

PART -IV**PARTICULARS OF SPECIFICATIONS FOR CONSTRUCTION****1. EARTH WORK:****1.1 Site Clearance:**

Clearance of site and removal of bushes and vegetation as per Engineer-in-Charge/Architect's instruction and the Contractor own cost. This item shall be executed as per Clause No. 2.4 of CPWD Specifications Vol. I with up to date correction slips. (Site area as per site plan Drg No : 0403-RG-01-TD-01L1, Sheet-01, dt: march 16)

1.2 Setting out and Marking Profiles:

Setting out of the work/buildings in the plot shall be carried out by the Contractor as per the instructions of the Architect and demarcation plans supplied by the Architect with the help of masonry pillars to serve as bench mark.

All existing ground levels shall be taken **at 5 meters intervals**. Ground levels shall be recorded in the field book. The Contractor at his own cost shall supply the labour required for taking levels. This item shall be executed as per Clause No. 2.5 of CPWD. Vol. I of 2009 with up to date correction slips.

(Site area & Lay out as per site plan Drg No : 0403-RG-01-TD-01L01, Sheet-1, dt march/16)

1.3 Excavation:

Excavation in all kinds of soils for raft foundation, column footings and plinth beams in the available soil at site of work as per drawings/excavation plans and structural drawings as provided by the architect for different components of the project. **Measurements for payment shall be as per relevant CPWD norms and specifications.** Surplus earth to be disposed of as per directions of Engineer-in-charge. (Drg No : SDC-1056 & 1056- A/ STR/01 & 02/dt 31.12.15.)

1.4 Filling of available earth/earth brought from outside:

Available earth or sand/earth or sand brought from outside filling around foundations or as and where ever required by the Development Authority including disposing of surplus earth within the site. The filling shall be done in layers not exceeding 20 cm in depth. Each layer leveled, watered, rammed and consolidated around foundations, under floors, wherever required and in other situations to make levels/slopes as shown in drawing. Nothing extra shall be paid on this account.

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This item shall be executed as per Clause No. 2.23 of CPWD. Vol. I and II 2009 with up to date correction slips. (Drg No : SDC-1056 & 1056 A/ STR/01 & 02/dt 31.12.15.)

1.5 Sand filling:

Sand filling under floors to be as per drawings, the compacted thickness as required as per the drawings. Sand shall be clean free from dust, organic and foreign material. The filling is to be watered and consolidated under the floor to obtain desired thickness. This item shall be executed as per Clause No. 2.24 of CPWD. Vol. I and II 2009 with up to date correction slips. (Drg No : SDC-1056 & 1056 A /STR /07/dt 31.12.15)

1.6 Anti Termite Treatment

Anti Termite treatment shall be done as specified in IS:6313 (Part-II) for pre-construction soil treatment or as specified in Clause No. 2.28 of CPWD Specifications Vol. I 2009 with up to date correction slips. **Measurement for payment shall be as per CPWD norms.** (Area for anti termite treatment as per Drg No: SDC-1056 & 1056A/STR/01 & 02 / dt 31.12.15)

2. CONCRETE:

2.1 Applicable Codes and Standards:

The codes and standards generally applicable to the work of this section but not limited to the list herein-after including latest corrections and revisions:

IS 8112	Specifications for 43 Grade Ordinary Portland Cement.
IS 516	Methods of test for strength of concrete.
IS 1199	Methods of sampling and analysis of concrete.
IS 1489- Part-1	Portland Pozzolana Cement (Fly ash Based).
IS 2386 & IS 383 (Part-I, II & III)	Method of testing for aggregate for concrete
IS 2645	Integral cement water proofing compound.
IS 3414	Code of practice for design and installation of joints in building.
IS 3558	Code of practice for use of immersion vibrators for consolidating concrete.
IS 4082	Recommendations on stacking and storage of construction materials at site.
IS 4926	Code of Practice for Ready Mixed Concrete
IS 6925	Methods of test for Determination of water soluble chlorides in concrete admixtures.
IS 9103	Admixtures for concrete.

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- All concrete mix shall be as per specifications and grade required for a particular item as per drawings and specifications. Coarse sand and Stone aggregate used shall conform to IS: 2386 Part-I and IS: 383 respectively.
- OPC shall be used in all RCC work.
- PPC or OPC shall be used in all works other than RCC work viz. Lean Concrete, Concrete sub floors, Masonry, Plaster, C.M. bed under flooring.

2.2 P.C.C. (Plain Cement Concrete):

- P.C.C. 1:5:10 (1 cement, 5 coarse sand, 10 graded stone aggregate 40mm nominal size) as per the drawings in foundation viz footings, Raft, under floor, or as and where indicated in drawings excluding centering and shuttering and curing for minimum 7 days. Stone aggregate shall conform to IS 383. This work shall conform to CPWD Specifications 2009 with up to date correction slips for cement concrete work Clause No. 4.1 for materials and Clause No. 4.2 for mixing, and laying.

(Drg No : SDC-1056 & 1056A/ STR/01 & 02 / dt:31.12.15)

- P.C.C. 1:5:10 (1 cement, 5 coarse sand, and 10 brick aggregate 40-mm nominal size) in sunken portion as indicated in drawings including curing. Brick aggregate shall conform to IS:3068. The work shall conform to CPWD Specifications 2009 with up to date correction slips for cement concrete work Clause No.4.1 for materials and Clause No. 4.2 for mixing.

(Drg No : SDC-1056 & 1056 A/STR/08/Dt 31.12.15)

- P.C.C. 1:3:6 (1 cement, 3 coarse sand, 6 graded stone aggregate 20 mm nominal size in concrete blocks for hold fasts for frames, bed-blocks, C.I. pipe covering or where ever required including centering and shuttering, if required and curing for 7 days. ***The number of Holdfasts and size as per relevent CPWD norms and specifications.***

(Door window schedule Drg No : 0403-RG-01-TD-01/02D01, SHEET 19, dt march 16)

- The proportioning for cement concrete (non-structural concrete) can be done by volume. Measuring boxes shall be made out of either timber or steel, coarse and fine aggregates shall be measured for volumetric proportioning with measuring boxes. Concrete shall be mixed in mechanical mixer of adequate capacity to mix one bag of cement at a time with the required proportions of concrete mix. The mixer shall have hopper attachment. One bag of cement will be deemed to weigh 50 kg and measure 1.25cft. in volume. Water shall be measured with calibrated cans.

2.3 R.C.C. (Reinforced Cement Concrete)

- ***Design mix M-25 Gr of cement concrete shall be used in footings Rafts, columns, Beams & Slabs and RCC walls .***

(General Note No -4 of DRG NO : SDC-1056 & 1056- A/ STR/01&02/dt 31.12.15)

- M-25 GR concrete shall be with minimum 330Kg of O.P.C cement per cum of concrete.
- All charges relating to preparation of design mix from a govt approved reputed engineering institute / NABL accredited Private laboratory and testing of Components of design mix in laboratory shall be paid by the contractors. (The contractor to take prior approval from the Engineer-in-charge for selection of engineering institute / private laboratory.) Aggregate samples used in Mix design to be displayed in glass / PET jars in field laboratory for reference.
- All RCC items for the purpose of this tender shall be carried out as per nomenclature of the relevant item.
- Ready Mix R.C.C. or/and design mix concrete at site of grade M-25 in foundations RCC walls, columns, plinth beams and beams, lintels, staircases and landings, suspended slabs, chhajjas and other RCC members etc. with graded stone aggregate 20mm nominal size with specified reinforcement. The work to be carried out as per Clause No. 5.9 of CPWD specifications 2009 with up to date correction slips for Cement concrete and R.C.C. work.
- For all Reinforced cement concrete work other than Ready Mix, batch mixing/RMC plant of appropriate capacity shall be used.
- Weigh batcher of min. 0.5 cum. Capacity with an arrangement to control quantity of water with electronic sensors may be used with permission of Engineer-in-charge.
- The concrete shall be cured and protected for a period of 14 days (minimum) from the day of placing concrete in position.
- Concrete for all reinforced concrete work such as foundations, R.C.C. walls, columns, beams, slabs etc. shall be deposited and well consolidated by vibrating using mechanical vibrators. Rest of the concrete work such as chhajjas & shelves etc shall be deposited and well consolidated by punning and tamping. Care shall be taken to ensure that concrete is not over vibrated so as to cause segregation.
- The Contractor shall be issued Structural drawings with sufficient details to enable the Contractor to carry out the work. The Contractor should prepare the Bar Bending Schedules, shop drawings for structural steel work etc. and get them approved from the Architect/Engineer-in-charge.
- Concreting shall be commenced only after the Project Engineer has inspected the centering, shuttering, reinforcement and electrical conduits/junction boxes/fan clamps

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etc. as placed and passed the same in writing (i.e. filling of pour card as specified).

2.4 Reinforcement & Structural Steel:

- Reinforcement Steel confirming to Clause No.5.1.3 CPWD specifications 2009 with up to date correction slips for Cement concrete and R.C.C. work for reinforcement shall be used.
- Straightening, bending, binding and placing in positions at all levels and heights, as per drawings, shall be the responsibility of the contractors.
- Laps and crossings shall be tied with soft drawn MS wires of size not less than 0.9 mm.
- The contractor shall be responsible for accurate placing of reinforcement as shown in drawings and shall not place any concrete until the reinforcement has been checked. The laps shall be provided as per drawings.
- The contractor shall provide proper cover to reinforcement as shown in drawings by using cover blocks & nothing shall be paid extra in this account.
- All structural steel shall be fabricated and fixed at site as and where shown in drawings. (General Note no- 5 of Drg No : SDC-1056 & 1056- A/ STR/01 & 02/dt 31.12.15)

2.5 Centering and shuttering:

- Shuttering used shall be of sufficient stiffness to avoid deflection and joints shall be tightly butted to avoid leakage of slurry.
- The material used for formwork for foundations, R.C.C. walls, columns, plinth beams, beams, suspended floor, roofs, lintels, landings, & staircase should be of steel or water proof ply.
- The material used for centering and shuttering shall be strong enough to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it during and after casting of concrete. The Contractor shall use Acrospan/Telescopic and base plates for formwork for slabs.
- It shall be made sufficiently rigid by using adequate number of ties and braces where required shall be provided to make up any settlement in the formwork either before or during the placing of concrete.
- The formwork shall be removed without damaging the surface of concrete or disturbing other sections.
- All the vertical supports should be of steel tubes with extension pieces i.e. Adjustable props. Ballies for support shall be permitted at specific positions with permission/approval of Architect/Engineer-in-charge.


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- In case of structures with two or more floors, the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the top most floors already cast.
- The shuttering should be properly repaired before use and properly cleaned to avoid stains, honey combing, seepage of slurry through joints etc.
- Suitable camber shall be provided in horizontal members of structure, especially in cantilever spans to counteract the effect of deflection. The formwork shall be so assembled as to provide for camber. The camber for beams and slabs shall be 4 mm per meter (1 to 250) or as directed by the Architect, so as to offset the subsequent deflection. For cantilevers the camber at free end shall be 1/50th of the projected length or as directed by the Architect.
- Proper shuttering oil is to be used on formwork before casting.
- The items shall be deemed to include for small and incidental labour such as Splays, rounded or covered angles, rebate instructions.
- Minimum period for striking Form work shall be 3 days for soffit of slabs (props to be refixed immediately after removal of formwork), after 7 days in case of soffit of beams (props to be refixed immediately after removal of formwork), removal of props for slabs spanning up to 4.5 meter after 7 days, removal of props for slabs spanning over 4.5 meter after 14 days, removal of props for beams spanning up to 6 meter after 14 days, removal of props for beams spanning over 6 meter after 21 days from the day of casting in normal circumstances, except for vertical formwork to walls, columns and beams can be removed after 24 hours from the time of casting, as per Clause No. 5.2.3.7 of CPWD Specifications 2009 with up to date correction slips for cement mortar, cement concrete and RCC work.
- All propping and centering should be of steel tubes with extension pieces, specifications duly approved of Architect. Staging shall be made sufficiently rigid by adequate number of ties and braces and extended with sufficient overlaps. Screw jacks or hard board wedges where required shall be provided to make up any settlement in the formwork before/during the placing of concrete.
- Shuttering used shall be of sufficient stiffness to avoid deflection and joints shall be tightly butted to avoid leakage of slurry. Shuttering plywood and steel shuttering with plane surface without dents etc. shall be used for shuttering and runners of required size shall be provided suited to the shuttering material. Shuttering surfaces shall be coated with suitable oil.


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2.6 Construction joints:

Concreting shall be carried out continuously up to the construction joints. Construction joints shall be provided as shown in structural drawings and as per Clause No. 5.4.4 of CPWD Specifications 2009 with up to date correction slips for Cement mortar, Cement concrete and R.C.C. work. The number of such joints shall be kept to minimum.

2.7 Expansion joints:

Expansion joints shall be provided as shown in structural drawings and as per Clause No. 5.4.5 of CPWD Specifications 2009 with up to date correction slips. **(To be provided for Towers & Boundary wall)**

3. MASONRY WORK/BLOCK WORK.

The 200 X100 X 70 mm fly ash bricks shall be used . They should be sound, compact and uniform in shape and colour. Bricks shall have smooth rectangular faces with sharp and square corners. Fly ash Bricks shall be free from visible cracks, flaws, warpage, nodules of free lime & organic matter and shall be machine moulded. Bricks shall have frog of 100 mm. in length, 40 mm. in width and 10 to 20 mm. deep on one of its flat sides. Fly ash shall conform to grade I or grade II of IS :9103. All half brick walling shall be provided with 6mm ms rods every 3rd layer. The fly ash bricks to conform to I.S.12894 : 2002 and have a minimum compressive strength of 75 kg/sq.cm

4. A. DOOR FRAMES

Providing and fixing frames made of **Marandi wood** as specified in the drawings, size of sections for Main entrance and all Internal door frames shall be finished size of cross section as shown in drawings. All door frames to be painted as per Architectural drawings with suitable synthetic enamel paint.

This item shall be executed as per Clause No. 9.3 of CPWD Specifications. Vol. I-2009 with up to date correction slips.

Sr. No.	Item	Frame Size (mm)		
1	Main Entrance Door frame	125	X	62.5
2	Other door frames in the flat	125	X	62.5

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The Main door Frame and Balcony door frames to be provided with double rebate . One rebate shall be kept unutilized for end users to fix mosquito proof door of their choice. One rebate only to be used for fixing of flush door by contracting agency .

Bed room & Toilet door frames to be provided with single rebate.

(Drg No: 0403-RG-01- TD- 01/02D01, Sheet no-19 /dt mar16)

B. DOOR SHUTTERS

Flush doors 35/30 mm (for main door & internal doors respectively) thick conforming to IS : 2202 (Part-I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters. 1 mm thk lamination to be provided to Main door shutters on out side only. 2nd class Teak wood lipping to be provided for main door and shall be painted with synthetic enamel paint of approved shade with due finish and using primer coat. Inside of the Main door to be painted with synthetic enamel paint. All other Internal doors also to be painted with synthetic enamel paint of approved shade on both sides. Inside of Toilet door shutter to be fixed with 1mm thk aluminium sheet to full height for water proofing. All shutters shall be provided with hardware(fittings for Doors & windows) as per following details:



1. Hardware for doors

A) Main Door :

a) Providing and fixing bright finished brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. Complete --- 1 No

b) Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete : 200x10 mm----- 1 NO , 150x10 mm---- 1 NO

c) Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. Complete.. Twin rubber stopper----- 1 no.


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B) Internal Doors : (Bed rooms)

a) Providing and fixing bright finished brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. Complete --- 1 No

b) Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete : 200x10 mm----- 1 NO, 150x10 mm---- 1 NO.

c) Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. Complete.. Twin rubber stopper----- 1 no.

Balcony doors : (inside):

a) Providing and fixing aluminium sliding door bolts, ISI marked anodised anodic coating not less than grade AC 10 as per IS : 1868), transparent or dyed to required colour or shade, with nuts and screws etc. complete : 300x16 mm- 1 no.

b) Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete : 200x10 mm----- 1 NO , 150x10 mm---- 1 NO.

c)Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. Complete.. Twin rubber stopper----- 1 no.

d) Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete : 125 mm- 2 NOS (INTERNAL &EXTERNAL).

C) Toilet Doors :

a) Providing and fixing aluminium sliding door bolts, ISI marked anodised anodic coating not less than grade AC 10 as per IS : 1868), transparent or dyed to required colour or shade, with nuts and screws etc. complete :

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300x16 mm- 1 no

b) Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete : 200x10 mm----- 1 NO, 150x10 mm---- 1 NO.

c) Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete : 125 mm- 2 NOS (INTERNAL & EXTERNAL).

2. Windows & ventilators :

• **Powder Coated Aluminum 2 track openable windows with 5.5 mm thick toughened glass shall be provided.** The minimum weight of Aluminum shall be 5.0 Kg per sqm of window opening, wherever used and as per approved shop drawing. Ventilators to be fabricated as per Architectural drawings. **Profile Sections of windows & ventilators to be strictly from reputed manufacturers like Hindalco, INDAL and Jindal.**

All required Hardware to be included in the window/ ventilator system.

(Drg No: 0403-RG-01- TD- 01/02D01, Sheet no-19 /dt mar16)

3. Fixing Details for frames :

- Vertical members of door frames shall be embedded below finished floor level. The portions of the frames embedded in floors and these in contact with wall/concrete portions shall be given a coating of coal tar. All door shutters shall be fixed at floor level and the bottom edge of shutters shall be 10 mm above the finished floor.
- Wood primer shall be applied on the surface of wooden frames.
- Doors frames shall be fixed in position only after completion of masonry work but before commencement of plastering, necessary opening shall be left in the walls to receive the door frames. Hold fast for door frames shall be embedded in position by providing PCC (1:3:6) cast-in- situ blocks. PCC (1:3:6) to be provided as per relevant specifications.
- Whenever frames are required to be fixed adjacent to R.C.C. columns, the frame shall be fixed with dash fasteners as required in lieu of hold fast.
- MS flat iron 40mm x 5mm and 300mm long shall be provided for Hold fast. Hold fast shall be fixed to the frames with 10mm dia bolts & nuts in wooden plugs and embedded in CC blocks of 300 x 100 x 150 mm in 1:3:6 mix.

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- Minimum of three holdfasts shall be fixed on each side of doorframes one at center point and other two at 30 cm from the top and bottom of the frames.
- Wherever the frame and wall is in the same plane, timber architrave of hard wood as filler shall be fixed as shown in drawings.

Painting shall be done on door frames as per relevant clause of the tender documents. (Drg No: 0403-RG-01- TD- 01/02D01, Sheet no-19 /dt mar16)

4. Electrical shaft door :

2 Hr fire rated Metal fire door with glazing as per architectural drawing.

5. Fire door :

2 Hr fire rated Metal frame and metal shutters with fire rated glass vision panel and hardware as per following specifications:

b) Providing and fixing of Hollow metal fire rated doors as per IS 3614 part-1 & part-2 for stability and integrity.

c) Pressed Galvanized steel conforming to IS 277 with the following specification. Recommended fire door shall have doors tested at CBRI for maximum rating of 2hrs tested .

d) Individual Test certificates should also be available for glass used in visionlites confirming the required fire ratings /panels being a part of the fire door assembly.

e) Doors should be finished in Thermosetting Powder Coating desired RAL Shades. Manufacturer test certificate shall cover doors both single & double leaf doors and Hardware should pass European certificate "CE" of conformity / UL with required fire ratings. Any deviation in specification and sheet thickness other than what is mentioned in the test certificates are not allowed.

f) Proper label confirming the type of door and the hourly rating is mandatory.

Approved manufacturer Navair International Ltd or equivalent subject to architect's approval. And should be ISO Certified company.

g) Door frame shall be double rebate profile of minimum size 154mm X 77 mm made out of 1.60mm (16gauge) minimum thick galvanized steel sheet. NDRF 154x77 Frames shall be Butt jointed and field assembled with self bolted.

h)The frames should be finished with Thermosetting Powder Coating in desired RAL Shade.


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- i) All provision should be mortised, drilled and tapped for receiving appropriate hardware. Frames should be provided with back plate bracket and anchor fasteners for installation on a finished plastered masonry wall opening.
- j) Door leaf shall be minimum 49mm thick fully flush double skin door with or without visionlite. Door leaf shall be manufactured from 1.20mm minimum thick galvanized steel sheet.
- k) The internal construction of the door should be rigid reinforcement pads for receiving appropriate hardware. The infill material shall be Rockwool treated with Viper FRS 881 LH. All doors NSD 12049 shall be factory prepped for receiving appropriate hardware and provided with necessary reinforcement for hinges, locks, and door closers.
- l) The edges should be interlocked with a bending radius of 1.4mm. For pair of doors astragals has to be provided on the meeting stile for both active and inactive leaf.
- m) Visionlite wherever applicable should be provided as per manufacturers recommendation with a beading and screws from inside. However the glass should be contra flam Door lite 11 mm of minimum size 350mm x 600mm clear 120 min fire rated and partially insulated (EW120), Clear Toughened, interlayer glass having a sound reduction of >37dB, LT of 86% and compliant to class 2(B)2 category of Impact Resistance as per EN 12600 standard from Glass manufacturer.(Payable in separate ite.)

6. Fire rated glass for fire rated doors vision panel:

- a) Supply and fixing of Interlayer FR Glass of Saint-gobain, Torch, Glaberwel make minimum 11 mm thick interlayer, 120 minutes fire Rated (EW120, EI 15 minutes)
- b) Non Wired, Toughened Interlayer Glass of approved make which can also withstand thermal shock up to 800 degree centigrade shall be used as a glazing (Vision Panel Top/side fixed glazing) and is to be fixed in between the glass beading by using ceramic fiber in accordance with BS : 476 Part 22/ EN 1363 EN 1364 for stability and integrity of size 300 mm x 500mm (Clear vision) and the manufacturer should have tested the glass of similar or bigger size with any type of door framing from CBRI Roorkee .
- c) The Location of the Fr Glass will be as per the directions of Engineer-in-charge (Actual Glass size will be measured for payment).as per the directions of Engineer-in-charge

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4 Panic Bar. (Required For Fire Staircase & Lift Lobby Location Doors Only) as per the directions of Engineer-in-charge

e) Supply & fixing of door closers of BLC-0408 Becker Fire Solution/ TS-73V DORMA / TS2000 GEZE Make. (Required For All Fire Doors Except Shaft Door) as per the directions of Engineer-in-charge

f) Supply & fixing of anchor fasteners of HILTI/ FISHER/ Equivalent of maximum 80mm length. as per the direc)

Fixtures for Fire doors

a) Supply & fixing of SS Ball Bearing Hinges of size 100 x 75 x 3mm complete with SS Screws of BB1953 Becker Fire Solution / 3090F DORMA / 8011008 GEZE Make (4 Nos per panel) (Required For All Doors) as per the directions of Engineer-in-charge

b) Supply & fixing SS Touch Type SBL 990 Series Becker Fire Solution / PHA2000 Series DORMA / 8026344/45 GEZE Make SS Touch type Panic Bar single / double leaf panic exit devices. (Required For Fire Staircase & Lift Lobby Location Doors Only) as per the directions of Engineer-in-charge

c) Single Leaf Panic Bar Set

d) Supply & fixing of SS Touch Type SBL 990 Series Becker Fire Solution / PHT-3905 DORMA / 8026301 GEZE Make Panic Trim For Operation From The Other Side .

e) Supply & fixing of Mortise Dead Lock DL7260 Becker Fire Solution / 288A DORMA / 8014002/ 8245207 GEZE Make. (Required For Shaft Door. AHU. Server Room, LT Panel Room , DH Room, Location) as per the directions of Engineer-in-charge

f) Supply & fixing of SS D Type Pull Handle of size 300mm mm Long of PHD2230 Becker Fire Solution/ 8133006 GEZE/ TGD130022 DORMA Make. Required For Shaft Door. AHU Server Room, LT Panel Room , DH Room, Location)as per the directions of Engineer-in-charge

g) Supply & fixing of SS D Type Pull Handle of size 300mm mm Long of PHD2230 Becker Fire Solution/ 8133006 GEZE/ TGD130022 DORMA Make. Required For Shaft Door. AHU Server Room, LT Panel Room , DH Room, Location)as per the directions of Engineer-in-charge

h) Supply & fixing of Stainless Steel 304 grade 300mm Long Concealed Flush Bolt of BFBS1930 Becker Fire Solution / 9114306 DORMA/ 8157007

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GEZE Make with necessary screws as required in Double Leaf Doors Only.

5. RAILINGS AND GRILLS:

a) Staircase Railing

M.S. railing of height as specified in the drawings (minimum 1200 mm above floor) is to be fixed to staircase as per the fixing details as indicated in the drawing. This item includes fabricating, erecting, preparing the surface, cleaned with sandpaper to remove scales & rust and applying a coat of red oxide, zinc chromate primer confirming IS: 2074, finished with Synthetic Enamel paint of approved shade at all levels and positions wherever required.

(Drg No : 0403-RG-01-TD-01/02D02, Sheet-20, dt Mar-16)

b) Balcony Railing

Balcony railing in M.S. of 1200 mm high fixed in position as per the fixing details as indicated in the drawing. This item includes fabricating, erecting, preparing the surface, cleaned with sandpaper to remove scales & rust and applying a coat of red oxide, zinc chromate primer confirming IS: 2074, finished with Synthetic Enamel paint of approved shade at all levels and positions wherever required. (Drg No : 0403-RG-01-TD-01/02D09, Sheet-30, dt Mar-16)

c) Plumbing Shaft Doors

MS door Frame with shutter to be provided in plumbing shaft. Main frame shall be made/fabricated with MS angle iron frame 35 x 35 x 5 mm and fixed with MS Holdfasts as shown in the drawings. Holdfasts for doors shall be embedded in PCC 1:2:4 blocks built in brick work. The Door shutter Frame should be made/fabricated with MS angle frame 25 x 25 x 6.25 mm with 20x6 mm thick MS flat horizontally to act as support frame @ 150 mm c/c welded to angle iron frame and over that 3 mm thick MS plain Sheet Welded to Frame. Two coats of anti-corrosive paint over a coat of primer shall be provided as per CPWD specifications.

(Drg No: 0403-RG-01- TD- 01/02D01, Sheet no-19 /dt mar16)

6. WATER PROOFING & TERRACING

- 1) Area as shown in drawings shall be rendered waterproof as per the treatment/process indicated in the drawings. Specifications for the work shall be as under for different type of treatment.

(Drg No : 0403-RG-01-TD-01P03, Sheet no- 13, dt Mar-16) and (Drg No : 0403-RG-01-TD-01P04, Sheet no- 14, dt Mar-16)

- 2) Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of:

Providing and laying water proofing treatment in 100 mm sunken portion of WCs,
ARINEM Consultancy Services Private Limited

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bathroom etc., by applying cement slurry mixed with water proofing cement compound consisting of applying : a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/sqm. This layer will be allowed to air cure for 4 hours. b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours. The rate includes preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry. (Drg No : 0403-RG-01-TD-01/02D04, Sheet no- 22, dt Mar-16)

- i. All sunken area to be filled with Cement Concrete consisting of 1:5:10 (1 cement, 5 coarse sand, 10 Brick aggregate of 40mm nominal size).

● **Water Proof Plaster**

2 Exposed slabs of water tanks shall be treated with 6 mm thick cement plaster in cement mortar 1:3 (1 cement, 3 coarse sand) mixed with a waterproofing compound conforming to IS: 2645 in accordance with the manufacture specification stating the qty. of waterproofing mentioned in per 50kg of cement laid to slopes over R.C.C. slabs finished with floating coat of neat cement.

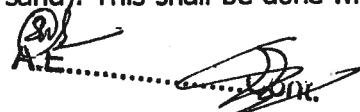
3 It shall be cured for at least 7 days during which period it shall be suitably protected from damage. All aforesaid operations shall be deemed to be included in quoted rates.

● **Water Proofing for Terraces.**

56. Brick koba treatment as per CPWD specifications .

● **Khurra**

57. The Khurra shall be of 45cm x 45cm x 5cm deep provided in cement concrete of mix 1:2:4 (1 cement, 2 coarse sand, 4 graded stone aggregate 20 mm nominal size) at places shown in the drawings and the junction with the rain water pipes shall be treated with cement mortar 1:3 to provide a smooth flow of water. Cement concrete shall be laid to average thickness of 50 mm with its top surface lower than the level of adjoining roof surface by not less than 50mm. The concrete shall be laid to a size greater than the stipulated size of the khurra in such way that the adjoining terracing shall overlap the concrete on its three edges by not less than 7.5 cm. The concrete will slope uniformly from the edges to the outlet, the slope being as much as possible and in no case less than 20mm cement concrete at outlet. The concrete shall be continued at the same slope through the width of the wall into the outlet opening to ensure watertight joint. The khurras and sides of the outlet shall then be rendered with 12 mm cement plaster 1:3 (1 cement, 3 coarse sand). This shall be done when



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the concrete is still green and shall be finished with floating coat of neat cement. The sides of the khurras and sides of the outlet opening shall be well rounded. Iron grating shall be provided at the outlet as a safeguard against choking. Iron gratings shall be of overall size 20 cm x 25 cm with an outer frame of 15mm x 3mm MS flat to which 4 nos. MS bars of 10 mm dia. shall be welded in the vertical direction keeping equal clear spacing of 2.5 cm. or as directed by the Architect. This item shall be executed and measured as per Clause No. 12.14 of CPWD Specifications Vol. I - 2009. (Drg no : 0403-RG-01-TD-01/02P02 ,SHEET-12 /Dt Mar-16) and (Drg no : 0403-RG-01-TD-01/02P03 ,SHEET-13 /Dt Mar-16)

8. FINISHING

● Plastering



● Ceilings, Soffits & Waists

6 mm thick plaster in cement mortar 1:3 (1 cement, 3 fine sand) on Soffits of R.C.C. slabs, waist of staircases, bottoms of balconies, chajjas etc. and all ceilings. Plaster to be finished even and smooth including providing 10mm square grooves at the junction of wall and ceiling and provision of drip mould where ever specifically required by the Architect along with curing and scaffolding all complete at all levels. Any chiseling, chipping of wall or RCC surfaces to make the surface even and in plumb is deemed to be included in the rate quoted for the particular item including scaffolding, curing, etc. all complete at all levels and positions. Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of seven days. During this period, it shall be suitably protected from all damages at the contractor's expense. The dates on which marked on the various sections plastered so that curing for the specified period

thereafter can be watched. The plaster shall be finished to a true and plumb surface and to the proper degree of the smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long. all jambs and corners with a plumb bob as the work proceeds. This item shall be executed as per Clause No.13.1.4CPWD Specifications Vol. II -2009.All aforesaid operations shall be deemed to be included in quoted rates.

● Internal Plaster

Internal plaster 12 mm thick 1:6 mix (1 part cement, 6 parts fine sand) on walls of

 A.E.....  Cont.

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corridors, staircases walls or as mentioned in drawing. Chicken wire mesh of approved quality shall be fixed R6||.C.C. And on either block/brick work with U-nails tightly and properly. Any chiseling, chipping of wall or RCC surfaces to make the surface even and in plumb is deemed to be included in the rate quoted for the particular item including scaffolding, curing, etc. all complete at all levels and positions. Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of seven days. During this period, it shall be suitably protected from all damages at t which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched. The plaster shall be finished to a true and plumb surface and to the proper degree of the smoothness as required. The work shall be tested frequently as the work precedes with a true straight edge not less than 2.5 m long and with plumb bob. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds. All aforesaid operations shall be deemed to be included in quoted rates.

● **External Plaster**

External Plaster 18mm thick, in two coats under layer 12mm thick cement plaster 1:5(1 cement : 5 coarse sand) finished with a top layer 6mm thick cement plaster 1:6 (1 cement : 6 fine sand). Any chiseling, chipping of wall or RCC surfaces to make the surface even and in plumb is deemed to be included in the rate quoted for the particular item including scaffolding, curing, etc. all complete at all levels and positions. Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of seven days. During this period, it shall be suitably protected from all damages at the contractor's expense. The date on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched. The plaster shall be finished to a true and plumb surface and to the proper degree of the smoothness as required. The work shall be tested frequently as the work precedes with a true straight edge not less than 2.5 m long and with plumb bob. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds. All aforesaid operations shall be deemed to be included in quoted rates.

9. **PAINTING :**


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1) External Wall finish : Exterior Textured Paint:

Two or more coats applied at 3.28 litres/ 10 sqm over and including priming coat of Exterior primer applied at 2.20 kg/10 sq.m (Or) as per

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manufacturer's specifications Exterior Textured paint (SINGLE /MULTY SHADE) to be provided up to 4th Floor level. Balance height of Tower including Parapet wall in terrace shall be painted with APEX exterior paint with primer coat as per Architectural drawings.

2) Internal Wall finish:

Distemping with oil bound washable distemper of approved brand and manufacture to give an even shade. New work (two or more coats) over and including water thinnable priming coat with cement primer. Columns in the Stilt floor are to be also painted with washable oil bound distemper.

3) Wood work steel work :

Wood work & steel work to be painted with Synthetic Enamel paint 2 or more coats over primer coat to get an even shade. Measurements for payment shall be as per CPWD norms.

10. FLOORING

A. Concrete Flooring

Stilt Floor (No basement underneath)

Sub floor in stilt floor (base concrete water floor finish) shall be as per structural drawing P.C.C. 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40mm nominal size) laid over a layer of 40mm thick stone dust over 230mm thick dry stone rubble packing and void filled with stone chipping and the top of rubble packing truly leveled and dressed. This sub flooring shall be laid over well compacted earth.

(For Area of flooring Drg No : 0403-RG-01-TD-01/02P01 /Dt march-16).

a) **Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, 40 mm thick with 20 mm nominal size stone aggregate to be provided in Stilt Floor Meter room, Electrical room, LV room, garbage collection room, utility room for flooring as per CPWD specifications.**

b) **Parking areas in covered stilt floor to be provided with C.C. pavement of mix M-25 grade with ready mixed concrete from batching plant. The ready mixed concrete shall be laid and finished with screed board vibrator, vacuum dewatering process and finally finished by floating, brooming with wire brush etc. complete as per cpwd specifications and directions of Engineer-incharge.**

B. Kota Stone Flooring

a) **Laying Kota stone flooring 20-25 mm thick along with 10% of white marble (Raj Nagar / Agaria/ Makrana as per approved sample)for borders in steps, Entry level lobbies, corridors and circulation areas of Stilt floor as directed by the Architect to be used in flooring. Nosing to be provided for steps. To be laid over 20mm base of 1:4 cement mortar and jointed with gray cement slurry mixed with pigment to match the shade of stone over lean concrete**

sub-base or R.C.C. slab as instructed by Architect including rubbing, polished to achieve mirror finish, cutting complete at all levels.

(Drg No : 0403-RG-01-TD-01/02P01,Sheet-12,dt march-16) and (Drg No : 0403-RG-01-TD-01/02P02,Sheet-13,dt march-16)

b) Providing & fixing Kota stone flooring 20-25 mm thick to be laid on treads and risers and skirting of staircase and 100 mm high skirting at the base of stilt floor columns. To be laid over 20mm base of 1:4 cement mortar over vertical and horizontal surfaces of stairs at all levels including jointing with gray cement slurry mixed with pigment to match the shade of stone, rubbing, polishing to achieve mirror finish, cutting, nosing complete at all levels. **Area of treads & risers of staircases shall be finished together after fixing of the border.** (Drg No : 0403-RG-01-TD-01S01/02/dt Mar-16) and (Drg No : 0403-RG-01-TD-02S01/02/dt Mar-16).

The complete job is to be done as per CPWD Specifications print including the cost of all materials and labour involved in all the operations described above cleaning of surface of RCC slab or base concrete, applying cement slurry, cutting, grinding, polishing to achieve mirror polish etc. all complete at all levels and positions. This item shall be executed as per Clause No.11.21 of CPWD Specifications Vol. I - 2009 All aforesaid operations shall be deemed to be included in quoted rates.

C. Vitrified Tile Flooring

Providing & laying Vitrified tiles (600 mmX600mm) in all bed rooms, living rooms & common areas of dwelling unit, **and corridors of all floors except Stilt floor as specified in the drawings**, on 20 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand) including grouting the joints with white cement and matching pigments etc. all complete. This item includes the cost of all materials and labour involved in all the operations described above including cleaning of surface of RCC slab, applying cement slurry, cutting etc. all complete at all levels and positions.

(Drg no : 0403-RG-01-TD-01/02P01,Dt Mar-16.) and (Drg no : 0403-RG-01-TD-01/02P02,Dt Mar-16.)

D. Anti skid Ceramic Floor Tiles

Providing & laying Anti skid / matte finished ceramic floor tiles (300mm X300mm) with cement mortar bedding 1:4 (1 cement, 4 coarse sand) 20mm thick over lean concrete sub-base cushion in all floors in toilets and balcony area including grouting, cleaning, complete at all levels in pattern as specified/directed.

This item includes the cost of all materials and labour involved in all the operations described above including cleaning of surface of RCC slab, applying cement slurry,

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cutting etc. all complete at all levels and positions.(Drg no : 0403-RG-01-TD-01/02P01,Dt Mar-16.) and (Drg no : 0403-RG-01-TD-01/02P02,Dt Mar-16.)

E. Ceramic Glazed wall Tiles

Providing & fixing Ceramic glazed wall tiles of size as per architectural drgs, to the required height in toilets , above kitchen platform, and over inner walls of underground & over head water tanks of colours and shade as approved , laid on 20 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand) including pointing the joints with white cement and matching pigments etc. all complete at all levels. All aforesaid operations shall be deemed to be included in quoted rates. (Drg no : 0403-RG-01-TD-01/02D04/Dt Mar-16.)

F. Skirting

Providing & laying 100mm high skirting on walls adjoining floor in all areas where ever the flooring has been provided as instructed by the Architects with the same floor finish, to be laid over a bed of 10 mm to 12 mm thick cement mortar in coarse sand 1:3 (1 cement: 3 coarse sand)as at the ends of floor as per CPWD Specifications Vol.- I civil work 2014 print. This item includes the cost of all materials and labour involved in all the operations including cleaning of surface, applying cement slurry, cutting, rubbing, polishing to achieve mirror finish, grinding, polishing etc. all complete at all levels. All aforesaid operations shall be deemed to be included in quoted rates.(Drg no : 0403-RG-01-TD-01/02P01,Dt Mar-16.) and (Drg no : 0403-RG-01-TD-01/02P02,Dt Mar-16.)

G. Precast Concrete Tiles

Providing and laying M-30 Gr, 60mm thick factory made cement concrete interlocking

paving block of glossy finish, manufactured in automatic block making machine with strong simultaneous vibration & compaction and of approved size and shape laid in required colour and pattern over 40mm thick compacted bed of coarse sand / stone dust, filling the joints of adjacent paving blocks with fine sand, and compacting with plate vibrator etc. all complete as per the direction of Engineer in charge including providing factory made PCC kerbs / edge restraints wherever required with cement concrete M15 grade including cost of labour, material , etc. all complete.(Drg No :0403-RS-01-TD-01L01, Dt Mar-16).

H. GRANITE OVER KITCHEN PLATFORM

Providing & Fixing 18 mm thick polished Granite stone over 20 mm thk cement

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mortar bedding on 50 mm thick R.C.C. Slab as indicated in the drawings including rubbing, polishing to achieve mirror finish, edge moulding, cutting hole for gas pipe, making provision for fixing of sink, all complete as indicated in drawing. The slab will be finished in front with Granite strips and the bottom shall be plastered as per drawings and as per standard Engineering practice.

(Drg no : 0403-RG-01-TD-01/02D03, Dt Mar-16.)

I. LIFT FACIA

Lift Facia shall be provided by Vitrified Tiles of size 600 mm x 600 mm, as specified & approved at location as shown in drawing. 10-15% area of lift facia to be with granite architectural bands. The base shall be 20 mm thick cement mortar 1:2 (1 cement: 2 coarse sand). The joints shall be grouted with white cement with an admixture of pigment to match the colour of the tiles. The 4 sides (jambs, ceiling & floor) of lift entrance wall thickness to be provided with granite lining. The cut out in the tiles for switches, floor indicator lights etc. shall be provided and edges dressed neatly as directed by Architect. The work will be executed as per CPWD specifications.

11. ELECTRICAL WORK

• Internal Electrical work (Scope): General

The scope of work is limited to the provision of non-metallic (PVC) concealed conduits in slabs and walls and the scope also includes provision of metallic concealed boxes and fish wires at location as shown in drawing. The contractor to study the electrical lay out drawings furnished by the architect. (Drg No : 0403-RG-01-TD-01/02-ELE-P01, Sheet-23, dt march-16) and (Drg No : 0403-RG-01-TD-01/02-ELE-P02, Sheet-24, dt march-16)

Checking of Drawings

Before commencing the conduiting work, the Contractor to carefully examine the drawings indicating the layout of the conduits, check the number and size of the conduit with respect to number of wires, location of junction boxes, sizes and location of switch boxes and other relevant details, Any change suggested by the contractor shall be got approved from the Architects before the actual laying of conduits. Any discrepancy found in the drawings shall be brought to the notice of the Engineer-in-charge/Architect promptly before execution of the work.

Material Conduits

All non-metallic (PVC) conduit pipes shall be of suitable material complying with IS:

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2509- 1973 and IS : 3419-1976 for rigid conduits and IS : 6946- 1973 for flexible conduits. The interior of the conduits shall be free from obstruction. The rigid conduit pipes shall be ISI marked. No PVC conduit less than 25 mm diameter shall be used.

Area of the wire Sq. mm	Size of conduits (PVC)				
	25		32	40	50
	Number of wires maximum(copper wire)				
1.5	8		14	-	-
2.5	6		12	-	-
4.0	6		10	14	-
6.0	5		8	11	-
10.0	4		7	9	-
16.0	2		4	5	12
25.0	-		2	2	6
35.0	-		-	2	5

The maximum number of PVC insulated copper conductor wire of 650/1100 volts grade that can be drawn in one conduit of various sizes is given in table below. Conduits sizes shall be selected accordingly.

Conduiting & metal concealed boxes without wiring to be also provided for INTERCOM, TELEPHONE, Dish T.V / cable T.V. etc and included in the cost.

Cable connections from electrical sub station /transformers to LT/HT panels and subsequent distribution network is included in cost.

- 1) All the electrification would be done in insulated copper wiring in accordance with I.S.I. code and according to the approved drawing issued by the Architect including Distribution board with approved make MCB's up to the electrical meter board.

All the electrification works shall be executed as per following few specifications :-

- | | | |
|----|---------------|------------------------------|
| 1. | Copper wiring | Plaza, National |
| 2. | Switches | Anchor (ordinary) |
| 3. | MCB | Indokopp, Havells |
| 4. | PVC Conduit | AKGor Equivalent I.S.I. make |

Street Light/LT Panels/HT Panels/Transformers: -Shall be provided as per requirement with ISI marked components and included in the cost. (Drg No : 0403-RG-01-TD-01L08,Sheet-08,dt Mar-16)

- 2) **Power backup :- D.G Set power back up of suitable capacity** shall be

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provided only for common area lights, Lifts and pumps and included in cost

12. Installation

Lift Elevator :

Providing and fixing of elevators (1 no. - 13 passenger capacity and 1 No. -15 passenger service/stretchers lift deeper car of **OTIS/KONE/JOHNSON** make) with **1.25-1.50** m/sec. Speed(as per manufacturer's specification). The lift shall be provided with Scratch proof S.S **doors and car side s.s panels, 20 mm thk granite flooring**, false ceiling, AC variable voltage and variable frequency type traction control, electromagnetic brake system, simple operation, non-touch screen operating panel with luminous buttons, over load warning indicator, battery operated alarm bell, CFL type emergency light, intercom suitable for hook up to Society EPBAX, infrared rays sensing door protection for suitable height, reverse phase relay on controller, fireman's switch at ground floor, car position indicator in car and at all positions indicator in car at all floors with UP/DOWN directions, light fixtures, ventilation fan etc. complete with all accessories including automatic rescue device. The lift manufacturer's shop drawing & lift pit size provided to be checked prior to execution. 18mm thick Granite Architraves to be provided at Lift entrance door opening and included in scope of work.

13. Fire Fighting System :

Shall be provided as per fire fighting norms, as shown in drawings. The complete installation of Fire Fighting System shall strictly confirm to the minimum specifications and guidelines given in NBC-2005 (Part-IV), IS:13030 for external hydrant system, other relevant IS code of practice and CPWD specifications (Part-V) amended up to date. (Drg No : 0403-RG-01-TD-01/02-SRF-P01/P02 Sheet-32, dt march-16)

1) Conduit Connections

All joints shall be sealed/cemented with approved cement. Damaged conduit pipes shall not be used in the work. Cut ends of conduit pipes shall have no sharp edges or any burrs left to avoid damage to the conductors.

2) External Development Work

Cement concrete roads as per road section, pathways, storm water drain, greenery with good soil, dumping manure, sludge and grass etc complete within the campus/boundary shall be provided as per drawing.

1800 mm high Boundary wall all around shall be provided apart from Gate House/Guard Room as per drawings. (Drg No : 0403-RG-01-TD-D10, Sheet-31, dt Mar-

16) and (Drg No : 0403-RG-01-TD-01L10, Sheet-10, dt Mar-16)

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- a) **Solar water Heating : Roof top Solar water heaters with 500 lpd water collection tanks with piping connection to both kitchen & toilets are to be provided at the rate of 125 litres /DU. Vendor specification enclosed for reference.**

ANNEXURE – I :-

TECHNICAL DATA FOR: 500 Liter ETC KLASIC SYSTEM

Hot Water Storage Tank:-

Sr No	PARAMETER	DESCRIPTION
1	System Tank Capacity	500 Liter
	Tube size & Nos. of Tube	58X1800 / 70X2100
	Area Per system	33 to 8 M2
2	Tank Material	GL Material with EPOXY marine coated (Triple coat)
3	Thickness	2.5 mm
4	Insulation	PUF (50mm thickness)
5	Outer cover	P.P Powder coated Galvanized iron (0.5 mm thickness)
7	Electric Heater	As per Requirement
8	Connection	Inlet :- 1 inch, outlet - 1 inch, 1.25 inch for anod, 1.25 for Ele.back up, 1-Inch for Air vent
9	Stand	M.S 3mm thickness Angle with P.P Powder coating
10	Tank Orientation	Horizontal

Vacuum Tubes :-

Sr No.	PARAMETER	SPECIFICATION
1	Outer Diameter	58/ 70 mm
2	Inner Diameter	48/ 58 mm
3	Tube Length	1800/ 2100 mm
4	Glass thickness	3 mm
5	Material	borosilicate 3.3 glass
6	Absorptive coating	graded AL-N/AL/C
7	Vacuum	< 5*10 ⁻⁵ Pa
8	Absorptance	>92%(Am1.5)
9	Emittance	<8%(80 °C)
10	Thermal expansion	3.3*10 ⁻⁶ °C
11	Stagnation temperature	>200°C
12	Heat loss	<0.8w/sqm
13	Maximum strength	0.8Mpa

- b) **Solar lighting : Every 3rd street light and common area lights are to be provided with Solar power.**

- b) **Solid Waste Management : Garbage collected from the chutes provided for the purpose in the towers are collected from the stilt floor and disposed off from the site**

- c) **Green Pavers : Factory made M-30 Grade ,600 x450x 75 mm RCC Grass grid pavers to be provided in open parking areas.**

- d) **Plinth Protection : To be provided as per CPWD specifications at specified locations as per architectural drawings.**

False ceiling : 100 mm sunken slabs in toilets are proposed.Moisture

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resistant grid false ceiling is with PVC TILES proposed underneath the toilets to conceal the pipe lines. (Drg No : 0403-RG-01-TD-01/02P01,Sheet-18,dt Mar-16)

f) Pump Room and pumps of required capacity as per details mentioned in Architectural drawings of Under Ground water Tank.

- Rain Water harvesting system shall also be provided as per drawing.
- All aforesaid operations shall be deemed to be included in quoted rates.

14. MISCELLANEOUS

a) Precast RCC Jali


Providing and fixing precast cement concrete jali 50mm thick, in CC 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6mm nominal size) reinforced with 1.6mm dia. mild steel wire including centering and shuttering, roughening cleaning, fixing and finishing in cement mortar 1:3 (1 cement : 3 fine sand) etc. complete excluding plastering of jambs, sills and soffits as per locations marked in architectural drawings.

b) M.S. Door (only to Mumty & Machine rooms)

Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6mm angle iron and 3mm M.S. gusset plates at the junctions and corners, using flats 30x6mm for diagonal braces and central cross piece, all necessary fittings like locking arrangement, hinges, etc. including welding with existing frame complete, including applying a priming coat of approved steel primer. All aforesaid operations shall be deemed to be included in quoted rates. (as per CPWD specs & drgs)

c) TANKS OVER TERRACE & UNDER GROUND TANKS

Are included in the scope of work and shall be executed as per drawings without any extra cost. These structures and other water/liquid retaining structures shall be made water proof by providing injection grouting, 12mm plaster mixed with water proofing compound and finished with commercial **ceramic glazed wall tiles on inside.** (Drg No : 0403-RG-01-TD-01L05,Sheet-05,dt march -16)


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**LIST OF APPROVED MAKES
TABLE -I**



Basic rates of various items, after discount, are mentioned in the following Table. Contractor is supposed to quote his turnkey rate considering these basic rates.

Sr. No.	Item	Rate (inRs.)	Unit per
1.	Vitrified floor tiles 600x600x10 mm	40.00	Sq.Ft.
2.	Vitrified floor tiles 600x600x10mm (Common Area)	40.00	Sq.Ft.
3.	Ceramic glazed wall tiles	30.00	Sq.Ft.
4.	Anti skid ceramic floor tiles (Toilet & Balcony)	25.00	Sq.Ft.
5.	35 mm thick Flush Door Shutter	2600.00	Sqm.
6.	MorticeDoor lock with handles(Entrance Door)	800.00	For Door shutter
7.	MorticeDoor lock with Latch (Bed rooms& Toilets)	400.00	For Door shutter
8.	Polished Granite 16-18 mm thick	90	Sq. Ft.

TABLE -II

Makes and Model reference nos. of various Chinaware, C.P. fittings and S.S. kitchen sink are mentioned in the following Table. While quoting the rates of relevant items, Contractor shall consider the rates of the makes & models as per the given Table.

Sr. No.	Item	Make	Model Reference no.
1.	C.P. Shower Head	Jaquar	OHSCHR-1989
2.	C.P. Shower Arm	Jaquar	SHA-CHR-477P
3.	C.P. Health Faucet	Jaquar	Jaquar
4.	C.P. Angle Stop Cock	Jaquar	AQT-CHR-3057N
5.	C.P. Bath Mixer	Jaquar	KLN-CHR-19273 UPR
6.	C.P. Wash Basin Mixer	Jaquar	KLN-CHR-19167B
7.	C.P. Sink Mixer	Jaquar	KLN-CHR-19309
8.	C.P. Long Body/Short body Bib Cock	Jaquar	Jaquar
9.	S.S. Kitchen Sink	Neelkanth	Neelkanth
10.	W.C. (Floor Mounted Commode)	Hindware	SLICK-20011 with

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			Cistern & Seat Cover
		Cera	Conventional 2008 with
			Cistern & Seat Cover
11.	Wash Basin without Pedestal	Hindware	CLEO-10012
		Cera	CADAL-2810

TABLE :III		
APPROVED MAKES		
(CIVIL WORKS)		
S.NO.	ITEM	APPROVED MAKES
1	Grey Cement (OPC / PPC)	ACC, GUJARAT AMBUJA, BIRLA, ULTRA TECH, J.K, L&T.
2	White Cement	JK, BIRLA
3	Anti- Termite Treatment	Pest Control India Ltd, Pest Control Incorporation. ted, Pest con India.
4	Fly Ash Bricks	Site Production/ As approved by Architect
5	Concrete Admixtures	FOSROC, STP, CICO-TL, SIKA
6	REINFORCEMENT TMT Bars(Fe 500)	SAIL, TISCO, RINL,
	Structural Steel	SAIL, TISCO.
7	FLUSH DOORS	GREEN, DURO, CENTURY, ALPRO
8	FIRE CHECK DOORS	GODREJ,NAVAIR, SHAKTI HORMAN, AGNI SURAKSHA.
9	LAMINATES	GREENLAM / FORMICA/ MERINO
10	HARDNER COMPOUND	FOSROC, STP, CICO, SIKKA
11	WOOD PRESERVATIVE	BISON BY BRITISH PAINTS / TREMSEAL BY PCI/ PIDILITE
12	ADHESIVE FOR WOOD WORK	DUNLOP, FEVICOL, VAMICOL, PIDILITE , ARALDITE OF CIBAGEIGY
13	PRELAMINATED PARTICLE BOARD	NOVAPAN, MERINO; . GREEN LAM / DURATUFF
14	PLYWOOD / BLOCK BOARD / SOFT BOARD	GREEN PLY / ARCHID / MERINO
15	SILICON SEALANT	DOWCORNING,WALTZER INDIA, SUPER FLEX
16	POLYCARBONATE SHEET	GE PLASTICS,POLYGAL,SUNLITE,DANPA LON
17	ALUMINIUM WINDOW SYSTEMS	KALCO,GOLD PLEX, KAWNEER, ALUMAK,SAPA
18	GLASS / TOUGHENED GLASS	MODI GUARD, SAINT GOBAIN, ASAHI
19	CERAMIC TILES	SOMANY, JOHNSON, NITCO, ORIENT,
20	VITRIFIED TILES	SOMANY, JOHNSON, NITCO, ORIENT,.
21	INTERLOCK TILES/GRASS PAVER	NIMCO PREFAB, UNISTONE, MODERN, NITCO

	BLOCKS	
22	CEMENT CONCRETE TILES/ CHEQUERED TILES	UNISTONE, ULTRA, EUROCON, NITCO DALAL
23	SYNTHETIC ENAMEL PAINTS	ICI DULUX NEROLAC, SHALIMAR, BERGER, ASIAN, ACRO.
24	ACRYLIC/OIL BOUND WASHABLE DISTEMPER	NEROLAC, SHALIMAR, ICI DULUX, ASIAN, BERGER, ACRO.
25	EXTERIOR PAINTS	APEX (ULTIMA), DULUX, ACRO, BERGER.
26	EXTERIOR PAINTS(Heat Resistant)	ICI DULUX, EXCEL COATINGS
27	TEXTURE PAINTS(External)	SPECTRUM, HERITAGE, ACRO, NEROLAC
28	CEMENT PAINT	SNOWCEM PLUS, NEROLAC, BERGER, DULUX, ASIAN, ACRO.
29	DOOR FITTINGS	GODREJ, OZONE, HAFLE
30	DOOR CLOSER	OZONE / DORMA / HAFELE
31	LOCKS	OZONE / EBCO / GODREJ / HAFELE, HARRISON
32	SCREWS	GKW
33	FASTENERS	HILTI, FICHER, GKW, AXEL
34	GYPSUM CEILING / MODULAR CEILING (UNDER TOILETS)	INDIA GYPSUM, LAFARGE ARMSTRONG (WATER RESISTANT)
35	DRAWER CHANNELS	OZONE / TELESCOPIC- EBCO
36	HINGES FOR SHUTTERS	HETTICH / EBCO (SS HINGES)
37	WOODEN SHUTTERS, FRAMES FIRE	SHAKTIMET, NAVAIR, PACIFIC
B	SANITARY :	
1	VITREOUS CHINA SANITARYWARE	JAGUAR / CERA/ SOMANY/HINDWARE PARRYWARE/JOHNSON
2	STAINLESS STEEL SINKS	JAYNA / KINGSTON / NEELKANTH / NIRALI/JOHNSON
3	C.P. FITTINGS & ACCESSORIES & FLUSH VALVES	JAGUAR /JOHNSON /CERA
4	SOIL, WASTE & RAIN WATER PIPE SUPREME / FINOLEX. / FLOWGUARD	SUPREME / FINOLEX. / FLOWGUARD/ ASTRAL
5	RCC PIPES	ANY ISI MARKED PIPE
6	G.I. PIPES	TATA / JINDAL HISSAR / PRAKASH
7	G.I. FITTINGS	ZOLOTO / KS / UNIK
8	GUN METAL VALVES	ZOLOTO / LEADER / SANT
9	C.I. VALVES	ZOLOTO / KIRLOSKAR / SANT / KARTAR
10	STONEWARE PIPES & GULLY TRAPS	PERFECT / BURN / RK / HIND / ANAND
11	C.I. MANHOLES (COVERS AND FRAMES	SKF/NECO / R.I.F. / B.C. / NEER
12	SFRC MANHOLE COVERS	KK / S K PRECAST CONCRETE / ADVENT
13	UPVC PIPES/ FITTINGS	SUPREME/FINOLEX/ FLOWGUARD/ASTRAL/ PRINCE

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14	MIRROR	ATUL / MODI FLOAT
15	CPVC PIPES & FITTINGS	ASTRAL/APOLLO /JAIN/SFMC

EXTERNAL ELECTRICAL WORKS

S.NO.	ITEM	APPROVED MAKES
1	WIRES & CABLES	Finolex,Havells,Indo-Asian,Gloster,National.
2	MCB, MCCB, RCCB, ELCB & MCB DBs	Legrand / ABB / L&T /Siemens / Havells / Schneider / GE / C&S.
	ACB' s	Haggar / Voltamp /Luminous / MDS / Indoasian(EON)
2	Lighting Fittings & Luminaries	Philips/Wipro / Havells/ Bajaj.
3	Semi-Modular/ Hybrid Type Sockets/switch	Havells,Indo Asian, MK,Legrand, Schnider,Northwest.C&S.
4	Solar P.V.CELLS & SYSTEM	As per Architect
5	Ceiling/Wall/Exhaust fans	Crompton /Almonard /Bajaj/Usha/Havells
6	Steel/PVC Conduit	BEC/AKG/STEEL KRAFT / POLYCAB / D - PLAST
7	Switch Fuse Unit (HRC Type	Schnider/GE/L&T/Siemens/Havells/MDS
8	Terminals	Elmex /Technoplast
9	Lugs	Dowells/ Ismal
10	Glands	Gripwell/ Comet/Comic
11	Indicating lamps	L &T/ Siemens/Technique
12	KWH Meters	L&T/HPL SOCOMEC / AE / Rishab
13	Selector Switches	Salzer /L&T/ Kaycee
14	LT Panels, Feedar Pillars etc.	Advance Control Panels, MAK engrs or equivalent (CPRI approved)
15	Power Capacitors	Crompton/Siemens Apcos/L&T
16	Power Transformers	Crompton/ Kirloskar/ABB/Siemens / Schneider
17	Street Light	K-Light / Bajaj/Philips /Crompton / Havells / Wipro
18	L.E.D LUMINARIES	Philips/Wipro / Havells/ Bajaj.
19	Submersible Pumps	KSB (OR)Equivalent
20	D.G.Set engine	Cummins,Ashokleyland, Kirlosker,mahindra
21	D.G.Set Alternator	Stamford,Kirlosker,Cummins,crompton
22	Switchgears	L&T,ABB,Siemens,GE Power,Havells,C&S.
23	Relays	L&T,Control Group,Siemens
24	LT XLPE Aluminium Armoured cables upto 1100v	Skytone/ National/Ralison/Nicco/Paragon

FIRE Alarm SYSTEM

S.NO.	ITEM	APPROVED MAKES
1	Addressable Panel	Hochiki / Rafiki / Siemens / Esser / Integlex Nohmi
2	Intelligent Addressable Smoke	Hochiki / Rafiki / Siemens / Esser /Integlex

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	Detectors + Multi criteria,	Nohmi
3	Intelligent Addressable Rate of Rise Heat Detector	Hochiki / Rafiki / Siemens/ Esser / Integlex
4	Zero Halogen Copper Cables	Nohmi
5	Addressable Duct Detector Unit	Lapp / National / Skytone.
6	Input / Output Modules	Edwards/ Hochiki / Rafiki / Siemens / Esser
7	Manual Call Box	By Parent Company Manufacturing Detectors / Panel
8	Strobe.	By Parent Company Manufacturing Detectors / Panel.
9	Steel Conduit (For all system))	U L LISTED
		Bec / Akg / M-Kay.
C	FIRE FIGHTING	
1	PIPES MS / GI	
2	GUN METAL VALVES	TATA, JINDAL / PRAKASH / HISSAR
3	SINGLE HEADED HYDRANT , VALVES,	LEADER / SANT
	FOUR WAY FIRE BRIGADE INLET AND	NEWAGE/ MINIMAX / SB
	SHUT OF NOZZLE	
4	RUBBER PIPE FOR HOSE REEL	
5	SLUICE AND NON RETURN VALVES	JYOTI/ GATES/ KESARA
6	PRESSURE SWITCH	KIRLOSKER / KALPANA / KARTAR / AIP
7	PRESSURE GAUGE	INDFOSS / SWITZER / DAN FOSS
8	PUMP	BRC / HD / ITALTEC
9	MOTOR	KIRLOSKER / GRUND FOSS / M&P
10	ENAMEL PAINTING OF PIPES	ABB / SIEMENS / CG / KIRLOSKER
11	PAINT PRIMER	ASIAN / GOODLAS / NEROLAC / ICI / BERGER
12	FASTENERS	ASIAN / JONSON & NECHOLSON / BERGER
13	WELD ROD	HILTI / FISCHER
14	BALL VALVES	ADVANI / ESAB / ADOR
15	BUTTERFLY VALVES	RB (ITALY) BUGATTI / ZOLOTO
16	ABC / CO2	AUDCO / C&R / KSB
17	RUBBER GASKET	MINMAX / LIFEGUARD / OMEX
18	ENGINE	CIC / VARUNA
19	HOSE DRUM	CUMMINS / CATERPILLAR / KOEL
20	MECHANICAL SEAL	NEWAGE/ SUKAN / KESARA
21	SIGNAGES	DURAMETALLIC / SEALOL
D	DATA-VOICE NETWORKING:	PROLITE / GLOLITE
1	CCTV	
E	PASSENGER/ Freight LIFTS	Hochiki / Panasonic / Sony / Samsung / Cease Fire
		JOHNSON, KONE , OTIS.

[Signature]
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