire protection functions as programmed.
- A special program check function shall be provided to detect common operator errors.
- An Auto-Program (self-learn) function shall be provided to quickly program initial functions within several seconds. During this operation, smoke detectors connected to the Signaling Line Circuit shall be automatically installed without labor intensive operator key commands and the using additional electronic equipment to program each individual detector.
- For flexibility, an optional off-line programming function, with batch upload/download, shall also be available.

### – SYSTEM COMPONENTS:

- Audible/Visual Combination Devices:
  - For Audible
    - Electronic sounders shall operate on 24 VDC nominal.
    - Electronic sounders shall be field programmable without the use of special tools, to provide slow whoop, continuous, or interrupted tones (Temporal Pattern) with an output sound level of at least 90 dBA measured at 10 feet from the device.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- Shall be flush or surface mounted as shown on plans.
- For Visual
  - Shall operate on 24 VDC nominal.
  - Shall meet the requirements of the ADA (Americans with Disabilities Act) as well as UL Standard 1971.
- Addressable Manual Pull Box
  - Addressable Manual Stations shall be provided to connect to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops. Up to 159 addressable manual stations may be connected to each SLC loop.
  - The Manual Pull Box shall, on command from the Control Panel, send data to the panel representing the state of the manual switch. Manual Fire Alarm Stations shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
  - All operated stations shall have a positive, visual indication of operation that cannot be reset without the use of a key.
  - Manual Stations shall be constructed of LEXAN (or polycarbonate equivalent) with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.
  - Stations shall be suitable for surface mounting, or semiflush mounting as shown on the plans, and shall be installed in accordance with ADA and local codes.
  - The Manual Station shall provide address-setting means using decimal switches. Addressable manual stations that use binary address setting methods, such as a dip switch, are much more difficult to install and are subject to installation error, and are not allowable substitutes.
- Addressable Photoelectric Detectors
  - Smoke detectors shall be addressable and shall connect with two wires to the Fire Alarm Control Panel Signaling Line Circuit. Up to 318 addressable detectors may connect to two separate SLC loops.
  - The detectors shall use the photoelectric (light-scattering) principal to measure smoke density.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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- The detectors shall be low profile ceiling-mount and shall include a twist-lock base.
- The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a switch) or initiated remotely on command from the control panel.
- The detectors shall provide address-setting means on the detector head using decimal switches. Because of the possibility of installation error, systems that use binary jumpers on dipswitches to set the detector address are not acceptable. The detectors shall also store an internal identifying code that the control panel shall use to identify the type of detector.
- The detectors shall provide an alarm and power LED. The LED shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. The LED is placed into steady illumination by the control panel indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED.
- Addressable Control Module
  - Addressable Control Modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized Audio/Visual appliances or audio speakers.
  - The Control Module shall mount in a standard 4-inch square, 2-1/8" deep electrical box or to a surface mounted backbox.
  - The NAC shall wire in a Class B (Style Y) or Class A (Style Z) fashion. Each control module shall support up to 1 Amp of Inductive or 2 Amps of Resistive Audible/Visual signals.
  - Audio/Visual power shall be provided by a separate supervised power Loop from the main Fire Alarm Control Panel or from a supervised, UL listed Remote Power Supply.
  - The Control Module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Control Panel shall use to identify the type of device. Modules that use binary jumpers or dip-switches are

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX II - SECURITY MEASURES SPECIFICATIONS

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subject to installation errors and are not acceptable. An LED shall be provided that shall flash under normal conditions, indicating that the Control Module is operational and is in regular communication with the control panel.

- A magnetic test switch shall be provided to test the module without opening or shorting its NAC circuit wiring.

### – BATTERIES:

- Shall be 12 volt, Gell-Cell type (two required).
- Batteries (two required) shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 5 minutes of alarm upon a normal AC power failure.
- The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

### 11. External Lighting

- LED Flood Lights with 50W to be installed as indicated in the Drawings outdoor.
- These lighting shall be sufficient to provide average LUX level of not less than 400 lux.
- For Detailed Drawings *\_referred in the drawing E-100\_*.
- For Detailed Specification refer to the **ANNEX IV – Section.18**.
- Qty = 3

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX III - PLUMBING SPECIFICATIONS

### ANNEX III

### PLUMBING SPECIFICATIONS

#### I. PURPOSE

THE PURPOSE OF THIS WORK IS TO SUPPLY AND INSTALL THE REQUIRED MECHANICAL WORKS AND MATERIALS TO MAKE THE OFFICES AND BATHROOMS READY FOR USE AT THE NEW ROOF FLOOR APARTMENT LOCATED IN THE SAME MAIN STREET OF THE UNDP.

#### II. SPECIFICATIONS

##### 12. Plumbing

- Minimum Required Inclination to installing pipes:
  - Using the existing 4" pipe comes from existing WC to connect and install the new pipes.
  - The contractor has to make sufficient inspection before installation the drainage system and check the slope and levels between the existing manholes or clean outlets and the level of floor drains and W.C pipes.
  - The contractor is responsible to check and fix the existing rain drain system on the roof, and ensure the quality of existing floor drain.
  - The Waste Water Pipes have to be installed always under the Utility water System, and have to be covered by cement layer at minimum thickness of 2 cm around the pipe and below the F.F.L at minimum depth of 10cm.
  - Vent pipes shall be extended where required and terminated to Top Roof; if fixings for stays penetrate the roof covering, seal the penetrations and make watertight.
  - PPR Pipe shall be used for Water Supply, PN20, High Quality Products and fittings.
  - Hot Water Supply Pipes shall be thermally insulated.
- General Notes:
  - Provide all drainage pipes for the sanitary ware. These main waste pipes shall be 110 mm PVC. The contractor shall connect the sewerage lines to the existing sewer line.
  - If the slope in the area of works does not allow the contractor to bury the pipes, he shall fix the pipes on concrete bases or attach them properly to the walls. For each case of site, the contractor shall select the best way with full cooperation with Engineers.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX III - PLUMBING SPECIFICATIONS

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- All waste pipes from sanitary ware shall have a water trap or siphon before it is connected to the main waste pipe. Provide cleaning eyes to each waste pipe for access to clear blockages when necessary.
- Provide Floor Drain with Odor Stopper or siphon before connection to main waste pipe. Each Floor Drain shall be connected by 75 mm PVC pipe and fitted with high quality stainless steel Cover.
- Test:
  - The Pipes have to be tested before covering with cement layer by hydrostatic pressure column pipe (4" - 1 m length) mounted on the floor drain and W.C Inlet, and close all other openings by special test equipment or equivalent to do such a test.

### 13. Sanitary wares

- High Quality, Bright White Color free of any cracking or semi cracking.
- Mixer taps are made of brass body and chrome finish, supplied with flexible hoses for hot and cold water. European or any equivalent.
- Installed at a proper height and best fit places as manufacture instructions and recommendations.
- Stainless steel hose connected to mixer tap in W.Cs.
- Stainless steel floor drain cover.
- Washbasins minimum dimensions 45x60cm with half pedestal, supplied with chromium steel hot and cold taps; vandal proof stoppers & S-trap. W.C commodes with flushing cistern in each toilet & Hydro-Auto Closer seat cover. It shall be made of high quality brand.
- Test
  - All Sanitary wares have to be tested before installation, and notice if any scratching or fracture lines appear.
  - If any of previous noticed, the contractor must directly replace with new items without any proposed of their maintenance.
  - The Supervisor Engineer shall approve all the sanitary ware.
- General Installation procedure
  - Use manufacturer's brackets and accessories where these are available and suitable for the mounting substrate.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX III - PLUMBING SPECIFICATIONS

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- If items are concealed, provide access doors of size required for easy access to the items. Provide access doors per specification.
- Deliver fixtures to site protected from damage under site conditions by coatings, coverings and packaging. Remove only sufficient protection to permit installation.
- Where pipes pass through walls, floors and ceilings, sleeves of the same material as the service pipe shall be used. All sleeves shall project 2mm clear of the finished surfaces of walls and floors.
- The Contractor shall be responsible for ensuring that the sleeves are in the correct position at the time they are built in.
- The space between the pipes and sleeves shall be packed with a suitable flexible material to maintain the fire rating of the walls and floors.
- The contractor shall check and review the drawings and visit the site and give sufficient notice so that inspection may be made of the following:
  - Submit nominated samples for approval of the Engineer.
  - If it is intended to incorporate samples into the works, submit proposals for approval. Only incorporate samples in the works which have been approved.
  - Do not incorporate other samples.
  - Keep endorsed samples in good condition on site, until practical completion.
  - If required, submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

### 14. General Installation procedure

- Accessories:
  - Use manufacturer's brackets and accessories where these are available and suitable for the mounting substrate.
- Protection:
  - Deliver fixtures to site protected from damage under site conditions by coatings, coverings and packaging. Remove only sufficient protection to permit installation.
- Inspection:

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX III - PLUMBING SPECIFICATIONS

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- The contractor shall check, review the drawings and visit the site and give sufficient notice so that inspection may be made of the following.
- Submissions:
  - Samples
    - Submit nominated samples for approval of the Engineer.
    - If it is intended to incorporate samples into the works, submit proposals for approval. Only incorporate samples in the works which have been approved.
    - Do not incorporate other samples.
    - Keep endorsed samples in good condition on site, until practical completion.
  - Shop Drawings
    - Submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

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### ANNEX IV ELECTRICAL & IT SPECIFICATIONS

#### I. PURPOSE

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THE PURPOSE OF THIS WORK IS TO SUPPLY AND INSTALL THE ELECTRICAL AND IT IN ADDITION TO THE FIRE ALARM SYSTEM AT THE NEW ROOF FLOOR APARTMENT LOCATED IN THE SAME MAIN STREET OF THE UNDP.

#### II. SPECIFICATIONS

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##### 1. Server/Communication Cabinet

- 24U
- Preferable EU origin made
- Has a transparent impermeable cover with lock and key
- Equipped with fan and two power multi sockets
- Shelf included
- With a locking, reversible front door and locking, removable side panels.
- The enclosure shall meet meets all requirements toward PCI DSS compliance.
- The top and bottom panels of the Cabinet shall be furnished with vents designed to help remove warm air from the enclosure and draw in cool air by convection.
- The top and bottom panels shall be provided with ports for cable routing.
- The Vendor shall provide a Data sheet, catalog or brochure for the offered Item.

##### 2. Data Patch Panel

- The Panel shall be 48 port.
- One To be installed in the Data cabinet in the Roof Floor.
- One to be installed in the Data Cabinet in the Ground Floor.
- The Panel shall be Category 6 hardware patch panel when loaded with RJ45 K6 jacks, shall be compatible with jacks having keystone mounting, and optimized for the K6 and K5e range.
- The Panel shall be Dust protected ports when loaded with K6 or K5e jacks, and shall be in compact modular form, and provide cable management tray.
- The Panel shall include Flexible labelling facilities – port by port, according EIA/TIA 606.

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- It shall include the fixing screws, cage nuts, earthing bolt, cable ties...etc.

### 3. 50 Port Voice Patch Panel

- The Voice Patch Panel shall be of 50 port Voice Patch Panel and shall be dedicated to the termination of vertical cabling, supporting UTP, 4, 50 pair cables in a voice backbone.
- Shall be using standard UTP RJ45 patch cords.
- It shall be supporting pairs 3, 6.
- The Panel shall be Standard 19 rack mount with 50 x RJ45 jacks and Labelling system.
- The Patch Panels shall be installed in the following locations:
  - Two Patch panels to be installed in the Main Building's Data Center.
  - Two Patch panels to be installed in the Ground Floor Data Cabinet.

### 4. 25 Port Voice Patch Panel

- The Voice Patch Panel shall be of 25 port Voice Patch Panel and shall be dedicated to the termination of vertical cabling, supporting UTP, 4, 25 pair cables in a voice backbone.
- Shall be using standard UTP RJ45 patch cords.
- It shall be supporting pairs 3, 6.
- The Panel shall be Standard 19 rack mount with 25 x RJ45 jacks and Labelling system.
- The Patch Panels shall be installed in the following locations:
  - Two Patch panel to be installed in the Data cabinet in the Roof Floor.
  - One Patch panel to be installed in the 2<sup>nd</sup> Floor communication cabinet
  - One Patch panel to be installed in the 1<sup>st</sup> Floor communication cabinet
  - Three Patch panel to be installed in the Ground Floor communication cabinet

### 5. Network switch (48 Ports)

- 48 Gigabit Ethernet ports with line-rate forwarding performance
- 48 10/100/1000 Ethernet ports
- 4 POE ports
- 2 fixed 10 Gigabit Ethernet SFP+ uplinks.
- To be installed inside the Data cabinet in the Roof Floor and in the Ground Floor.
- Approved Brands;
  - Cisco 2960X, or any equivalent

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

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### 6. Network switch (12 Ports For CCTV Termination)

- Ethernet Switch - 12 Ports - Manageable - 12 x POE - 2 x Expansion Slots - 10/100/1000Base-T, 10/100Base-TX - PoE Ports.
- To be installed in the Data Cabinet in the Roof Floor.

### 7. Fiber Optic Patch Panel

- The FO Patch Panel shall conform the following Standards:
  - Electronic Industry Standards (EIA/TIA)
  - International Telegraph and Telephone Consultative Committee (CCITT)
  - ANSI
  - ASTM standards
- The Fiber Optic Patch Panel shall be designed for termination of single mode optical fibers with SC Type connectors inside field equipment cabinets or equipment enclosure racks located within the buildings.
- The patch panel shall include the following accessories for fiber optic cables as required per the contract plans:
  - Mounting bolts
  - SC Type receptacle, Interconnect sleeve or bulkhead adapter
  - Jumper cables
  - Fiber drawers
  - Storage for fiber
  - Cable clamps with strain relief
- Ensure that number of ports is as required per the contract plans.
- Ensure that SC Connector is for Multimode application, pre-radiused, zirconia ferrule, and metallic or composition body with strain relief boot. Ensure that the SC connector meets the following requirements:
  - Operating temperature: -40° C to 60°C
  - Insertion Loss: < 0.25 dB
  - Reflectance: < -55 dB
  - Durability: < 0.3dB change for > 200 matings

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

- The 12-port fiber patch panel shall provide for termination of 12 Multimode optical fibers and applicable for installation in the Data Cabinet.
- The patch panel shall be constructed from 24 gauge (minimum) sheet metal, painted gray.
- The fiber patch panel shall have a clear front cover that is easily removable or opened to provide easy access for cable installation. Ensure that the cover is attached to panel enclosure via hinge or fastened thumbscrews. Ensure that the bottom/back panels provide openings for cable entrance, and provide for strain relief at each entrance point. Ensure that the patch panel provides drawers and other fixtures to maintain the minimum bending radius of fiber cables without strain placed on the cable.
- Ensure that all SC connectors on the patch panel and plug end on jumper cables are capped with an approved cap.
- Ensure that jumper cables (patch cables) are compatible with Multimode fiber and provided with factory installed SC type Multimode connectors. Ensure that the number of jumper cables is equal to the number of patch panel ports. Ensure that length of jumper cables connecting field equipment is as required for each connection. Ensure that spare jumper cables are 3m long. Ensure the fiber optic characteristics of the patch jumper cables meet the same requirements as the ITS Material Specifications for Fiber Optic Cable and manufacturers requirements.

### 8. UPS

- Type: Online
- Form factor: Rack mounted
- Preferable US or EU origin
- To be installed in the Data Cabinet in the Roof Floor.
- The UPS shall meet the following Specifications:

#### Rated Power

KVA	1
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#### AC INPUT

AC Input voltage	230 VAC + 20 %
AC Input Frequency	50 Hz +/- 6 %
AC Input Power factor	0.85 to Unity*

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

### DC CHARGER

Battery Voltage	36V or 48V
Rectifier	IGBT based PFC Type

### AC OUTPUT

Technology	Mosfet Based Double Conversion PWM
Output voltage	230 VAC +/- 1 %
Output Frequency	50 Hz +/-0.5 %
Output Power factor	0.8 to 1 lag
Output waveform	PWM Sine wave
Galvanic Isolation	Inbuilt Galvanic Isolation Transformer Provided
Harmonic Distortion	Less than 3 % on Linear Load
Transient Recovery	± 4 % from 0 to Full load and corrected within 60 msec.
Inverter Efficiency	85 % - 90 % Depending on DC voltages

### INDICATIONS & ALARMS

Indications	Mains on, Inverter On, Battery Low, Over Load, Output Under Voltage, Output Over Voltage, DC Over Voltage
Audible Alarm	Intermittent beep for 30 sec. On mains fail. Battery low pre-alarm at 80 % of Battery discharge. Intermittent Beep for all other Trip Conditions

### PROTECTIONS

Protections	Output Overload, Output short circuit, Battery low trip, DC over voltage, Output under voltage / over voltage.
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### GENERAL

Bypass Facility	Manual / Static Bypass Switch*
Audible Noise	Less Than 50 dB at 1 meter
Design ambient	0-50°C
Relative Humidity	Max. 95 % Non Condensing
Enclosure	M.S. Powder coated with castor wheels.

### 9. Fiber Optic Patch Cord

- Multimode Optical Cords (50/125 µm) shall be suitable for 10 Gb Ethernet network.
- Max. Optical losses: 0.3 dB.
- Length 0.5m.

### 10. Patch Cords

- The RJ45 to RJ45 patch cords shall consist of stranded UTP, 4-pair cable and shall be tested to 100% in compliance with TIA/EIA-568-B. The required colors are blue and white; the supervisor engineer has the right to change the color as required.
- The required length is 0.5m.

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- The Material and work specified herein shall comply with the applicable requirements of:
  - ANSI/TIA/EIA – 568-B Telecommunications Cabling Standard.
  - FCC Part 68
  - ISO/IEC 11801 2nd Edition
  - Or any other equivalent standards

### 11. Armored Fiber Optic Cable

- 4 Cores, 8.5 mm Outer Diameter, 2.3 mm Loose Tube Diameter
- Multimode 50/125
- COMPLIANCE
  - ITU-T G652.B OS1
  - ITU-T G652.D/G655/G657.A1/G657.A2 OS2
  - ITU-T G651.1 OM1 OM2 OM3 OM4
  - IEC60793-2-10 type A1a.1/A1b OM1/OM2
  - IEC60793-2-10 type A1a.2 OM3
  - IEC60793-2-10 type A1a.3 OM4
  - ISO/IEC 11801 , ISO/IEC 24702
  - IEEE 802.3z Gigabit Ethernet
  - ANSI/TIA/EIA 568C.3
  - ROHS compliant Directive 2002/95/EC
- MECHANICAL & ENVIRONMENTAL CHARACTERISTICS
  - Max. Tensile Load : 2000 N
  - Max. Crush Load : 1000 N/100 mm
  - UL Fire Rated : OFNR
  - Operating Temp. : -20 °C to +60 °C
  - Storage Temp : -40 °C to +85 °C
  - Sheath Material Standard : PE
- To be extended and terminated at both Data Cabinet and Main Building's Data Center.

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### 12. Voice Cable

- 100 or 25 pair 0.5mm Dia Armoured Jelly filled Telephone cable annealed bare copper conductor, insulated with 0.25mm solid polyethylene and 2.2mm sheathed.
- The 100 pair to be connected between both Data Cabinet's Voice Patch Panel in the Ground Floor and the Data Center in the Main Building.
- The 25 pair to be extended and terminated between the Voice Patch Panel in the Roof Floor and to the Patch Panels in the following locations:
  - One cable from GF to the 2<sup>nd</sup> Floor communication cabinet
  - One cable from GF to the 1<sup>st</sup> Floor communication cabinet
  - One cables from GF to the Roof Floor communication cabinet

### 13. RJ45 socket UTP CAT6

- The Socket shall take AWG 22 single-core cables up to AWG 26 and AWG multicore cables, and the contacts marked with dual color code and wiring schemes T568 A and T 568 B.
- The Socket shall Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-1 and TIA/EIA 568 C. Or any other equivalent standards
- All flush-mounting boxes, support frames and plates shall be provided from the same brand selected, and suitable for the function and appearance.
- Wherever the Sockets are installed in the Existing Masonry Block, the Flush Mounting Boxes shall be used and the Sockets shall be installed within 3, 4 or 6 modules according to the other sockets beside.
- The Data Sockets shall include labeling for identification purposes. In addition, they shall have the shutter in the front of faceplate.
- This Socket will also be applied for Voice Sockets.
- The RJ45 jack shall be frontal (not facing the ceiling or the ground).
- The RJ45 Cat. 6 UTP Connector shall be provided separately and from the same brand. **"The integrated RJ45 Cat.6 with the Socket will not be acceptable"**.
- The Vendor shall provide a Data sheet, catalog or brochure for the offered Item.

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### 14. CAT.6 Cables

- The Cables shall be according to EIA/TIA 568-C.2 CAT6 CABLE; UTP for Internal Installation and SFTP for External Installations.
- CAT.6 UTP Cables to be connected and terminated from the Data and Voice patch panels from one side to the outlets on the other side as per the drawing (Data outlets terminated to Data patch panels and Voice outlets to Voice patch panel).
- CAT.6 UTP Cables to be extended and terminated from the each Indoor Cameras in the Roof Floor and Ground Floor from One side to the 12 Ports Network Switch and to the NVR respectively.
- CAT.6 SFTP cables to be extended and terminated between the Data Patch Panel in the Roof Floor and the existing Patch Panels in the following locations:
  - One Cable to the 2<sup>nd</sup> Floor Communication Cabinet.
  - One Cable to the 1<sup>st</sup> Floor Communication Cabinet.
  - Two Cables to the Ground Floor Communication Cabinet.
  - Two Cables from the Data Center in the main Building to the Ground Floor Data Cabinet.
- CAT.6 SFTP Cables to be extended and terminated from each Outdoor Camera in the Roof Floor, and Ground Floor from One side to the 12 Ports Network Switch and to the NVR respectively.
- When laying the Cables, extension of 0.5m shall be applied for each Data/Voice Socket, 1m for each Camera, and 1.5m in the Data Cabinet.
- The Quantity will be calculated in meter.

### 15. 16A Schuko German Standard Socket Outlets

- All sockets shall be 16A Schuko Type F, from a well-known brand.
- All flush-mounting boxes, support frames and plates shall be provided from the same brand selected, and suitable for the function and appearance.
- The Sockets shall meet the below Specifications table;

ITEM	VALUE
Number of Gangs	1
Colour	As specified by the Supervision Team
Switched	No

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ITEM	VALUE
Socket Type	Type F - German Schuko
Mounting Style	Flush Mount
Current Rating	16A
Voltage Rating	230V ac
Material	Plastic
Number of Modules	2
Terminal Type	Screw
Faceplate Mounting Type	Clip in
Fixing Standard	Schuko
Earth Terminal	Yes
International Protection Rating	IP40

- The Vendor shall provide a Data sheet, catalog or brochure for the offered Item.

### 16. Lighting Fixtures

- The Lighting Fixtures shall be according to the Drawings and specified as LED.
- The Wattage for each luminaire Type shall be as indicated in the Drawings.
- The Contractor shall provide samples before submission, and Data sheet/ Photo in his Offer.
- Wherever the Lighting Fixtures installed External or in a wet area, the IP shall be not less than IP45.
- The Contractor shall provide 2 Fixtures Unit for each Type as a spare except for the Flood Light (50W).
- All External Lighting shall be IP68, and ensure proper Water-proof casing.
- All the Lighting Fixtures shall be controlled manually from a switch, except the Entrance, it shall be controlled two occupant sensors with override switch; one sensor will be mounted above the Main Door, and the other at the bottom of the Staircase.

### 17. Emergency Lighting

- Emergency Exit Sign and Routes shall be 5W, LED, and the base shall be recessed in the False ceiling.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR

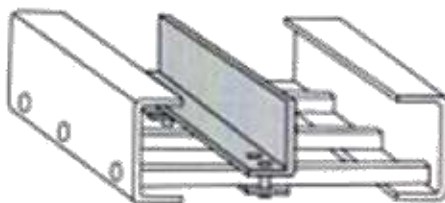


## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

- Battery-operated emergency lights shall use only reliable types of rechargeable batteries provided with suitable facilities for maintaining them in properly charged condition.
- Maintenance-free, rechargeable Ni-Cad battery “Other Options may be applied depends on the availability in the market”.
- Internal solid-state transfer switch automatically connects the internal battery to LED Board for minimum 90-minute emergency illumination.
- Charge rate/power “ON” LED indicator light and push-to test switch.
- Fully automatic solid-state, two-rate charger initiates battery charging to recharge a discharged battery in 24 hours.
- The connected power shall be from nearest power supply socket.

### 18. Cable Trays, Conduits and Trunking

- The Cable trays shall be installed as indicated in the Drawings, 250mm each. One for Low Current Wiring, and the other for High Current Wiring.
- The Distance between each one shall be allowed for installing, maintenance and not affecting each other signaling.
- The Cable Trays shall be G.I Metal, with thickness capable for handling the weight of the installed Cables with Safety Factor of 50%.
- The Contractor shall install a Divider Strip in the Cable Tray for Data/Voice System Cables and CCTV System Cables (@200/50mm respectively).



*Strip Divider*

- The Conduits, Trunking and Flexible Tubes shall be made from high Quality products and ensure proper strengthen when installation and pulling the cables. They shall be with the proper size to fit all the installed cables with 50% free space.
- The Trunking shall be installed as noted in the Drawings. Perfect appearance shall be applied.

# REHABILITATION OF THE UNDP PREMISES ON THE ROOF FLOOR



## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

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- Coordination shall be applied wherever needed and for all MEP installation.

### 19. Air Conditioner

- Supply, installation, commissioning and testing of split ACs using proper tools and procedures.
- Refinishing/closing of all holes/penetrations, done for the installation of the ACs, by the supplier using his material, manpower and tools.
- Supply of O&M manual
- One year onsite servicing and guarantee after installation.
- Guarantee Period: Minimum of 12 months.
- Feature of the required Split Air Conditioner;
  - Capacity: 12,000 BTU/h [1 ton]
  - Outdoor Temperature : -7 °C (Winter) - +45 °C (Summer)
  - Energy Efficiency rating : A
  - Compressor Type: Rotary type / Scroll Type
  - Modes: Dehumidification/ Heating (with Heat Pump)/ Cooling/ Auto Modes
  - Speed Setting: 3 Fan Speed
  - Low Noise Level
  - Control : Microprocessor controlled codeless remote
  - Power Source (V/Hz/O) : 230/50/1
  - Display : LED/LCD
  - Remote control distance : Min 6 meters
- The Contractor shall submit the Brochure/Manual for the selected Brand and Model indicating the above features as minimum characteristics of the AC.
- The AC shall be submitted in its Original Packaging Case without any deflection or renovation Packaging.
- The Drainage of the AC to be installed wherever applicable to the nearest floor drain or directly to outside.
- The AC shall be installed according to the manufactures recommendation and instructions.
- Cooper Pipes shall be suitable to the AC as per the manufactures instructions and recommendations; Insulated with high density Armoflex; Gas and Liquid Pipes shall be separately insulated.

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## ANNEX IV - ELECTRICAL & IT SPECIFICATIONS

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- Acceptance of Testing shall be made to the followings;
  - Working 3 hours daily for three days.
  - Noise Level
  - Fan Speed
  - Operation Modes
  - Drainage of condensing water.
  - Remote Control with all features.

### III. GENERAL TERMS AND REMARKS

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- All IT equipment provided should have a one Year warranty.
- Printed labeling for Data, Voice outlets and cables.
- Printed labeling for the patch panel, patch cords, Access points and all data & voice outlets.
- Contractor is required to provide weekly progress report on all items.
- Contractor might advise on solutions that reduces cables and conduits' quantities.
- The Quantity may be increased or decreased according to the current conditions and installations.
- General Installation procedure for Electrical Works:
  - Accessories:
    - Use manufacturer's brackets and accessories where these are available and suitable for the mounting substrate.
  - Protection:
    - Deliver fixtures to site protected from damage under site conditions by coatings, coverings and packaging. Remove only sufficient protection to permit installation.
  - Inspection:
    - The contractor shall check, review the drawings and visit the site and give sufficient notice so that inspection may be made of the following.
  - Submissions:
    - Samples
      - Submit nominated samples for approval of the Engineer.
      - If it is intended to incorporate samples into the works, submit proposals for approval. Only incorporate samples in the works which have been approved.

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- Do not incorporate other samples.
- Keep endorsed samples in good condition on site, until practical completion.
- Shop Drawings
  - Submit dimensioned drawings showing details of the fabrication and installation of services and equipment, including relationship to building structure and other services, cable type and size, and marking details.