

BHAVNAGAR MUNICIPAL CORPORATION

(Pradhan Mantri Awas Yojana)

(Tender No.: BMC/Town Planning Department/E-36/2019-20)



Tender

**For construction of 1252Nos. of EWS-II type Housing
(P+10 & P+13 floors) along with all infrastructure at site under PMAY on
T.P.S. No. 5A, Sidsar, F.P. No. 56, 60 & 68, Bhavnagar**

ATURNKEY PROJECT

(For Conventional Technology - R.C.C. Framed Structure)

Estimated Cost Rs. 114,43,40,728=00

VOLUME I - TECHNICAL BID

**Municipal Commissioner
BHAVNAGAR MUNICIPAL CORPORATION
BHAVNAGAR**

23. MINIMUM ACCEPTABLE SPECIFICATIONS

Sr. No.	Description	Minimum Specifications
1.	RCC Works	Contractor shall carry out structure design from his Structural Consultant (The Consultant must have Structural Engineer License from Bhavnagar Municipal Corporation), which shall be proof checked by Project Architect. Further soil investigation / exploration survey shall also be carried out by the Contractor wherever necessary at his own cost. Shuttering (form work) system shall be as per approval of water proof plywood, Steel plate, steel propping and spans. Additional alternation changes during the work shall has to be incorporated in the structure drawing & shall be resubmitted to BMC / PMC / Project Architect accordingly. The contracting agency then has to prepare bar bending schedule, submit it to BMC / PMC & after checking the bar bending schedule, then BMC / PMC shall permit to work to start. The Structural Engineer has to compulsory visit all sites at every stage of construction and whenever required by BMC / PMC and also he has to give suggestion/comments in writing to BMC / PMC during construction and Structure Engineer has to issue structure stability & completion certificate to the client after completion of work.
	RCC in foundation, columns, beams, slab, loft, lintel, chhajah, stair case, copping etc.	The detailed dimensions & mix of all RCC to be adopted shall be as per approved structural design and as per IS 456 (Only steel props shall be used for shuttering below slab & beams). Use of fly ash shall not be accepted. Concrete shall be done by ready mix plant only.
2.	Reinforcement	TMT Fe-500/550D of approved make only.
3.	Masonry Works	
a	Foundation & up to plinth	Brick masonry works in C:M 1:6 proportion
b	Parapet wall of all terrace & Wall of wash area	All terrace level parapet wall & wall of wash area should be RCC as per structure design of 1.15 mt. in height from the finished terrace / floor level. Providing & fixing of 16 to 20 mm thk. Green Marble of approved shade to top of RCC wall of wash area in single piece (in full length) over 15mm (average) base of cement mortar 1:3 (1-Cement: 3-fine sand) laid and jointed at backside with grey cement slurry mixed in bonding chemical of approved make, fine grit and araldite including rubbing, polishing, curing, edge polishing for both side etc. completed as per drawings and as directed. Marble fixed with required stainless

Sr. No.	Description	Minimum Specifications
		steel pins / clamps / dowels including drilling holes, making notches etc. for securely fixing with crams / pins to wall.
c	Landing wall of stair case, passage wall, OTS wall etc. for super structure	230 mm thk. Brick masonry works in C:M 1:6 proportion & 1.15 mt. in height from the finished floor level.
d	Superstructure other than above	Autoclaved aerated lightweight concrete block using readymade premix tensile adhesive mixture of approved make & proportion as directed.
e	All partition wall (Brick / AAC)	For brick masonry - In C:M 1:4 proportion and as per detailed specification. RCC bends/ including reinforcement shall be provided at intervals specified in structural drawings. For AAC - Using readymade premix tensile adhesive mixture of approved make & proportion as directed. RCC bends / including reinforcement shall be provided at intervals specified in structural drawings.
4.	Railing in staircase	Providing, fabricating, fixing & anchoring of M.S. pipe (R.H.S. or S.H.S.) railing of the approved design with hand rail of M.S. tube (medium class pipes, app railing wt. 15 kg / m) and vertical bars embedded in waist slab / tread. The height of the railing shall be 1.00 m from finished level of step as specified in drawing. Providing & applying one coat of red oxide primer and two or more coats of enamel paint of approved make & shade etc. complete as directed.
5.	Plastering work	
a	Internal Ceiling	10mm thk. cement plaster in single coat on ceiling & soffits of stair for interior plastering finished even and smooth in cement Mortar 1:4 (1-Cement : 4-Sand) incl. finishing with a floating coat of neat cement slurry.
b	Internal Wall	10mm thk. cement plaster in single coat on brick/concrete walls for interior plastering finished even and smooth in cement mortar 1:4 (1-Cement : 4-Sand) incl. finishing with a floating coat of neat cement slurry.
c	External Wall	20mm thick sand faced cement plaster on walls upto all height above ground level consisting of 12 mm thick backing coat of C. M. 1:3 (1-Cement:3-sand) and 8mm thick finishing coat of C.M. 1:1 (1-Cement:1-Sand (bhogavo) etc. complete.
6.	Floor finish	
i	Flooring & skirting	

Sr. No.	Description	Minimum Specifications
a	Bed room / Kitchen / Living room/ Shop / Security cabin / Association office	605 x 605 mm double charged vitrified tiles flooring of approved made, shade & pattern over 50 mm (average) or required thk. base of cement mortar 1:6 (1-Cement : 6-Coarse Sand) including jointed with color cement slurry including finished with flush pointing & cleaning the surface etc. complete. 75 mm high skirting (projected 3mm from plastering surface) in all rooms, passages in residential& commercial.
b	Toiletsfor residential&commercial	300 x 300 mm ceramic tiles flooring of approved made, shade & pattern laid on a bed of 12 mm or required thk. ofCementmortar 1:3 (1-Cement: 3-Coarse Sand) finished with flush Pointing in white cement etc. complete. - floor level min. 25 mm below passage level.
c	Wash area, Lift machine room, Stair room, Stair Landing, Passages, Pump room etc.	25mm thick polished Kota stone slab flooring of approved made, shade & pattern over 20mm (Average) or required thick base of cement mortar 1:6 (1-Cement: 6-Coarse Sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. Floor level of external Passages min 25 mm below from DUs internal floor level.
d	Loft in DU	10mm thk. cement plaster in single coat for interior plastering finished even and smooth in cement mortar 1:4 (1-Cement : 4-Sand) incl. finishing with a floating coat of neat cement slurry.
e	Chhajah top	20mm thick sand faced cement plaster on walls upto all height above ground level consisting of 12 mm thick backing coat of C. M. 1:3 (1-Cement: 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1- Cement: 1- Sand Bhogavo) and Cement Vata (10 cm. x 10 cm. size) quarter round in cement mortar 1:1 including neat cement finishing watering, providing throating of plaster drip and moulding to R.C.C. Chhaja etc. complete.
ii	Wall Tiles (Dado)	
a	Kitchen area - platformside	Coloured Glazed Tiles of approved made, shade & pattern up to 2.10 mt.from FFL of the size 300 mm x 450 mm x 8 mm dado on 10 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) & jointed with white cement slurry etc. complete.
b	Wash area	'---Do--- as above (sr. no. ii.a) butfrom finished floor level to parapet wall top level
c	All Toilet for residential & commercial	'---Do--- as above (sr. no. ii.a)

Sr. No.	Description	Minimum Specifications
iii	Staircase riser & tread	Polished kota stone slab 25mm thick in tread & risers of steps, on 10mm thick cement mortar 1:3 (1-Cement : 3 coarse sand) and jointed with gray cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete.
iv	Parking area of residential	Providing and laying 100 mm thk. cement concrete 1:4:8 (1-Cement: 4: coarsesandand: 8-crushed stone aggregates 40 mm nominal size) and curing complete for P.C.C. within plinth area below grade slab. RCC Grade Slab of 125 mm thk. in controlled cement concrete grade & reinforcement as per structure design with Trimix-VDS Finishing. Providing & cutting Contraction (dummy) Joint as directed in grade slab of size 3 to 5mm in width x 40mm in depth cutting with mechanically operated cutter machine and cleaning & filling the joints with Bituminous of Grade 90/15 or as approved made in poring grade as per manufacturer's application methodology.
v	Terrace area	Providing and laying waterproofing treatment for terrace including (a) applying neat cement slurry 2.75 kg/sq.mt. of cement admix with waterproofing compound of approved made after cleaning the surface. (b) Average 110mm thick laying brick bat concrete using brick bats 25 to 100 mm size with 50% cement mortar 1:5 (1-cement : 5-coarse sand) admixed with waterproofing compound of approved made over 20 mm thick layer of C.M.1:5 to require slope including rounding of junction or walls and slabs (c) after two days of proper curing applying a second coat of cement slurry. (d) Finishing the surface with 20 mm thick cement mortar 1:4 and finally finishing the surface with trowel As directed with cement slurry. (e) After finishing the whole terrace shall be flooded with water for a period of one week 72 hrs. for curing. After completion of brickbat providing & applying broken China Mosaic Flooring for Terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar crème out upto surface using white cement including rounding off junctions and extending them upto 30 cm along the wall, clearing with water and oxalic acid etc. as directed & pattern. Providing Cement Vata

Sr. No.	Description	Minimum Specifications
		rounding in brickbat coba concrete including neat cement finishing, wateringetc. complete as directed. Terrace Finished Floor Level should be kept at least 50 mm below stair room Finished Floor Level.
7	Platform in Kitchen for DU & Community Hall	Providing & constructing sandwich type Kitchen Platform of 60cm. width and 75cm. height with 16 to 20mm thk.Polished Marble slab top on resting on single side 25 mm thick polished kota stone as bottom and 40mm thick double polished kota stone vertical support fixing by making grooves including 75 mm wide facing patti of marble with edge of the patti shall be finished with quarter round molding & mirror polished etc. completed with cutting hole as per sink size as shown in detail architectural drawing. 1 no. of 25mm thick polished Kota Stone (size: 11" x 17") to be fixed in the wall for Water Pot Shelf with edge finished half round moulding and mirror polish as per architectural drawing. Providing and laying 50 mm thk. Otta in Cement concrete 1:5:10 (1-Cement: 5-fine sand: 10-graded brick aggregates 40 mm nominal size) and curing complete below Kitchen platform.
8	Door shutters	
a	Main Door	Providing and fixing waterproof Flush Door of 35mm thk. shutters, solid core construction including 6mm x 35mm teak wood beading patti all side with paint finish, door magnet, S.S. Handle of 15 cm size, S.S. Stopper of 20 cm long size, 3 no. of S.S. Hinges in each door, S.S. Aldrop 30 cm long size, S.S. Tali 20 cm long size etc. of all S.S. Grade confirming to ASIS 304 fasteners and fixtures with necessary screws including both side 1mm thick laminate of approved made & shade etc. complete as directed by engineer-in-charge.
b	Other Door In residence - Wash, Bedroom & Stair room / Lift machine room / SecurityCabin/ Association office	Providing and fixing waterproof Flush Door of 35mm thk. shutters, solid core construction including 6mm x 35mm teak wood beading patti all side with paint finish, door magnet, S.S. Handle of 15 cm size, S.S. Stopper of 20 cm long size, 3 no. of S.S. Hinges in each door, S.S. Aldrop 30 cm long size, S.S. Tali 20 cm long size etc. of all S.S. Grade confirming to ASIS 304 fasteners and fixtures with necessary screws including both side finished with one coat of enamel primer and two or

Sr. No.	Description	Minimum Specifications
		more coats of enamel paint of approved make & shade etc. complete as directed by engineer-in-charge.
c	Toiletsfor residential andcommercial	Providing and fixing PVC DOOR WITH FRAME AND SHUTTER 30mm thick FACTORY MADE SOLID BOTH SIDE PRELAM PANEL PVC DOOR SHUTTER consisting of frame made out of M.S. tubes of 19-gauge thickness and size of 19mm x 19mm for stiles, top and bottom rails. M.S. frame shall have a coat of steel primer of approved make and manufactures. M.S frame covered with 5mm thick heat moulded prelamPVC 'C' channel of size 30mm thickness, 70 mm width of which 50mm shall be flat and 20mm shall be tapered in 45 degree Angle on either side forming stiles, and 5mm thick, 95mm wide prelam PVC sheet out of which 75mm shall be flat and 20mm shall be tapered in 45 degree on the inner side ot form top and bottom rail and 115mm wide prelam PVC sheet out of which 75nmm shall be flat and 20mm shall be tapered on both side to form lock rail, Top, bottom and lock rails shall be provided either side of the panel. 10mm (5mm x 2) thick 20mm wide cross PVC sheet shall be provided as gap insert for top rail and bottom rails. Paneling of 5mm thick both side prelam PVC sheet to be fitted in the M.S. frame welded,sealed to the stiles and rails with 7mm (5mm + 2 mm) thick x 15mm wide PVC sheet beading on inner side, and joined together with solvent cement adhesive. An additional 5mm thick PVC strip of 20mm width is to be stuck on the interior side of the 'C' channel using PVC solvent adhesive etc. complete as per direction of Engineering in charge, manufacture's specification and drawing.
9	Door frames	
a	Main Door	Providing & fixing of 16 to 20 mm thk. Green Marble of approved shade to Door frame in single piece (in full length) over 15mm (average) base of cement mortar 1:3 (1-Cement: 3-fine sand) laid and jointed at backside with grey cement slurry mixed in bonding chemical of approved make, fine grit and araldite including rubbing, polishing, curing, edge polishing for both side etc. completed in zigzag pattern as per drawings and as directed. Frame should be double groove (danti) for door shutter & safety door. Marble fixed with required stainless steel pins / clamps / dowels including drilling holes, making notches etc. for securely fixing with crams / pins to wall.

Sr. No.	Description	Minimum Specifications
b	Other Door In residence - Wash, Bedroom, Security Cabin & Association Office	'---Do--- as above (sr. no. 9.a) but in single groove (danti) for door shutter.
c	Toilets for residential and commercial	Providing and fixing factory made Polyvinyl Chloride (PVC) doorframe of the size 50 x 47 mm with a wall thickness of 5mm, made out of extruded 5mm rigid PVC foam sheet, meter out of two corners and joined with 2nos. of 150mm long brackets of 15 x 15mm M.S. Square tubes. The two vertical door profiles are to be reinforced with 19 x 19 mm M.S. square tube of 19 gauge, EPDM rubber gasket weather seal to be provided throughout the frame. The door frame shall be fixed to the wall using 65/100 mm long M.S. screws through the frame by using PVC fasteners. A minimum of 4 nos. of screws to be provided for each vertical members and minimum 2 nos. for horizontal members etc. complete as per manufactures specification and direction of Engineer in charge.
d	Stair room / Lift machine room	Providing and fixing precast frame of 125 x 75 mm size or approved size shall be made of controlled cement concrete M-200 with 4mm tensile G.I. bars including finishing with groove, hinges and fasteners etc. complete.
10	Aluminum Window section	
a	Window	Providing and fixing window having extruded Aluminum Colour Powder Coated section frame main outer size 63.50 x 38.10 x 1.95 mm(of Jindal Section no:4605,@ Wt 1.094 Kg / Rmt), horizontal two track member size 61.85mm x 31.75 mm x 1.20mm (of Jindal Section no: 8687 @ wt. of 0.695 Kg/mt), vertical member of size 61.85 mm x 31.75mm x 1.30 mm (of Jindal Section no:8758 @ wt. of 0.0.659 Kg/mt) with sliding shutters of horizontal member size 40mm x 18mm x 1.29mm (of Jindal Section no:8949 @ wt. of 0.456Kg/mt), vertical member of size 40mm x 18mm x 1.29mm (of Jindal Section no:8947 @ wt. of 0.456Kg/mt/ Section 8948, @ Wt. 0.457 Kg/mt) with 5mm thick transparent bronze colour tinted float glass with powder coated aluminum fittings and fixtures and transparent silicon sealant glass fixing to frame as per details etc complete for window.
b	Ventilation	Providing and fixing standard extruded of aluminum section of size 63mm x 38.10mm x 1.2mm (Jindal Section:2434, @ Wt. 0.643 Kg/mt) with colour. Powder Coated Aluminum Frame for ventilation with 5 mm thick

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		frosted glass as details etc. complete for Ventilation
11	Sill, Jams & soffits of Window / Ventilation	Providing & fixing of 16 to 20 mm thk. Green Marble of approved shade to Window/Ventilation sill, jams & soffit in single piece (in full length) over 15mm (average) base of cement mortar 1:3 (1-Cement: 3-fine sand) laid and jointed at backside with grey cement slurry mixed in bonding chemical of approved made, fine grit and araldite including rubbing, polishing, curing and edge polishing at both side etc.completed in zigzag pattern as per drawings and as directed. Marble fixed with required stainless steel pins / clamps / dowels including drilling holes, making notches etc. for securely fixing with crams / pins to wall.
12	Paint finishing	
a	Internal ceiling & wall for residence& Commercial.	Applying two coats of Birla or Asian acrylic Lappy (Putty) and one or more coats of primer of approved brand and manufacture on new wall and Ceilling surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.
b	Internal ceiling & wall for common area like stair area, passages, Parking, Stair & Lift machine room for residence, Security cabin, Pump room, Association Office etc.,	Applying two coats of Birla or Asian acrylic Lappy (Putty) of approved brand and manufacture on wall and Ceiling surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth. Distempering (two or more coats) with oil bound washable distemper of approved brand and manufacture and of required shade on ceiling surfaces to give an even shade, over and including a priming coat with alkali resistance primer of approved brand after thoroughly brushing the surface and other foreign matter and also including preparing the surface even and sand papered smooth.
c	External Wall of residence, Security cabin, Pump room, Housing Gate, Commercial, Association Office	Finishing wall with weatherproof exterior emulsion paint of approved made on wall surface (two or more coats) to give a required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials etc. complete.
13	Sanitary / water supply / plumbing & drainage system	
a	Indian (Orrisa) type W.C. pan for common toilet of residence	Providing and fixing water closet (Indian type W.C. Pan) size 580 x 400mm with 100mm size P or S trap for water closet squatting pan including jointing the trap

Sr. No.	Description	Minimum Specifications
		with the pan and soil pipe in cement Mortar 1:1 (1-Cement: 1-Fine sand) and G.I. inlet connection for flush pipe with W.C. pan. Also, fixing pair of white vitreous China 250mm x 130mm x 30mm footrest in Cement Mortar 1:3 (1-Cement: 3-Coarse Sand) (A) Vitreous China. (I) Long pattern = White or colour.
b	Anglo Indian type W.C. pan for attached toilet of residence / commercial / security cabin / Association Office	Providing and fixing water closet (Anglo Indian type W.C. Pan) as per approved size including with seat cover and 100mm size P or S trap for water closet squatting pan including jointing the trap with the pan and soil pipe in cement Mortar 1:1 (1-Cement: 1-Fine sand) and G.I. inlet connection for flush pipe with W.C. pan. (A) Vitreous China. (I) Long pattern = White or colour.
c	Wash basin in toilets of residence, commercial&Association Office	Providing & fixing flat back Wash Basin of size 450x300 mm or other size as per drawing with single hole for pillar tap with C.I. or M.S. brackets painted white including cutting holes and making good the same including C.P. Brass waste, M.I. Fisher union 32mm dia., 15mm dia long body pillar tap capstan head, screw down high pressure with screws, and back nuts, C.P. Brass stop tap, and plastic connection P.V.C. Waste pipe, Rubber Plug etc.
d	Kitchen sink	Providing & fixing S.S. Kitchen sink Glossy AISI 304 Grade, 1mm thk. with overall size 485x410 mm & bowl size 410 x 365 x 165 mm with single hole for pillar tap including cutting holes and making good the same including C.P. Brass waste, M.I. Fisher union 32mm dia., 15mm dia pillar tap, capstan head, screw down high pressure with screws, and back nuts, C.P. Brass stop tap and plastic connection P.V.C. Waste pipe, Rubber Plug etc.
e	Urinal in toilet of commercial	Providing and fixing Urinal or approved quality including connecting the Urinal with waste pipe, tap etc. complete. (A) White or colour earthenware flat back or corner type size 430mm x 260mm x 350mm.
f	Nahani Trap	Providing & fixing PVC SWR Nahani Trap IS 14735 for drain with jali of the 100 mm nominal diameter of self-cleaning design with C.I. Screwed down or hinged grating including the cost of cutting and making good the walls.
g	Shower Rose	100 mm dia. C.P. brass shower rose with 15 mm or 20 mm inlet
h	Bib Tap	15 mm dia. Brass chromium plated screws down type
i	Stop Tap	15mm dia. brass screw down concealed type

Sr. No.	Description	Minimum Specifications
j	Check or Non-return Valve.	Full way Wheel Gun Metal type
k	Half turn flush cock	Chromium plated brass type
l	Water supply network for cold water (Rising main {Vertical} from U.G.T. to O.H.T. & internal supply)	Providing, laying and jointing in true line and level U.P.V.C. Pipe (SCH-40) including fitting as approved by Engineer-in-charge. Pipe shall be fixed on the wall with the help of clamp at every two-meter c/c or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent and including cost of all materials.
m	Water supply network for hot water	Providing and fixing concealed center point to wall, ceiling & floor C.P.V.C. (SDR 13.5) Pipe of approved make having National Sanitation Foundation (NSF) seal for hot water of 15 mm dia. nominal bore tube fitting and clamps including making good the wall, ceiling and floor etc. complete.
n	Waste water, drainage & Rain water network (up to manhole at G.F. level)	Providing, supplying, lowering, laying and jointing in standard length ISI Mark rigid PVC pipes and specials of approved make including all taxes and charges, jointing material, fittings, labour etc. complete. Giving satisfactory hydraulic testing as per ISI code. Test pressure 6kg/sq.cm. or 10 kg./sq.cm.
o	External water supply network (Main network from source to U.G.T. and branch lines below ground)	Ductile Iron Pipes with internal cement mortar lining and external Zinc coating with finishing layer of Bitumen; manufactured, tested and duly marked in strict accordance with and confirming to IS: 8329/2000 (as per latest amendment); suitable for push-on Jointing, along-with one number Rubber Gaskets for each length of pipe (EPDM Gasket as per IS: 5382/1985). Class- K7 or K9. Ductile Iron fittings like, bends, tees, reducers or any other specials as per IS-9523-2000 (as per latest amendment) use with D.I. Pipes manufactured as per IS:8329/1994 (With external bitumen & zink coating & internal cement mortar lining) Socket & Spigot Type and Flanged Ended
p	External drainage network (from connecting house manhole and service manhole and onwards)	Providing, supplying, laying, jointing and fixing Glazed Stoneware pipes I.A.E. with special and required jointing solution including hydraulic testing complete as per drawing. The pipes and fittings shall be of best quality of approved make. The pipe shall be manufactured from stoneware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close even texture,

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		free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. the pipe shall be capable to withstand pressures of 1.5 m lead without showing sign of leakage. The thickness of the wall shall not be less than 1/12th of the internal dia. the depth of socket not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm around the pipe. The pipes shall generally conform to relevant IS latest edition.
q	Gully chamber with trap	Brick Masonry Chamber with Gully trap & FRC medium duty round cover as per standard design of GWSSB with required depth & size.
r	Sewer Manhole	A, B or C type as per standard design of GWSSB with required depth and for required dia. of sewer pipe etc. as per drawing & design.
s	Inspection Chamber	Brick Masonry inspection chamber of various size as per drawing & design with FRC medium duty cover.
t	Rain water harvesting network below ground	Providing & constructing percolation well with borewell as per design & drawing with ISI Mark rigid PVC pipes and specials of approved make including giving satisfactory hydraulic testing as per ISI code. Test pressure 6kg/sq.cm. or 10 kg./sq.cm.
u	Control valve for water supply network	Control valve of approved make for control of water supply of each flat as per drawing.
14	Overhead & Underground tanks	All inner walls up to full height & bottom of RCC overhead & underground water tanks should be covering with 2 nd quality glazed tiles of approved size & make.
a	Overhead tank (For firefighting)	As per fire norms
i	On F.P. No. 56 (208 DUs)	Total 4 Nos. each having 20000 ltr. Capacity R.C.C. (above each & every stair room of residential building as per detail design & drawing.)
ii	On F.P. No. 60 (572 DUs)	Total 11 Nos. each having 20000 ltr. Capacity R.C.C. (above each & every stair room of residential building as per detail design & drawing.)
iii	On F.P. No. 68 (472 DUs)	Total 10 Nos. each having 20000 ltr. Capacity R.C.C. (above each & every stair room of residential building as per detail design & drawing.)
b	Overhead tank (For domestic water supply network)	Triple layer PVC tank of approved make as per detail design & drawing.
i	On F.P. No. 56 (208 DUs)	Total 16 Nos. each having 5000 ltr. Capacity (i.e. 5000 ltr. capacity Per 13 Nos. of Du) of above specification

Sr. No.	Description	Minimum Specifications
ii	On F.P. No. 60 (572 DUs)	Total 44 Nos. each having 5000 ltr. Capacity (i.e. 5000 ltr. capacity Per 13 Nos. of Du) of above specification
iii	On F.P. No. 68 (472 DUs)	Total 40 Nos. each having 5000 ltr. Capacity (i.e. 5000 ltr. capacity Per 13 & 10 Nos. of Du) of above specification
iv	For Commercial	Required nos. & capacity of above specification.
c	Underground tank (For fire-fighting as per fire norms)	R.C.C. as per detail design & drawing of required capacity. (Circular or rectangular as decided by BMC/Project architect)
i	On F.P. No. 56 (208 DUs)	Total 1 No. - Having 75,000 ltr. Capacity
ii	On F.P. No. 60 (572 DUs)	Total 2 No. - Each having 1,00,000 ltr. Capacity
iii	On F.P. No. 68 (472 DUs)	Total 2 No. - 1 having 1,00,000 ltr. Capacity & 2 nd having 75,000 ltr. capacity
d	Underground tank (For domestic water supply network)	R.C.C. as per detail design & drawing of required capacity. (Circular or rectangular as decided by BMC/Project architect)
i	On F.P. No. 56 (208 DUs)	Total 1 No. - Having 1,50,000 ltr. Capacity
ii	On F.P. No. 60 (572 DUs)	Total 2 No. - 1 having 2,50,000 ltr. Capacity & 2 nd having 2,00,000 ltr. capacity
iii	On F.P. No. 68 (472 DUs)	Total 2 No. - 1 having 2,50,000 ltr. Capacity & 2 nd having 1,50,000 ltr. capacity
iv	For Commercial	Required nos. & capacity of above specification.
15	Sunken slab	Providing 10mm thk. Waterproof Cement plaster in single coat on sunken portion walls for interior plastering of even and smooth in Cement Mortar 1:4 (1-Cement: 4-Sand) incl. finishing with a floating coat of neat cement slurry. Providing horizontal & vertical Cement Vata (10 cm. x 10 cm. size) quarter round in cement mortar 1:1 including neat cement finishing watering etc. complete. Providing and filling cinder of Light weight material or broken AAC blocks for filling sunk portion etc. as directed. Providing and laying waterproofing treatment for Sunk including applying neat cement slurry 2.75 kg/sq.mt. of cement admix with waterproofing compound after cleaning the surface. (b) 100mm thick laying cement concrete flooring 1:2:4 (1-cement: 2-coarse sand: 4-graded stone aggregates 20 mm nominal size) laid in single layer and finished with a floating coat of neat cement slurry to require slope including rounding of junction or walls and slabs. After finishing the whole sunken area shall be curing with water for a period of one week & testing for non-leakage.
16	Plinth protection	Carrying out plinth treatment to all structures by

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		spraying chemical solution for termite control treatment including labour and material consistent with I.S.I specification as directed & instructed.
17	Fabrication work:	
a	Grill to windows	Providing and fixing M.S. Grills to windows as per drawing made with M.S. flats at required spacing and frame around, M.S. square / round bars or M.S. pipe (S.H.S.) fixed with round headed bolts and nuts or by screws finished with one coat of red oxide primer and two or more coats of enamel paint of approved made & shade etc.
b	Openable Grill to wash area	Providing and fixing openable M.S. Grills to wash area with provision for drying of clothes as per drawing made with M.S. flats at required spacing and frame around, M.S. square / round bars or M.S. pipe (S.H.S.) fixed with round headed bolts and nuts or by screws with locking arrangement and finished with one coat of red oxide primer and two or more coats of enamel paint of approved made & shade etc.
c	Plumbing duct	Providing and fixing M.S. pipe to plumbing duct as per drawing made with M.S. flats at required spacing and frame around, M.S. M.S. pipe (R.H.S. or S.H.S.) fixed with round headed bolts and nuts or by screws finished with one coat of red oxide primer and two or more coats of enamel paint of approved made & shade etc.
d	MS ladder for terrace to stair room / Lift machine room	Providing and fixing in position 90 cm. wide M.S. Ladder with both side railing fabricated from M.S. flats, angle, pipe (RHS & SHS), etc. as per detailed drawing and as directed with welding, anchoring and 1 coat of red oxide primer and 2 or more coats of enamel paint of approved made & shade.
e	MS ladder for stair room to O. H. Tank	Providing and fixing in position 60 cm. wide M.S. Ladder fabricated from M.S. flats 10 mm x 75 mm with 20 mm dia. steel bar steps in double rows @ 30 cm c/c. They include stays of 10 mm x 50 mm flats fixed at 3 mt. c/c with welding anchoring and 1 coat of red oxide primer and 2 or more coats of enamel paint of approved made & shade.
f	MS Grill door to be provided at staircase entrance area at parking floor	Providing and fixing openable M.S. Grill door to staircase entrance area at parking floor as per drawing made with M.S. flats at required spacing and frame around, M.S. square / round bars or M.S. pipe (R.H.S. or S.H.S.) fixed with round headed bolts and nuts or by screws including provision of locking arrangement and finished with one coat of red oxide primer and two or

Sr. No.	Description	Minimum Specifications
		more coats of enamel paint of approved make & shade etc.
g	Rolling shutters for shops	Providing and fixing Rolling Shutters of approved make made of 80 mm wide M.S. laths inter-locked together through their entire length and jointed together at the ends by end locks mounted on specially designed pipe shaft with bracket plates, guide channels and arrangements for inside and outside locking with push-pull operation including the cost of hood cover and spring etc. complete. Applying priming coat after and including preparing the surface by thoroughly cleaning, oil, grease, dirt and other foreign matter and scoured with brushes fine steel wood, scrapers and sand paper with ready mixed priming paint brushing red lead and painting two or more coats with enamel paint of approved make & shade, brushing, interior to give an even shade including cleaning the surface of all dirt, dust and other foreign matter.
18	Filling within foundation & plinths	Filling in foundation and plinth with Murrum or selected soil brought from outside in layers of 20 cm. thickness including watering ramming and consolidating etc. completed. Black cotton soil or any other soil received from excavated material which shall not proper to fill in opinion of the Engineer-in-charge / PMC shall be strictly restricted.
19	Boundary wall surrounding to Plot	
i.	RCC Works	RCC Retaining wall / Frame structure / Pile foundation based on SBC report & as per architectural design & drawing Cast in situ single under reamed piles of specified diameter and length below pile cap. The detailed dimensions & mix of all RCC to be adopted shall be as per approved structural design and as per IS 456 (Only steel props shall be used for shuttering). Use of fly ash shall not be accepted. Concrete shall be done by ready mix plant only. Retaining wall / structure for compound wall must be considered, if required as per structure design, no extra cost will be paid for the same and it will be in scope of work. (For FP 60 West side)
ii.	Reinforcement	TMT Fe-500/550D of approved make only.
iii.	Masonry Works	
	Foundation, up to plinth & superstructure	Conventional Brick work using common burnt clay building bricks having crushing strength not less than 35

Sr. No.	Description	Minimum Specifications
		kg./Sq.cm. in cement mortar 1:6 (1-Cement : 6-coarse sand) curing etc. complete for following.
iv	External Plaster work	20mm thick sand faced cement plaster on walls up to height 10 meters above ground level consisting of 12 mm thick backing coat of C. M. 1:3 (1- Cement: 3-sand) and 8mm thick finishing coat of C.M. 1:1 (1- Cement: 1-Sand (bhogavo)) etc. complete.
v	Paint finishing	Providing, applying & finishing wall with weather proof exterior emulsion paint on wall surface (two or more coats) to give a required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials etc. complete.
20	Internal R.C.C. Roads	As per Crust design and MoRTH Specifications shall be followed for all items
i	Earthwork (As per MoRTH Specification Clause No. 301)	Excavation for road way in all strata for road work as per "L" section & detailed drawing and MoRTH Specifications Clause No. 301 with suitable mechanical means or manually as approved including cutting, sorting out the useful materials and loading in tippers, trimming bottom and side slopes, in accordance with requirements of lines, grades and cross sections, and transporting to the embankment location within all lifts and lead etc. complete as directed. Carting & disposing the surplus excavated stuff received from roadway cutting etc. from site of work to outside at suitable location with suitable means incl. loading, unloading, transporting and disposal the surplus excavated stuff with all required lead & lift etc. complete as directed.
ii	Sub-grade & Soil stabilization	Loosening, leveling, compacting and stabilization of the excavated road way supporting sub-grade and preparing the ground by loosening of the ground up to a level of 150 mm below the sub-grade level and including spreading, mixing & pulverized coarse sand (Zone-I) at work site brought from approved quarry including all required leads & lifts and all incidental charges, taxes, royalty etc. complete as directed (with excavated stuff) in place @ of 6.00 M3 per 100 M2 area by using a motor grader or suitable means as approved for soil stabilization, watering, grading and compacted in layers to meet requirement of table 300-2 of MoRTH for sub-grade construction. as per site condition as directed by the Engineer incl. leveling the ground to the required line, grade & profile by suitable means, watering and compacting with vibratory power roller to

Sr. No.	Description	Minimum Specifications
		achieve the desired compacted density etc. complete as directed.
iii	Sub-base Course (As per MoRTH Specification Clause No. 401)	Providing, spreading, mixing by mix in place, dressing & compacting Granual Sub-Base with Coarse Graded Material (Grading I) (Table: 400-2) having soaked CBR value not less than 30% brought from approved quarry located outside including all required leads & lifts, in a required compacted layers (each layers not exceeding 150 mm thickness) as per the drawings or as directed for construction of sub-base & side shoulder (As Per MoRTH Specifications Clause No.401) including spreading in uniform layer in such loose quantities that the thickness of each compacted layer should not be less than required compacted thickness of layers shown on the drawing on well prepared surface by using a motor grader, dressing, watering, mixing by mix in place method with rotavator at OMC, compacting with vibratory roller of minimum 80 to 100 KN static weight with plain drum or heavy pneumatic tyred roller to achieve the desired density at O.M.C. including filling the depression which occur during the process, all lead & lift, all taxes, royalty etc. complete as directed. Total thickness of GSB shall be 300 mm. minimum (i.e. 2 layers each having 150 mm compacted thickness)
iv	Base Course (As Per MoRTH Specification Clause No.404)	Layer of minimum 150.00 MM compacted thickness for Water Bound Macadam by mechanical means, Grading- I (Using screening crushable type such as moorum or gravel-Using Screening Type-A (13.2 mm Aggregate) (Providing, Laying, spreading & compacting stone aggregates of specific sizes in a following single compacted layers to construct the base of water bound macadam (As Per MoRTH Specification Clause No. 404) including spreading in uniform thickness, hand packing, rolling with vibratory roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening/binding material to fill up the intestines of coarse aggregate, watering and compacting to the required density, all required lead and lift, all taxes, royalty etc. complete as directed).
v	Dry lean Cement Concrete Base Course (As per MoRTH Specification Clause No. 601)	Construction of minimum 100.00 MM compacted thickness dry lean cement concrete Sub - base over a prepared sub - base/base of WBM with coarse and fine aggregate conforming to IS: 383, the size of coarse aggregate not exceeding 25 mm, aggregate cement

Sr. No.	Description	Minimum Specifications
		ratio not to exceed 15:1, aggregate gradation after blending to be as per table 600-1, cement content not to be less than 150 kg/ cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, laid with a paver with electronic sensor, compacting with 8-10 tonnes vibratory roller, finishing and curing incl. maintenance of Diversion, all required lead and lift, all taxes, royalty etc. complete as directed.
vi.	Surface Course (As per MoRTH Specification Clause No. 602)	Construction of minimum 200.00 MM thick (compacted) Continuously Reinforced Cement concrete Pavement in M - 30 Mix as per approved mix design over a prepared sub-base, with cement content as per approved mix design, course and fine aggregates conforming to IS:383, maximum size of course aggregates not exceeding 25 mm, mixed in a batching and mixing plant as per approved mix design, transported to site, laid with a fixed form or slip form paver, spread, compacted and finishing to lines and grades in a continuous operation as per drawing, surface texturing as per IRC - 15 & as approved including provision of contraction, expansion, construction and longitudinal joints, joint filler, separation membrane of impermeable plastic sheeting 125 micron thick as approved, sealant primer, joint sealant, deboning strip, dowel bar, tie rod, Super plasticizer admixture IS marked as per 9103-1999 @ 0.50 per cent by weight of cement as approved, finishing to lines and grades as per drawing & MoRTH Specifications including curing of concrete for 14-days, construction & maintenance of diversion, all required lead and lift, all taxes, royalty incl. cost of all materials & labours including cost of reinforcement (TMT bars Fe 500/Fe500D) required for pavement, joints of dowel, tie bars, expansion joints etc. complete as directed.
vii	Service Pipes for road crossing	Supplying & fixing RCC heavy duty non-pressure pipe of I.S. class NP3 with collars for SERVICE PIPE carrying heavy traffic as per I.S. 458 - 1991 specifications incl. setting & jointing the pipes in CM 1:2 including watering & laying (to level & slope) of I.S. class NP3 of 300 mm internal dia. as directed & as per detail drawing.
viii	Service Chambers	Constructing Service Chambers having inside clear dimension of 0.60 x 0.60 x 1.00 M depth as per given detailed drawing including 100 mm thk. P.C.C. 1:4:8 mix

Sr. No.	Description	Minimum Specifications
		(1-Cement:4 coarse sand, 8 M/c stone aggregate 20MM nominal size) - 330 MM thick brick masonry walls with heavy duty Precast R.C.C 100 MM thick Top slab of size 0.75 x 0.75 M in C.C. M - 200 (C.C. 1:1.5:3 - 1-Cement :1.5 coarse sand, 3 M/c stone aggregate 20MM nominal size) with handles, inside plastering 10 MM thick in Cement Mortar 1:4 (1 Cement - 4 Coarse sand) finished with a floating coat of neat Cement slurry and making bottom channels in 40 mm thk. Cement Concrete 1:2:4 mix (1-Cement : 2 coarse sand, 4 M/c stone aggregate 20 MM nominal size) finished smooth with a floating coat of neat cement incl. Providing and fixing 100 mm thk. R.C.C. coping on top of wall in C.C. M-200 incl. curing, testing, excavation etc. complete as directed.
ix	Kerb Stone (As per MoRTH Specification Clause No. 408)	Providing and fixing pre-cast concrete kerb stone of grey cement based concrete block 30 cm length, 30 cm height and 15 cm thick of M200 grade concrete as per approved design and including excavation for fixing in proper line and level, filling the joint with C:M 1:3 (1-cement : 3-fine sand etc. complete as directed & as per detail drawing.
21	Internal Paths / Paver block paving (other than RCC Road)	
i	Earthwork	---Do--- same as per item of RCC Road work
ii	Sub-grade & Soil stabilization	---Do--- same as per item of RCC Road work
iii	Sub-base Course	---Do--- same as per item of RCC Road work (But 3 layers instead of 2 layers)
iv	Surface course	Providing and fixing pre-cast Rubber Dye inter locking concrete block 80 mm thick with grade of concrete M350 pneumatic compressed by mechanically pressed and as per approved design including 75 mm sand layer for leveling and filling the joint with sand in proper line and level etc. complete. In front of shops (commercial) paver block paving must be provided and filling with hard murrum including rolling, watering, consolidating etc. completed as directed.

Sr. No.	Description	Minimum Specifications
22	Housing entry gate	Providing & Constructing of required No. R.C.C. Frame Structure Housing Entry Gate as per architectural & structural design of appx. Size - 6.0 mt. in height and 6.0 mt. in width inclusive of excavation of foundation, columns, masonry works, plastering, required & sufficient nos. of electric points with fixtures & fittings, finishing with weather proof exterior paint, Painting of Name Board of Housing scheme etc. completed as per detailed architectural and structural drawing & as directed / instructed by BMC officials.
23	Security Cabin - at each Housing entry Gate	Providing & Constructing of required Nos. R.C.C. Frame / Load bearing wall structure Security Cabin adjoining to Housing Entry Gate as per architectural & structural design of appx. 9.00 sqm. Carpet Area and 2.44 mt. clear floor height inclusive of excavation of foundation, columns, masonry works, internal & external plastering, doors & windows, required & sufficient nos. of electric points with fixtures & fittings, finishing with interior & exterior paint, etc. completed in ready to use in condition and as directed / instructed by BMC officials.
24.	Openable / Sliding Compound Gate - at Housing entry Gate	Providing & fixing of required Nos. of openable / sliding Compound Gate of appx. size 6.0 mt. in length and 1.52 mt. in height made out of RHS/SHS M.S. Pipe inclusive on 1 wicket gate of 1.22 mt. wide in each gate, arrangements of openable fittings & fixture, finishing with oil paint, etc. completed in ready to use in condition as per detailed architectural drawing & as directed / instructed by BMC officials.
25.	Cattle Trap	Providing & fixing of required Nos. of Cattle Trap of appx. Size - 6.0 mt. in length & 1.66 mt. in width of having 23 cm thk. RCC wall all around & 2 Nos. of RCC Beam of size 23 cm x 30 cm as per structure designs in ready mix conc. of M200 / M250 and providing and fixing 65 mm dia. G. I. Pipe of medium grade, 10 mm thk. M.S. plate, cleat etc. completed including of internal plastering, bottom IPS finishing, horizontal & vertical cement vata etc. in ready to use in condition as per detailed architectural drawing & as directed / instructed by BMC officials.
26	Letter box	Providing & fixing of required size of letter box at parking of each block / wing of building.
27	Numbering	The numbering of DU shall be printed on Acrylic plate of size 150x100 mm and fixed above the entrance door of each DU and block numbering of appropriate size shall be painted on each entrance of block as directed.

Sr. No.	Description	Minimum Specifications
28	Lift	8-person capacity lift shall be provided confirming to relevant BIS Code and façade shall be cladded with green marble slab at parking floor as per architectural drawing. Lift shall be automatic with gearless mechanism & without machine room. Lift shall be with Automatic Rescue Device.(For more detail refer detail specification)
29	Electrification	Concealed copper wiring. One fan point, two light points, and one plug point in each room. Also necessary point for Fridge, TV, Computer. In common passages of all floors, at terrace and in parking area light fixtures & fittings shall be provided by contractor as per detailed drawing & as directed.
a.	General electrification	Providing & fixing in position cupboard for electrical meters at parking fabricated from G.I. checkered net of approved gauge & shutters having fixtures and fittings for locking arrangement including of one coat of enamel primer and two or more coats of enamel paint of approved make & shade etc. complete as per detail drawing and as directed by engineer-in-charge. LED fittings & fixtures (minimum 10 Watt capacity) of approved make must be provided as per detail drawings in all common area like ground floor parking area, lift & stair landing area, lobby area of each floor, stair & machine room of lift, common toilets, pump room, electric room, security room, association office etc.
b.	Meter	• Provide Single Phase meter for Each Flat/Unit. • Provide Single Phase meter for each Shops. • One Three Phase meter for Lift, Lift Passage Light, Staircase Light, Foyer Light, Terrace light, Parking Light and Lift room Lighting as well as Lift Well Light for each Wing / Block. • One Three Phase meter for each Wing / Block for Water Supply Load. • One Three Phase Meter for Fire Pump. • Erection of one Three Phase meter for Street light, common area plot, Pump Room, Garden and Security Cabin, its location is finalized by BMC / Project Architect.
c	Conduits for electrical and Telecommunication cables	To be laid as per National Building Code / BIS standards and to be concealed mostly.
i	From meter location to DB	Use 2 wire 4 Sq.mm. Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in medium class Rigid PVC pipe and accessories

Sr. No.	Description	Minimum Specifications
		to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green color for earth continuity.
ii	From DB to Switch board	Use 2 wire 2.5 Sq.mm. Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in medium class Rigid PVC pipe and accessories to be erected in / on wall / ceiling with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green color for earth continuity.
iii	From Switch board to point	Use 2 wire 1.5 Sq.mm. Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in medium class Rigid PVC pipe and accessories to be erected in / on wall / ceiling with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green color for earth continuity.
iv	From DB to Power point (15A)	Use 2 wire 2.5 Sq.mm. Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in medium class Rigid PVC pipe and accessories to be erected in / on wall / ceiling with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green color for earth continuity.
d	Pumps	
i	For water supply network	3 phase open well horizontal mono block pump set of approved make with suitable LPM, head and suitable diameter of delivery pipe including of supplying & erecting approved make cable for pump to panel, motor control cubical panel [Star delta] made from 16G CRCA sheet duly epoxy powder painted inside and outside with hinged doors and locking with suitable size of ON - OFF isolator (AC 3 / 23 duty) main fuses. Digital volt and current meter (in a single unit) with micro controller based control unit and current sensing single phasing preventer electronic overload protection, over voltage (Programmable) protection and under voltage (Programmable) protection, prod less dry run protection programming facility for setting of all parameter like overload current, high voltage limit, low voltage limit, dry run limit with digital indication on seven segment LED display for any fault like over load, high voltage, low voltage, dry running single crimped, electronic star delta timer, feather touch start / stop push buttons to be erected on angle iron frame. Grouted on wall the contactors will be of L& T, Siemens, BCH make only)
	For FP 56	Total 4 Nos. (i.e. 1 no. for each block/wing) + 1 No. standby

Sr. No.	Description	Minimum Specifications
	For FP 60	Total 11 Nos. (i.e. 1 no. for each block/wing) + 2 Nos. standby
	For FP 68	Total 10 Nos. (i.e. 1 no. for each block/wing) + 2 Nos. standby
	For Commercial	Required nos. & capacity of above specifications
30	General	Efficient Rain Water harvesting network / system to be laid /installed. Environment friendly material (green) to be used as far as possible. Good landscaped are to be provided. Necessary signage boards of required size as instructed and society main board over all entry gate. Sufficient nos. of Precast benches within campus and common area, Slide, Swing-set, See-Saw, merry-go-round and other Children's playing equipment should be provided in children play area as per drawings.
31	Fire safety	As per requirement of approved design & as per CGDCR regulations / NBC Part IV & as per fire department of BMC
32	DG set (5 Nos.)	A. D.G. Set is meant to run emergency load. B. D.G SET should be suitable to cater the total load consisting of followings: (For each building) 1. One number of lift 2. One number of Water pump 3. Common lighting like passage, staircase, streetlight, parking, terrace etc. 4. 10% additional load of (1+2+3) above
	For FP 56	Continuous rating of 125 KVA, BHP not less than 154 BHP – 1 No.
	For FP 60	1. Continuous rating of 200 KVA, BHP not less than 254 BHP – 1 No. 2. Continuous rating of 160 KVA, BHP not less than 198 BHP – 1 No.
	For FP 68	1. Continuous rating of 200 KVA, BHP not less than 254 BHP – 1 No. 2. Continuous rating of 125 KVA, BHP not less than 154 BHP – 1 No.

Note: -

1. All above Items (size & make) shall approve by concern authority.
2. All utilities pipes shall be fitted on G.I. saddle clamps such that pipes should remain 50 mm away from wall.