PROJECT:
INTERIOR DESIGN WORK OF

ELECTORAL EDUCATION AND INFORMATION CENTER (EEIC)
BIRATNAGAR, NEPAL

BILL OF QUANTITIES, DRAWINGS AND SPECIFICATION

JULY, 2019

Client:

UNDP

ELECTORAL SUPPORT PROJECT, Nepal
Chakupat, Lalitpur, Nepal

Client: UNDP
Project : Interior Design Works of the EEIC
Location : District Election Office, Biratnagar, Nepal

SUMMARY OF COSTS

Sl.	Description	Total Amount
A	Civil Works	
B	Carpentry Works	
C	Furnishing works	
D	Electrical and Allied Works	
E	Air-conditioning system	
	Sub-Total	
	VAT	
	TOTAL	

Amount in words: ……..

……
Authorised Signature

…… ……
Name of the Company **Company Seal**

Notes:
1.All Materials brought on site of works and meant to be used in the same shall be the best of their respective kinds and to the approval to the architects/Employer.
2. Samples of all materials shall be got approved by the Architects/Employer and shall be deposited with him before the order for the material is placed with the suppliers. The material brought on the works shall confirm in every respective with approved samples.

3.Any material that have not been found to confirm to the specification will be rejected for which shall be removed from the site by the contractors within 48 hours at their own cost.

4.The contractor shall provide the mateials as mentioned in the specification.

5. Workmanship: All works shall be to level plumb and square comers, edges and arises in all cases shall be unbroken and finished neat.

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Bill No. A: Civil Works					
S.No	**Description of Works**	**Unit**	**Quantity**	**Rate**	**Amount (NRS)**
1.0	**Dismantling**				
	Dismantling Brick wall, partitions(low and high),furniture, ceiling, slabs required for new construction using cutter on both side of wall for minimum disturbance to the structure retaining its services like sewer, drainage, electricity, etc. including collection transportation and disposal of dismantled debris off the site as per drawing, specification and direction of Architect.				
1.1	Wall	Sq.M.	26.00		
2.0	**Plaster**	Sq.M.	12.00		
	Supplyng, laying and fixing plaster including supply of materials, labour, mixing, making grooves, strengthening joints, curing and scaffolding where required all complete as per drawing, specification and direction of Architect. 12.5 mmthick 1:4 cement sand mortar				
3.0	**Marble Works**				
	Providing and Laying approved quality, pattern and colour (Similar as existing marble) 19mm thick pink indian marble on floor with cement mortar of mix 1:4 (1 Cement: 4 Coarse Sand) backing and filling joints with necessary screeding works at necessary space with white cement slurry all complete as per the technical drawings and specification and instructions.				
3.1	Flooring	Sq.m	45.00		
3.2	100mm high skirting	R.m	20.00		
4.0	**Marble Polishing works**	Sq.m	85.00		
	Clean and mirror polish the existing indian marble flooring without affecting other existing structures including cutting, grinding, polishing and cleaning all complete as per specification and instruction of Architect.				
6.0	**False Ceiling (Modular)**	Sq.M.	85.00		
	Supplying and installing Acoustic Board False Ceiling: 600 x 600 ceiling tile of dune or classic lite or fine fissured micro finish acoustic board false ceiling with 44 mm high Silhoutte black groove main Runner and Cross Tee with 3mm reveal each, with suspension hangers with spacing no larger than 400mm and as per attached catalogue, drawing, specification and direction of Architect.15mm width Shilloutte Black groove Channel and Dune or Classic lite or Fine fissured Micro look Board				
	Make: ARMSTRONG OR EQUIVALENT				
7.0	**False Ceiling (Gypsum)**	Sq.M.	20.00		
	Providing and fixing suspended Boral or equivelant gypsum board ceiling (straight, vertical & curved) , with thickness no less than 12mm with exterior surface duly taped at all joints, leveled with calcium silicate compound, with surface prepared with POP/putty along entire area to receive two coats of Primer and three coats of Emulsion Paint. frames with suspension hangers with spacing no larger than 400mm screwed to the ceiling/walls as per attached catalogue,design, drawing, specification/schedule of finishes and direction of Architect.				
	Make: BORAL or EQUIVALENT				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
8.0	**Wall putty**	Sq.m	110.00		
	Providing and applying wall putty work in order to make the total plastered wall surface perfectly leveled , including cost of all materials,labour, conveyance, scaffolding, watering, curing, etc., as per drawing, specification/schedule of finishes and direction of Architect.				
	MAKE: JK/BIRLA/ASIAN or equivalent				
9.0	**Paint**				
9.1	**Plastic Emulsion**	Sq.m	192.00		
	Supply and applying one coat primer and two coats of anti fungus, anti stain plastic emulsion paint in wall surfaces above wall putty , at any level, finished smooth including supply of materials, labour, preparation of base etc. all complete as per drawing, specification/schedule of finishes and direction of Architect.				
	MAKE: ASIAN/BERGER or euivalent				
9.2	**Enamel**	Sq.m	20.00		
	Supply and applying one coat primer and two coats of anti fungus, anti stain enamel paint in wall surfaces above wall putty , at any level, finished smooth including supply of materials, labour, preparation of base etc. all complete as per drawing, specification/schedule of finishes and direction of Architect.				
	MAKE: ASIAN/BERGER or equivalent				
10.0	**Stepped Seating**	Sq.m	21.00		
	Fabricate, supply and install raised seating in mock polling area made up of min. 50mmx50mm MS square pipe steel structures and supports of 40mmx40mm square pipe and seating top and side cover of 25mm thick seasoned pine wood planks painted with approved enamel paint with one coat of wood primer and three coat of enamel paint. The plank shall be fixed with nut and bolts in metal structure all complete as per drawing, specification and instruction of engineeer.				
				SUB-TOTAL (A)	

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Bill No. B: Carpentry Works					
S.No	**Description of Works**	**Unit**	**Quantity**	**Rate**	**Amount (NRS)**
1.0	**Furiture works**				
	Fabricate, supply and fixing furnitures made of 19mm blockboard of approved quality, brand Green or equivalent as approved with 1mm laminate finish,with high quality exclusive steel hardware fiitings and heavy section channels, hinges, 8 mm glass, locks including all accessories like buffers, push magnets, patch fittings, brackets etc where necessary and all complete as approved per the drawings, specification and instructions.				
	Make: BOARD: Greenboard or equivalent LAMINATE: GREENLAM or equivalent				
1.1	Polling Booth (T1)	No	4.00		
1.2	Registration Desk (T2)	No	1.00		
1.3	Storage Cabinet (1.8m x 0.84m x 0.60m) (R1)	No	1.00		
1.4	Ballot Box Stand	No	1.00		
1.5	Museum Rack (Display Cabinet) (R2)	No	3.00		
1.6	Storage Cabinet (0.85m Wx 2.10m Hx 0.60m D) (R3)	No	1.00		
1.7	Podium (T3)	No	1.00		
1.8	Builtin Cabinet (R3)	No	1.00		
1.9	Pamplet Holder	No	10.00		
1.10	Information board	No	1.00		
2.0	**Wooden partition**	Sq.M.	78.00		
	Supply and fixing Haldu wood frame 60 x 60mm in cross section with battens no larger than 450mm c/c apart bothways horizontally and vertically including the framing above false ceiling. The partition shall consist of 10mm thick approved commercial ply along the straight surface and 2 layers of flexible ply along the curve. The surface shall be finished with 1mm thick approved Laminates on both sides to be applied with with fevicol adhesive. The partition shall have glazings of 8mm thick toughened glass with etching patterns where required. The glass shall be fixed with approved quality Sisham wood moulding of size 15mm x 35mm. This moulding shall be finished with high quality french polish over sand finished wooden surface. There shall be 4" high sisham wood skirting flushed with the partition which shall be finished with french polish over sand finished surface all complete as per drawing, specification and direction of Architect. The length of the partitions shall be verified at site				
	Make: COMMERCIAL PLY:Green Board or equivalent LAMINATE: GREENLAM or equivalent				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
3.0	**Cladding Works**	Sq.M.	78.00		
	Supply and fixing 19mm thick board with battens spaced at regular intervals horizontally and vertically. The cladding shall consist of 19mm thick approved commercial ply along the straight surface . There shall be 6mm MDF cladding over the ply and shall be finished with 1mm thick approved Laminates to be applied with with adhesive of approved make with 1 mm thick groove finished with plastic paint matching the shade of laminate.There shall be 4" high sisham wood skirting flushed with the partition which shall be finished with french polish over sand finished surface all complete as per drawing, specification and direction of Architect. The length of the partitions shall be verified at site				
	Make: COMMERCIAL PLY: SURYA/SAGUN/DURO LAMINATE: GREENLAM				
4.0	**Wooden decorative boxing**	No	1.00		
	Provide decorative boxing for the TV.				
	The cladding shall consist of 19mm thick approved commercial ply along the straight surface . There shall be 6mm MDF cladding over the ply and shall be finished with 1mm thick approved Laminates to be applied with with adhesive of approved make with 5 mm thick groove finished with french polish(minimum five coat) of approved shade and color all complete as per drawing, specification and direction of Architect. The length of the partitions shall be verified at site				
	Make: COMMERCIAL PLY: Greenboard or equivalent LAMINATE: GREENLAM or equivalent				
5.0	**White Board**	No	2.00		
	Supply and install whiteboards of 900 mm X 1200 mm with movable MS steel stand with castors on the bottom all complete as per design and specification				
6.0	**Window/Door covering works**	Sq.M	10.00		
	Supply and install 19mm thick block board covering for windows and door finished with gypsumboard for wall finish. The surface shall be finished with pain including the required framing, accessories and hardwares as per drawing, specification and instruction of Architect.				
7.0	**Wooden Beading/Moulding with polish**	M.	25.00		
	The cladding at walls shall have approved quality teak wood moulding of size 1" x 3/4". The moulding shall be finished with high quality French Polish (not less than 5 coats) over sand finished wooden surface, as per drawing, specification/schedule of finishes and direction of Architect.				
8.0	**Aluminum partition**	Sq.m	12.00		
	Aluminium Partition: Providing and Fixing Aluminium Partition consisting of Aluminium Sections 63.5 MM X 38.1 MM X 1.00 MM thick hollow anodised . . The Sections would be installed at an interval of 1m vertically and bottom section of size 114.60 x 44.45 x 2mm Aluminium snap beeding for glazing/panelling etc. and 5.5 mm thick float Transparent Glass including providing screwless aluminium glazing clip. Bottom upto 900mm Ht. will be provided with 9 MM thick both side pre-laminated particle board flat pressed 3 layer of interior grade complete with fixing clips, fasteners, filling up of gaps at junction, top, bottom, & sides with required PVC/Nepprene felt etc.. The joints shall be smooth, mitred and jointed with cleat angle etc as per direction of engineer/site Incharge.Rates shall be inclusive of frostate sticker to be applied as shown in the drawings.				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
9.0	**Aluminium Door**	No	1.00		
	Aluminium Door: Providing and Fixing anodised Aluminium Door consisting of Sections 83.5 MM X 44.45 MM X 2.00 MM thick vertical, top and middle horizontal members and bottom members of size 114.60MM X 44.45MM X 2.00MM thickness. Bottom upto 3' Ht will be provided with 12MM thick both side pre-laminated board as mentioned in the item 1 above and rest above provided with 5.5 MM thick transparent float glass. Door provided with 100 MM stainless steel dead lock Godrej make, hydraulic floor spring(godrej Make) ,(double action) heavy quality ISI marked with SS cover plate 100 MM dia Circular plate type handles (2 nos.) tower bolt of size 250 x10 mm (Barrel Type) including cutting the floor etc complete as directed by engineer/site Incharge.				
				SUB-TOTAL (B)	

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Bill No. C: Furnishing Works

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
1.0	**Vertical Blind**	Sq.M.	20.00		
	Supply and install Vertical Blinds made of glass fibre fabrics in width not less than 4". Minimum overlapping of 20mm in fabric. Top aluminium anodized rail of 1.4 mm thickness. 40mm wide channel with front lamination of same fabric. Runners having stainless steel hooks with built-in shock spring and self aligning slip clutch. End control box composed of double gear system. Botton weight fully plastic covered linked with plastic bead chain. Approved colour and pattern as per attached drawing, specification/schedule of finishes and direction of Architect.				
	MAKE: VISTA OR EQUIVALENT				
2.0	**Staff Chairs**	Nos.	Rate only		
	Provide revolving chair: Thick Padded Contoured Fabric/PU Seat and Mesh Back with Lumbar Support. Pneumatic Seat Height Adjustment. Height Adjustable Lower Lumbar Support. Tension Adjustable Lumbar Support. Locking Tilt Control Mechanism. Tension Control.				
	▫ *Stainless steel Chrome* ▫ *High quality black net/mesh finished on back* ▫ *Black PU on seat.* ▫ *Fine hard plastic on armrest.* ▫ *Stainless steel Chrome Base* ▫ *Size approximately: Chair H 86.5cm, Seat H: 46cm, Seat D: 49.5cm, Seat W.: 46cm*				
	MAKE: UBL or equivalent with 3 years of warranty				
3.0	**Stainless Steel Hook for headset**	No	20.00		
	Provide and install stainless steel hook of 3kg capacity with stainless screws for Headset including all accessories and hardware required as per instruction of engineer.				
				SUB-TOTAL (C)	

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Bill No. D: Electrical and Allied Works

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
1	**DISTRIBUTION BOARDS**				
	Supply, delivery, installation of distribution Board wall mountable, push button lock and made of 16 SWG MS metal sheet including neutral bar and phase bar and adequate space for incomming and outgoing cable with all the chiselling of wall fixing mortar and civil works with complete internal wiring as per the drawing, specification, instruction , electricity rules all complete.(Make: MCB Seimens,ABB or equi.)				
a	**DISTRIBUTION BOARD-DB-EEIC**	Set.	1		
	FDB-GF Box				
	City Supply Section				
	Circuit Breakers:				
	Incoming : 1 nos 20 A TP MCB (10 kA, BC)				
	Outgoings:				
	2 nos. of 16 Amp DP MCB (10 kA)				
	10 nos. of 6/10/16 Amp SP MCB (10 kA, BC)				
	2 nos. of 20 Amp DP MCB(10 kA, BC)				
	100A TPNE Copper Busbar with accessories				
	AC Supply Section				
	Circuit Breakers:				
	Incoming : 1 nos 16 A TP MCB (10 kA, BC)				
	Outgoings:				
	5 nos. of 16/20 Amp DP MCB(10 kA, BC)				
	Meters:				
	1 set. 0-500V Voltmeter with selector switch				
	1 set. 0-50A Ammeter with selector switch				
	1 set. of 50/5A ring type CT coil				
	Indicator Lamps				
b	**UPS-DB**	Set.	1		
	DB Box				
	Circuit Breakers:				
	Incoming : 1 nos.20 A DP MCB (10 kA, BC)				
	Outgoings:				
	4 nos. of 16/20 Amp SP MCB (10 kA, BC)				
c	**Manual Changeover Switch for Standby Generator** Supply, installation and connection of 63A TPN Manual Changeover (HAVELL'S / BENTEX or equivelent), (Based on 60 amp Mains incoming connection and 25 ~ 30 KVA Genset)	Set	1		
2	**LOW TENSION FEEDER CABLES / WIRES/CONDUITS**				
	Supply, delivery, laying, connecting, testing and commissioning of the following Armoured /unarmoured PVC insulated and sheathed power cables and wires through HDP pipe/Listic (whichever applicable) including cable shoes/sockets cable clamps and necessary connecting, fixing, earthing, , chiselling of existing wall / ceiling and redoing the chiselled area with cement and sand mortar as per the drawings, site conditions, specifications, electricity rules and instructions all complete.(Cable Make: Prakash/Litmus/Pioneer or NS mark)				
a.	4 core, 25 sq.mm armoured. Cu cable	rm	100		
	(main connection)				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
b.	4 core, 10 sq.mm unarmoured. Cu cable	rm.	35		
	(MDB to FDB)				
c.	3 x6 sq.mm unarmoured. Cu cable	rm.	65		
	(FDBs to UPS DB to UPS DB & UPS)				
c.	1c, 6 sq.mm multistrand Cu cable (E)	rm.	45		
3	**LIGHT POINTS WIRING THROUGH CONDUIT/LISTIC for UPS**				
a	Supplying the materials and concealed wiring through ceiling, false ceiling, wall of light points (the point wiring should include light, fan outlet of required length from control devices/switches to a point) using 2 x 2.5sq.mm +1 x 1.5 sq.mm Multistrand Flexible FRLS wire in a hard HDP pipe of size 20/25 mm. copper WIRE including cable shoes/sockets cable clamps and necessary connecting, fixing, chiselling of existing wall / ceiling and redoing the chiselld area with cement and sand mortar as per the drawings, site conditions ,specifications and instruction all complete. (Make: Cables- prakash/Litmus/Pioneer or NS:344/2052 , HDP-NS)	pt.	41		
4	**13AMP/15 AMP POWER POINT WIRING**				
	(For all the general power sockets, server and computer power sockets)				
4a	Supplying the materials and concealed wiring through ceiling, false ceiling,tables wall of power points (the point wiring should include wiring between the power points) using **2 x 4 +1x2.5 sq.mm FRLS Cu wire** in a HDP pipe of size 20/25 mm. dia. including cable shoes/sockets cable clamps and necessary connecting, fixing, earthing, chiselling of existing wall / ceiling and redoing the chiselled area with cement and sand mortar as per the drawings, site conditions ,specifications and instruction all complete. (Make: Cables- prakash/Litmus/Pioneer or NS:344/2052 , HDP-NS)	pt.	19		
5	**AC POWER POINT WIRING**				
	(For Air Conditioner)				
5a	Supplying the materials and concealed wiring for **single phase AC units** through ceiling, false ceiling wall of power points (the point wiring from nominated DB to indoor AC units and outdoor to indoor units interconnection) using **2 x4 sq. mm + 1x2.5 sq.mm Flexible multistrand FRLS Cu wire** in a HDP pipe of size 25 mm. dia. including cable shoes/sockets cable clamps and necessary connecting, fixing, earthing, chiselling of existing wall / ceiling and redoing the chiselled area with cement and sand mortar as per the drawings, site conditions ,specifications and instruction all complete. (Make: Cables- prakash/Litmus/Pioneer or NS:344/2052 , HDP-NS)	pt.	4		
6	**LIGHT FIXTURES**				
	Supply, delivery, installation, testing and commissioning of the following light fixtures with all the acessories including the necessary connection, fixing and insulating materials as per the electricity rule, drawings, site conditions, specifications and instructions all complete.				
a	6" Dia downlighter with 12w LED lights	set.	20		
	Legero (LVT 6512) or equivalent				
b	36 watt recessed mounted LED luminaire with complete prismatic difuser suitale for modular ceiling. Size : 570mmx570mm	set.	14		
	Legero (LRP 1236 or equivalent				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
e	2" dai Spot Light with 3 W LED warm	set.	3		
	(Make: Legero or equivalent)				
f	1x40W FTL with Acrylic cover	set.	2		
	(Make: Legero or equivalent)				
g	9" dia Exhaust Fan	set.	2		
	(Polar, Usha, Crompton or equivalent)				
7	**SWITCHES,SOCKETS ,PLUG WITH PLATES**				
	Supplying and fixing of following switches, sockets including metal boxes concealed inside wall and accessories with necessary civil works as per drawings, specifications, electricity rules and instructions all complete. MODULAR SWITCHES MAKE: CLIPSAL/ORANGE/OR EQUIVALENT				
a	1- gang one way switch	no.	2		
c	2-gang one way switch	no.	1		
e	3- gang one way switch	no.	1		
f	4-gang one way switch	no.	5		
g	6-gang one way switch	no.	1		
k	16 A, 6 pin, power socket coupled	no.	3		
l	13 A, 3 pin, power socket coupled	no.	22		
m	TV Socket	no	1		
n	2A output USB Charger Outlet (Make: Northwest or equivalent)	no	11		
8	**2amp USB CHARGING POINTS WIRING**	pt.	11		
	Supplying the materials and concealed wiring through ceiling, false ceiling, wall of USB charging points using 2 x 2.5sq.mm +1x1.5 sq.mm Multistrand Flexible FRLS wire in a hard HDP pipe of size 20/25 mm. copper WIRE including cable shoes/sockets cable clamps and necessary connecting, fixing, chiselling of existing wall / ceiling and redoing the chiselld area with cement and sand mortar as per the drawings, site conditions ,specifications and instruction all complete. (Make: Cables- prakash/Litmus/Pioneer or NS:344/2052 , HDP-NS)				
9.00	**Networking/Data Points Wiring**	Per Point	3.00		
	Supply, delivery, wiring, conduit laying of computer networking points with cat 6 UTP cable (from switch to individual points) through 16 / 20mm dia. HDP pipe concealed in ceilings, walls and floors including heavy type metal box and all necessary connecting, fixing, insulation all complete. (IT ROOM TO EEIC PREMISES) CABLE MAKE: NEX-1/D-LINK/AMP or equivalent				
10.00	**Single Gang Face Plate with Information Outlet**	Nos.	3.00		
	Supply and installation of Computer Outlets RJ 45 , CAT 6 , single , with required facia plate and flush mounting GI boxes MAKE: D-LINK/LINK-BASIC or equivalent				
11.00 a.	**Category 6 Patch Panel** Supply and Installation of 24-ports, rack mounted, High-impact, flame retardant,thermoplastic or Powder-coated steel, 22/24 AWG, CAT 6a RJ-45 patch panel for Data as per specification/schedule of finishes. (MAKE: LINK BASIC, NEX-1 or equivalent)	Nos.	1.00		

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
12.00	**9U Wall Mount Rack with FAN** Supply, installation, testing and commissioning of 9U rack with fan designed to integrate wall-mounting, easy equipment access, and cable management in IT network. Adjustable rack rails with square mounting holes accommodate up to 12U of standard 19" rackmount equipment; adjustable front and rear vertical rackmount rails; Locking, reversible Plexiglas® front door (2.7mm thick) and locking, removable side panels. MAKE: LINK BASIC or Equivalent	Nos.	1.00		
13.00	**Supply and installation of following switches:**				
c.	**Cisco SG100-16** 16-port Gigabit Switch	Nos.	1.0		
14.00	**TV Point wiring**	Per Point	1.00		
	Wiring for TV Point from System Room to respective locations with RG6 Coaxial Cable and Power supply wires through in 20mm HDP pipe including MS box, juntion box, pull boxin with all required materials with necessary distributor terminal in between the TV Terminals.				
15	**EARTHING**	set.	2		
	Supplying materials, installation, testing, commissioning of earthing for Building earthing / equipments body earthing / system earthing, consisting following specified parameters: (provisional - to be installed if the existing ssystem does not have required minimumEarth resistance of 4-6 Ohms for Mains and 1 Ohms for System)				
	Plate Earthing				
	* Earthing with COPPER earth plate 600 mm x 600 mm x 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe ect. (but without charcoal or coke and salt) complete as required. * 150mm thick alternate layers of Salt and Charcoal covering earth electrode completely. * Brazed jointing of earth electrode with earthing conductor including copper nut-bolts. * Providing of perforated 25mm. dia. GI watering pipe including earth excavation, refilling with compacted soil in layers of maximum 300mm. thickness all complete. The contractor should responsible to maintain earthing resistance less than 5 Ohm. * Supply and installation of SWG no 8 gauge bare copper conductor from Earthing Stationss 3 Phase Main DB, Generator neutral and body and System				
16	**SECURITY SYSTEMS**				
16.1	**CC Camera point wiring**	pt.	4		
	Supplying and laying of CAT-6 UTP cable made of Cu with 23/60 twin dc wire inside **20/25 mm. dia. HDP** materials **including labour charge** for laying CCTV cables with pull boxes, metal box all complete and concealed wiring through ceiling, false ceiling, wall, table whichever applicable including cable shoes/sockets cable clamps and necessary connecting, fixing, chiselling of existing wall / ceiling and redoing the chiselld area with cement and sand mortar as per the drawings, site conditions ,specifications and instruction all complete. **All point wiring from each CCTV (IP cameras) to be terminated to HUB switch** (Make: HDP-NS) From server room to specified location CABLE BRAND: PIONEER, PRAKASH OR NS:344/2052 CABLE MAKE: NEX-1/D-LINK/AMP or equivalent				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
16.2	**UPS Output Power points for NVR and switch**	set	2		
	Supply and installatiopn of UPS Output Power points for cameras with 2 x 4 sq. mm. + 1 x 2.5 sq. mm. multistrained PVC insulated copper conductor in a hard HDP pipe of size 20/25 mm from UPS DB to various points. CABLE BRAND: PIONEER, PRAKASH OR NS:344/2052				
16.3	**Supply Delivery, Installation Testing and Commissioning of CCTV camera/ HDVR system as per the drawing, specification all complete.**				
a	Supply, installation, testing and commissioning of 2 MP Full HD Network Small IR Dome Camera. 1/3" 2 Megapixel progressive scan Aptina CMOS, H.264 & MJPEG dual-stream encoding, 25/30 fps@ 1080P (1920×1080), DWDR, Day/Night(ICR), AWB,AGC,BLC, Multiple network monitoring: Web viewer, CMS (DSS/Smart PSS) & DMSS, 3.6mm fixed lens (2.8mm, 6mm optional), Max. IR LEDs Length 30 m, Micro SD memory(-S), IP66, IK10, PoE. Make: DAHUA 1200 model or equivalent	set.	6		
b	**8 Channel Network Video Recorder (NVR) with 2 TB Hard Disk**				
	Supply, installation, testing and commissioning of 8Channel Network Video Recorder (NVR) with 6 TB Hard Disk. >Max 256Mbps incoming bandwidth >Up to 8ch@1080P(4ch @H.265 + 4ch @H.264) realtime live-view >Up to 12Mp resolution live-view & playback >2HDMI/1 VGA simultaneous video output >8 channel synchronous realtime playback, GRID interface >Support Multi-brand network cameras: Dahua, Arecont Vision, AXIS, Bosch, Brickcom, Canon, CP Plus, Honeywell, Panasonic, Pelco, Samsung, Sanyo, Sony, Videotec, Vivotek and etc. >ONVIF Version 2.4 conformance >3D intelligent positioning with Dahua PTZ camera >Support 4 SATA HDDs up to 24TB, 3 USB(2 USB3.0), 1 eSATA port >Support IPC UPnP, 8PoE ports >Support P2P, QR code scan & add >Multiple network monitoring: Web viewer, CMS(DSS/Smart PSS) & Smart Phone(DMSS) >2 TB HDD	set.	1		
	MAKE : DAHUA or quivalent				
c	24" LED Monitor for display - Dell or equivalent Optimal Resolution:1920 x 1080 at 60 Hz Aspect Ratio:Widescreen (16:9) Pixel Pitch:0.2745mm x 0.2745mm Brightness:250 cd/m2 (typical) Color Support:16.7 million colors Contrast Ratio:1000: 1 (typical), Dynamic Contrast Ratio : 8 Million:1 (Max) Backlight Technology:LED	No	1		
e.	**Category 6 Patch Panel**	Nos.	1.0		
	Supply and Installation of 24-ports, rack mounted, High-impact, flame retardant,thermoplastic or Powder-coated steel, 22/24 AWG, CAT 6a RJ-45 patch panel for Data as per specification. **(MAKE: LINK BASIC/DIGI-LINK) or equivalent**				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
f.	**8 Port POE Switch**	Nos.	1.0		
	16-Port Desktop Gigabit PoE Switch - 8 Ports - 10/100/1000 Base -T - 2 Layer Supported - Wall Mountable IEEE 802.3, 802.3u, 802.3x, 802.3ab,802.3az, 802.3af, and 802.3at (PoE+) Full line rate and forwarding rate of 64B frame at: 1.488 Mpps for 1000M port, 0.1488 Mpps for 100M port, 0.01488Mpps for 10M port				
16.4	**FIRE ALARM SYSTEM INSTALLATION WORKS**				
A	Supply , delivery, installation testing and commission of following accessories as per the instruction, specification, drawing all complete.				
a	**Smoke Detectors**				
	Supply, installation, testing and commissioning of Optical smoke detector with base; auto compensation; digital processing algorithm; protected area - up to 120 sq. m.; low profile design; LED indication with 360 visibility; sensor status indication every 8 seconds.	nos.	6		
	Make: TELETEK EECTRONICS/HORING LIH/SYSTEM SENSOR or equivalent				
b	**Fire Indication Lamp**				
	Supply, installation, testing and commissioning of fire remote indicator with 1 input. The device repeats the status of 1 or several automatic fire detectors (up to 3 SensoMAG detectors series). The remote indicator operates with limited current detectors.	nos.	2		
	Make: TELETEK EECTRONICS/HORING LIH/SYSTEM SENSOR or equivvalent				
c	**Hooter with flash light**				
	Supply, installation, testing and commissioning of indoor conventional piezo siren (sound output - 105 dB) with red flash (LED strobe).	nos.	2		
	Make: TELETEK EECTRONICS/HORING LIH/SYSTEM SENSOR or equivalent				
d	**Manual Call Point**				
	Supply, installation, testing and commissioning of surface mounting Manual Call Point with resettable flexible element, LED indication and special tool for resetting after alarm event.	nos.	2		
	Make: TELETEK EECTRONICS/HORING LIH/SYSTEM SENSOR or equivalent				
e	**4 zone Fire Alarm Control Panel**				
	Supply, installation, testing and commissioning of 4 zone fire panel, 12 Volt battery back-up; One man test function; 4 fully monitored fire zones with up to 32 fire alarm detectors per zone and unlimited number of call points; 2 monitored siren outputs 300 mA each; 1 “fire” and 1”fault” relay output; Active EOL allowing continuous monitoring of inputs; Walk test; Multilanguage support LED indication; Security key; Metal box.	nos.	1		
	Make: TELETEK EECTRONICS (MAG 4M)/HORING LIH (AH-00212)/SYSTEM SENSOR or eequivalent				

S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
f	**SMOKE DETECTOR/HEAT DETECTOR/ MCP/RESPONSE INDICATOR POINT WIRING**				
	Supplying the 2x1 sq.mm Flexible Cu wires materials and concealed wiring through ceiling, false ceiling, wall, table whichever applicable in a hard PVT conduit of size 20/25 mm. dia. as per drawing specifications and instruction all complete. CABLE BRAND: PIONEER, PRAKASH OR NS:344/2052	pt.	11		
g	**SOUNDER POINT WIRING**	pt.	2		
	Supplying the 2x1.5 sq.mm Flexible Cu wires materials and concealed wiring through ceiling, false ceiling, wall, table whichever applicable in a LISTIC/HDP pipe of size 20/25 mm. dia. as per drawing specifications and instruction all complete. CABLE BRAND: PIONEER, PRAKASH OR NS:344/2052				
h	**FIRE EXTINGUISHER**				
	Supply, delivery and installation of 5 Kg ABC Stored Pressure Multi-purpose type Fire Extinguisher having glow sign on cylinder with fixing accessories per the drawings, specification/schedule of finishess, electricity rules and instructions all complete.	nos.	2		
	Make: NAFCO or equivalent				
				SUB-TOTAL (D)	

Client: UNDP
Project : Interior Design Works of the EEIC
Location : District Election Office, Biratnagar, Nepal

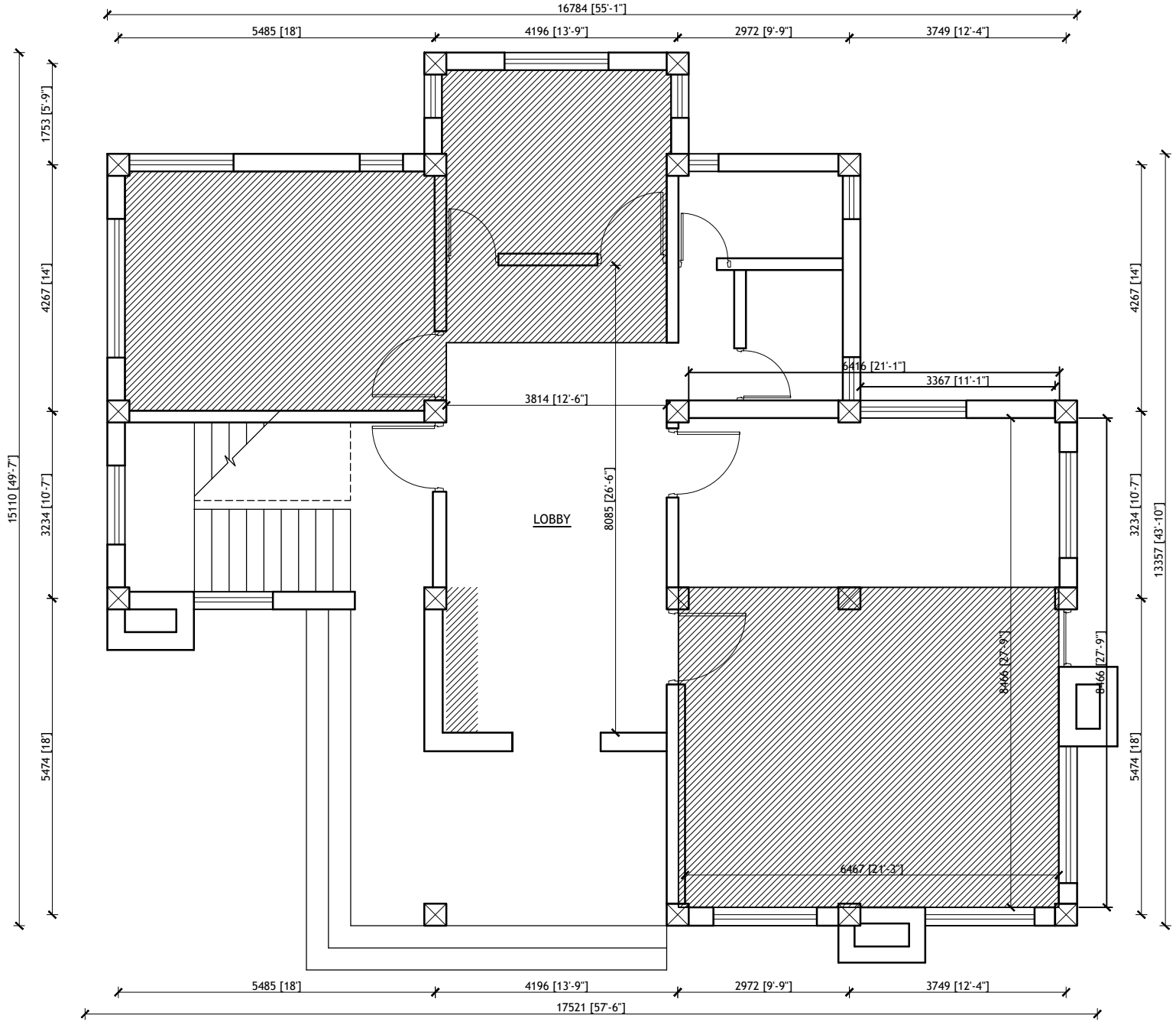
Bill No. E: HVAC Works					
S.No	Description of Works	Unit	Quantity	Rate	Amount (NRS)
1.0	**PART A**				
	Supply, installaton, testing and commissioning of heat pump type split HVAC system inlcusive with fully charged refrigerant (R-410A) inclusive of interconnicting power and control cables, individual wired/wireless remote contrllers and supports made of MS angle/ rods as per specifications and drawings of following capacity **MAKE: MITSUBISHI/LG or equivalent**				
1.1	**4-Way Ceiling Cassette Type Indoor & Outdoor Unit with Drain Pump.**	set	1.00		
	Nominal cooling capacity: 5.8 kW				
	Nominal heating capacity: 6.3 kW				
	Refrigearnt: R410A				
	Sound Pressure Level at high speed: 32 dBA				
	Air flow rate at high speed: 477 CFM				
	Electrical power source: 1 Ph, 220-240V, 50 Hz				
	Liquid line pipe diameter: 6.4 mm				
	Gas line pipe diameter: 12.7 mm				
	Type: Heat Pump **Capacity: 1.5 TR ± 5%**				
1.2	**4-Way Ceiling Cassette Type Indoor & Outdoor Unit with Drain Pump.**	set	3.00		
	Nominal cooling capacity: 7.1 kW				
	Nominal heating capacity: 8 kW				
	Refrigearnt: R410A				
	Sound Pressure Level at high speed: 50 dBA				
	Air flow rate at high speed: 741 CFM				
	Electrical power source: 1 Ph, 220-240V, 50 Hz				
	Liquid line pipe diameter: 9.5 mm				
	Gas line pipe diameter: 15.9 mm				
	Type: Heat Pump **Capacity: 2.0 TR ± 5%**				
2.0	**PART B**				
	Installation between indoor to outdoor unit including all required installation materials like copper tube, gas, insulation tube, electrical wiring of the following capacity:				
2.1	Installation charges for Ceiling Cassette units	Nos.	4.00		
2.2	Outdoor supporting angles	Nos.	4.00		
2.3	Extra piping	M.	40.00		
3.0	Fresh Air Supply				
3.1	**Conventional site fabricated ducts using Lock Forming Machines / closing machine**				
	Supply, Installation, Testing of factory fabricated ductwork complete with fire retardant gaskets, slip on flanges, wire rope suspension arrangement, GI perforated 'C' channel supports, 20mm thick foiled insulation etc. in accordance with the approved shop drawings and specifications.				
	a. 0.63mm (24 gauge) GSS	RM	45.00		

3.2	Supply, Installation, Testing & Balancing of square supply air diffusers as per the approved shop drawings and specifications with fixed air distribution grid, removable key-operated volume control damper. The diffusers shall be anti-smudge ring/flush type.				
	a. 600 x 600 diffusers with volume control damper having neck size as mentioned in the "Approved for Construction" shop drawings suitable for fixing in Grid ceiling.	Nos	8.00		
3.30	**AHU**				
	Supplying , installing , testing and commissioning of double skin draw thru type AIR HANDLING UNITS compelete with 50 mm thick aluminium filter as per specification, each compelete with TEFC squirrel cage induction motor, centrifugal DIW forward curved bloward curved blower, belt drive and vibration isolators. Motor shall be suitable for 220+10% volts, 50Hz, 1 phase AC supply	No	1.00		
	Airflow Rate : 150m3/h				
				SUB-TOTAL (E)	

Client: UNDP
Project : Interior Design Works of the EEIC
Location : District Election Office, Biratnagar, Nepal

S.No	Description	Qty	Capacity/Size	Make
A	Samples to be provided			
1	Wood			
2	Marble			
3	Block Board			
4	Ply			
5	Laminate			
6	Blind			
7	Gypsum board			
8	Frame of grid ceiling			
9	Board of grid ceiling			
10	Light fixtures			
11	Switches			
12	Power sockets			
13	USB charging outlet			
14	Switch gear			
15	House wires			
16	Network cables			
B	Catelogue to be provided			
1	Security systems			
2	Fire alarm system			
3	Survelliance system			
4	HVAC System			
5	Network switch			
6	FIre Extinguishers			

ARCHITECTURAL DRAWINGS



GROUND FLOOR PLAN
Total Builtup area = 2025.71 Sq. Ft.
Carpet area for EEIC =594.7 Sq.Ft

PROPOSED EEIC AREA

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
GROUND FLOOR LAYOUT PLAN

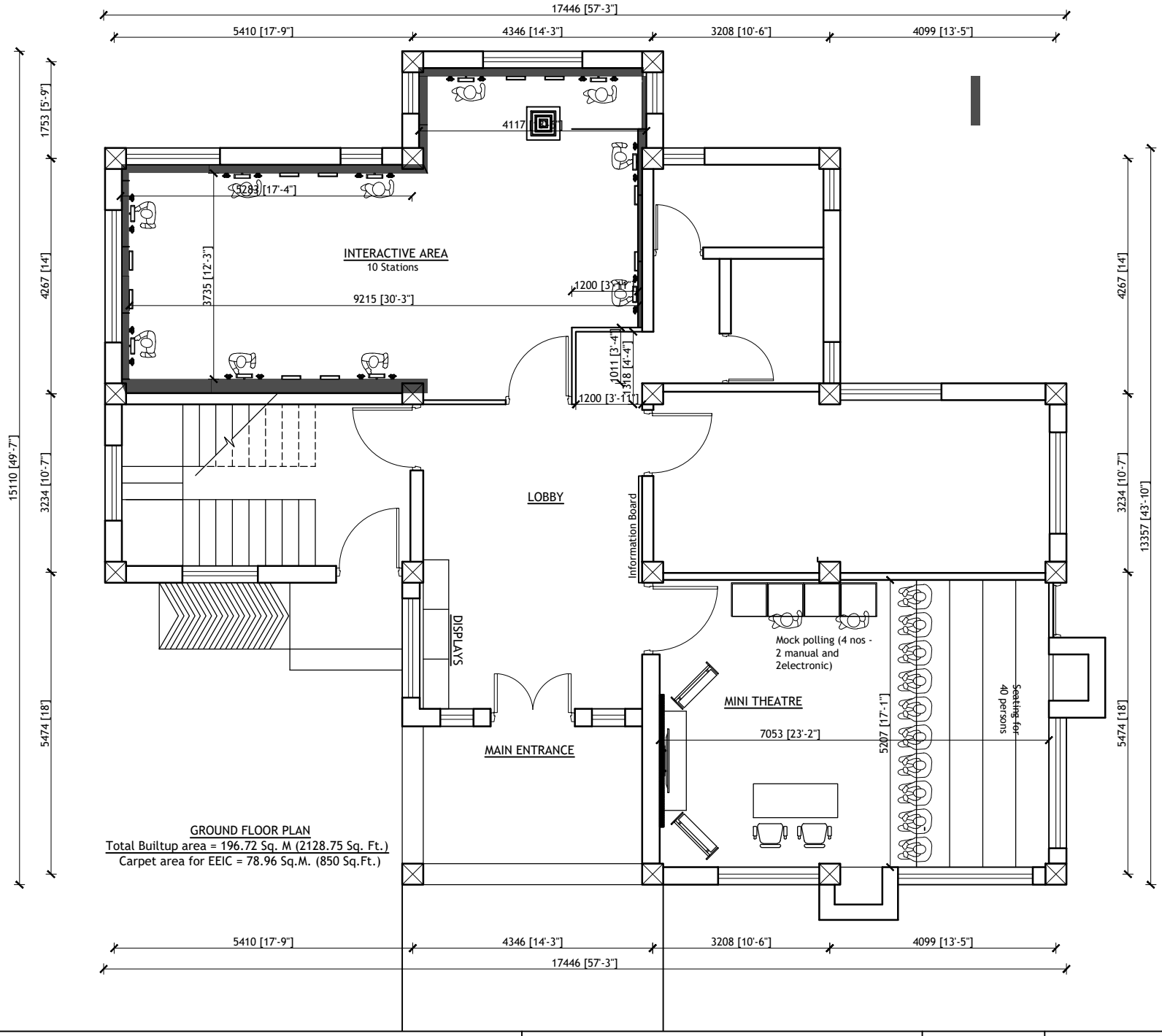
Revision No: 0

Designed by:
[ ]

Scale 1:100

Date: July 2019

Drawing No.
1



PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
GROUND FLOOR LAYOUT PLAN

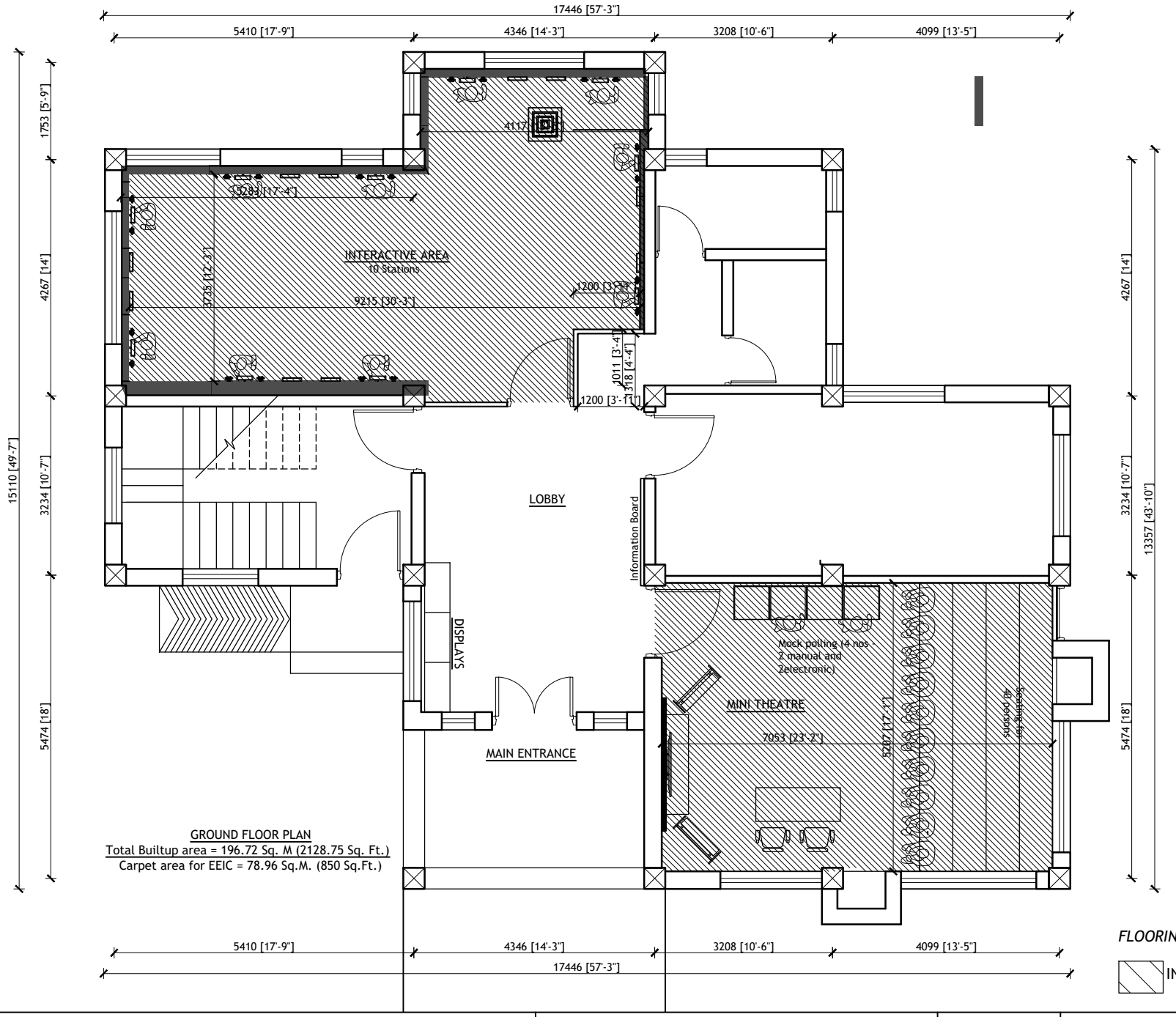
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Designed by:
[ ]

Scale 1:100

Date: July 2019

Drawing No.
3



PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
FLOORING LAYOUT PLAN

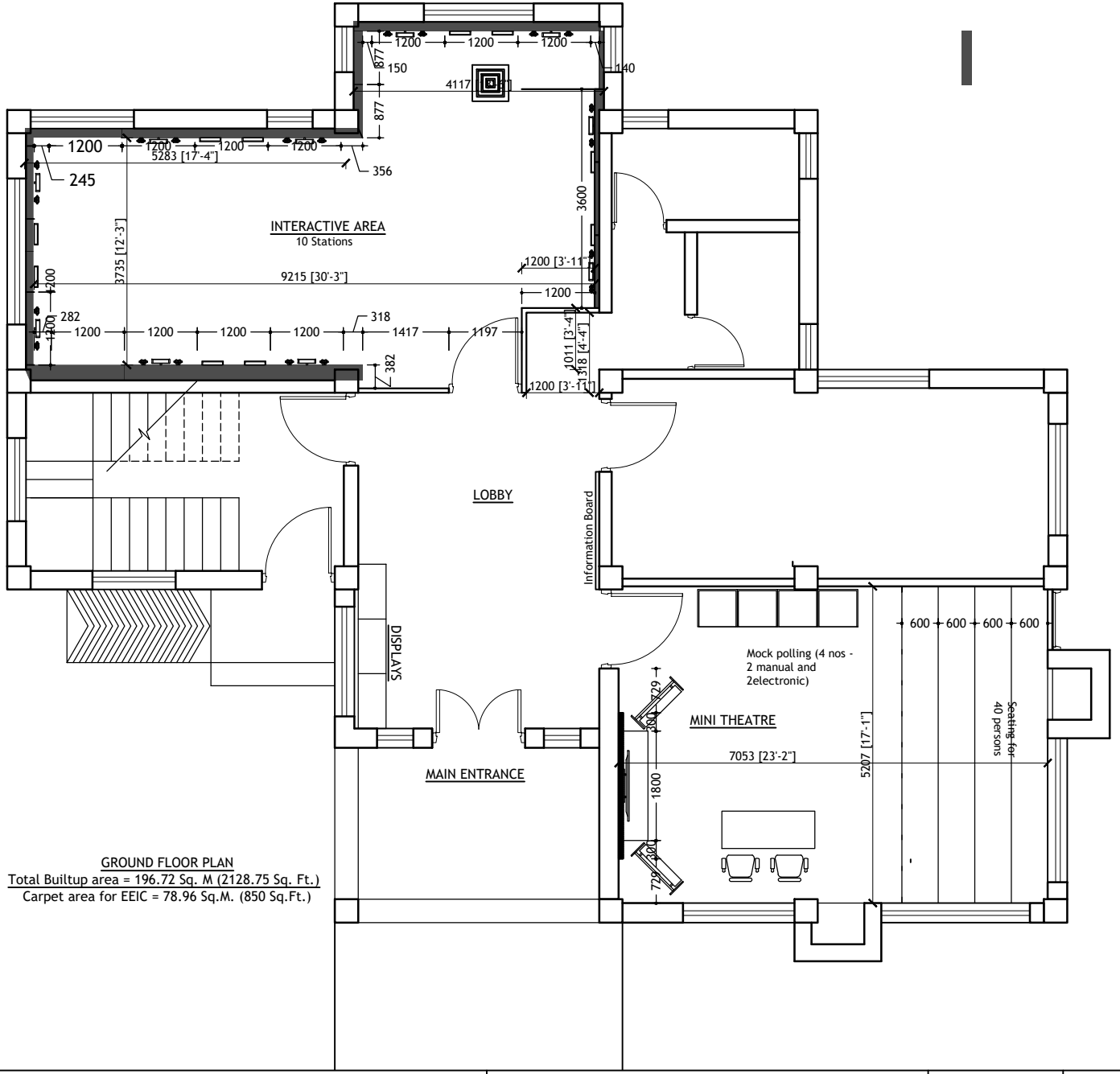
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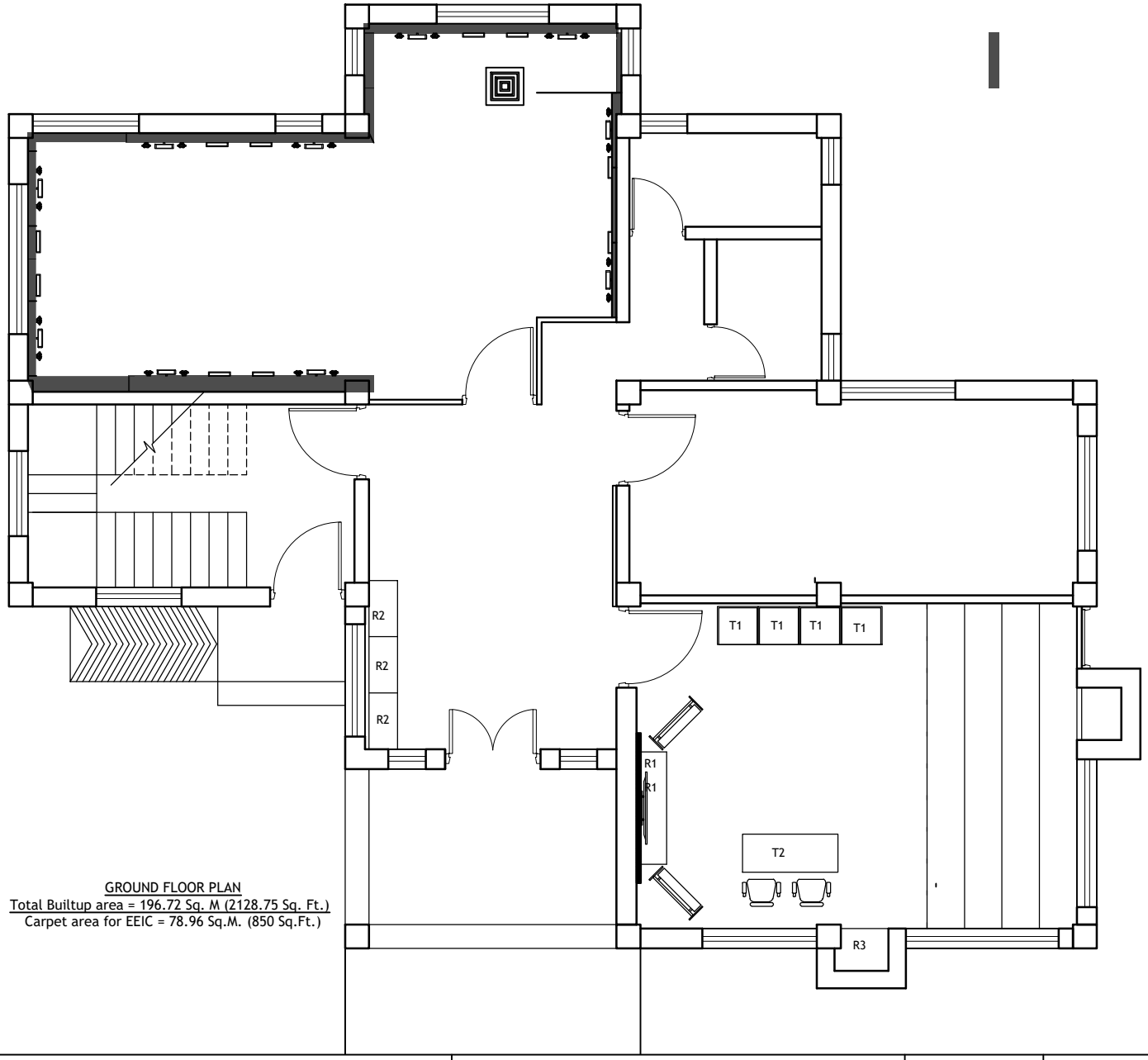
Date: July 2019

Drawing No.
6



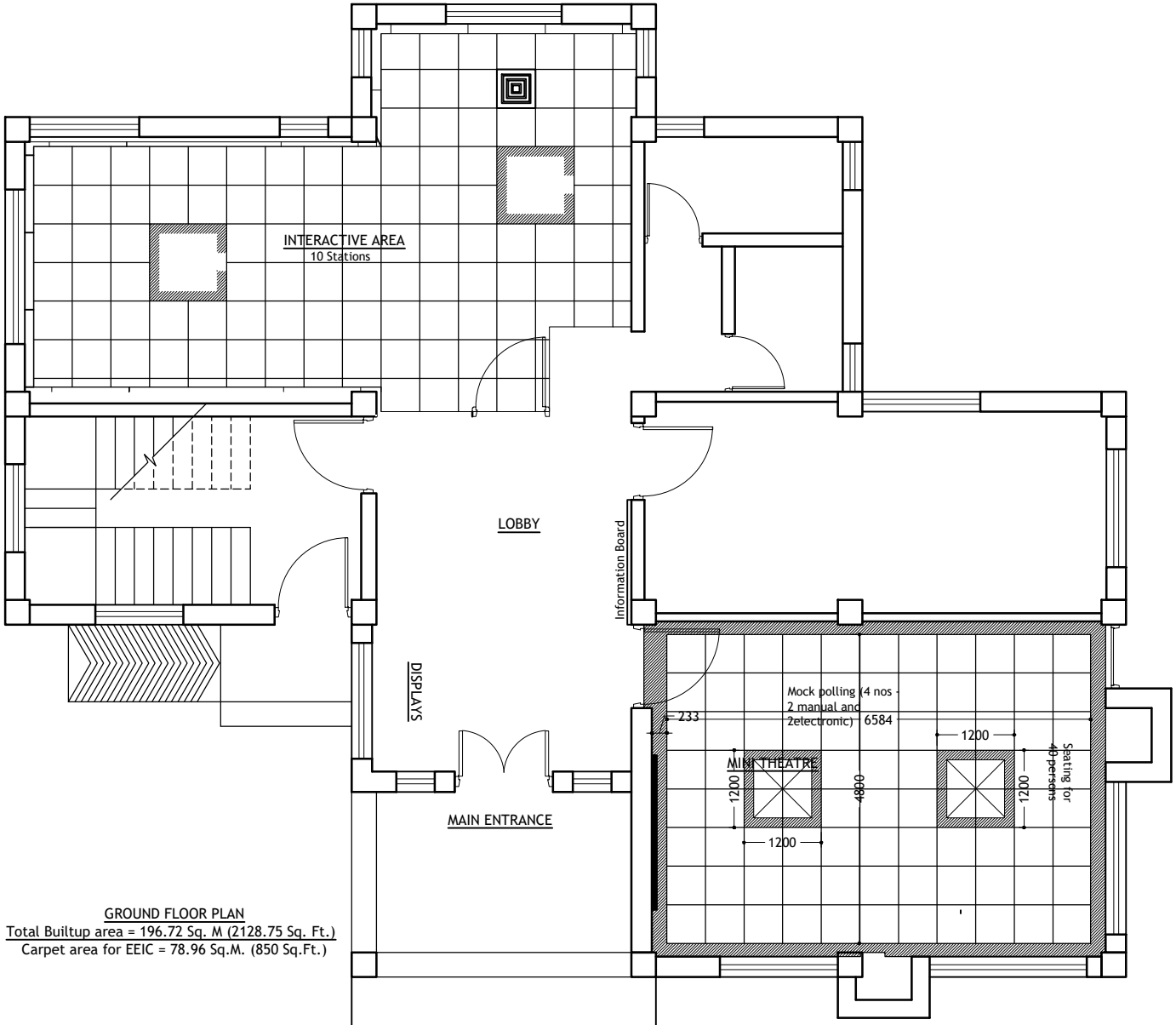
GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **LAYOUT PLAN - DETAIL DIMENSION**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. 7



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE LAYOUT PLAN**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. 8



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

CEILING TYPE

Modular Acoustic False ceiling

Gypsum false ceiling

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
FALSE CEILING

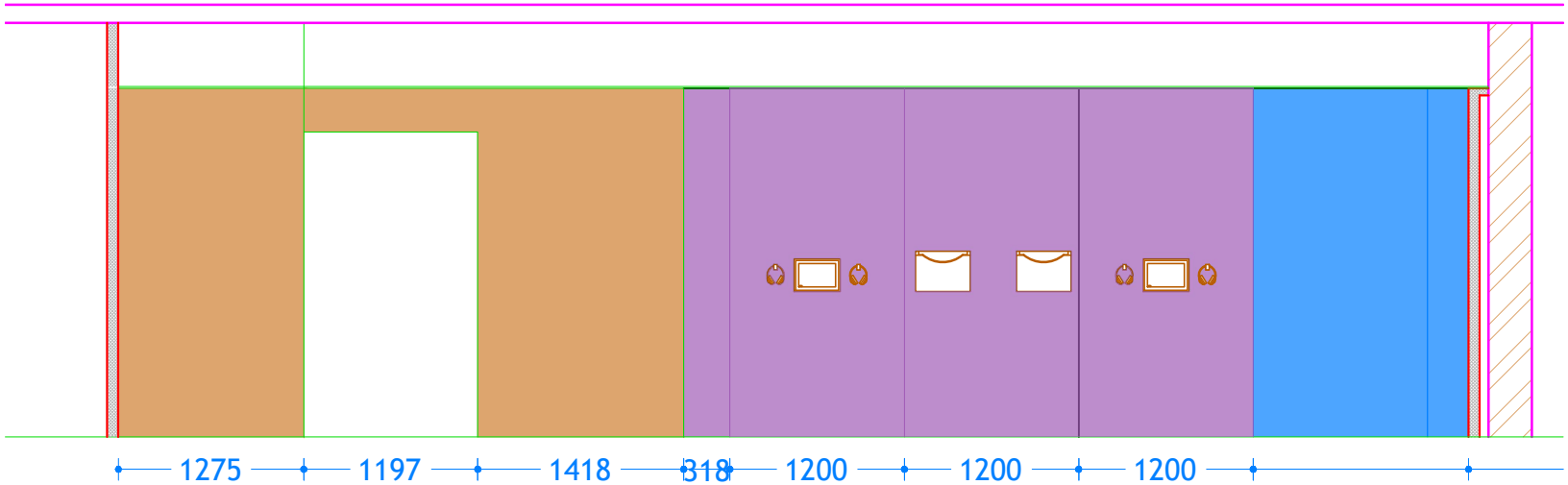
Revision No: 0

Designed by:
[ ]

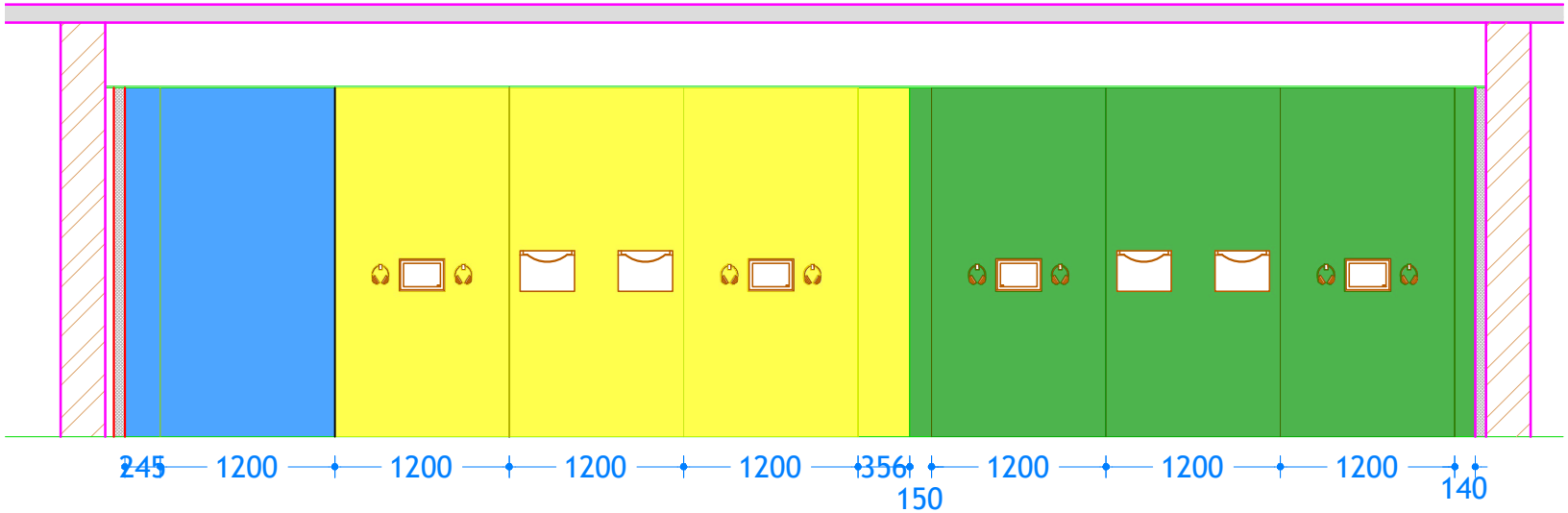
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Date: July 2019

Drawing No.
9

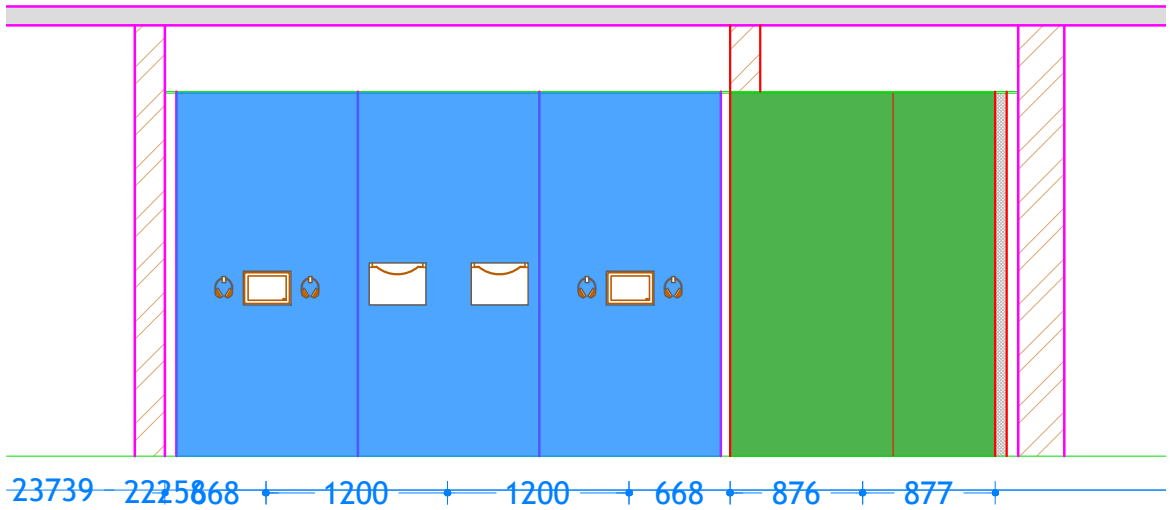


NORTH WALL ELEVATION

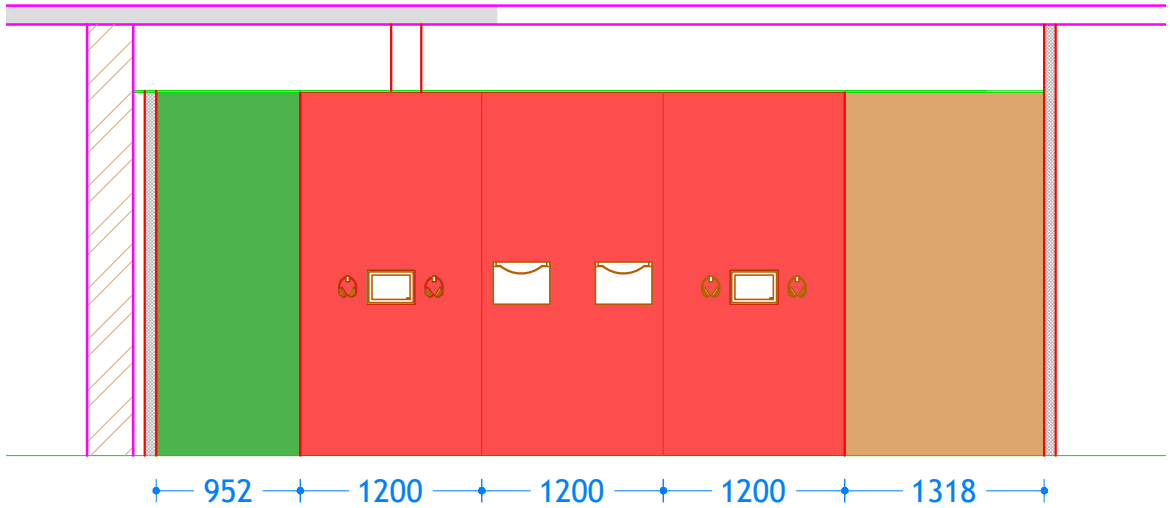


SOUTH WALL ELEVATION

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **PARTITION DETAIL**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. 10

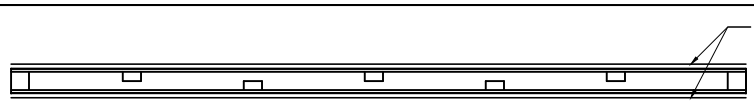


EAST WALL ELEVATION



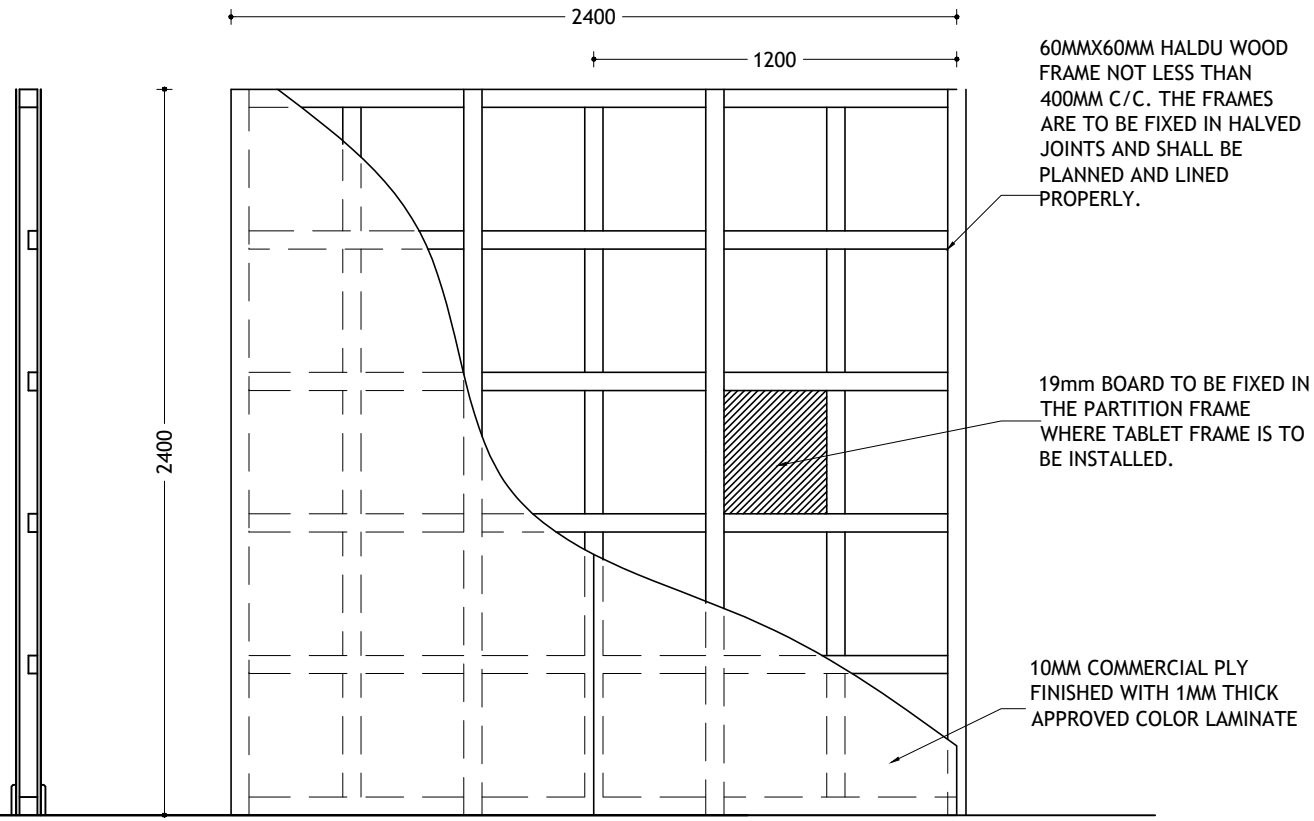
WEST WALL ELEVATION

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **PARTITION DETAIL**	Revision No: 0	Designed by: [ ] Scale 1:50 Date: July 2019	Drawing No. 11



PLAN

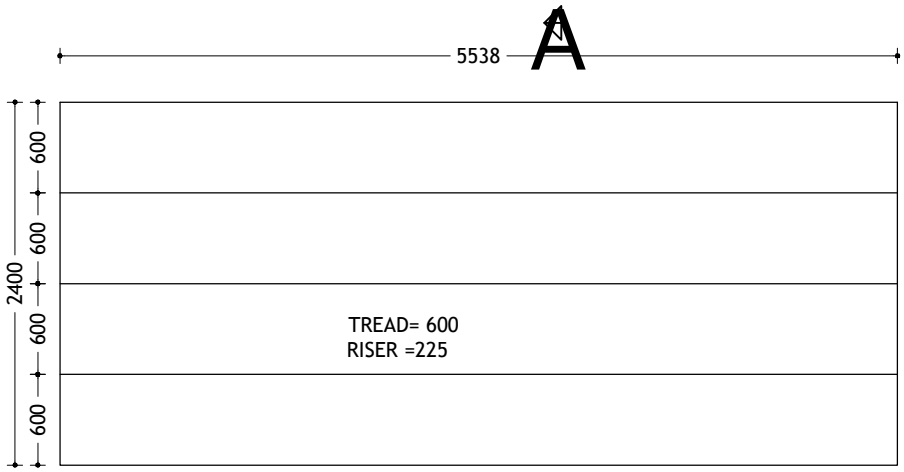
A



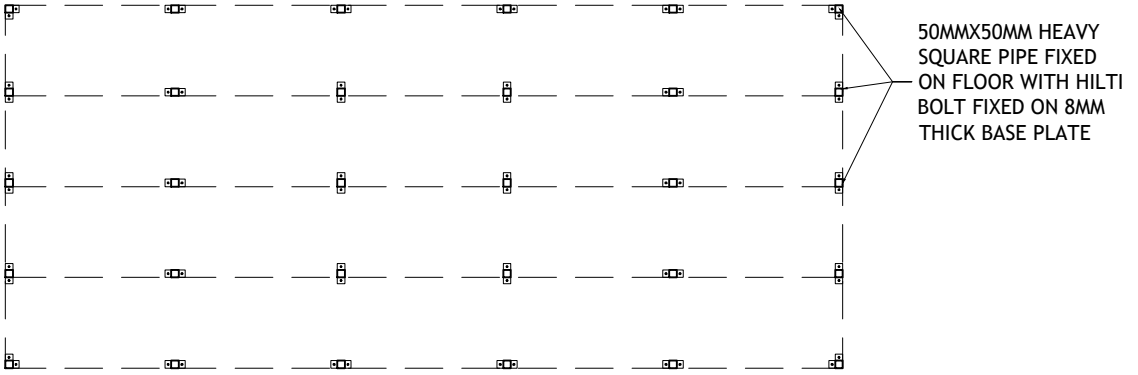
SECTION AT A-A

FRAMING DETAIL
A

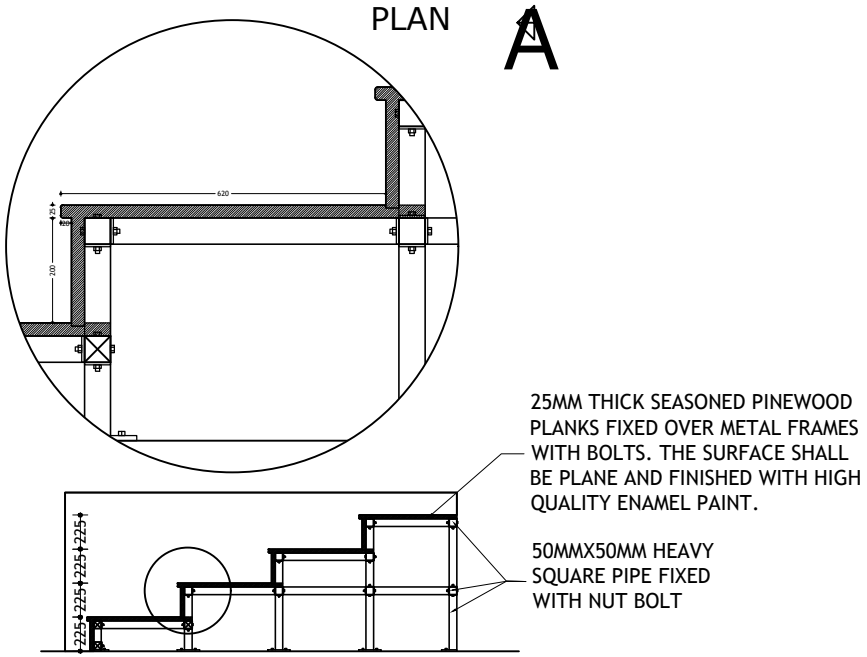
PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **PARTITION DETAIL**	Revision No: 0	Designed by: [ ] Scale 1:25 / Date: July 2019	Drawing No. 12



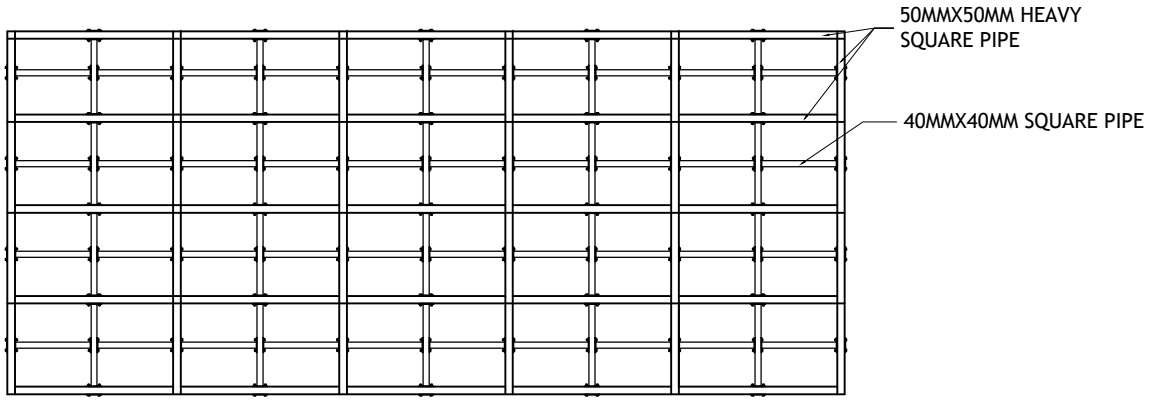
PLAN



BASE FIXING PLAN

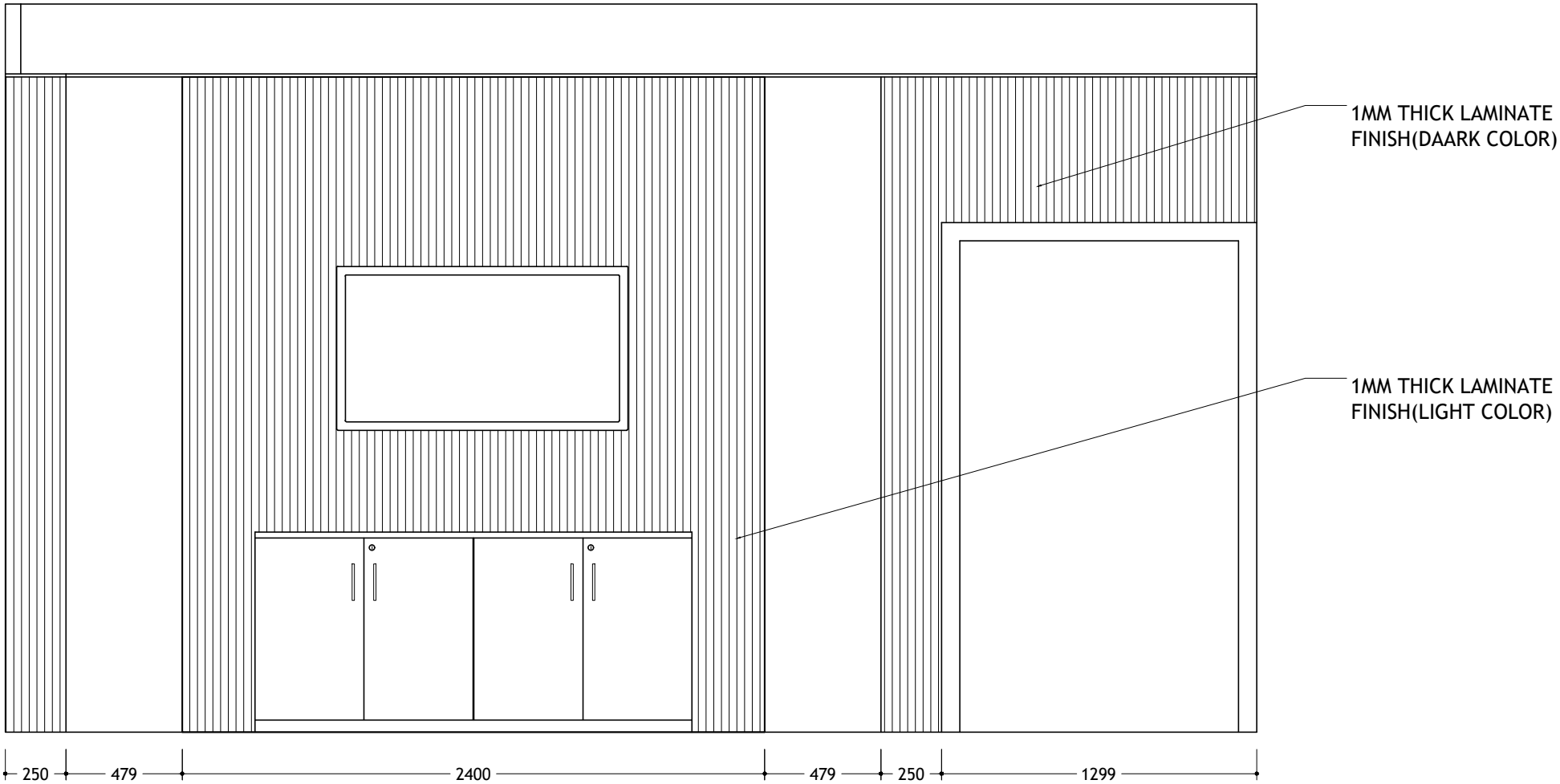


SECTION AT A-A



FRAMING DETAIL

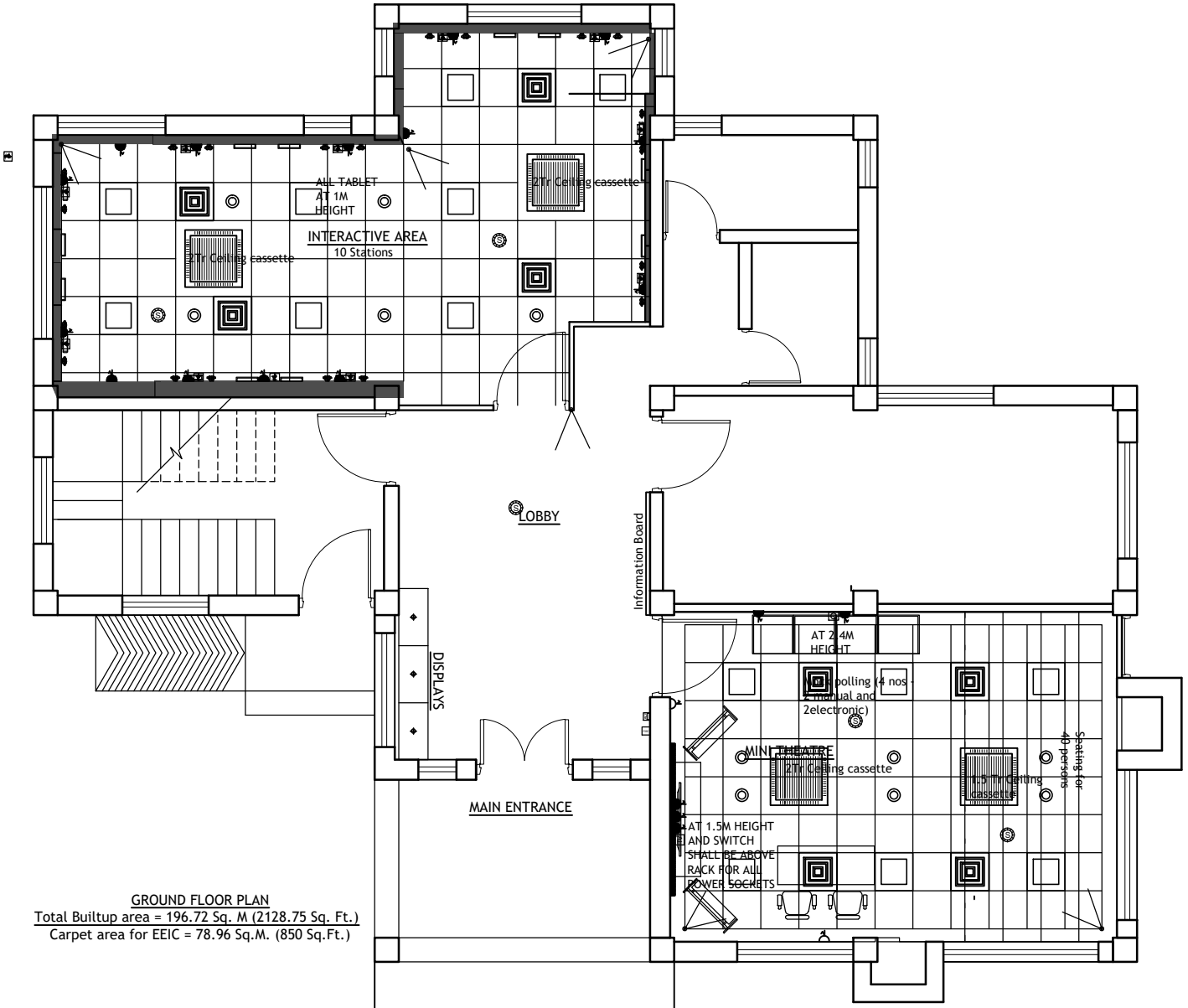
PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** PAMPHLET HOLDER	Revision No: 0	Designed by: [ ] Scale 1:50 Date: July 2019	Drawing No. 13



TV WALL DETAIL

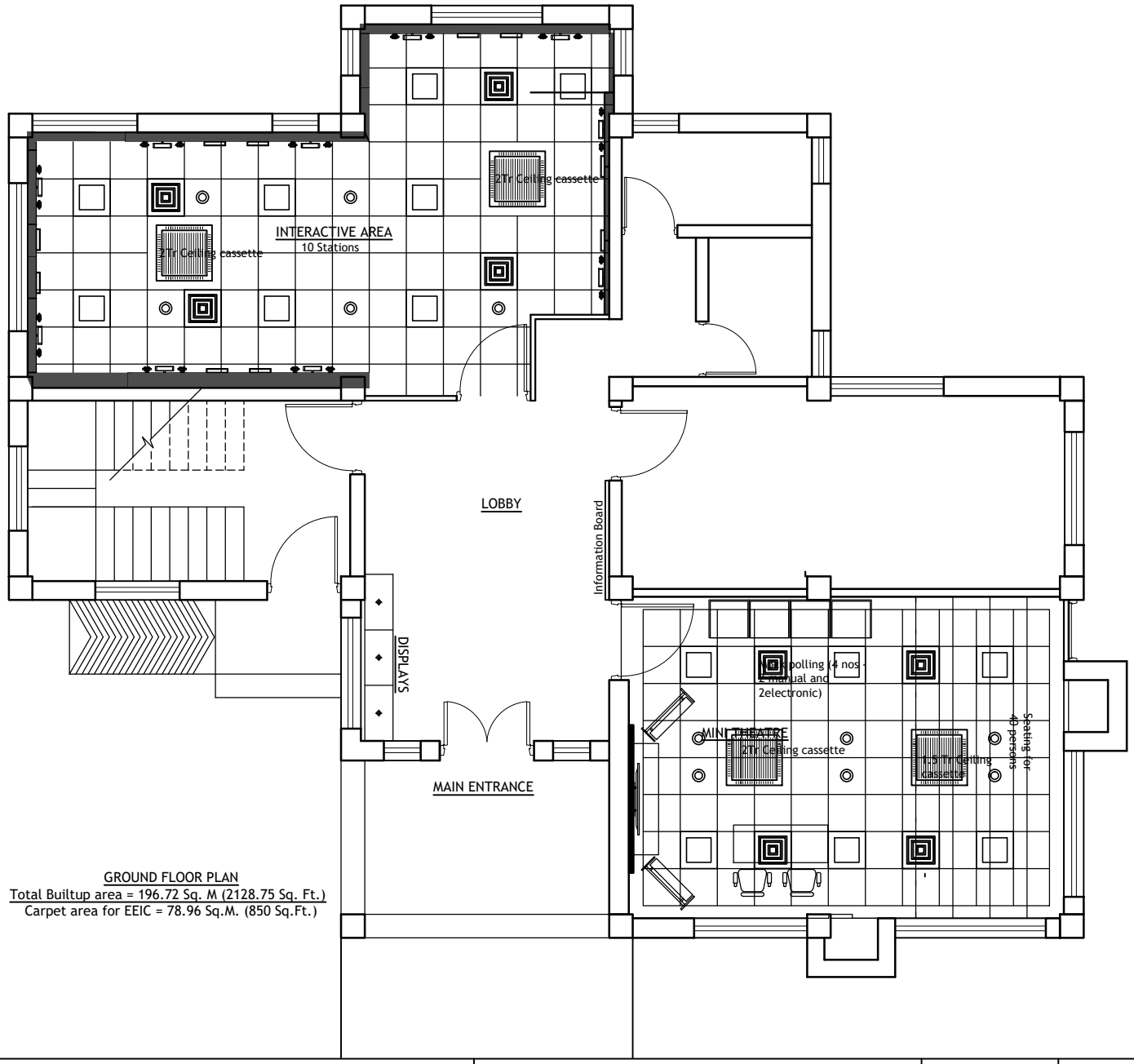
PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **Wall Cladding for TV Backing**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. 14

ELECTRICAL DRAWINGS



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **ELECTRICAL LAYOUT PLAN**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. E1



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
LIGHTING PLAN WITH CEILING

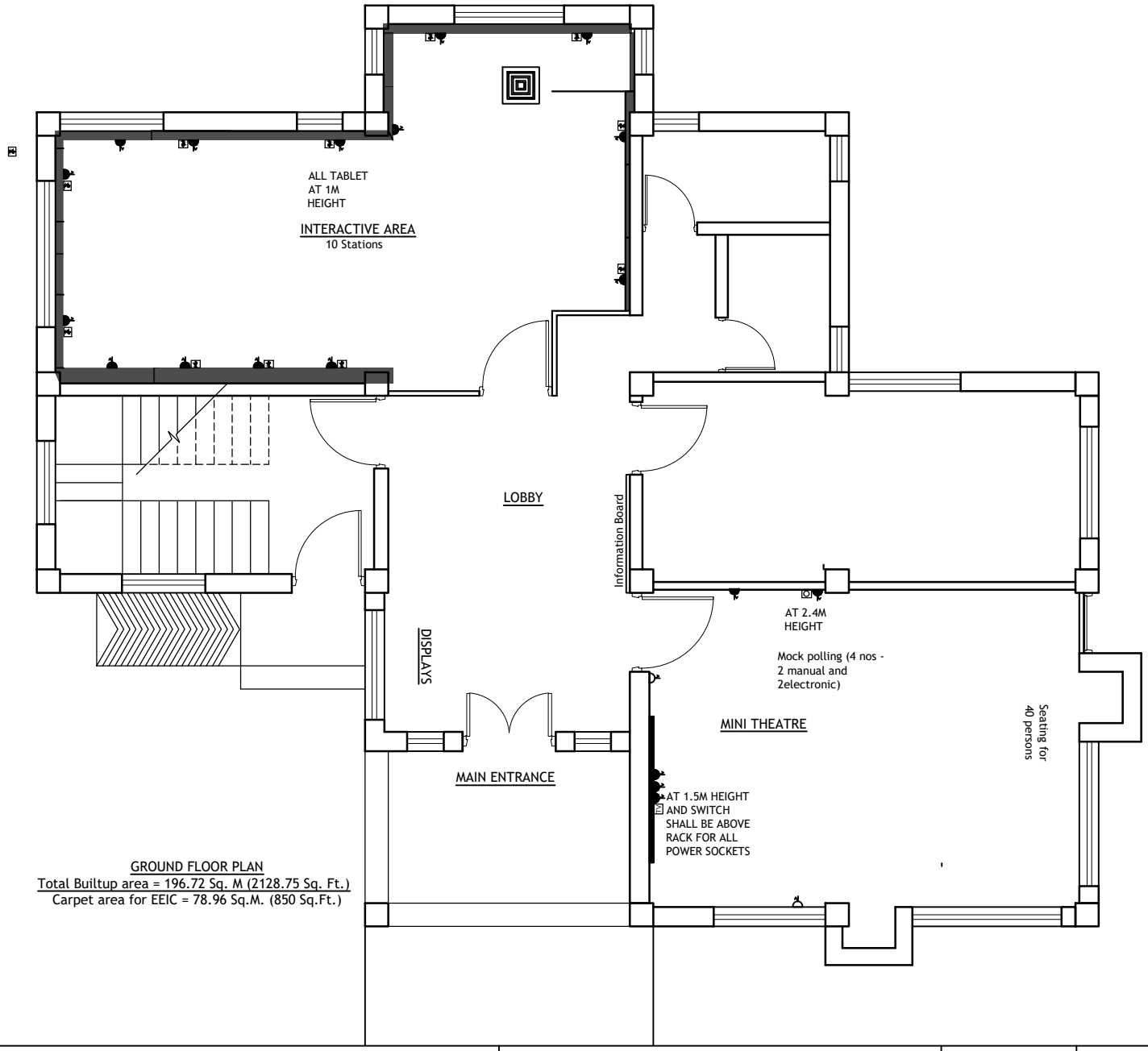
Revision No: 0

Designed by:
[ ]

Scale 1:50

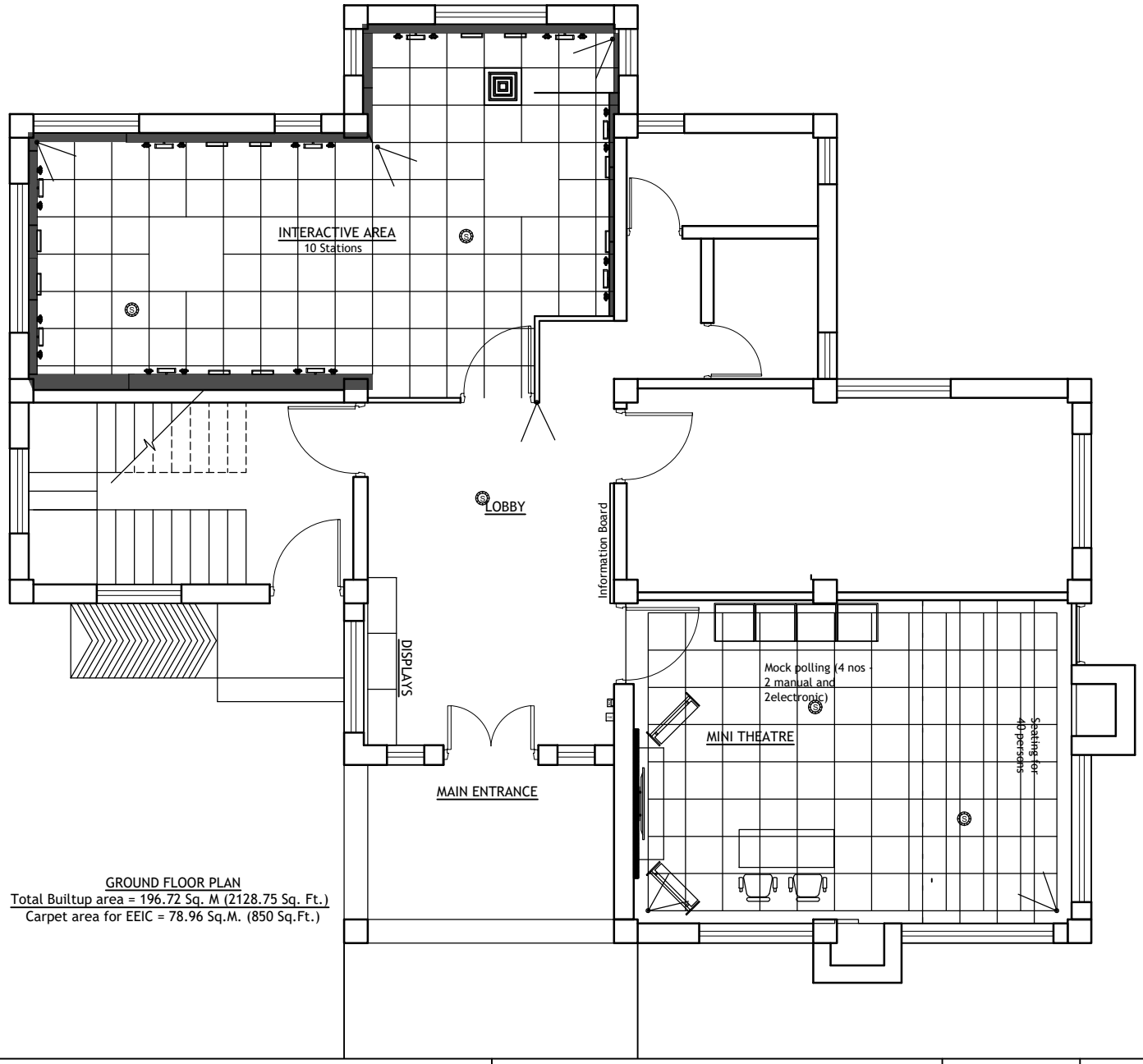
Date: July 2019

Drawing No.
E2



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **POWER/DATA/COMMUNICATION**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. E3



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
SECURITY SYSTEMS WITH CEILING

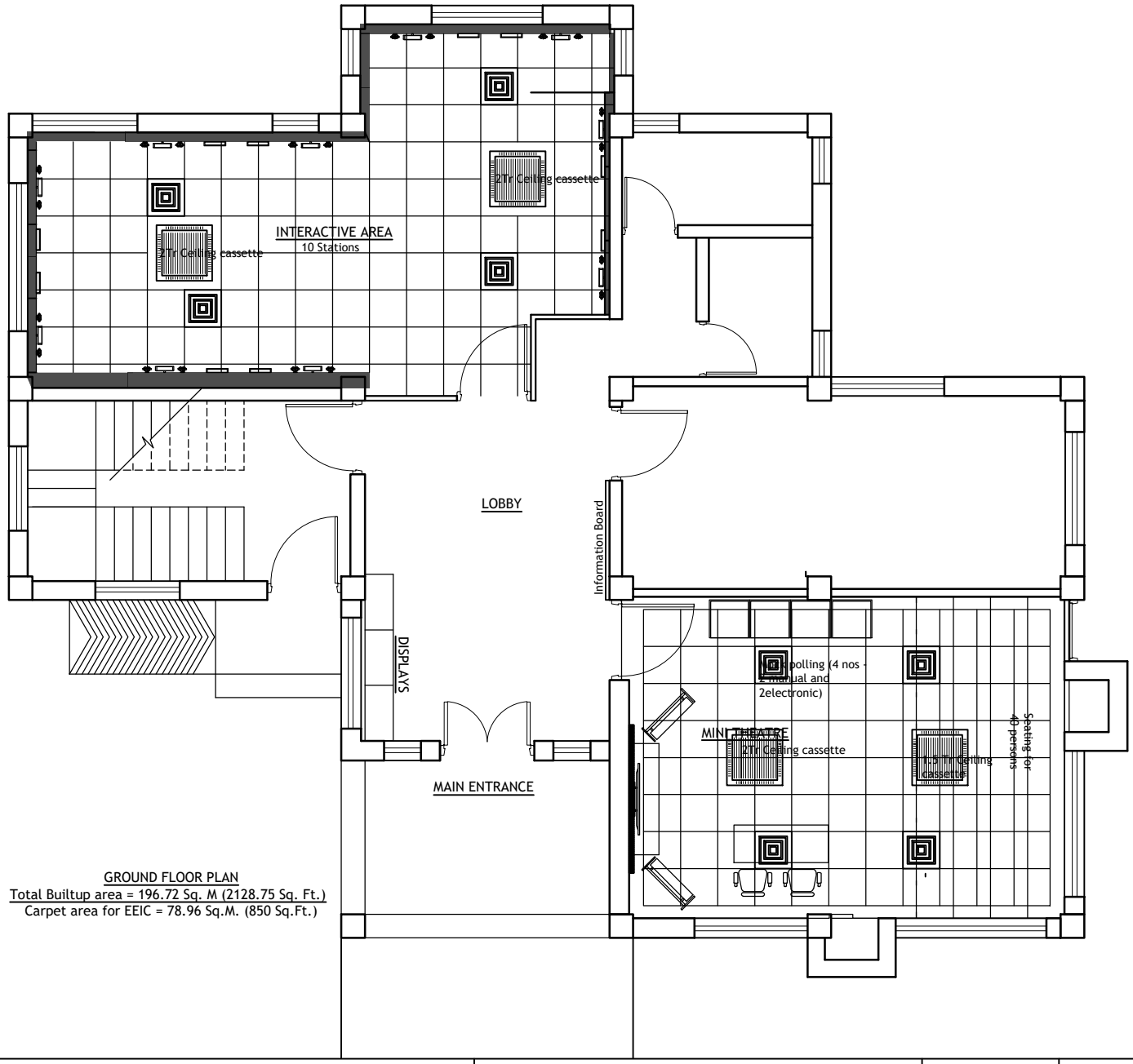
Revision No: 0

Designed by:
[ ]

Scale 1:50

Date: July 2019

Drawing No.
E4



GROUND FLOOR PLAN
Total Builtup area = 196.72 Sq. M (2128.75 Sq. Ft.)
Carpet area for EEIC = 78.96 Sq.M. (850 Sq.Ft.)

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
HVAC PLAN WITH CEILING

Revision No: 0

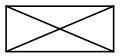
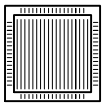
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[ ]

Scale 1:50

Date: July 2019

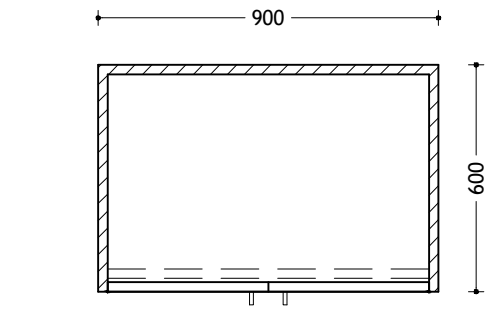
Drawing No.
E5

LEGENDS

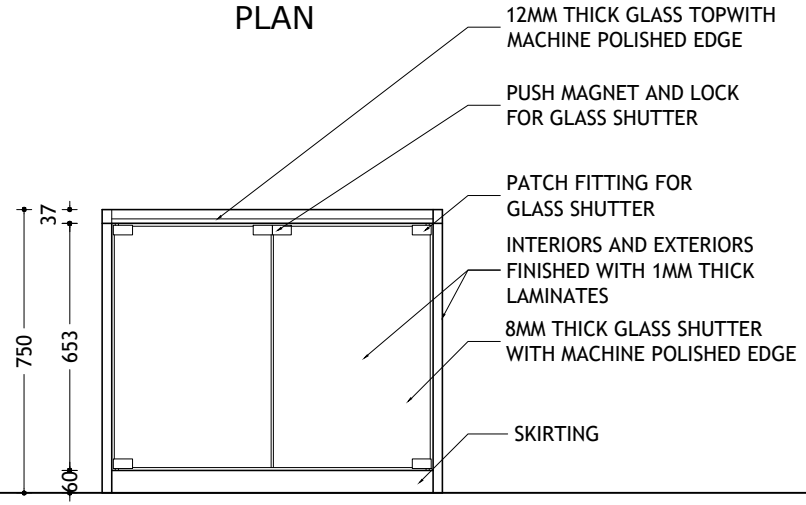
	Electrical connections		2' x 2' Recessed LED lights
	Distribution Box		2' x 2' Surface mounted LED lights
	Manual Call Point		LED Down lights
	FIRE Panel		Dome lights
	Data Socket		2'/4' wide tubes
	DATA Panel		Exhaust fan with louvers
	USB Charging outlet		Spot lights
	Power Socket		CC TV Panel
	Power Socket (Flat pin from UPS)		CC TV - Fixed
	Switch		AC - Ceiling mounted

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **LEGENDS**	Revision No: 0	Designed by: [ ] Scale 1:50 / Date: July 2019	Drawing No. E6

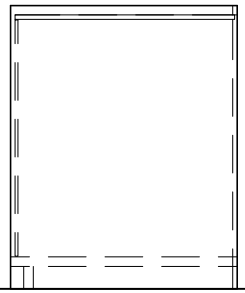
FURNITURE DETAILS



PLAN

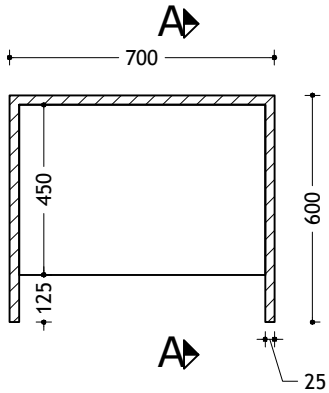


FRONT ELEVATION

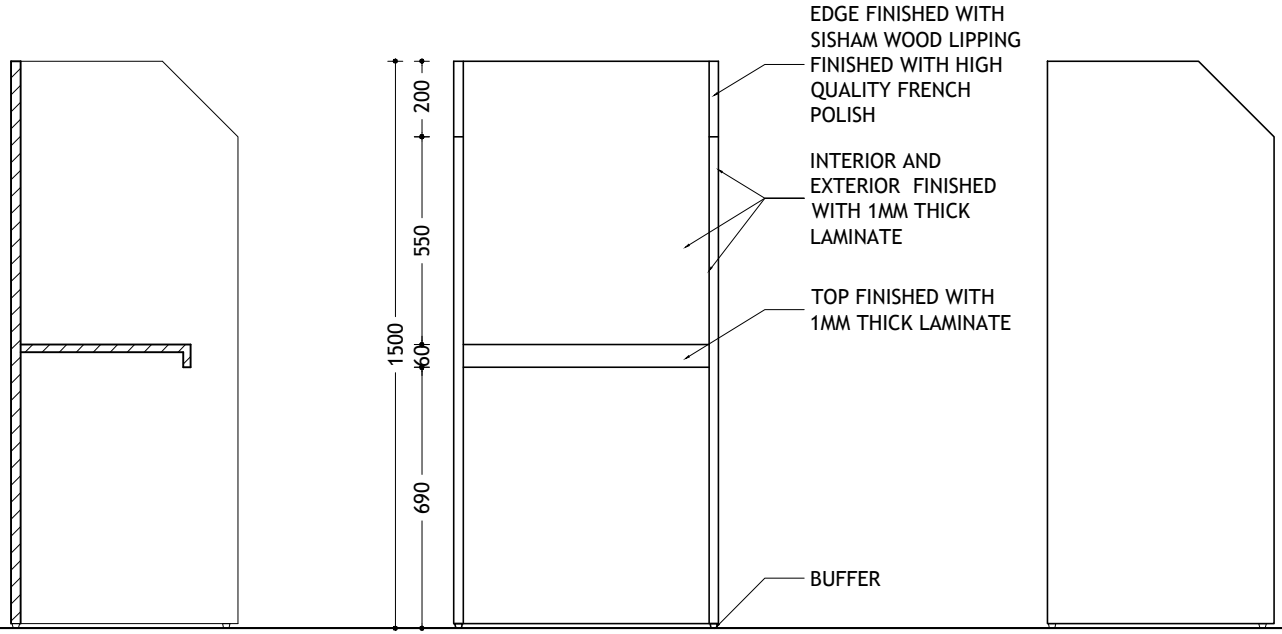


SIDE ELEVATION

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** DISPLAY CABINET	Revision No: 0	Designed by: [ ] Scale 1:20 / Date: July 2019	Drawing No. F1



PLAN

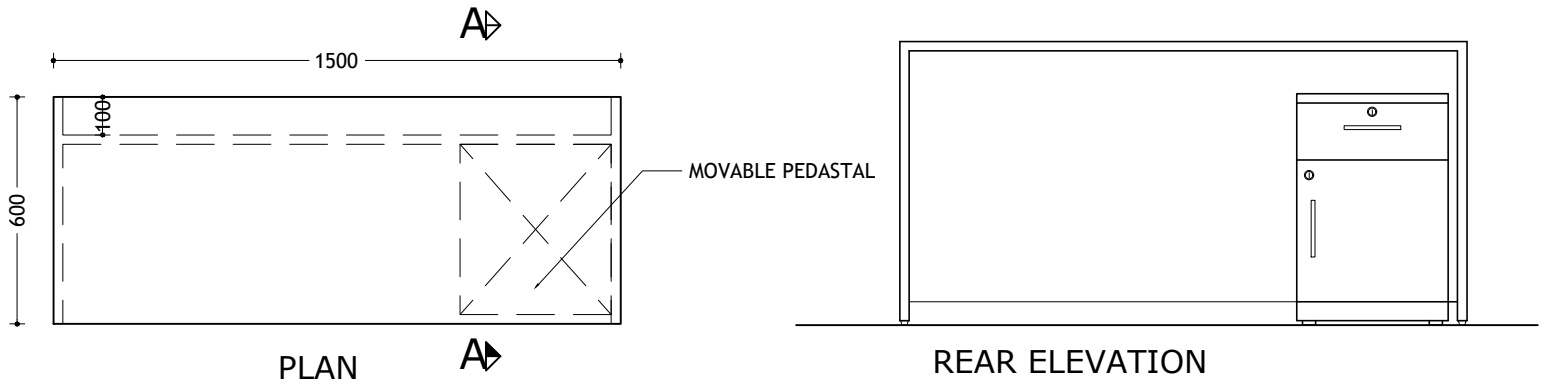


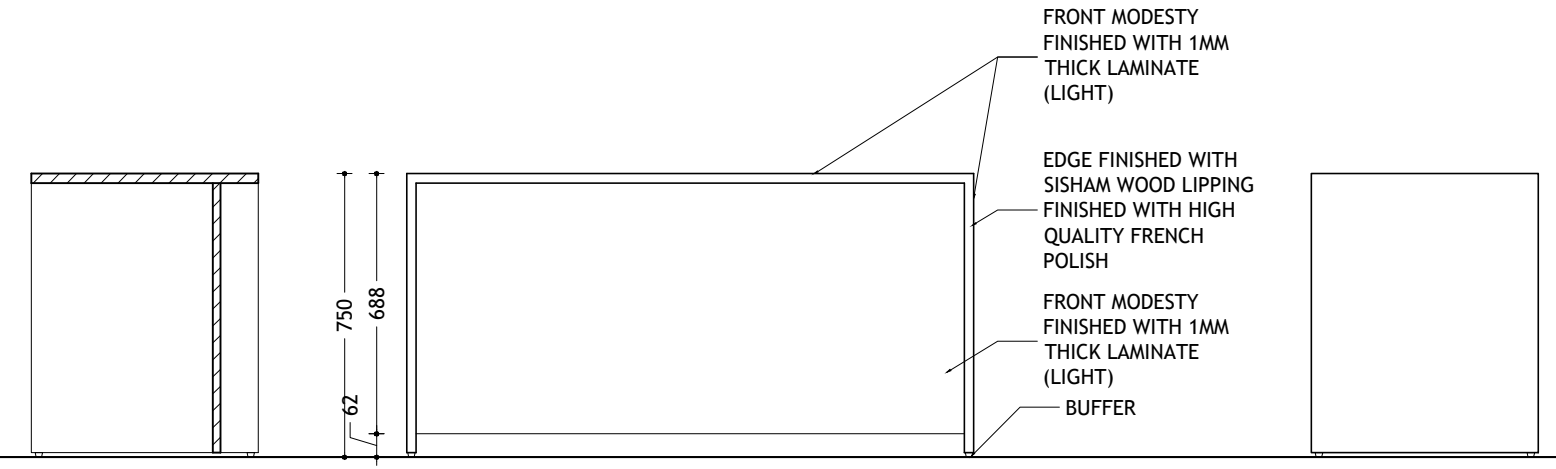
SECTION AT A-A

FRONT ELEVATION

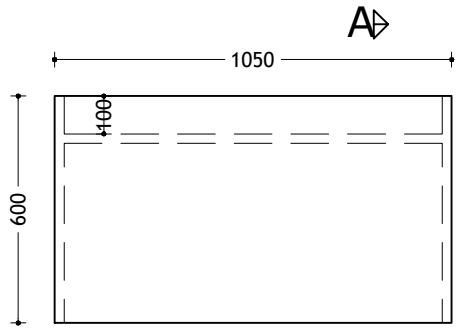
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PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** VOTING BOOTH	Revision No: 0	Designed by: [ ] Scale 1:20 / Date: July 2019	Drawing No. F2

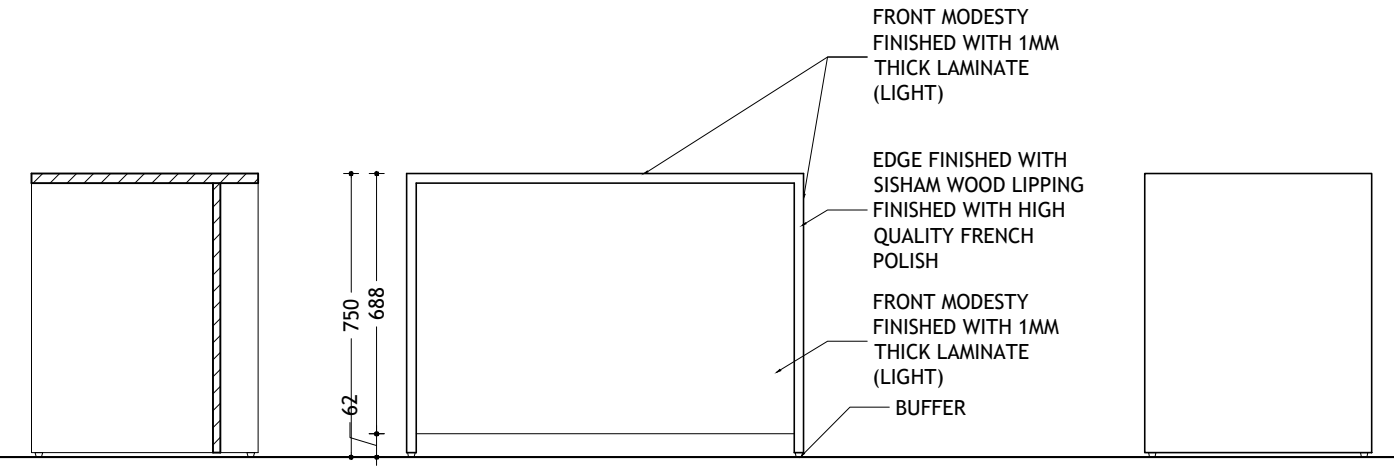




PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** REGISTRATION DESK	Revision No: 0	Designed by: [ ] Scale 1:20 / Date: July 2019	Drawing No. F3



PLAN

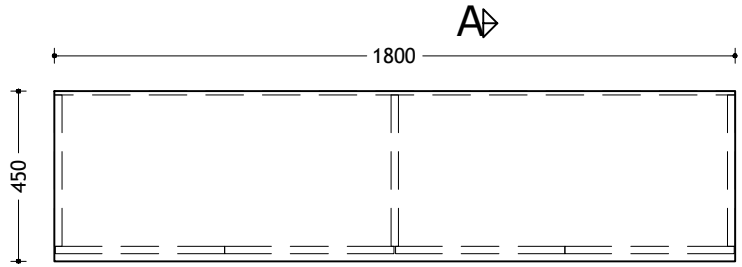


SECTION AT A-A

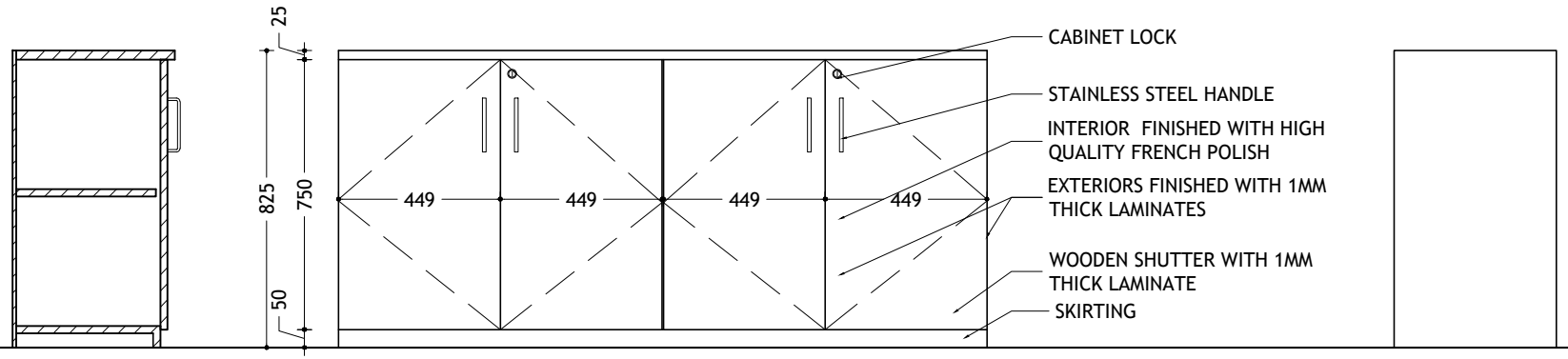
FRONT ELEVATION

SIDE ELEVATION

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** REGISTRATION DESK	Revision No: 0	Designed by: [ ] Scale 1:20 / Date: July 2019	Drawing No. F3



PLAN

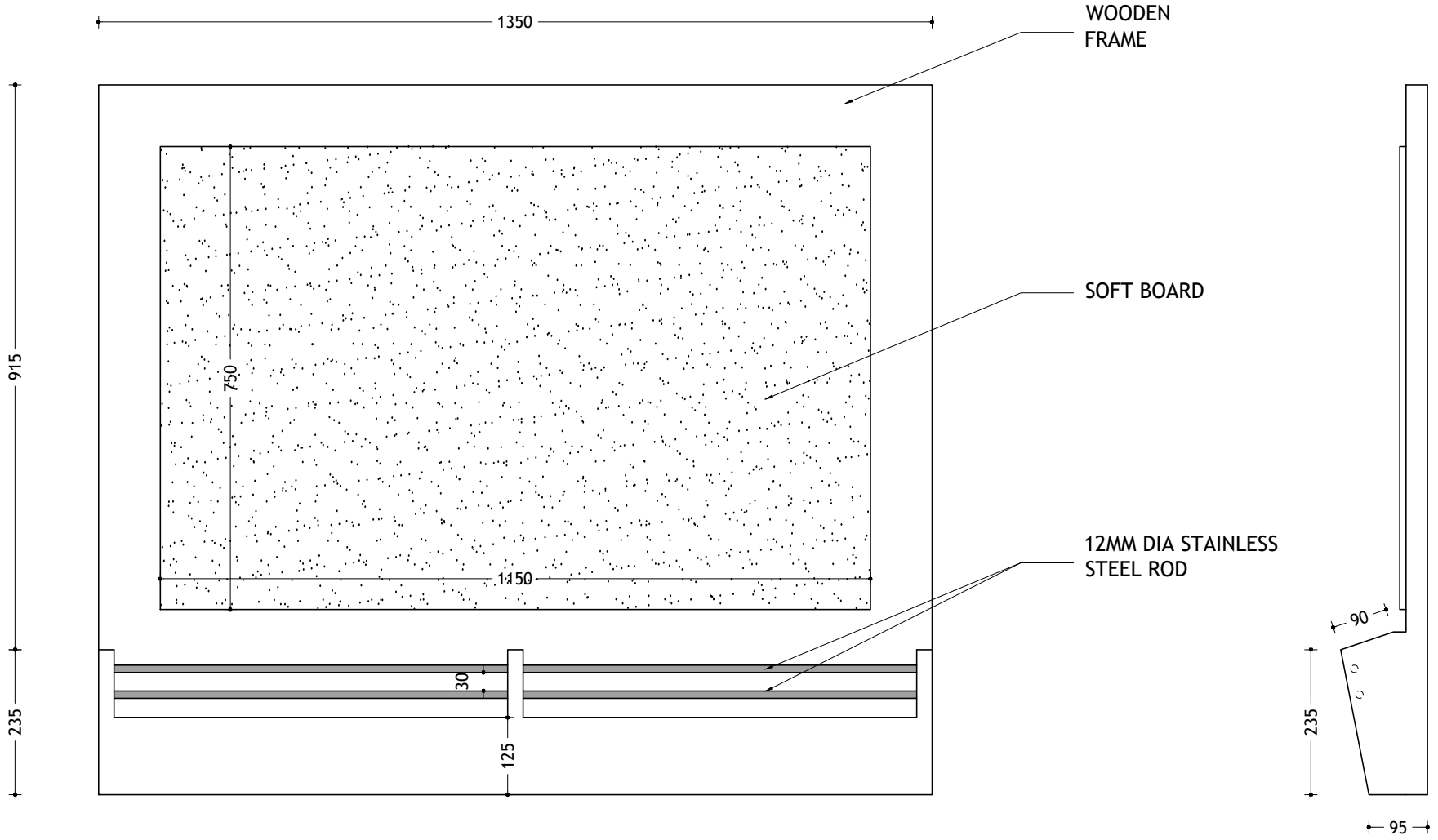


SECTION AT A-A

FRONT ELEVATION

SIDE ELEVATION

PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** STORAGE CABINET	Revision No: 0	Designed by: [ ] Scale 1:20 / Date: July 2019	Drawing No. F4



FRONT ELEVATION

SIDE ELEVATION

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
FURNITURE DESIGN:
INFORMATION BOARD

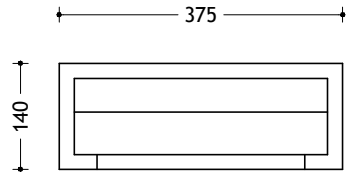
Revision No: 0

Designed by:
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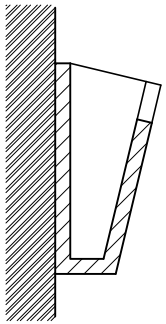
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Date: July 2019

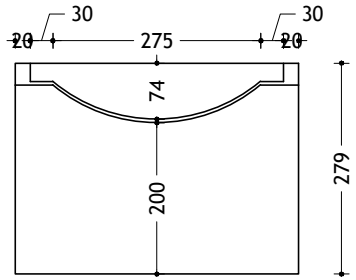
Drawing No.
F5



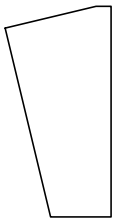
PLAN



SECTION AT A-A



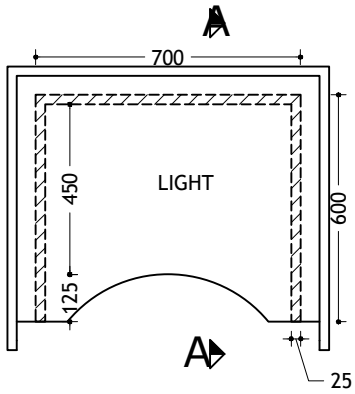
FRONT ELEVATION



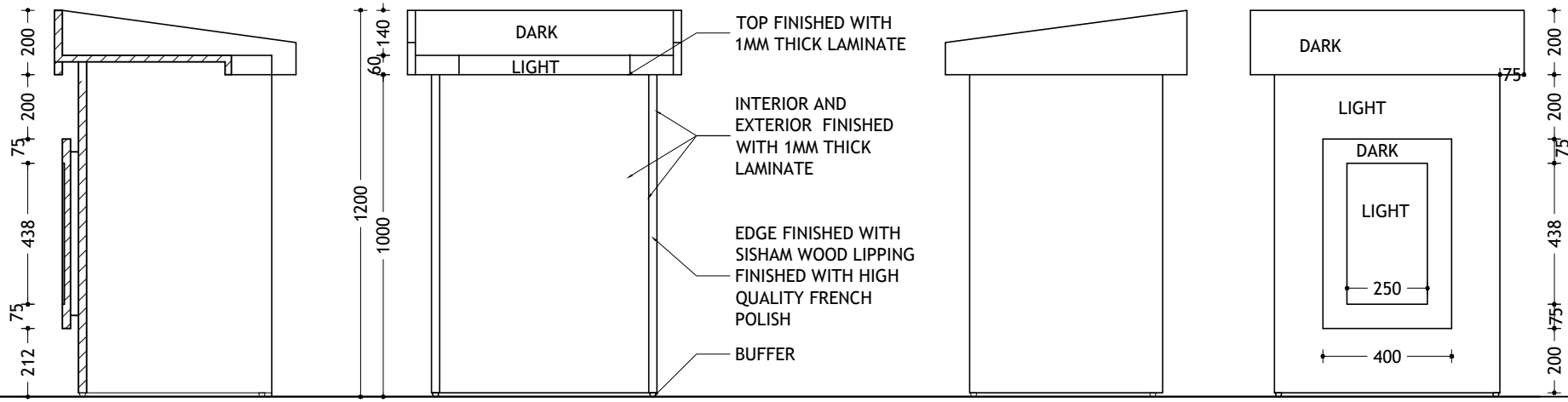
SIDE ELEVATION

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PROJECT: **ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)** BIRATNAGAR	TITLE: **FURNITURE DESIGN:** PAMPHLET HOLDER	Revision No: 0	Designed by: [ ] Scale 1:10 / Date: July 2019	Drawing No. F6



PLAN



SECTION AT A-A

REAR ELEVATION

SIDE ELEVATION

FRONT ELEVATION

PROJECT:
ELECTORAL EDUCATION AND INFORMATION CENTRE (EEIC)
BIRATNAGAR

TITLE:
FURNITURE DESIGN:
PAMPHLET HOLDER

Revision No: 0

Designed by:
[ ]

Scale 1:20

Date: July 2019

Drawing No.
F7

SPECIFICATIONS

Specifications - CIVIL WORKS

1. Whenever the specifications are not given or when the specifications are ambiguous, the relevant **Nepalese standard** or **Indian Standard** or **British Standard** and further amendment will be considered as final and binding.

2. The work shall be related to the drawing that the Contractor is presumed to study. Nothing extra to be paid for any item because of its shape, location, or other difficult circumstances, even if the schedule makes no distinction, as long as the item is shown in the drawing.

3. The sources of material stated in the specifications are those from which materials are generally available. However, material not confirming to specifications shall be rejected even if they come from the stated sources. The Contractor should satisfy him that sufficient quantity of material of acceptable specification from the stated or other sources.

4. "Site Engineer" shall mean the employees deputed by the Employer.

5. The requirements of the specifications under (A) General, (B) Materials shall be fulfilled by the contractor without extra charge i.e. the item rate quoted shall be deemed to have taken these specifications into account.

A). GENERAL

This section of the Specifications covers the removal of existing concrete, reinforced concrete, masonry, existing buildings or steel structures or partitions or part of the structures which interfere with the construction and installation of new facilities.

Existing structures which are to remain in place shall be protected from damage, removed facilities shall be salvaged or disposed of as specified herein.

Executio
n
1.
Precautions

The contractor shall exercise due care to avoid damage to existing structures and facilities that are not to be removed. Fences, conduits, water lines~electrical lines shall be protected by the contractor from injury. He shall be entirely responsible for damage to the persons or property caused by his operation. The contractor shall plan his work to minimize interference with road traffic.

2. Drawing, Instruction, Measurements:

All the works shall be done according to the drawing and instruction of the site Engineer and the contractor shall arrange to test materials and portion of the work at his own costs in order to prove their soundness and sufficiency. If any work and portion of work is found to be defective or unsound, the contractor shall pull down and re-executes the same at his own costs. The defective material shall be removed from the site.

3. **Dismantling of Existing Structures:**
   The contractor shall dismantle existing structures in such a manner as to avoid damaging them to permit their reuse. Reusable materials shall be removed with care, not to damage them. Removed material to be salvaged shall be stockpiled by the Contractor at Locations approved by the Engineer and shall be properly protected from damage.

4. **Rate for Materials, Equipments and Labor:**
   The unit rates quoted by the contractor for the agreed works shall be inclusive of supply of materials, overhead as well as transport and unloading, storing, hire and use of the equipments and tools to be employed and cost of the wages of labour, local taxes and levies other than VAT, price escalation risk, loss, wastage, to fulfil all the duties and liabilities as specified in the conditions of Contracts.

   All the works shall be carried out during normal working hours and the contractors shall be responsibly supervise all the works. In special, if the works demand the continuous or further time requirements to execute and complete the works, even after it is late in evening or unfavourable condition, the contractor shall continue or execute the work with the approval and as directed by the Engineer even up to late or start at night in the Contractor's own risk and cost.

5. **Construction Schedule:**
   Along with the Bid, the contractor shall submit detail Construction schedule meeting the requirements of the Employer to complete the scope of Work within Thirty days (30 days) from the date of agreement. Any Quotations with construction schedule exceeding Thirty days (30 days) will be rejected.

6. **Variation**:
   The Quantity provided in BoQ are estimated only. Due to difference between the actual condition and the minor change in scope or minor design change, the quantity may vary up to 15% of the total amount. The Contractor shall be not entitled to claim for any loss or profit due to such variations in quantity.

7. **Measuring Materials:**
   Materials requiring measuring shall be measured separately in boxes of appropriate sizes before being mixed.

8. **Temporary Protection:**
   All walls, newly laid concrete or other works requiring protection from weather or accidental injury shall be protected by means of tarpaulin or in any other way so as to keep the work immune from damage. Nothing extra shall be paid for on this matter.

9. **Quality of Works:**
   Materials, tools and plants and workmanship shall be the best of several kinds obtainable in the market and as approved by the site Engineer.

10. **Leave Clean:**
    On completion, all works must be clean down, rubbish removed and the works and land cleared of rubbish, surplus materials, debris and other accumulations and everything left in a clean and orderly condition.

11. Sample:

Sample of each type of construction materials required, shall be submitted by the contractor for the approval of the site Engineer. The Contractor will be required to perform all work under the contract in accordance with these approved samples.

12. Storage

Safe dry and proper storage shall be provided for all materials, particularly for cement. For cement storage capacity should be equal to at least one fourth the total quantity to be used but may not exceed 2 ton (i.e. 40 bags) or as directed by the site Engineer.

13. Curing of works:

All the concrete works, pointing works, plastering work, punning, or any other similar concrete works should be cured by clean water at least for 7 days after application under the direct supervision of site representative of Employer with contractor's own cost.

14. Electricity:

The Contractor shall make his own arrangement for Electricity required for the execution of the works

(B) MATERIALS:

1. Water:

Water shall be clean and free from oil, waste, acid and other organic matter in solution or suspension. Water shall be from municipal main or tank or well or river water source (fresh and drinkable water). Storage for the water shall be of the sufficient size and as directed by the site Engineer. The Contractor shall make his own arrangement for storage and supply of water.

2. Sand:

The fine aggregate (sand) shall confirm to either I.S 383-1970 or IS.515-1959. Sand shall be clean river or pit sand of approved quality and free from salt, earth, dust and other impurities. Sand containing more than 4 to 6 % of clay, dust and silt shall be washed with clean water. Sand to be used for all cement concrete works must be the coarse sand. Medium sand may be used in cement mortar for masonry, plastering, pointing etc. Sand filling in plinth, where specified may bedone with fine sand. The fineness modulus of sand should not be less than one. Size of measuring box for the purpose of mix proportion, shall be 30 x 30 x 38 cm.

3. Portland Cement:

Ordinary Portland cement shall confirm to IS 269-1976. Cement shall be fine and its chemical composition, consistency, tensile & compressive strength, soundness, setting times must be according to IS. It shall be packed in gunny bags or weatherproof paper bags and shall be free from lumps. Cement shall be stored in waterproof building at 300 mm above plinth level and shall be stacked 600 mm clear from the walls and stored in such a manner that permits of easy access of inspection. Layer of cement in each stacking shall not exceed 6 (six) to prevent bursting of bottom bags.

4. Cement Mortar:

Cement mortar shall be of proportions as specified in Bill of quantities for each type of work. It shall be composed of Portland cement and sand. The ingredients shall be

accurately gauged by measure and shall be well and evenly mixed together in a mechanical plant mixture or as directed by the site Engineer. If hand mix is allowed then it shall be done in brick platform. The gauged ingredients of the mortar shall put in the platform and mixed dry first and then water shall be added and mixed again until it is homogeneous and of uniform colour. Required quantity of cement shall be used at one time and shall not be such to exceed mortar amount that can be consumed within half an hour of its mixing.

5. **Coarse Aggregate:**
   Aggregate shall be crushed hard rock and shall be free from vegetable matter, loam, clay, dust and other impurities. If required, aggregate shall be thoroughly washed in clean (potable) water. The stone ballast shall be of 20mm size and down for building works. Size of measuring box for the purpose of mix proportion, shall be 30 x 30 x 38 cm.

6. **Bricks:**
   All bricks shall be of first class of good quality, approved by the site Engineer. The brick shall be free from grit and other impurities such as lime, iron, and other deleterious salt, well-burnt, copper coloured, sound, hard, rectangle with sharp edges and shall give ringing sound when struck with each other. They shall be of uniform size. Brick masonry work shall be either in English or Flemish bond.

7. **TMT - Steel / Deformed Bar:**
   The reinforcements shall be free from fillings, loose rusts, mill scales, paints, oil, grease, adhering earth, or any other material that, in the option of the site Engineer may impair the bond between the concrete and the reinforcement or that causes corrosion of the reinforcement or disintegration of the concrete. The certificate shall be required from the suppliers for each lot of the reinforcement purchased and in addition the contractor must undertake tensile and bending tests on random samples of the reinforcement delivered to the site. All steel, which is represented by a sample, which fails to reach the minimum requirements as per schedule, is to be removed from the site immediately.

8. **Vitrified Tile, Porcelain glazed Tile and Granite:**
   Vitrified Tile, Porcelain glazed Tile and Granite shall be of smooth surface, shinning, durable and of sizes and colour as approved by the site Engineer. The samples of each type of tile shall be presented for approval before commencement of the work.

9. **Scaffolding:**
   Scaffolding shall consist of wooden bales (props) and necessary plywood. All the scaffolding members shall be checked before installation for their strength and stiffness and tied up properly. In case of finished works such as plastering, painting and distempering, no part of scaffolding should touch the structure. Where ladders are used, gunny bags shall be tied up at the ends to prevent any damage to the work by sliding or tipping. No extra payment shall be made for scaffolding.

10. **Timber:**
    Timber shall be of the type as stated in the schedule and of the best kind available, perfectly dry, well seasoned, and free from knots, cracks, shakes and other defects and any appearance of rot.

11. **Glass:**

Sheet or plate glass shall be of approved mark and 5 mm thicknesses as stated in the Bill of quantities and visually clear when viewed from any direction. It shall be free from bubbles, waves and all other defects.

12. Oil paints and Primer:

These shall be only of readymade mixed type in sealed tins of approved colour and marks as specified/ instructed by the site Engineer.

13. Plastic Emulsion paint and Primer:

These shall be only of readymade mixed type in sealed tins of approved colour and marks as specified/ instructed by the site Engineer. First a pest is made by adding little hot water to the distemper power and stirred thoroughly, and pest is allowed stand for a few minutes. The pest is then thinned with water to have a thin cream to the consistent of oil paint and stirred thoroughly all the time while applying. If the surface is rough, it should be smoothened by sandpaper. The surface must be perfectly dry before paint is applied (commenced). In new cement plaster areas, the new surface shall be washed over with a solution of zinc sulphate. The number of coats shall be two or as specified.

14. Enamel paint:

These shall be only of approved brand in sealed tins or packages as specified/ instructed by the site Engineer. The contractor should submit the specification and method statement for painting for prior approval.

15. Plaster of Paris:

These shall be made out of best Plaster of Paris powder of approved quality to be applied in wall surfaces above cement plaster and ceiling at any level, finished smooth, plane and in level including supply of material, labor, preparation of base etc.

16. Chapra polish:

These shall be only of approved brand in sealed packages as specified/ instructed by the site Engineer. The contractor should submit the specification and method statement for painting for prior approval.

17. Waste water pipes and fittings:

All waste water pipes and fittings shall be of standard marks according to I.S.I subject to the approval of the site Engineer. These must be free from flaws and the interior surface shall be cleaned / smooth.

18. Special Material:

If material of a particular brand is specified in the schedules of Quantities, these shall be produced accordingly from the particular manufacturer. These shall include materials such as bricks, tiles, waterproofing and hardening compounds, special paints, acoustic and insulation boards and other finishing materials of approved marks.

The responsibility for the use of these materials lies with the contractor and he should avail himself of necessary guarantees from the manufacturer. Such guarantees as may be required by the owner shall be obtained by the contractor and deliver to the Site Engineer. Special brand names have been avoided, where possible.

Where brand names have been used merely to describe the nature of described materials and not used to endorse or indicate preference for a particular product or manufacturer. Goods, which have similar characteristics and provide performance and quality at least equal to those specified and confirming to IS standard, are acceptable.

19. Test of Materials:

The Contractor shall at his own cost, arrange and carry out the tests of materials to be used in the works or any other tests as deemed necessary by the site Engineer. No extra payment shall be made for tests of materials. **(C) SPECIFICATIONS OF WORK ITEMS:**

I. CIVIL WORKS

1. Lean Concrete

The "lean concrete" means plain cement concrete with the ratio of cement: sand: coarse aggregate equals to 1:2:4 by volume. Lean concrete shall be laid to the thickness of minimum 7.5-cm. or as specified in the Bill of Quantities or drawing.

Measurement for payment of 'Lean concrete work' shall be made on the basis of actual placed volume of lean concrete in cubic feet. Payment shall be made for the number of cubic metermeasured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, transport and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

2. Brick Masonry Work

The Brick Masonry shall be for the foundation and superstructure wall works. The masonry wall shall be constructed with **1:6** cement sand ratio with vertical joints as mentioned in the provided approved drawing and the gap between the each block of vertical joints should be 10 to 20 mm.

All the brick shall be thoroughly soaked in water before use till bubbles cease to come up. The brick shall be laid in cement-mortar on the bed with ratio as specified in the Bill of Quantities to make it properly bonded. When bonding each brick unit must be set back in every course and the joint shall be broken vertically. Each course shall be in true line, horizontal and plumb.

The mortar thickness shall not exceed 10 mm nor shall be not less than 6 mm. The Contractor shall make curing of the brick masonry work and the curing period of the masonry wall shall be as per weather conditions and as per instruction of the site Engineer. In general, the masonry surface shall be water sprayed at least twice daily for a period of at least ten days. The masonry wall shall be considered to be set after forty-eight (48) hours.

Measurement for payment of 'Brick work' shall be made on the basis of actual constructed volume of Brickwork in cubic feet. Payment shall be made for the number of cubic metermeasured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials and all other

costs necessary for the performance and completion of the Works in the workmanlike manner.

3. Concrete Work

Concrete work shall mean and include all and every concrete works, for the civil works. The Contractor shall perform the concrete work in strict conformity to the Specification and as directed by the Employer and shall inform Employer, at least 24 hours in advance, of the times and places which he intends to place concrete.

Composition of Concrete

General Mix Composition: The concrete shall be composed of cement, fine aggregate, coarse aggregate, water and admixtures as specified. All materials shall be well mixed and brought to the proper consistency. The mix proportions shall be as follows:

For concrete
1:1½:3

Minimum compressive strength (28 days)	220 kg/cm2
Minimum cement content	410 kg/m3
Maximum water cement ratio	0.6
Maximum slump	5 - 10 cm.

For Concrete
1:2:4

Minimum compressive strength (28 days)	160 kg/cm2
Minimum cement content	300 kg/m3
Maximum water cement ratio	0.6
Maximum slump	5 - 10 cm.

The detailed concrete mix design shall be submitted to the Employer for approval on the basis of producing concrete, having suitable workability, consistency, density, impermeability, durability, and required strength with concrete compressive strength test records. If 160 kg/sq. cm., strength of 28 days, cannot be achieved with the above cement content, more cement shall be used for which the Contractor will not receive any extra payment.

Consistency: The detailed mix proportions shall be submitted to the Employer for approval to secure concrete of the proper consistency and to adjust for any variation in the moisture content or grading of the aggregate as they enter the mixer. Addition of water to compensate for stiffening of the concrete before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

Ceme
nt

Quality: The Contractor shall furnish normal Portland cement in fifty (50) kg net-weight sacks. The cement for the civil work shall conform to the requirements of "Portland cement, Type I" designated in ASTM C150.Where conditions require the

use of high sulphate resistance cement, cement conforming to the requirements of ASTM CISO Type V shall be used without any cost to Employer.

Coarse Aggregate

Grading: Coarse aggregate shall be graded for each maximum size within the standard limits specified as follows:

Percentage passing by weight

Designation of size in inch (sieves with square openings)	2 inch	1 ½ inch	1 inch	¾ inch	3/8 inch	No. 4
40 mm (1 ½ to ¾ inch)	100	90 to 100	20 to55	0 to15	0 to5	-
20 mm (3/4 inch to No. 4)	-	-	100	90 to 100	20 to 55	0 to 10

Fine Aggregate

Quality: Fine aggregate shall conform to the requirements of ASTM C33 and shall be natural sand or manufactured sand. It shall consist of clean, hard, dense and durable rock particles, free from injurious amounts of dust, silt, stone powder, pieces of thin stone, alkali, organic matter and other impurities.

Grading: The fine aggregate as batched shall be well graded, and when tested shall conform to the following limits:

Sieve size	Percentage passing by weight
9.51mm (3/8 inch)	100
4.76 mm (No.4)	95 to 100
2.38 mm (No.8) 8	0 to 100
1.19 mm (No.16)	50 to 85
595 micron (No.30)	25 to 60
297 micron (No.50)	10 to 30
149 micron (No.100)	2 to 10

Concrete Construction Tolerance

Variations in alignment, grade and dimension of the structures from the established alignment, grade and dimensions shall be remedied or removed and replaced by the Contractor at his own expense as directed by the Employer.

Repair of Concrete

The Contractor shall repair at his own expense the imperfections of concrete surfaces and the irregularities which do not meet the specified dimensions. Repairing work shall be performed and completed within 24 hours after the removal of forms, in accordance with the direction of the Employer.

Curing

Prior to placing concrete, the Contractor shall obtain Employer's approval in respect of the method to protect and cure concrete and the facilities he proposes to use. After concrete has been placed, it shall be protected and cured strictly in accordance with the method approved by the Employer. All costs for the curing of concrete shall be included in the unit price bid for the concrete work.

Tests

The Contractor shall make all necessary tests for determining the mixed proportions of each type of concrete, including tests of aggregates, so as to produce the concrete specified below In order to control the quality of concrete to be placed, the Contractor shall perform the following field tests:

Measurement for payment of Concrete (1:1½:3), Concrete (1:1:2) work and Concrete 1:2:4 shall be made on the basis of actual placed volume of Concrete in cubic feet. Payment shall be made for the number of cubic metermeasured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials and its transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

4. TMT steel reinforcement

The Contractor shall place all the TMT steel reinforcement bars in the structures as shown on the approved working drawings, bar-bending schedule or as instructed by the site Engineer.

Reinforcement bars shall be accurately placed and special care shall be exercised to prevent the reinforcement bars from being displaced during the placement of concrete. Intersecting points and splices of the reinforcement bars shall be fixed by using suitable clips or annealed wires, the diameter of which shall be not less than No. 16 gauge. The reinforcement bars in structures shall be placed and supported by use of concrete blocks, metal spacers, metal hangers, or other satisfactory devices to ensure required coverage between the reinforcement bars and the surface of concrete as per the instruction at site by the site Engineer.

Drawings of bar lists/ bar bending schedule shall be prepared by the contractor and submitted for approval.

Measurement for payment of 'TMT steel Reinforcement Bars' shall be made on the basis of actual weight of TMT steel Reinforcement Bars in kg. Payment shall be made for the number of kg measured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

5. Plaster work

This section covers the furnishing and installation of exterior part and cement plaster and all accessories associated with the installation of this item complete, and in place as shown on the drawings or as directed by Engineer. Thickness of the plaster will be as per specified in Bill of Quantities or as directed by site Engineer. Material shall be delivered in original package containing the manufactures trademark and shall be

stored in moisture proof store. Damaged or deteriorated materials shall be removed from the jobsite. Temperature adequate for proper setting and curing of the work shall be maintained. No plaster shall be applied over surface containing excessive moisture. Masonry surface to be plastered shall be cleared and free from loose partial grease, oil, acid or similar foreign matter. When necessary, excessive suction of masonry shall be reduced by wetting the masonry structure.

Before installing plaster, surface shall be inspected and any defects or deficiencies, which would interfere with or prevent a satisfactory plaster installation, shall be corrected. All plastering shall be executed in a workmanlike manner, leaving all finished plaster surfaces free from waves or imperfection. All works shall be performed in accordance with best trade practices, the instructions and recommendation of the materials manufacture, and the requirements of codes and regulations applicable to the work.

Particular care shall be taken to protect adjoining surfaces and material from any damage by the plastering operation. Damage caused by any plastering operation shall be repaired without additional cost to the employer.

Thickness of the plaster should be as per shown in Bill of quantities. In case of the 20 mm thick plaster, plastering should be done in two coats of 10 mm thick each. The second coat should be applied after the proper setting of the first coat.
Percentage retained by weight plus or minus 2% on each sieve size is given in table

Sieve size	min	max
4.75mm (S. No. 4)	0	0
2.4 mm (S. No.8)	0	10
1.2 mm (S. No.16)	10	40
600 micron (S. N0.30)	30	65
300 micron (S. No.50)	70	90
150 micron (S. No. 100)	95	100

The surface to be plastered shall be cleaned of all projections, dust, loose particles, grease, bond breakers, oil, and other foreign matter. Do not apply plaster directly to Surface of masonry or concrete that has been coated with bituminous compound or other waterproofing agents or in case Surface that has been painted or previously plastered. Before plasterwork is started, wet masonry surfaces thoroughly with a fine fog spray of clean water to produce a uniformly moist condition. Check metal grounds, corner beads, screeds, and other accessories carefully for alignment before the work is started.
The mix proportion for plaster (1:4) shall be as specified in Bill of Quantities. Cement and sand for each batch shall be accurately measured and mixed dry until evenly mixed and until the mass is uniform in color. The water content shall be maintained at a minimum; continue mixing until plasticity is obtained. Mortar that has begun to set shall not be used. Retempering of mortar will not be permitted.

Upon completion of the work, cut out and patch loose cracked, damaged or defective plaster. Patching shall match existing work in texture, color and shall be finished flush

with plaster previously applied. Do all pointing and patching of plasterwork adjoining any other finish work in a neat and workmanlike manner. Leave clean exposed surfaces, in condition ready to receive paint or other finish.

Measurement for payment of 'Plaster work' shall be made on the basis of actual plaster area in square feet. Payment shall be made for the number of square metermeasured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

6. Painting works:

All surfaces shall be painted except the following:

(a)
Exterior:

Roofing, paving, concrete, nonferrous metals, glass, pre-finished items.

(b)
Interior:

Ceramic tile, glass, pre-finished surfaces, non-ferrous metals, stainless steel, attic surfaces.

A list of the painting materials and their colors which are to be applied to the specified surfaces shall be submitted to the site Engineer for approval. The finished surface shall be free from runs, drops, ridges, waves, pales, brush marks, and variations in color, texture, and finish. The hiding shall be complete, and coat shall be so applied as to produce firm of uniform thickness. Special attention shall be given to insure that all surfaces including edges, corners, crevices, welds, and rivets receive a film thickness equivalent to that of adjacent painted surfaces.

Adjacent areas and installations shall be protected by the use of drop clothes or other approved precautionary measures.

Metal or wood surfaces adjacent to surface to receive water-thinned paints shall be primed and/or touched up prior to the application of water-thinned paints. The first coat on plaster shall include such repeated touching up of suction spots or overall applications of primer sealer as necessary to produce a uniform color and gloss. The first coat on both faces of wood doors shall be applied at essentially the same time.

Coating Progress

Sufficient time shall elapse between successive coats to permit proper drying. This period shall be modified as necessary to suit adverse weather conditions. Oil base or oleo resinous solvent-type paints shall be considered dry for recoating when the paints feel firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or less of adhesion of the undercoat.

Coating shall be as follows:

(1) All Plaster Surface shall be given two coat of water proof snowcem paint over one coat of white cement

(2) Gloss Finish

Wood:

First coat: 1 coat of Wood Primer.

Second coat: 2 coats of Enamel paint.

(3) Metal

Surface:

First coat: 1 coat of Metal Primer Chromate

Second coat: 2 coats of Aluminum Paint

Storage, Mixing and thinning

At time of application, paint shall show no signs of hard settling, excessive skinning, levering, or other deterioration. Paint shall be thoroughly stirred, strained, and kept at a uniform consistency during application.

Where necessary to suit conditions of surface, temperature, weather, and method of application, package paint may be thinned immediately prior to application in accordance with the manufacturer's directions, but not excess of 0.5 liter of suitable thinner per 4 liter.

The use of thinner for any reason shall not relieve Contractor from obtaining complete hiding.

Samples shall be clearly identified by designated name, specification number, batch number, project Contract number, intended use, and quantity involved. At the discretion of the Employer, samples may be tested before approval, or materials may be approved for use based on the test reports furnished. In the latter case, the samples will be retained by the site Engineer for possible future testing should the material appear to be defective during or after application.

Measurement for payment of Painting Works each shall be made on the basis of actual area in square feet. Payment shall be made for the number of square metermeasured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

7. False Ceiling:

False ceiling shall be done with 12mm thick Gypsum board or Acoustic Board whichever is mentioned in bill of quantities with GI concealed framing, joints shall be covered with UB 888 compound and paper tape to give a monolithic finish.

Measurement for payment of 'False Ceiling' shall be made on the basis of actual area in Square Feet. Payment shall be made for the total area measured as

per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, paint, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

8. Gypsum Partition:

Gypsum Partition works shall be done with 12mm thick Gypsum board with GI concealed framing, joints shall be covered with UB 888 compound and paper tape to give a monolithic finish.

Measurement for payment of 'Gypsum Partition' shall be made on the basis of actual area in Square Feet. Payment shall be made for the total area measured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

9. Aluminum Partition:

Aluminum Partition shall be made of approved color minimum 60mmX30mmX .9mm thick anodized Aluminum section or more as per requirement of the drawings with minimum 1.2 mm thick aluminum section and shall be fitted with 5 mm clear glass, 9mm thick high pressure pre-laminated board and good quality hardware all complete shall be fabricated, supplied, and installed as per drawing or as per instruction given by the site Engineer.

Measurement for payment of Aluminum Partition' shall be made on the basis of actual area in Square Meter as per Bill of Quantities. Payment shall be made for the total area measured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike

10. Aluminum works in Doors:

Aluminum Doors shall be semi glazed door/full glazed or opaque, made of approved color anodized Aluminum section of minimum 1.2 mm thick section and shall be fitted with 5 mm to 12 mm thick clear glass as per type of door required in the design may be normal single panel, double panel, sliding or swing type door, 9mm thick high pressure pre-laminated board and good quality necessary hardware including floor spring, handle, door closure, door stopper, locks etc. all complete shall be fabricated, supplied, and installed as per drawing or as per instruction given by the site Engineer.

Measurement for payment of 'Aluminum Door' shall be made on the basis of actual area in Square Meter. Payment shall be made for the total area measured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

11. Rolling Shutter work:

Rolling Shutter of approved pattern and manufacture, finished of one coat of red oxide primer followed by two coat of aluminum paint etc. all complete shall be

fabricated, supplied, and installed as per drawing or as per instruction given by the site Engineer.

Measurement for payment of 'Rolling Shutter' shall be made on the basis of actual weight of finished goods in Square Feet. Payment shall be made for the total weight measured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, paint, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

12. Tile Paving:

a) Vitrified Tiles:

Vitrified tile shall be laid in proper line and level as instructed by the site Engineer. The tiles are laid with close joints, which shall be filled up with white cement slurry as specified. The sample of Vitrified tile shall be produced for the approval of site Engineer before laying it.

The Vitrified tile shall be laid over the bedding course cement mortar (1:4) with cement slurry on its backing.

Measurement for payment of 'Vitrified Tile' shall be made on the basis of actual area in square meter. Payment shall be made for the number of square meter measured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labor, tools/equipment, materials, transport to site and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

b) Porcelain Glazed Tile:

High density glazed ceramic tiles shall be installed in toilet, bathroom, and kitchen. Ceramic floor shall be a pre-cast tile as specified herein. Manufacturer's original containers, bundles, or packages shall be delivered to the site unopened with seals unbroken and labels intact. Floor-tile operations in spaces requiring wall tiles shall not be started until after the wall-tile installation has been completed.

Ceramic tiles shall be installed in walls of bathroom up to the height as instructed by the site Engineer. The size of tiles shall not be less than 20 x 300 cm.

The ceramic tile shall be laid over the bedding course cement mortar (1:4) with cement slurry on its backing. The interface between the tiles shall be joint filled with proper leveling with white cement.

Surface to receive applications of materials shall be clean and free from dirt, dust, oil, grease, and other objectionable matter. Joints shall be straight, leveled, perpendicular, and have even width not exceeding 1.6mm. Wainscots shall be built of full courses.

Vertical joints shall be maintained plumb for the entire height of the tile work. Damaged or defective tiles shall be replaced.

Upon completion, wall surfaces shall be thoroughly cleaned. Acid shall not be used for cleaning of glazed tiles. After the grout has set, tile wall surfaces shall be given a protective coat of a non-corrosive soap or other approved methods of protection.

13. Cement punning and Skirting:

This section covers the furnishing and installation of cement punning and skirting with 1:1 cement mortar on the plastered surface and any other part as directed by Engineer and all accessories associated with the installation of this item complete, and in place as shown on the drawings or as directed by Engineer.

Particular care shall be taken to protect adjoining surfaces and material from any damage by the skirting operation. Damage caused by the operation shall be repaired without additional cost to the employer.

The surface for skirting shall be cleaned of all projections, dust, loose particles, grease, bond breakers, oil, and other foreign matter before application.

Measurement for payment of 'cement punning and skirting' shall be made on the basis of actual area in square feet. Payment shall be made for the number of square metermeasured as per unit rate quoted in the Bill of Quantities. The unit rate shall include full cost of labour, tools/equipment, materials and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

II. SANITARY WORKS

1. Water supply and sanitation works: The Staff Quarter shall have an adequate water supply and sanitation system as approved by the site Engineer. The Contactor shall submit samples of the all fixtures, pipes and ancillaries to be installed for prior approval.

a) Water supply pipeline:

All water supply pipeline works shall be concealed and performed with PPR pipes as directed by the site Engineer. It includes the laying of the PPR pipes of diameter as specified in drawing or as specified by site Engineer and shall be joined with necessary PPR nipples, tee, bends, cross, socket and all other necessary for the completion of the works. The system shall confirm the water tightness.

Measurement for payment of 'Water supply pipeline' shall be made on the basis of lump sum basis. Payment shall be made on the basis of lump sum as per lump sum rate quoted for the item in the Bill of Quantities. The lump sum amount shall include full cost of labor, tools/equipment, materials, transport and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

c) Supply and installation of Toilet and bathroom fixture:

The contractor shall supply and install the bathroom and toilet fixtures to the satisfaction of the Employer. It includes supply and installation of standard English type Commode pan with flushing cistern of approved quality shall be installed as directed by site Engineer. Wash basin 12" x 18" (hot cold) with 25mm PVC pipe shall be connected to sewer pipe along with waste pipe and connection pipe. Bathroom sanitary set (soap case, mirror, paper holder, etc) shall

be installed properly as directed by site Engineer. Tap of approved quality shall be supplied and installed properly.

Measurement for payment of 'Supply and installation of Toilet and bathroom fixture' shall be made on the basis of actual number of the toilet and bathroom in number. Payment shall be made on the basis of actual number of the toilet and bathroom fixture as per rate quoted for the item in the Bill of Quantities. The rate shall include full cost of labor, tools/equipment, materials, transport and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

d) Supply and installation of sanitary pipeline and ancillaries and catch pit:

50 mm diameter PVC pipe shall be connected from kitchen & bathroom to main sewerage pipe of diameter 100mm to convey waste water. 100 mm diameter PVC pipe shall be connected from toilet to the main sewer pipe and to the septic tank as specified in the drawing or as directed by the Engineer. Overflow from septic tank shall be connected to the soak pit through 50mm PVC pipe, which is ultimately drained to the natural drainage system. All these should include fittings, cap bends, door bend, cross, tee etc of approved quality for satisfactory completion of the works. A catch pit of 1m x 1m x 1m shall be constructed as shown in the drawing. The system shall confirm the water tightness.

Measurement for payment of Supply and installation of sanitary pipeline and ancillaries and catch pit' shall be made on the basis of lump sum. Payment shall be made on the basis of lump sum as per rate quoted for the item in the Bill of Quantities. The rate shall include full cost of labor, tools/equipment, materials, transport and all other costs necessary for the performance and completion of the Works in the workmanlike manner.

Note: This specification is of a general type only and must be used in conjunction with the drawing of the particular item being made. Anything shown on the drawing, but not the specification must be complied and vice-versa.

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1 General

The following specification will apply under all circumstances to the electrical installations against this contract and it is to be ensured that the contractor shall obtain for himself at his own responsibility all the information which may be required for the purpose of making the tender and for entering into a contract keeping in view the specifications detail here under, drawing and design of the electrical installation and inspection of site etc. The tender rates shall include the cost of materials, erection, connections, commissioning, labour, supervision, testing instruments, tools transport, all breakage, wastage sundries, scaffolding, maintenance, of all works for one year etc. The rate in the BOQ should be for an item complete in all respects.

2 Scope

The works covered shall include supply of all materials, labour, equipment and services in connection with the work complete as indicated. The contractor shall consult drawings, bill of quantities and specifications all together, which gives the total scope of the works.

3 Rates

The rate quoted in the tender shall include all charges of materials, installation, testing & commissioning, labor, tools and equipment, shed for material store, transferring all materials from place of availability to the site, all taxes, contingencies, breakage, wastage and maintenance of installations, equipment for one year. The rate in the original contract shall determine the values of extra work where such extra work is of a similar nature and has been executed under similar conditions. Whenever the extra work is not of similar nature, the rate for the same shall be determined prior to the execution of work and get approved by the consultant.

4 Workmanship

a. Workmanship and good appearance of the installation shall be of equal importance with its electrical and mechanical efficiency, and all portions of the work shall be so laid out and installed that the work as a whole is of uniform quality and shall present a neat appearance in a manner meeting the approval of Consultant. The Contractor shall verify in the field all measurements necessary of the electrical work and shall assume responsibility for their accuracy.

b. Materials which are defective or damaged during the progress of work shall be replaced or repaired in approved manner at the expenses of Contractor. The installation shall comply with all applicable laws and ordinances and with the requirements of Indian codes and as specified herein or shown on the drawings. The progress of the electrical work shall be carried out so as to conform to the entire

installation shall be completed as soon as the condition of site and working places will permit.

c. All cutting, drilling, channeling, patching etc., required for installation of electrical work shall be carried out in a manner approved by the Consultant. Any defects in finishes, plasters, wood work, metal work, masonry, concrete, or other materials resulting from the performance of the work shall be replaced or repaired at no expense to the owner and to be satisfaction of the Consultant.

d. Upon completion of the electrical work the Contractor shall submit to the Consultant, reproducible drawings showing the layout, and connection of electrical system as constructed and denoting all information pertinent to the proper maintenance of the system.

e. If any alteration is found necessary, the Contractor will have to do the same on mutually agreed rates.

f. The work shall be carried out in the best workman like manner and any defect or minor changes in the design/ connection if pointed out shall be carried out by the Contractor without any extra charges.

g. An electrical supervisor shall be employed by the Contractor and will remain at site to receive orders or any other instructions from the Engineer.

h. Whatever recessed fittings are required to be provided the electrical Contractor shall be responsible for informing the civil Contractor to keep the necessary recesses in the slab and in the false ceiling.

i. The list of approved makes and manufacturers of electrical materials is attached. Only such materials as are on the list shall be used.

5 Materials

All materials and Equipment shall be new and shall be in accordance with the standard established by ISI. Where materials of Equipment are specified or shown on the drawings by name of manufacturers, name plates, instruction plates, warning signs and any other marking whatsoever on the Equipment and accessories there of shall be in English language. Equipment or materials of other manufacturers may be considered for use if of equal quality, appearance and, electrical and mechanical characteristics and approved by the Engineer.

6 Color Coding

All outgoing and incoming power cables including point-wiring cables will follow the following colour coding phase indicating lamps wherever recommended.
Phase - 1 - Red (R); Phase - 2 - Yellow (Y); Phase - 3 - Blue (B); Neutral - Black (B)

7 Standard of Work

The work shall be carried out to the satisfaction of the Architect/ /Engineer and in accordance with the regulations of Nepal National Building Code: 2003, IS, NS & Nepal Electricity Authority, Electricity Rules and Regulations and the enclosed specifications.

8 Quantities

All quantities mentioned in the bill of quantities are not actual and the contractor will get payment according to measurement of actual work. The schedule of quantities is liable to alteration by deletion or addition as required.

9 Specifications

The specifications shall be considered as part of this contract. The drawings indicate the extent and general arrangement of the futures, controlling switches, wiring system etc. and are essentially diagrammatic. The drawing indicates the points of termination of conduit runs and broadly suggests the routes to be followed.

The work shall be installed as indicated on the drawings. However, any minor changes found essential to co-ordinate the installation of this work with other trades shall be made without any additional cost to the Owner. The data given herein and on the drawings is as exact as could be secured, but its complete accuracy is not guaranteed. The drawings are for the guidance of the Contractor; exact locations, distances and levels shall be governed by the site conditions and the Architectural drawings.

10 Drawings

The drawings provided are design drawing and generally are diagrammatic. They do not show offsets, bends, pull box junction box, which may be required for the installation. The contractor shall follow the drawings as closely a possible and shall provide necessary bends, pull box etc. The contractor shall prepare and submit for approval detailed shop drawings of all installations not detailed in the drawings provided. Some modification in design drawings can be done during the construction time in order to overcome practical difficulties provided the modification is approved by the

consultant. The shop drawing shall include the details of the following **shall be approved by the Consultant**

Main panel board and sub panel boards/distribution boards showing the details of elements such as meters, MCCB's, CT's, incoming and outgoing cables, details of cable and sub cable layout.

11 Materials and Equipment

All materials and equipment shall be of the approved make and design. Unless otherwise called for, only the best quality materials and equipment shall he used. The materials and equipment shall conform to relevant standards as listed under sub-head "Regulations and Standard". The Contractor shall be responsible for the safe custody of all materials and shall insure them against theft or damage in handling or storage etc. A list of items of materials and equipment, together with a sample of each shall be submitted to the Architect/ Engineer within 15 days of the award of the contract. Any item, which is proposed as a substitute, shall be accompanied by all technical data giving sizes, particulars of materials and the manufacturer's name. At the time of submission of proposed substitute the Contractor shall state the credit, if any, due to the Owner. In the event the substitution is approved, all changes and substitutions shall be requested in writing and approvals obtained in writing from the Engineer.

12 Engineer and Foreman

The Contractor shall employ a competent, qualified full time electrical Engineer/Overseer and foreman to direct the work of electrical installation in accordance with drawings and specifications. The electrical Engineer shall be available full time on the site to receive instructions from the Engineer or his nominee in the day to day activities throughout the duration of the Contract. The electrical Engineer shall correlate the progress of the work in conjunction with all relevant requirements of the supply authorities.

13 Internal Wiring

13.1 System of Wiring

The system of wiring shall consist of PVC insulated copper conductor wires in HDP conduits and shall be concealed or surface mounted as called for.

13.2 General

Prior to laying and fixing of conduits, the Contractor shall carefully examine the drawings indicating the layout, satisfy himself about the sufficiency of number and

sizes of conduits, location of junction boxes, sizes and location of switch boxes and other relevant details. Any discrepancy found in the drawings shall be brought to the notice of the Engineer. Any modification suggested by the Contractor shall be got approved by the Engineer before the actual laying of conduits is commenced.

13.3 Conduits

Conduits and accessories shall conform to relevant IS/BS Standards. Heavy duty HDP conduits or PVC conduits or galvanized steel conduits shall be used as called for in the Schedule of Quantities. Buried wiring passing under floor of ground floor shall run in HDPE /PVC conduit. Joints between conduits and accessories shall be securely made to ensure earth continuity. Sample of HDP conduit shall be submitted before laying for approval from Engineer.

The conduits shall be delivered to the site of construction in original bundles and each length of conduit shall bear the label of the manufacturer.

The number of 650 / 1100 volt grade PVC insulated copper conductor wires that may be drawn in the conduits of various sizes are given below and space factor shall not exceed
40%.

Maximum permissible numbers of 650/1100 volt grade PVC insulated wires that may be drawn into rigid non metallic or MS conduits are given below:

Size of wire nominal	*Maximum number of wires within conduit of size*					
Sq. mm.	**16**	**20**	**25**	**32**	**40**	***50***
1.0	5	7	13	20		
1.5	4	6	10	14		
2.5	3	5	10	14	-	
4	2	3	6	10	14	
6		2	5	9	11	
10			4	7	9	
16	-	-	2	4	5	*12*
25	-			2	2	*6*
35	-	-	-		*2*	*5*

13.4 Connections

All jointing methods shall be subject to the approval of the Engineer. Separate conduits shall run for all power outlet wiring. Conduit connections for PVC conduits shall be screwed metal to metal with white lead and shall be painted with one coat of self-etching zinc chromate primer and two coats of enamel paint.

The threads and sockets shall be free from grease and oil. Connections between screwed conduit and sheet metal boxes shall be by means of a brass hexagon smooth bore bush, fixed inside the box and connected through a coupler to the conduit. The

joints in conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduits.

13.5 Bends in Conduit

Where necessary, bends or diversions may be achieved by means of bends and / or circular inspection boxes with adequate and suitable inlet and outlet screwed joints. In case of recessed system each junction work shall be provided with a cover properly secured and flush with the finished wall surface. No bends shall have radius less than 2.5 times the outside diameter of the conduit.

13.6 Fixing Conduits

All conduits shall be installed so as to avoid steam and hot water pipes. After the conduits, junction boxes, outlet boxes and switch boxes are installed in position, their outlets shall be properly plugged or covered so that water, mortar, insects or any other foreign matter docs not enter into the conduit system. Surface conduits shall be fixed by means of spacer bar saddles at intervals not more than 500mm. The saddles shall be of 3 mm x 19 mm galvanised mild steel flat, properly treated, primed and painted, securely fixed to supports by means of nuts and bolls/rail bolts and brass machines screws.

13.7 Switch Outlets and Junction Boxes

All outlet boxes for switches, sockets and other receptacles shall be rust proof and thickness shall be of minimum 18 swg, having smooth external and internal surfaces to true finish.

All outlet boxes for receiving plug sockets and switches shall be fabricated to approve sizes. All boxes shall have adequate number of knock out holes of required diameter and earthing terminal screws.

13.8 Inspection Boxes

Rust proof inspection boxes (pull box) of min. 18 swg thick mild steel sheet having smooth external and internal finish shall be provided to facilitate removal and replacement of wires, where required. These shall be provided if continuous length of conduit is more than 10 metre. The depth of the box shall be 100 mm and shall have a hinged cover with push button lock.

13.9 Circuit for Telephone, TV, Computer Networking and Music System

Conduits and system of conduiting for telephone, TV, Computer networking and alarm system shall be the same as far electrical system, except they shall be installed at least
150mm away from the electrical conduits.

13.10 Conductors

All PVC insulated copper/aluminium conductor wires shall conform in all respects to standards as listed under sub-head "Regulations and Standards".

13.11 Bunching of Wires

Wires carrying current shall be so bunched that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not run in the same conduit.

13.12 Drawing Conductors

The drawing and Jointing of PVC insulated copper/ aluminum conductor wires and cables shall be executed with due regard to the following precautions. While drawing wires through conduits, care shall be taken to avoid scratches and kinks, which cause breakage of conductors. There shall be no sharp bends. Insulation shall be shaved off like sharpening of a pencil and it shall not be removed by cutting it square, PVC insulated copper conductor wire ends shall be soldered (at least 20mm length).Strands of wires shall not be cut for connecting terminals. The terminals shall have sufficient cross sectional area to take all strands and shall be soldered. Connecting brass screws shall have flat ends. All looped joints shall be soldered and connected through terminal block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductors having nominal cross sectional areas exceeding 10 sq. mm shall always be provided with cable sockets. At all boiled terminals, brass flat washer of large area and approved steel spring shall be used. Brass nuts and bolts shall be used for all connections.

Only certified wiremen and cable jointers shall be employed to do jointing work. All wires and cables shall bear the manufacturer's label and shall be brought to site in original packing. For ail internal wiring, PVC insulated wires of 650/1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in loop system and no joints shall be allowed in the length of the conductors. If the use of joints connections unavoidable due to any specific reason, prior permission, in writing, shall be obtained from the Engineer. No wire shall be drawn into any conduit, until all work of any nature, that may cause injury to wire, is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Before the wires are drawn into the conduits, the conduits shall be thoroughly cleaned of moisture, dust, dirt or any other obstruction by forcing compressed air through the conduits. The minimum size of PVC insulated conductor wires for all sub-circuit wiring for light points shall be 2.5 sq.mm copper equivalents.

13.13 Joints

All joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. No joints shall be made in conduits and in junction boxes. Conductors shall be continuous from outlet to inlet.

13.14 Mains and Sub-Mains

Mains and Sub-Mains cable or wires where called for shall be of the rated capacity and approved make. Every main and sub-main wire shall be drawn into an independent adequate size conduit. An independent earth wire of the proper rating shall be provided for every single-phase sub-main. For every 3-phase sub-main, 2 nos. earth wires of proper rating shall be provided along with the sub-main. The earth wires shall be fixed to conduits by means of clips at not more than 1000mm distance. Where mains and sub- mains cable are connected to switchgear, sufficient extra lengths of cable shall be provided to facilitate easy connections and maintenance.

13.15 Load Balancing

Balancing of circuits in three-phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

13.16 Colors Code of Conductors

Colour code shall be maintained for the entire wiring installation: red, yellow, blue for three phases, black for neutral.

13.17 Switches, Receptacles and Fixtures:

13.17.1 Switches

All 5/15 amps switches shall be enclosed type flush mounted, suitable for 220/230 volts AC. All switches shall be fixed inside the switch boxes on adjustable flat MS strips/plates with tapped holes and brass machine screws, leaving ample space at the back and sides for accommodating wires. Switch controlling the light/power point shall be connected to the phase wire of the circuit. The switch shall be one way, two way or intermediate according to the needs and referring to the drawing.

13.17.2 Wall Socket Outlet

Wall socket outlets shall be of the three-pin type. The switch controlling the socket outlet shall be on the phase wire of the circuit. An earth wire shall be provided along with the circuit wires and shall be connected to earthing screw inside the box. The earth terminal of the socket shall be connected to the earth terminal provided inside the box.

13.17.3 Fitting of Lighting Fixtures

The light fixtures and fittings shall be assembled and installed in position complete and ready for service, in accordance with details, drawings, manufacturer's instructions and to the satisfaction of the Engineer.

13.17.4 Fixing of Exhaust Fan

Exhaust fans shall be fixed at location shown on drawings. They shall be wired to plug to socket outlet at a convenient location near the fan. Wires shall be connected to all fixtures through connector blocks. All the necessary works and extra materials for fixing shall be provided.

13.18 Cutting and Patching

Cutting and patching required for the proper installation and completion of works including plastering, masonry work, concrete work and painting shall be done by the contractor himself and skilled labor shall be provided for the same.

14 Site Condition

The equipment and materials to be installed should be suitable for site conditions. It is estimated that the maximum temperature at site will be 48^0C.

15 Main Distribution Board

The main Distribution Board shall be indoor type, totally enclosed made from 16 SWG heavy gauge mild steel, dust and vermin proof suitable for floor mounting. The depth of the board shall not be less than 6”. The steel sheet should undergo acidation and phosphotation process before two coats of red oxide primer are applied, then two final coats of enamel paint of approved color shall be applied.

The bus bar shall be made from high conductive electrolytically pure copper bar strips of sufficient cross sectional area so that maximum current density of 1.2 amp. Per sq. mm. shall not be exceeded. The neutral bus bar shall not be less than 50% of the phase bus cross section. The bus bars shall be sufficiently supported by insulator so that insulation resistance shall not be less than 20 mega ohms.

Arrangement shall be made at the bottom of the control panel for receiving incoming cable. Space for outgoing cables shall be properly designed as the per the requirement and individual buildings.

The interconnection of cable to the bus bars, MCCB shall be done with heavy-duty crimping type chromium plated brass double compression cable shoe of suitable size.

The MCCB's shall have a breaking capacity (at 400 volts) as mentioned in BOQ for incoming as well as for outgoing circuits. The circuit breaker shall be operated by a toggle type handle and shall have quick make, quick break trip free mechanism. The circuit breaker shall be of inverse time and instantaneous trip type with static trip release. A push trip shall be provided on the cover to test the MCCB mechanically. The 'ON', 'OFF' and 'Trip' positions shall be clearly marked on the enclosure.

The connections from bus bars to the incoming as well as outgoing MCCB's shall be done by copper strips having sufficient cross-section.

All contact surfaces in copper bus bars and strips shall have coatings of silver by brazing.

16 Molded Case Circuit Breakers (MCCB)

Molded case circuit breakers shall be of approved make with visible contacts, large contact separation and indication of switch position; shall have adequate breaking capacity, fit for manual operation with a suitable handle; with automatic bimetallic and electromagnetic tripping mechanism having adjustable setting ranges as required. MCCB's up to 100 A shall be suitable for a fault level of 25 KA .

17 Miniature Circuit Breakers (MCB)

Miniature circuit breakers shall be quick make and break type, and shall conform to relevant Indian Standards. The housing shall be heat resistant and having high impact strength. The breaking capacity shall not be less than 10KA at 230 volts. MCB's shall be flush mounted and shall be provided with trip free manual operating lever and "ON" and OFF" indications. The contacts shall be provided to quench the arc immediately. MCB shall be provided with thermal and magnetic releases for over current and short circuit protection. The over load or a short circuit device shall have a common trip bar in the case of DP and TPN Miniature circuit breakers.

18 Measuring Instruments

All meters shall be housed in a separate compartment and accessible from front only. Lockable doors shall be provided for the metering compartment. The main Distribution Boards shall be provided with indicating panel comprising

one number (0-500 V) voltmeter with 3 way "ON" and "OFF" selector switch and CT operated ammeter with 3 ways and neutral selector switch of appropriate range and scale. Wiring for meters shall be colour coded and labelled with approved plastic beads for identification.

18.1 Current Transformers

Current transformers shall be provided for Distribution Boards carrying current in excess of 30 amps. All phases shall be provided with current transformers of accuracy class 1 and suitable VA burden for operation of associated metering.

18.2 Indicating Panel

All meters and indicating instruments shall be in accordance with relevant NS Standards. The meters shall be flush mounted and draw out type. Indicating lamps shall be neon type and of low burden, and shall be backed up with 5 amps fuses and toggle switch.

18.3 Testing

All the Distribution Boards shall be subject to tests specified in relevant standards and test certificate shall be furnished.

18.4 Wiring

In wiring, a Distribution Board, it shall be insured that total load of various Distribution Boards and/or consuming devices is divided evenly between the phases and number of ways. Connection in the bus bars, MCCB's, MCB's shall be made using cable shoes with sleeve.

19 Earthing

All the non-current carrying metal parts of electrical installation shall be earthed properly. All metal conduits, trunking, cable sheaths, switchgear, distribution fuse boards and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system. All earthing shall be in conformity with Nepal Electricity Rules.

Earthing shall be carried out as per drawing with at least 600 mm. x 600 mm. x 5 mm. copper plate buried at least 1.5 m below ground and connecting to Main Distribution Panel with 25 x 3 mm copper strip. The earth resistance of the earthing electrode shall not exceed 5 ohms.

The contractor shall furnish main earth connection to all electrical equipment chassis and metallic conduit by means of appropriate sized copper wires as specified herein or shown in drawing.

Earthing stations shall consist of plate or rod electrodes buried underground to specified depth and in accordance with IS 3034-1966 and shall be as per the bill of quantities.

Earthing system shall be at least 1 meter away from the building foundation and the main earth to the building shall be obtained by tapping this system by earth wire of appropriate size as shown in the drawing. The connection of these earth wires by twisting shall not be allowed. Appropriate connectors of cable shoes held fast by nuts and bolts shall make all the wire connection.

The earthing plate or rod and earthing cable or strip shall be connected properly by brazing using copper brazing rod. The size of the continuous earth wires used with cable shall not be less than half the installation conductor size.

All the earth terminals of 15 A power sockets shall be connected by insulated copper conductor with 2.5 sq. mm. Copper cable emanating from the respective distribution board. The earth connection to the distribution board shall be obtained from the main switch board and main switch board in turn shall be connected to the earthing system by using copper wires of sufficient sizes a shown on the drawings.

Earthing set should consist of the following:

1 no. of 60 cm x 60 cm x 3 mm. Copper plate.
1 no. of watering GI pipe 1.8 m x 50 mm dia.
Brick masonry with RCC slab for inspection and earth connection. Charcoal and salt filling.
Electrolytic bare copper wire secured to earth plate with cable shoe, nut bolt and also connected to the earth pipe with nut and bolt.

20 Sub Distribution Board (SDB)

Sub distribution board shall be made compact with 16 SWG mild steel sheet cubicle, concealed type/surface type with double cover having locking arrangement. The depth of the board shall not be less than 4". The mild steel sheet shall be painted with two coats of red oxide primer, and two final coats of steel gray color enamel. The bus bar used shall be made from highly conductive, electrolytically pure copper bar strips of sufficient cross sectional area so that maximum current density of 1.2 amp/sq. mm. shall not be exceeded. Neutral bus bar shall not be less than 50 % of the phase bus cross section. The interconnection of cable inside SDB shall be done with crimping type cable shoe of appropriate size. The incomer MCCB shall have breaking capacity of 10 KA (ICs) or higher at 400 volts and outgoing MCB's shall have breaking capacity of 10 KA or higher at
380 volts. Armoured sheath of all the armoured power cables shall be properly connected to body earth of SDB. All the connections in bus bar and MCCB's and MCB's shall be made using cable shoes with sleeve.

21 Loading of MCB's

S/N	MCB	No. of points
1	6 A SP MCB	Max. 10 nos. of light points or max 800 W
2	10 A SP MCB	Max 6 nos. of 13A 3 pin for computer
3	16 A SP MCB	Max 3 nos. of 15 A 3 pin power points

22 Relevant Standards

Following specifications and code or their latest revision shall apply under all circumstances.

i Low voltage Moulded Case Circuit Breaker - IS
ii) Transformer - IS
iii) Earthing - IS
iv) Wiring installation - IS 732,1963
v) PVC cable - IS 554,1964

vi) Distribution boards - IS 2675,1966

vii) Bus bars and Bus chambers - IS 375,1963

viii) Switch fuse units on cubicle switch boards - IS 4047-1968

ix) Switch gear bus bars - IS 375-1963

x) H.R.C. Fuse links - IS 2208-1962

xi) Distribution fuse boards - IS 2675-1966

xii) Tubular fluorescent lamps for general lighting service - IS 2418-1965

xiii) Tungsten filament lamps for general service - IS 418-1963

xiv) Industrial light fittings with metal reflectors - IS 17-1961

xv) Water light electric light fittings - IS 3553-1966

xvi) Switch socket outlets - IS 4615-1968

xvii) Three pin plug and socket outlets - IS 1293-1967

xviii) Switches for domestic and similar purpose - IS 3854-1966

xix) Ceiling fans - IS 374-1966

xx). 1100 volt cable - IS 692-1965

xxi) Low tension circuit breaker - IS 2516-1965

xxii) Steel boxes for enclosure of electrical accessories - IS 5133-1969

23 Code of Practice

Earthing - IS 3043-1966

Electrical Wiring/ Installations - IS 732-1966

Switchgears - IS 3072-1966

Lightining protection - IS 2309-1969

24 Abbreviation used

LT - Low Tension

AC - Alternating Current MDB

- Main Distribution Board DB - Distribution Board

KV - Kilo Volt

KVA - Kilo Volt Amp

PVC - Poly Vinyl Chloride

SWG - Standard Wire Guage (British) IS - Indian Standard

TPN - Three Phase Neutral

DP - Double Pole

MCB - Miniature Circuit Breaker

MCCB - Moulded Case Circuit Breaker

25 Standard and Make

All materials intended for this project shall be all new and as per specifications laid herein. Where equivalent types are available, samples shall be submitted to the project for formal approval before procurement is made. A brief descriptions or acceptable brands are mentioned below for various requirements

Items	Model/Brands
MCCB	MerlinGerin/Siemens/Legrand/Hager
MCB/ RCCB	Huasmann or equi.
Wiring Cable	Trishakti/Litmus/Prakash cable/Pioneer
Light switch (Modular) /Power socket	Clipsal, Orange or equivalent
36 W LED Panel light fixture	Wipro, Legero, or Equivalent
Picture light	Toyostar, Wipro, Homedec, Decon
1x 40 W FTL Box type	Anchor / Phillips / Wipro / Lumex
12 W LED Surface/recessed light	Wipro, Legero, Liper, or equivalent
10 pair tel tag block	Pouyet, Krone
Power cable	Janata/Prakash /Premier/Nepal cable ,NS
Fan (ceiling, wall , exhaust)	Usha/Crompton/Khetan/polar
Distribution Board, Panel	Hyonjan, Ankur Metal, Purna Metal crafts
PVC wiring duct	Plaso duct.
RJ11 telephone outlet	Clipsal
RJ 45 computer Jack	AMP, NEX 1
EPABX System	FORTH, HICOM (Siemens), Samsung, NEC, Alcatel

26 Samples

The successful bidder shall submit a sample of each item for approval before the installation of electrical fixtures. All the light fixtures and accessories shall be of genuine quality and the manufacturer of the accessories shall be mentioned at the time of bidding.

Drawings and samples shall be submitted by the contractor and should not be deviated from actual samples submitted without the written instructions from the consultants. Non approval given by the consultants to any drawings or sample submitted by the contractor shall in any way exonerate the contractor from his liability to carry out the work in accordance with the terms of the contract. All the light fixtures and accessories shall be of genuine quality and the manufacturer of the accessories shall be mentioned at the time of bidding. The successful bidder shall submit a sample of each item for approval before the installation of electrical fixtures.

Samples of the items whose standard and make are not indicated shall be submitted and get approved by the consultant before installation.

27 Testing before installation

The following equipment and material shall be tested before

installation. Power cable (armoured/unarmoured)
MCCB
MCB

The insulation resistance for underground cable shall be more than 10 Megaohm.

28 Completion Tests

After completion of work, the following tests shall be performed before commissioning the system.

28.1 Testing Insulation Resistance between Line and Earth

The insulation resistance between a line and earth shall be checked by 500 volt megger. The phase conductor is connected to the terminal and marked "Line" on the megger and terminal marked "Earth" is connected to the earth continuity conductor or an efficient earth. The test shall be performed with all fuse links in place, all switches 'ON' and all lamps in position. The result must not be less than 50 mega ohms divided by number of outlets. The test shall be performed for all outgoing circuits of main control panel, feeder post, MDB and DB.

28.2 Testing Insulation Resistance between Line to Line

The test shall be performed with all lamps removed and all switches 'ON'. The result must not be again less than 50 megaohms divided by numbers of outlets. This test also shall be performed for all outgoing circuits of main control panel, feeder post, MDB and DB.

Test should be made to verify that all single pole switches are on phase conductors and not on the neutral or earth conductor.

To ensure that all the metering instruments and other accessories as MCCB, MCB, switches work in perfect order.

The earth resistance of the earth system shall be checked with earth resistance tester and shall not exceed 5 ohm.

If the above test results are not satisfactory, the contractor shall rectify the faults at his own cost until the required results are obtained. The contractor in the presence of the consultant shall carry out these tests without any charge to the owner.

28.3 Testing of Earth resistance

Resistance of earth electrode shall be measured using Earth Tester and the value should not be greater than 5 ohm.

29 Completion Drawings

On completion of the job and before issuing of certificate of virtual completion, the contractor shall submit to the Consulting engineer general layout drawings, drawn at approved scale indicating panel, distribution board, diesel generating set and its accessories AS installed". These drawings shall in particular give the following;

General Layout of fixtures and accessories.

Cable laying location with detail as size, numbers, and depth.

Locations of DB's, sub DB's, junction boxes et.

Main panel board, distribution board details.

Panel and other equipment locations and size etc.

Details of earth pits, connections and locations.

Connection drawing of all electrical connections.

30 Wiring of Telephone Points

Wiring of telephone points shall be done using telephone cables of various pairs in HDP conduit of at least 12 mm. internal diameter concealed inside wall and slabs. Tapping from one socket to other is not allowed.

Each single telephone line shall be connected to floor Distribution point by 3 pair cable. Each telephone outlet shall be of RJ11 type 3"x 3" face plate on 18 swg metal box flushed inside a wall. One single face plate shall serve max. of 2 separate telephone lines and socket shall have screw type connection inside rather than by twisting of wires. At least
20% spare pair shall be provided at floor DP for future expansion.

Floor distribution point shall consist of sufficient nos. of Krone / Pouyet type tag block with frame inside a metal box with cover and locking arrangement. There must be sufficient space for cable termination inside the box. DP shall be flushed inside a wall mounted at a height of 12"from finished floor level.

At least 6 inch separation shall be provided between electricity cable HDP pipe and telephone cable pipe.

Each separate telephone line shall be considered as a point.

Cost of telephone point wiring shall include the complete labour charge and cost of following items:

Telephone cables of appropriate pair from main exchange to DP and to each telephone outlet including extra spare pair as per above specifications

HDP pipe of various sizes in which the telephone cables will be run. There shall be at least 20% extra space inside the HDP pipe after the cable is run for the ease of pulling cables.

It is the full responsibility of contractor to terminate all the cables in telephone socket, DP and MDF and provide complete and correct tag data to the owner.

Separate Earthing for EPABX system

Separate earthing shall be provided for telephone system and the earth resistance should not exceed 5 ohm for this purpose. Specification of earthing is same as in earthing for electrical distribution system.

31 Wiring of Fire Alarm System

Each smoke detector, heat detector, response indicator, manual call point, sounder is considered as a point and point wiring shall be done using 2 wire (single or double core)
1.5 sq. mm. dc cable in HDP conduit concealed inside RCC slab, ceiling, wall etc as per site condition from each point to fire alarm control panel. Detectors are divided into different zones and each zone shall have separate circuit up to the control panel. The cables at control panel shall be properly numbered for identification. All the civil works including chipping and finishing shall also be included in point wiring.

32 Wiring of Computer Networking

Each Computer outlet RJ-45 jack plate is considered as a point and wiring shall be done using UTP Cat-5 networking cable from each point to the nearest hub as shown in the drawing in a HDP pipe concealed inside RCC slab, ceiling, and wall as per site condition. All the hubs shall also be connected by cabling. The cables shall be properly terminated at face plate and properly numbered at hub for identification. All the civil works including chipping and finishing shall also be included in point wiring.

33 Wiring of Access control system

Each point at door is considered as a point and wiring shall be done using 1 sq. mm 10 core copper cable from each point to the central control system as shown in the drawing in a HDP pipe concealed inside RCC slab, ceiling, and wall as per site condition and the cables shall be properly numbered at control room for identification. All the civil works including chipping and finishing shall also be included in point wiring.

34 Wiring of CCTV surveillance system

Each camera point outdoor/indoor is considered as a point and wiring shall be done using low loss RG-59 coaxial cable from each point to the central monitor room as shown in the drawing in a HDP pipe concealed inside RCC slab, ceiling, wall, underground as per site condition. Cable joints between camera point and central monitor system are not allowed. The cables shall be properly terminated at the face plate and properly numbered at control room for identification. All the civil works including chipping and finishing shall also be included in point wiring.

35 Guarantee

After the completion of the work and before issuance of final certificate of virtual completion the contractor shall furnish a written guarantee by his acceptance of the contract that all work installed will be free from any defective materials and all defects and that all apparatus will develop capacities and characteristic specified and that if during a period of one year from date of completion and acceptance work any such defects on workmanship or defective material, repair or otherwise correct the

defects of deficiency without cost to the owner within a reasonable time. In the event of default on this guarantee by the contractor, the owner may have works done as required and charge the cost to the contractors.