



# Nagpur Metropolitan Region Development Authority

Project Section

II nd floor, NIT Complex, West High Court Road  
Gokulpeth Bazar, Nagpur- 440010.

No. E.E. (Project-II)/2123

Nagpur, Dated:-20.9.2021

## Detailed Quotation Notice

### Name Of Work:- Redevelopment of Deekshabhoomi Premised at Nagpur.

Nagpur Metropolitan Region Development Authority is declared as a Nodal Agency for carrying out the work of Redevelopment of Deekshabhoomi, Nagpur.

Metropolitan Region Development Authority invites sealed quotations on Item rate basis from Authorized Manufacturer / suppliers / dealers /Contractors for various items. The details of items are available in the office of Executive Engineer (Project-2), NMRDA, 2ND floor, NIT complex, West high court road, Opposite Sudama Theatre, Gokulpeth Market, Nagpur440010 during office hours and also on website-([www.nmrda.org](http://www.nmrda.org), [www.mahatenders.gov.in](http://www.mahatenders.gov.in)).

The rate should be quoted separately for each item.

### General Description

Item No.	Item Details	Apprx. Quantity	Units
	<b><u>CIVIL WORKS :</u></b>		
1	Providing and fixing double leaf panelled door shutter including teak wood first class frame with 460 x 150 mm thick as per detailed architectural drawing ( Enclosed) consisting panelled vertical styles 230 mm x 200 mm and top and bottom rail 235 mm x 200 mm, panels 50 mm thick country teak wood first class including vertical and horizontal styles with carving, engraving, and brass fixtures and fastening and T.W. beading at junctions of panel inserts with 3 coats of wood polish etc. complete in all aspects as per architect specifications / drawing and as directed by engineer in charge.	93.50	sqm
2	Providing, Fabricating, Assembling, painting, hoisting & erecting MS Built-up section/Tubular Structure (MS built-up section:-Rolled section & plates conforming to IS 2062 minimum required grade E250,Tubular Structure:- made from Steel hollow sections, ISI marked from SAIL / RINL / TATA/JINDAL conforming to IS 1161/4923/1239, minimum required Grade YST 240, in the profile shape as per drawings with special plate connector, pinion joints, Plates, hollow sections etc., required for all operations involved. The item shall be executed as per approved drawings and direction of the Engineer-in-Charge. The Tensile membrane should be Type II fabric make of Mehler Technologies or equivalent approved make having a minimum weight of 900 g/sqm, minimum tensile strength of 4300/4200 N/50mm and minimum tear strength 500/500N as per manufacturers specification with a 20 years warranty etc. over steel frames with all fittings and fixtures complete as per Drawing / Detail & as per technical specifications and as per the instructions of Engineer-in-charge.(Rate includes cost of fabric , shop drawings, patterning, forming, cutting, fabrication,	1044.59	sqm

	high frequency welding of fabric, Transport to the site, erection by machinery at any height, assembling and installation with GI cables, hardware, Aluminium flat, EPDM gasket and required accessories wherever required for all operations in all respect as per direction of Engineer-In-Charge). (Note :Actual Surface area of fabric shall only be measured for payment.)		
3	Providing & fixing 38 mm thick wood block flooring of first class teak wood laid over 25 mm thick leveling layer of cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 10 mm nominal size) coated with a thin layer of hot bitumen penetration 80/25 (blown type) @ 2.45 kg per sqm, including fixing blocks in position after dipping in hot bitumen (blown type) up to half depth, planed, levelled smooth and finished etc including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) as directed by engineer in charge .complete in all aspects as per architect specifications/ drawing and as directed by engineer in charge.	194.95	Square Metre
4	Stone work for flooring, etc. (by using 5axis Italian CNC machine +-1mm tolerance maximum), traditional work, figure work (below under mentioned type, thickness, any size) in Italian etc. for below mentioned items : Providing and laying 16 to 18 mm thick Italian Marble stone flooring , Perlato, Rosso verona, Fire Red or Dark Emperadore etc, mirror polished, laid in required pattern in linear portion of the building all complete as per architectural drawings, with 18 mm thick stone slab laid over 20mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with white cement slurry @ 4.4 kg/sqm, including pointing with white cement slurry admixed with pigment to match the marble shade including rubbing, curing and polishing etc including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use )complete in all aspects as per architect specifications/ drawing and as directed by engineer in charge.	953.09	Square Metre
5	Stone work for cladding, etc. (by using 5axis Italian CNC machine +-1mm tolerance maximum), (below under mentioned type, thickness, any size) in Italian etc. for below mentioned items : Providing and fixing 16 to 18 mm thick Italian Marble stone, Perlato, Rosso verona, Fire Red or Dark Emperadore etc., mirror/ eggshell polished , Marble stone work for wall lining (veneer work) including dado, skirting, risers of steps etc., in required design and pattern wherever required, stones of different finished surface texture, on 12 mm (average) thick cement mortar 1:3 (1 cement : 3 coarse sand) laid and jointed with white cement slurry @ 3.3 kg/sqm including pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing, polishing etc including rubbing, curing and polishing etc including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) complete in all aspects as per architect specifications/ drawing and as directed by engineer in charge.	218.41	Square Metre
6	Stone work for flooring, carving, moulding, cornices, string, courses etc. (by using 5axis Italian CNC machine +-1mm tolerance maximum), ornamental work, traditional work, figure work (below under mentioned type, thickness, any size) in Sandstone etc. for below mentioned items : Providing and fixing 40 mm thick rubbed white Shivpuri or Gwalior Sand stone flooring over 20 mm (average) thick base of cement mortar 1:5 (1 cement : 5 coarse sand) with joints 3 mm thick, side buttered with cement mortar 1:2 (1 cement : 2 stone dust) admixed with pigment to match the shade of stone and pointing with same mortar, etc complete including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ quality/moulding etc by exec. engineer is necessary before use ) in all aspects as per architect specifications/ drawing and as directed by engineer in charge.	81	Square Metre
7	Stone work for plain/design flooring, etc. (by using gang saw cut), (below under	3095.46	Square

	<p>mentioned type, thickness, any size) in Sandstone etc. for below mentioned items :</p> <p>Providing and fixing 40 mm thick rubbed white Shivpuri or Gwalior Sand stone flooring over 20 mm (average) thick base of cement mortar 1:5 (1 cement : 5 coarse sand) with joints 3 mm thick, side buttered with cement mortar 1:2 (1 cement : 2 stone dust) admixed with pigment to match the shade of stone and pointing with same mortar, etc complete including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) in all aspects as per architect specifications/ drawing and as directed by engineer in charge.</p>		Metre
8	<p>Stone work for cladding, etc. (by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), ornamental work, traditional work, figure work (below under mentioned type, thickness, any size) in Sand stone, etc. for below mentioned items :</p> <p>Providing and fixing Stone 30mm thick Shivpuri or Gwalior White sand stone for wall lining etc. (vener work) upto required height, backing filled with a grout of average 12 mm thick cement mortar 1:3 (1 cement : 3 coarse sand) including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade with secured to the backing and the sides by means brass cramps of required size &amp; shape in RCC/ CC / Brick masonry backing with cement mortar 1:2 ( 1 cement : 2 coarse sand), including drilling necessary hole for pins and fasteners etc complete in all aspects including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) in all aspects as per architect specifications/ drawing and as directed by engineer in charge.</p>	1031.29	Square Metre
9	<p>Stone work for cladding, carving, moulding, cornices, string, courses etc.(by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), ornamental work, traditional work, figure work (below under mentioned type, thickness, any size) in Sandstone, etc. for below mentioned items :</p> <p>Providing and fixing Stone work ashlar sunk Shivpuri or Gwalior White sand stone or moulded or sunk and moulded upto required level in cement mortar 1:6 (1 cement : 6 coarse sand) including pointing with white cement mortar 1:2 (1 white cement : 2 stone dust) with and admixture of pigment matching the stone shade, Triangular/ Square/ rectangular/ circular/ polygonal/moulding/ carving pillars, Applying breathable, non-reactive, antifungal, and water repellent Silane/ Siloxane chemical etc including rubbing, curing and polishing etc including transportation, loading, unloading, using mechanical equipments/machine, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) complete in all aspects as per architect specifications/ drawing and as directed by engineer in charge.</p>	835.14	Cubic Metre
10	<p>Stone work for cladding, carving, moulding, cornices, string, courses etc.(by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), ornamental work, traditional work, figure work (below under mentioned type, thickness, any size) in Sandstone, etc. for below mentioned items :</p> <p>Providing and fixing Shivpuri or Gwalior White sand stone work in capitol/copings, cornices, string courses and plinth courses, upto required thickness in Cement mortar 1:6 (1 cement : 6 coarse sand), including pointing with white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade, Applying breathable, non-reactive, antifungal, and water repellent Silane/ Siloxane chemical etc including rubbing, curing and polishing etc including transportation, loading, unloading using mechanical equipments/machine , stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) complete in all aspects as per architect specifications/ drawing and as directed by engineer in charge.</p>	944.61	Cubic Metre

11	<p>Stone work for cladding, etc. (by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), (below under mentioned type, thickness, any size) in Sandstone, etc. for below mentioned items :</p> <p>Providing and fixing Shivpuri or Gwalior White sand stone 30-40mm thick stone dry cladding upto required heights with of uniform colour and size upto or above 1mx1m, fixed with the help of fixing adjustable brass cramps of approved quality required shape and size adjustable with nuts, bolts, and washer( total weight not less than 260 gms) including making necessary recesses in stone slab, drilling required holes etc. and sealing the joints with approved weather sealant on walls at all heights, Applying breathable, non-reactive, antifungal, and water repellent Silane/ Siloxane chemical etc including rubbing, curing and polishing etc including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) complete in all aspects as per architect specifications/ drawing / design and as directed by engineer in charge</p>	11022.43	Square Metre
12	<p>Stone work for jali etc. (by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), ornamental work, traditional work, figure work (below under mentioned type, thickness, any size) in Sandstone etc. for below mentioned items :</p> <p>Providing and fixing stone Shivpuri or Gwalior White sand stone jali 40 mm thick throughout in cement mortar 1:3 (1 cement : 3 coarse sand), including pointing in white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment, matching the stone shade, jali slab with or without any chamfers, Applying breathable, non-reactive, antifungal, and water repellent Silane/ Siloxane chemical etc including rubbing, curing and polishing etc including transportation, loading, unloading, stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) complete in all aspects as per architect specifications/ drawing / design and as directed by engineer in charge etc complete in all aspects as per architect specifications/ drawing / design and as directed by engineer in charge.</p>	561.94	Square Metre
13	<p>Stone work for carving, moulding, cornices, string, courses etc. (by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), ornamental work, traditional work, figure work (below under mentioned type, thickness, any size) in Marble etc. for below mentioned items :</p> <p>Solid Marble stone</p> <p>Providing and fixing Solid Ambaji White marble stone work for Ashok Stambha including cladding, carving, moulding, cornices, string, courses etc. , ornamental work, traditional work, figure work (any type, any size any thickness) rubbing, curing and polishing etc including transportation, loading, unloading using mechanical equipments/machine , stacking, scaffolding ( For all heights), cleaning , fixing, joint filling, polishing, grinding, necessary lifting machinery, placing, etc. complete. (prior approval of sample/ brand by exec. engineer is necessary before use ) complete in all aspects as per Architect specifications/ drawing and as directed by Engineer in charge.</p>	9.03	Cubic Metre
14	<p>Stone work for flooring, etc. (by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), traditional work, figure work (below under mentioned type, thickness, any size) in Granite etc. for below mentioned items :</p> <p>Providing and laying in position flooring of telephone black /Amba White / Cat bary brown / Ruby red / Ocean Brown granite stone of approved shade and size 18 mm to 20 mm thick on bed 1:6 cement mortar including cement floats striking joints, pointing in C.M. 1:3 curing and cleaning etc. complete.</p>	5247.79	Square Metre
15	<p>Stone work for treads and risers of steps and staircases, etc. (by using 5axis Italian CNC machine <math>\pm</math> 1mm tolerance maximum), traditional work, figure work (below under mentioned type, thickness, any size) in Granite etc. for below mentioned items :</p> <p>Providing and fixing polished 18 mm to 20 mm thick telephone black / Amba White / Cat bary brown / RBI red / Ocean Brown granite stone for treads and</p>	244.67	Square Metre

	risers of steps and staircases of approved colour and shade with rounded moulding and three grooved line for the treads on bed of 1:4 Cement mortar including float filling joints with neat cement slurry curing polishing and cleaning etc. complete.		
16	<p>Waterproofing Treatment for Landscaping Decks</p> <p>Polyurethane based waterproofing system for podium and landscape decks</p> <p>Providing and Supplying single component Pitch Free PU ( Polyurethane Coating) @ 1.3 mm minimum DFT including Below mentioned steps</p> <p>1st Step Surface Preparation: RCC Surfaces must be clean, even and sound concrete. Remove all oil, dirt, laitance, protrusions(by light grinding) and other contaminants manually to attain a fairly smooth surface.</p> <p>2nd Step Crack treatment: Cutting and opening cracks to a depth of 10mmx10mm in V shape by mechanical means. cleaning all the dirt and loose particles by air pressure and wetting crack to attain SSD condition. filling the crack using Nitobond SBR Latex having specific gravity ranging from 1.015 to 1.040 @ 27 deg Celsius mixed in the ratio of 1(polymer):3 (cement ) maintaining W/C ratio to 0.35 to achieve thixotropic consistency . Product should be tested in accordance with BS 6319.</p> <p>3rd Step Bore Packing : Use Nitobond SBR or equivalent approved make as bonding agent over pipe and Internal side of concrete followed by filling high strength non shrink grout Conbextra GP2 in the gap around pipes up to 20mm (between pipe and concrete) before treating the surface with Waterproofing layer.</p> <p>4th Step Coving: Providing and applying Cement Mortar 1:4 admixed with Nitobond AR having 43% solid contents at the junction of slab and vertical offsets. Nitobond AR mixed cement mortar shows 75% improvement in adhesion (slant shear strength N/mm<sup>2</sup> as per BS 6319) than control samples.</p> <p>5th Step Waterproof coating : Providing and applying waterproofing treatment to sound, moisture free concrete surface using Nitoproof 600PF- manufactured by Fosroc Cheicals India Pvt Ltd. Nitoproof 600 PF or equivalent approved make is liquid applied single component pitch free polyurethane coating capable of bridging substrate cracks upto 2 mm. It shall be applied in two coats at coverage rate of 2.25kg/sqm to a achieve a minimum DFT of 1.3 mm Or WFT of 1.5 mm. The membrane formed shall confirm to following minimum properties:</p> <p>i) Elongation : &gt;400% as per ASTM D 412</p> <p>ii) Tensile Strength : 2.5 N/mm<sup>2</sup> as per ASTM D 412</p> <p>iii) Adhesion in-peel test : &gt;50 N as per ASTM C- 836</p> <p>iv) Recovery from 350% elongation : 95% as per ASTM D 412</p> <p>v) Water Vapour Transmission 2.3mm film: 0.6 g/m<sup>2</sup>/hr</p> <p>vi) Initial Hardness Shore A : min 60 as per ASTM D 2240</p> <p>vii) Root resistant : protection screed required</p> <p>Membrane Termination shall be done 300 mm above FFI by providing a groove cut of 15mm x 15mm &amp; filling it with elastomeric sealant like Nitoseal PU40 of fosroc or equivalent approved make.</p> <p>System includes supply , application and termination of coating all complete as per manufactured specification methodology or as per direction by engineer-in-charge complete.</p> <p>6th Step Separation layer : Providing and installing minimum 150 GSM non-woven geotextile membrane over the finish waterproofing treatment prior to protection screed. Geotextile to be overlapped for 100 mm and spot stuck with adhesive/hot air gun</p> <p>Laying of Protection screed of average 50 mm thick in slope using M20 grade concrete over geotextile as per recommendations (screed concrete to be paid separately)</p>	781.44	Square Metre
17	Re-plantation of Trees of various girth sizes including digging out the tree from roots, cutting and disposing extra branches, transporting the tree to the place of plantation, necessary excavation, watering , refilling, labour, machinery etc as directed by engineer in charge and maintaining the transplanted tree till well established by watering , weeding , stirring the soil and clipping if necessary and maintaining for 6 months etc complete.	100	JOB
18	Salvage value of the scarp material obtained from dismantling of existing structure/ buildings in the premise of Dheekshabhoomi including dismantling of	1	Job

	all existing structures, disposing of all scrap material obtained from site by removal of debris including all lifts , leads, labour, machinery, loading ,unloading , transportation of scrap material/ debris and as directed by engineer in charge		
19	Providing and applying fibre reinforced elastomeric liquid water proofing membrane with resilient acrylic polymers having Sun Reflectivity Index (SRI) of 105 on top of concrete roof in three coats @10.76 litre/ 10 sqm. One coat of self-priming of elastomeric waterproofing liquid (dilution with water in the ratio of 3:1) and two coats of undiluted elastomeric waterproofing liquid (dry film thickness of complete application/system not less than 500 microns). The operation shall be carried out after scrapping and properly cleaning the surface to remove loose particles with wire brushes, complete in all respect as per the direction of Engineer-in-Charge.	3645	sqm
20	Providing and laying Cast in situ/Ready Mix cement concrete in M-30 of trap/granite/quartzite/gneiss metal for R.C.C. pardi of required thickness including steel centering, formwork, cover blocks, laying/pumping, compacting and roughening the mif special finish is to be provided and curing complete. (Excluding reinforcement and structural steel). With fully automatic micro processor based PLC with SCADA enabled reversible Drum Typemixer/concrete Batch mix plant (Pan mixer) etc. complete. With fine aggregate (Crushed sand VSI Grade)	1820	cum
21	Supply and fixing of 20 gauge Stainless Steel plates of grade 304 engraved with approved matter writing all complete as per sample approved and fixed with two rawls plugs stainless steel srew/ double side tape of 3M or approved equivalent make make required nos of holes, wherever required complete as per direction of Unit Incharge.	2103222	Sq. cm
22	Supply and fixing of emergency sign boards size of required size made out of 3 mm thk acrylic sheet/ Sun boards/ ACP sheet Green/ Red Colour Glow Night Tape pasted on sheet with single side writing with fixing on wall, fixed with stainless steel srew/ double side tape of 3M or approved equivalent make required nos of holes, wherever required complete as per direction.	1046901	Sq. cm
23	Providing and fixing 12 mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & spring type fixing arrangement and making necessary holes etc. for fixing required door S.S 304 Grade fittings ISI standard fittings (Door handle, lock and stopper, Pivot, floor sping (appox 100 to 120 kgs) , lock etc. complete in all aspects as per manufacturer / architect specifications and as directed by engineer in charge.	44.10	Sqm
24	Providing and fixing 12 mm thick frameless toughened glass partitions of approved brand and manufacturer, including providing and fixing partitions at top & bottom with aluminum channel etc. with necessary S.S 304 grade ISI standard fittings and fixtures etc. complete in all aspects as per manufacturer / architect specifications and as directed by engineer in charge.	226.25	sqm
25	Supply and fixing of TRACDEK Double Skin Insulated roofing system comprising external sheet of TRACDEK Klippon profiled sheeting 406 mm cover width, 41 mm crests @ 203 mm c/c manufactured out of 0.58 mm TCT (total coated thickness) SMP coated Galvalume (275 Mpa yield stress) steel. The sheet shall have wide pans with stiffening ribs for effective water shedding and special male/ female ends on side-laps for purlin support and anti-capillary flute in side lap. The sheet shall have a hot-dip metallic coating of zinc aluminium alloy coating mass total of both sides, AZ-150 as per AS-1397 ) having 275 Mpa yield stress. The sheet shall be coated with exterior coat of Silicon Modified Polyester paint, 20 microns top coat applied over 5 micron primer and conversion coat and a 5 micron polyester back coat. The external sheets shall be fixed to G.I sub-girts with clips and no fasteners to penetrate the sheeting. The clip should lock over the male rib and into the underside of the centre and female ribs and shall be fastened to support with wafer-head self-drilling zinc-coated fasteners. The internal sheeting shall be TRACDEKHi-Rib profiled sheets manufactured out of 0.50 mm TCT SMP GALVALUME Hi-Tensile Steel (150gsm, zinc aluminum alloy coating mass total of both sides,AZ-150 as per AS-1397 ) having 550 Mpa yield strength. The sheet	194.95	sqm

	shall be coated with exterior coat of Silicon Modified Polyester paint, 20 microns top coat applied over 5 micron primer and conversion coat and a 5 micron polyester back coat. The sheets shall have 1020 mm cover width, 28-30 mm high crests at 250 mm wide pans with special male/female side-laps and anti-siphoning feature to prevent leakages. The pan shall be stiffened by using 3 small ribs. The Sub-Girts Of Size 50mm X 50mm X 50mm X 1.6mm Manufactured Out of 18(G) G.I. ' Z ' Shape would be fixed to Inner liner on face Side at Purlin Locations by means of Galvanised Self Drilling self tapping fasteners thru the crest. An Insulation of 50mm thick glass wool insulation 16 Kg/M3 - Density wrapped in polythene bags shall be laid over the internal sheeting and G.I. sub girts are held between the external and internal sheets. The sheets shall be supplied in lengths maximum upto 6 - 12 metres to suit site dimensions Flashing, Cappings and Ridges manufactured out of same materials of rate in same thick as mentioned above in standard lengths of 2.5 Mtr and fixed by means of hex-head self drilling stitching screws etc complete including all fixing fixture, labour, machinery, etc. needed for finishing, erecting at any height as per drawing and as per direction of engineer in charge.		
26	Rebaring of various dia. of TMT bars of required depth and dia. Wise drilling size by Hilti rebar grouting method and refilling by RE-500 Chemical of required quantity including all necessary equipment and as directed by Engineer-In-Chrg etc. complete.(Including staging) :-		
i )	8 mm dia 100 mm deep	200	Nos
ii )	10 mm dia 100 mm deep	200	Nos
iii )	12 mm dia 125 mm deep	200	Nos
iv )	16 mm dia 160 mm deep	200	Nos
27	Providing and fixing mild steel framework with dsign of cast iron ( Weight of M.S =65 Kg / Sqm + Weight of CI =30 Kg/ Sqm as per detailed drawing and design provided by the project consultant / Architect including all fixtures necessary ,welding ,transportation, loading unloading installation with hydra and similar equipments fixing done with hilti make HRD C Anchor bolts comprising of polyamide PA6 Grade sleeve and coated anti corrosive primer and two coats of oil painting etc complete as approved by engineer consultant/ Engineer- in charge MS gate with CI (65+30 ) KG / SQM P/F Mild steel grill work with coat iron casting ( 50 kg/Sqm ) etc complete in all aspects as per architect specifications/ drawing / design and as directed by engineer in charge	68.74	Square Metre
28	Providing and fixing stainless steel ( Grade 316) ladder, staircase railing and similar works made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the ) ladder, staircase railing and similar works with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor with suitable arrangement as per approval of Engineer-incharge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	450	Kg
29	Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured). Suspended floors, column, roofs, landing, beams and balconies (Plan area to be measured)	2175	sqm
30	Removing rich mix cement concrete with saw cutter including loading, unloading, scaffolding (for all heights), stacking the spoil as directed with all leads lifts, necessary machineries (Hydra etc.) complete spec. no : as directed by Engineer Incharge/Project consultant. By machine removing rich mix concrete in saw cutter, Below plinth	25	cum
31	Removing rich mix cement concrete with saw cutter including loading, unloading, scaffolding (for all heights), stacking the spoil as directed with all leads lifts, necessary machineries (Hydra etc.) complete spec. no : as directed	40	cum

	by Engineer Incharge/Project consultant. By machine removing rich mix concrete in saw cutter, Above plinth		
32	Making core by Demand headed core cutting machine of 73mm, 100mm dia and 150mm dia upto various depths including all required staging, anchorage & machine mounting, scaffolding etc. complete spec. no. as directed by Engineer Incharge/Project consultant. 75mm dia, 100mm dia, 150mm dia		
a )	75mm dia-230mm to 1000mm depth	60	Nos.
b )	100mm dia-230mm to 1000mm depth	40	Nos.
ci )	150mm dia-230mm to 1000mm depth	30	Nos.
	<b>PLUMBING WORKS :</b>		
33	Providing and fixing cast brass twin coat hooks fixed to PVC rawl plug with SS screws , including all fittings complete in all respect.	33	each
34	Providing and fixing Perfume Dispenser, including all fittings complete in all respect.	33	each
35	Providing and fixing fully automatic soap dispenser, including all fittings complete in all respect.	59	each
36	Providing and fixing C.P. brass 15 mm nominal bore bib cock Jaquar cat. FLR-5047N or Equivalent model of Kohlar/Roca.	40	each
37	Providing and fixing fully automatic Hand dryer Euronics Model-EH 26 NW or Equivalent model of Kohlar/Jaquar ,including all fittings complete in all respect.	12	each
38	Providing and fixing Thermoflex or Kaiflex Make thermal insulation tubing, a elastomeric flexible material having hermetic blister closed cell structure of expanded synthetic rubber over pipes of following nominal bores and thickness including protection by wrapping with 24 gauge aluminium sheet with riveted screw joints all required accessories complete as per specification. 13 mm thick	8	each
i )	For 20 mm dia Pipe	30	Metre
ii )	For 25 mm dia Pipe	245	Metre
iii )	For 32 mm dia Pipe	135	Metre
iv )	For 40 mm dia Pipe	285	Metre
39	Supplying breaker machine with operator and fuel including any repair occur to machine while working should be responsibility of the supplier, all the saftety measures and insurance of machine and operator will be the responsibility of the supplier. Rate will be on per day basis and working will be of 8 hours including lunch and tea break of one hour.	20	Days
40	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete :For pipes 250 to 300 mm diameter	1	each
41	Storm Water Drainage System Constructing bricks masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design : With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	175	each
42	Extra for depth beyond 60 cm of brick masonry chamber For 500x450 mm size With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	17	Metre
43	Providing & fixing of Pop-up ROTOR sprinkler having variable adjustable arc (50 to 360 degree) nozzle capable of covering 4.9 - 14 mtr at 2.5 kg/cm2 with discharge rate of 0.02 to 0.891 LPS. the rotor body, stem, nozzle, and screen shall be constructed of heavy duty , ultraviolet resistan plastic with small exposed cover along with SJ712, 3/4" Pop up connecting four elbow swing joint assembly. The fittings shall be made of UV resistant thermo plastic and service saddle of varying material Polypropylene.	42	each
44	Providing & fixing of Rotatory Pop up having colour coded Rotator nozzle with	20	each



	multiple stream water spray capable of covering 2.5m- 10.7m at 2.5 kg/cm <sup>2</sup> with Matched Precipitation Rate, Discharge rate of 0.08 to 0.40 LPS. The Spray Head body shall be constructed of heavy-duty, ultraviolet resistant plastic and stainless steel spring with multifunctional wiper seal with small exposed cover along with SJ-512, 1/2" Pop up four elbow swing joint assembly. The fittings shall be made of UV resistant thermo plastic and service saddle of varying size of material Polypropylene.		
45	Providing and fixing Drip Line 16 mm LLDPE pipe with Required Drippers at Spacing 500 mm C?C and Accessories such as joiners, Tees, Elbows, End cap, clamps etc. complete	600	metre
46	Providing and fixing of Automate/Equ. PVC Ball Valve, Security Pivot to Maintain Lever in space, double Water tight joint, direct injection stem non mechanical, with a base which permits maximum penetration in to the valve.		
a )	20 mm size	8	each
b )	50 mm size	10	each
c )	63 mm size	6	each
47	Providing and fixing of double acting 1" air release valve shall be capable of both releasing and admitting air from and in to the line. The working pressure shall be 5 kg/cm <sup>2</sup> , including service saddle and riser assembly.	1	each
48	Providing and fixing of 12" rectangular valve box with green lid and corrugated structure with unique shovel access slot and bolt hole knockout.	16	each
49	Providing and fixing of Rain Bird/Hunter/Automat make 6" Round box with openable greenlid and corrugated structure with unique shovel access slot and bolt hole knockout.	8	each
50	Providing and fixing of Brass Quick Coupling Valve 3/4" made up of solid brass with locking cover corrosion resistant and stainless steel spring, including service saddle and riser assembly including brass key threads in to top of QCV to provide water access and brass swivel elbow.	15	each
51	Providing and fixing of Disc Filter with capacity matching pump design flow having an suitable inlet connections, to create a helical effect in the incoming water, spinning particulate in suspension away from the flitting element and so minimizing cleaning frequency, 3/4" outlet for flushing at bottom of filter & maximum working pressure of 10 Bars, with pressure gauge.	1	each
52	Providing and fixing of mono bock or open well submersible pump set 2/3 HP of having discharge 3 LPS @ 38 m. head.	1	each
53	Providing and fixing of control panel suitable for pump set having panel box and fixed along with following accessories - Starter , start/ stop push buttons, ammeter, Voltmeter, indicating lamps, MCB, with cable etc.	1	each
54	Providing and fixing of Pressure Relief Valve all complete as directed by Engineer-in-charge..	1	each
55	Providing and fixing 100 mm dia Centrifugally cast (spun) Iron S&S pipe as per IS: 3989 soil, waste and vent pipes of including all fittings suitable for same pipes ie. Plain & door bends, junctions (tee), terminal guards, collars etc as required, GI pipe supports, GI clamps with EPDM rubber of pipes & fittings jointed with lead joints, painting of pipes & fittings with two or more coats of Syntetic enamel paint as directed by Engineer-in-charge.	415	Metre
56	Providing and fixing of 100 mm inlet and 100 mm outlet Centrifugally cast (spun) Iron S&S as per IS: 3989 P-trap of self cleansing design of with G.I. inlet fitting with 1 or 2 inlets fabricated from 100 mm dia G.I. pipes and welded G.I. sockets fixed to C.I. trap with lead caulked joint, GI Pipe & GI Fittings including 125x125 mm stainless steel tile grating of Chilly/Camry Make, including cost of cutting and making good the walls and floors.	48	each
57	Providing and fixing of 100x50 mm GI Reducing elbow Floor Drain of including 125x125 mm stainless steel tile grating of Chilly/Camry Make fix in floor with cement mortar.	14	each
58	Providing and fixing cast brass clean out plug of with suitable insert keys for opening, male threaded joint with 100 mm dia. GI female threaded socket caulked to CI pipe including cost of Lead or Other Joint. 100 mm dia	3	each
59	Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1mx1mx400micron, finished with 12mm cement	45	each

	plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet & inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams complete.		
	<b>SIGNAGE WORKS :</b>		
60	Supply & fixing of Retro reflective signboard made out of 3mm thick Aluminum composite panel with face fully covered with retro reflective sheeting of single side of approved shade and make. the letters and graphics of signboard shall be electrocut by plotter cutter in another retro reflective sheet retro reflective approved shade and make .the signboard should be fixed on wall, complete all as specified.	83.61	Sq. m
61	Supplying & fixing of retro reflective sign board of size 900 mm x 600 mm. The board made of High intensity prismatic grade type IV retro reflective sheeting as per I.R.C. / M.O.S.T. with message and graphics to be overlay film of same make duly plotter cut, letters written (both sides) in white colour, to be pasted on 3mm thick ACP sheet.The back side of frame shall be covered with 3mm ACP sheet..the signboard should be fixed and riveted on a support frame of 38 mm x 16 gauge dia ,stainless steel and post of 75 mm x 2 Nos, 16 gauge dia stainless steel pipe fixed with a foundation of 30 x 30 x 50 mm cement concrete. as specified and approved complete all as specified.	20	each
62	Supplying & fixing of retro reflective sign board of size 1200 mm x 900 mm. The sign board made of High intensity prismatic grade type IV retro reflective sheeting as per I.R.C. / M.O.S.T. with message and graphics to be overlay film of same make duly plotter cut, letters written (single side) in white colour, to be pasted on 3mm thick ACP sheet. The backside of frame shall be covered with 3mm ACP sheet. Frame made of 40mm dia pipe & 2 no 63mm diavertical posts 16 gauge dia stainless steel pipe fixed with a foundation of 30 x 30 x 50 mm cement concrete. as specified.	5	each
63	Supply & fixing of Retro reflective sign board of size 1800 mm x 1200 mm.The sign board made of High intensity prismatic grade type IV retro reflective sheeting as per I.R.C. / M.O.S.T. with message and graphics to be overlay film of same make duly plotter cut, letters written (both sides) in white colour, to be pasted on 3mm thick ACP sheet. The backside of frame shall be covered with 3mm ACP sheet. Frame made of 40mm dia pipe & 2 no 63mm diavertical posts 16 gauge dia stainless steel pipe fixed with a foundation of 30 x 30 x 50 mm cement concrete. as specified.	3	each
	<b>ELECTRICAL WORKS :</b>		
	<b>FITTINGS</b>		
64	Supply, installation, testing and commissioning of Trimless Flush Mounted Profile for grazing effect IP67 ( customized as per site conditions) with a flex of 21.6W/m 140XSMD LED/m of Lumen output 2100lm/m dividable per 50mm ,with a McAdam Step 3 and efficacy of 97lm/W including 24V DC power supply Make : Delta Catno: Femtoline25/Erco/Kreon	500	Each
65	Supply, installation, testing and commissioning of trimless floor upright with narrow optics of 20deg with a recessed depth 100mm, 7W 774lm including of all mounting accessories CRI>90 ,colour temp (+3000K) warm white and an efficacy of 116lm/w at source (IP 67) Make: Delta Light Cat no Logic RA 93020 ANO/Erco/Kreon	325	Each
66	Supply, installation, testing and commissioning of floor mounted IP55 cylindrical Bollard of 250mm Dia and 210 mm height ,CRI>80,+3000K CCT 840 Lm and efficacy 133Lm/W inclusive of Power supply. Make : Delta Light Cat no Montur R P 20 LED/Erco/Kreon	35	Each
67	Supply, installation, testing and commissioning of pole/surface mounted LED floodlight suitable for Polesano ,360 deg adjustable including 16X flood lens 43	52	Each

	deg ,CRI>80 colour temp 3000K with 42W ,4500 Lumens with an efficacy of 107 Lm/W IP66 ,Class 2 complete erected in position as per specification. Make Delta light Cat no: Polesano 830 MEdium N-B /Kreon/Erco		
68	Supply, installation, testing and commissioning of floor mounted spike light with white LED 6.4W ,600lm ,CRI>90 with 30deg lens including all mounting accessories and 350mA DC ,IP55 and power supply Make : Delta Light Cat no KIX M Pin/Kreon/Erco	506	Each
69	Supply, installation, testing and commissioning of Ceiling mounted LED light with Opal glass diffuser ,Black Finish and 6.3 W ,840Lm,CRI>80 and IP65 fixture including 350mA DC power supply , efficacy of 133lm/w ,Class 1,color temperature 3000K Warm white complete erected in position as per specification. Make : Delta Light Cat no Montur R LED WW /Erco/Kreon	90	Each
-+	FITTINGS		
70	Supply, installation, testing and commissioning of IB LED ICBW02-20Watt or equivalent (IP 65) complete erected in position as per specification.	10	Each
71	Supply, installation, testing and commissioning of 10.4W non adjustable down light with depth 55 mm, CRI>90 ,3000K CCT , Lumen 1075 lm with a 33 deg clear PC reflector including LED POWER SUPPLY 350-500mA-DCand an efficacy of 110 lm/W Make: Delta Cat no Reo X /Erco /Kreon	14	Each
72	Supply, installation, testing and commissioning of 6m Delta Light Pole with a net weight of 27 KG IP54 powder coated with Qualicoat - Seaside quality label complete erected in position as per specification. Make: Delta Light Cat no : Polesano/Kreon/Erco	8	Each
73	Supply, installation, testing and commissioning of Floor surface mounted spotlight with 16.8 W ,1995 Lm and a 11 deg reflector ,CRI>90 IP 65 ,efficacy of 122lm/W color temp +3000K Warm white includng 500mA DC Power Supply complete erected in position as per specification. Make : Delta Cat no : Kix HP 93011 N /Kreon/Erco	15	Each
74	Supply, installation, testing and commissioning of boundary wall light IP 65 rated specialized light with symmetric 360degree crook fittings complete.	50	Each
75	L.T. SWITCH PANEL BOARDS Supply, installation, testing and commissioning of MAIN LT PANEL : Incomings:1 Nos. 630Amp 4 Pole MCCB's (Ics=25KA upto 433V)CT's of ratio 600/5Amps 1 Set Digital type ammeter (0-600Amp) and Voltmeter (0-500V) with selector switch - 1 Set .BusBars:TPN aluminium bus bars of minimum of 800 Amps capacity with heat shrinkable coloured sleeves and I/c DMC/SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc.Outgoings:4 Nos. 100Amp TPN MCB's (Ics=10KA upto 433V)2 Nos. 250Amp TPN MCB's (Ics=10KA upto 433V)6 Nos. 63Amp TPN MCB's (Ics=10KA upto 433V)2 Nos. 40Amp TPN MCB's (Ics=10KA upto 433V)3 Nos. 25Amp TPN MCB's (Ics=10KA upto 433V) 3 Nos. 25Amp TPN MCB's (Ics=10KA upto 433V)	1	Set
76	Supply, installation, testing and commissioning of distribution panel Incomings:1 Nos. 100Amp 4 Pole MCCB's (Ics=25KA upto 433V)CT's of ratio 100/5Amps 1 Set Digital type ammeter (0-100Amp) and Voltmeter (0-500V) with selector switch - 1 Set. Bus Bars:TPN aluminium bus bars of minimum of 200 Amps capacity with heat shrinkable coloured sleeves and I/c DMC/SMC bus bars supports at required intervals complete for cross section, size supports & their spacing etc. Outgoings:10 Nos. 63Amp TPN MCB's (Ics=10KA upto 433V)4 Nos. 63Amp TPN MCB's (Ics=10KA upto 433V)6 Nos. 63Amp DP MCB's (Ics=10KA upto 433V)	3	Set
	<b>CCTV</b>		

77	SITC of Outdoor Bullet/BOX Camera:Supply of 5MP Bullet camera Total sensor pixels 5MP 2592*1944@25/30FPS, Built-in/external 850nm IR illuminator intensity adjustable with 50meter viewing distance, Fully configurable triple streaming with minimum 3 streams should be configure at h.265,Color 0.5lx, Mono 0.05 lx, With IR 0.0 lx, 120dB WDR AS PER IEC62676-PART5 , True day/night, Electronic shutter, DNR, BLC, defog, Privacy Masking- Four independent areas, fully programmable, Full duplex / half duplex Audio Streaming, Varifocal 9 to 22 mm lens auto zoom and focus, Micro SD card slot with minimum 512GB , three layer Password protection, HTTPS, TLS1.2, AES256 Bit encryption, camera temp support minimum +60deg c ,ONVIF Profile S, IP67, IK10, CE, FCC,NDAA, UL Certified. Camera shall support analytics Line crossing, Enter field, Follow route, Loitering, Removed object ,object counting, Approved Makes: Axis/Bosch/ Pelco/Avigilon/Mobotix	105	Nos.
78	SITC of Outdoor PTZ Camera: Supply, installation, testing and commissioning of 1080p HD IP outdoor PTZ Cameras with 1/3" or better progressive scan Exmor CMOS , 1920 (H) X 1080 (V); @60fps, 2 MP or better, 30 X optical Zoom (4.3~4.5 mm -129~135 mm) , 12X Digital Zoom, Minimum illumination Sensitivity- Color 0.05 lx , B/W : 0.01 Lx , WDR Min 90 as per IEC62676-PART 5 , Dynamic Noise Reduction, Backlight compensation BLC , Fully configurable triple streaming with minimum 3 streams should be configure at h.265, White Balance, Mechanical Switchable IR filter , PAN Range 360 Degree continuous, Tilt Range +15 to -90 degree, PAN/TILT Modes- PAN preset 240 Deg / s, Tilt preset 120 deg / S, Presets 256 , Tours , Audio 1/1 Channel In/Out , Micro SD card slot with minimum 512GB , three layer Password protection,HTTPS,public key infrastructure, encryption TLS1.2,AES256 Bit encryption, 24 individually configurable privacy masks, Alarm inputs/ outputs -1/1 , IR Distance 150 meter (360 deg rotation) without loss of any details , Dual Power option (POE -Power on Ethernet +, AC) , IP-66 , IK10, ONVIF Profile S, G,T, camera support minimum operating temperature with IR +60deg c,CE , UL Certified ,NDAA with all mounting accessories. motion detection and camera tampering analytics Approved Makes: Axis/Bosch/ Pelco/Avigilon/Mobotix	13	Nos.
79	Supply, installation, testing and commissioning of Storage and VMS Software:Supplying, Installation, Testing & Commissioning of Server/storage based video management System Software for license of min 120 camera for viewing and recording expandable upto 128 cameras and shall be of same camera OEM, minimum and 2 client workstation , Support VMS client for live and playback, Support Remote Access, ,VMS shall have the capability to change the resolution and fps on recorded video to increase storage capacity, FIPS140-3 Encryption, complete in all respects as per specifications.Supply, installation, testing and commissioning of RAID-5 protected (standard configuration), all-in-one video management solution for up to 128 channels, dual port Gigabit Ethernet network interface,16 GB system memory an Intel Xeon 4210,Processor, 96 TB Gross capacity storage type 12 Trays: 3.5-inch SATA, 8TB HDD, supports minimum 450 mbps bandwidth, Microsoft Windows Storage Server 2019,iDRAC, NVIDIA Quadro 2GB Grpahic card, 4*mini display portApproved Makes: Axis/Bosch/ Pelco/Avigilon/Mobotix	1	Lot
80	Supply, installation, testing and commissioning of Industrial Grade Layer 2 Switch with 16 PoE Port and 2 optic fiber ports with suitable wall mount rack. Approved Makes: Cisco/D-Link/TP Link	8	No.
81	S/I/T/C of 42 U Floor mountable Equipment rack with openable door and power strip suitable for controlequipment's. Along with inbuilt Fire Suppression system with following specifications..... 3.0 Ltr Cylinder with Valve, Agent (Novec 1230),Master Kit comprising of Solenoid Actuator with manual	4	No

	override, Discharge hose, Pressure gauge, Connectors, Cylinder support straps, Discharge pressure switch, Power Supply Unit, Control Unit, Display Unit, Multisensor detectors (2 nos), Time delay, Harness & Connectors. Nozzles (2 Rack discharge).		
82	Supply, installation, testing and commissioning of Pole For Mounting of PTZ camera	4	Nos.
83	Supply, installation, testing and commissioning of Client Computer Supply, installation, testing and commissioning of PC with Operating system Windows 8.1 (64-bit, Professional or Enterprise) Windows 10 (64-bit, Professional or Enterprise, patched with Anniversary, CPU Intel Core i7 4770 3.4 GHz (up to 3.9 GHz) RAM 8 GB, Free disk space Minimum 3 GB for Single Site Systems, Minimum 5 GB for Enterprise Systems, Network card 1000Base-T and supported upto 4 Graphics Card with 21" or higher professional monitor (1920x1080 or higher resolution) Approved Makes: HP/Dell/IBM	1	Nos.
84	Supply, installation, testing and commissioning of Monitor Supply, installation, testing and commissioning of 42" LED Monitor Complete with Wall mounting kit Approved Makes: Sony/Panasonic/ LG	4	Nos.
85	Supply, installation, testing and commissioning of Industrial Grade Layer 3 Switch with 16 PoE Port and 16 optic fiber ports with suitable wall mount rack. Approved Makes: Cisco/D-Link/TP Link	1	No.
86	Supply, installation, testing and commissioning of unarmored 12 core single mode OFC as per tender specification	1800	Mtrs.
87	Supply, installation, testing and commissioning of OFC accessories like 24/36 Port LIU24, Splice trays, Loaded Adaptor and Blank Plates, UTP and Optical Patch Cords, pigtailed etc. as per schematic and system design of tender specification	1	Lot
88	SITC of Armoured 3x1.5 sq mm Power Cable	1800	Mtrs.
89	Supply, installation, testing and commissioning of 9U Wall mount rack with power strip MS Powder coated acrylic door.	1	No.
<b>GROUND SOUND SYSTEM</b>			
90	Supply of Dual 12" Two-Way Weatherised Vertical Line array Speaker (IP 55 rated or better) with a Frequency Response (-3dB):- 100-14KHz & Long Term Power Handling of >= 600W. Power Taps @100V : 150W, 300W, 600W. The Loudspeaker should have a Sensitivity (1W/1m) of 105dB with Max. SPL of >= 139dB peak. OEM Mounting Grid included.	16	Each
91	Supply, installation, testing and commissioning of Video wall complete with Video Processor and cabling Led Screen Details Led Pitch = P-10, (smd-rgb) Led Screen Type = RGB - Full Color Dimensions = 12 (Height) x 20 (Width) Feet, Total Feets = 240 sq feet, Luminance = 6000 - 7000 Nits, Led Type = Outdoors, IP65, chipset = EPISTAR - Taiwan, Power Supply = 5V, 190-124v, constant current, Scan = Constant Scanning mode Led Screen Details Led Pitch = P-10, (smd-rgb) Led Screen Type = RGB - Full Color Dimensions = 12 (Height) x 20 (Width) Feet, Total Feets = 240 sq feet,	3	No

	Luminance = 6000 - 7000 Nits, Led Type = Outdoors, IP65, chipset = EPISTAR - Taiwan, Power Supply = 5V , 190-124v, constant current, Scan = Constant Scanning mode		
92	Supply, installation, testing and commissioning of Digital Signal Processor with 2 x XLR IN, electronically balanced audio input,6 x XLR OUT, electronically balanced audio output with 2 x XLR Thru out ,and 1x XLR AES/EBU IN digital input,with Nominal Input Voltage:1.23V / +4 dBu, maximum output voltage:8.7V / +21 dBu,input impedance :10k Ohm,CMR:-80dB@1kHz,A/D &D/A conversion :24 bit sigma delta,THD+N<0.01%.	1	Each
93	Supply, installation, testing and commissioning of Dual/Four channel power amplifier with inbuilt DSP, Max Midband Output Power >=900W @ 8 Ω; >=1700W @ 4 Ω &>=2500W @ 2 Ω,Max Bridged Output Power>=6000W @ 4 ohms,70 V & 100 V Operation,Frequency Response, ref. 1 KHz: 10Hz - 21 KHz (±1dB), THD:<0.05%, Max input level >= +21 dBu, input impedance:20 kΩ, Signal to Noise ratio >= 104 dB, Crosstalk < -80 dB with built in protection such as Audio Limiters, output delay per channel,31 band GEQ per channel, PEQ per channel, Power remote via switch,delay time selectable, floating relay contacts, inputs for presets selection.	4	Each
94	Supply, installation, testing and commissioning of 10 channel Compact Mixing System (6 x Mic/Line + 4 x Mic/Stereo-Line), Auxiliaries (MON, FX, AUX) : 2 Pre, 2 Post, 2 Pre/Post switchable, Frequency Response, -3 dB, ref. 1 kHz : 15 Hz to 65 kHz, Crosstalk, 1 kHz Channel to Channel < -80 dB, THD at 1 kHz < 0.005%, CMRR MIC input 1 kHz > 80 dB, Dual stereo 24/48-bit multi effects processors, 100 Factory + 20 User, Tap-Delay, Digital Audio Interface Channels : 4 In / 4 Out, AD/DA Conversion, Sampling Rate : 24-bit, 44.1 / 48 / 88.2 / 96 kHz.	1	Each
95	Supply, installation, testing and commissioning of Freestanding Gooseneck Mic with base for podium having dual condenser back electret microphone element ,Selectable Omnidirectional/ Cardioid/ Supercardioid/ Hyper Cardioid polar pattern,LED status display and with programmable button for Push to Talk or Push to Mute functions having ,frequency response 50Hz-20kHz ,sensitivity 5.5mV/Pa,clipping level >125dB SPL ,output impedance 200 ohm, Dynamic Range > 100 dB.	2	Each
96	Supply, installation, testing and commissioning of Handheld Wireless Mic with Cardioid polar pattern for transmitter, Dynamic microphone with Neodymium magnet , Receiver frequency response 80Hz-18kHz,Receiver RF sensitivity < 1.0 μV,Receiver Image rejection>55dB,Receiver Dyanmic range >95dB and receiver having 32 channels possible,Receiver S/N ratio >100dB A,distortion<1 % , Transmitter sensitivity - 3.2 mV/Pa,modulation:+/-40kHz	2	Each
97	Supply installation testing and commissioning of 4 sq mm 2 core speaker cable	3000	Mtr
98	Supply installation testing and commissioning of Microphone cable.	1000	Mtr
99	Supply, installation, testing and commissioning of Speakon,XLR Male &Female,Phonoconnector,RCA to Phono patch cord,RCA to RCA Patch cord	1	lot
100	SITC of Audio Earthling	1	No
<b>PUBLIC ADDRESS SYSTEM</b>			
101	Supply, installation, testing and commissioning of Digital Public Address and Emergency Sound System Controller certified to International standards of Emergency Sound System EN 54 (IEC 60849) with following features : One working & one Hot Standby /Redundant, in case of failure of any of the controller the another system must automatic switchover without any manual	1	Nos

	<p>intervention</p> <ul style="list-style-type: none"> <li>- Completely digital audio and control data transmission.- Fibre/ CAT 5 connection for digital network and connection to amplifiers and other interface.- In-built Digital Message storage with min 1gB capacity for 3 hrs of audio messages.</li> <li>- PC based programmable inbuilt Web server."</li> <li>- External Alarm Inputs /Programmable auto relay of pre recorded messages/Alarm tones/messages</li> <li>- Automatic Fault Diagnostic and reporting at central location- From Mic Capsule in call station upto amplifiers and loudspeaker circuits. The system shall be able to make emergency calls (all calls) even if the network controller has failed- Freely programmable 200 level of priority/ around 50 Different chime/alarm tones, freely programmable/modifiable zone assignment and routing - Up gradation requires no changes in control equipment,</li> <li>- provision for more 248 zones from single controller</li> <li>- All Programmable through software.</li> <li>-Inbuilt message scheduler to schedule the broadcast of pre-recorded messages.</li> <li>- 2 x 16-character LCD display and a rotary control to navigate through the menu.</li> <li>- 28 simultaneous audio channels available for audio transportation between any inputs and outputs</li> <li>- The network controller shall have 4 analogue audio line outputs.</li> <li>- Sampling Frequency of controller shall be equal or more then 44.1 khz.</li> </ul> <p>PA System shall be fully integrated with Fire alarm system Approved Makes : Bosch/TOA/Bose</p>		
102	<p>Supply, installation, testing and commissioning of EN 54 certified Digital Class-D Amplifier 500W each with single/dual channels as per the design/tender requirement. The amplifiers should have digital audio interface connection to network controller via Fiber optics/CAT 5 .</p> <p>Features- Inbuilt Digital Audio signal processing like 3 section parametric equalization</p> <ul style="list-style-type: none"> <li>- Built in or external min 1 channel Automatic Volume control circuitry for noise sensing, Front LCD Character Display for status information.</li> <li>- Compliance to Standards for Emergency sound System IEC 60849</li> <li>- Inbuilt Amplifier Monitoring eg for Short Circuit etc. Inbuilt Output monitoring</li> <li>- Loudspeaker line monitoring for every zone/speaker circuit</li> <li>- Automatic Amplifier Changeover to hot standby amplifier in case of failure of working amplifier with internal relays.</li> <li>- output voltage between 100V, 70V or 50V by changing jumpers</li> <li>-Separate amplifiers or separate channels of amplifiers for every zone should be considered</li> <li>- digital signal processing for audio</li> <li>- 2 auxiliary audio inputs with microphone/line level selection</li> <li>- 8 x control inputs are freely programmable</li> <li>- 1 x control outputs shall be freely programmable and can be programmed for faults and calls</li> <li>- designed for redundant network wiring - 3 sections of parametric equalization and 2 sections of shelving equalization and audio delay</li> </ul> <p>Approved Makes : Bosch/TOA/Bose</p>	20	Nos
103	<p>Supply, installation, testing and commissioning of IP65 two-way, full-range Speaker, Long throw 5.25" (133 mm) woofer housed in a UL 94-5VB fire rated ABS plastic for extended LF performance down to 55 Hz. 90 W power handling provides for 108 dB maximum SPL (114 dB Peak). 60 W transformer with 8 ÷ pass-through. Frequency response (-10 dB) 55 Hz - 20 kHz. Transformer taps:</p>	64	Nos

	100V: 60 W, 30 W, 15 W, 8ø. IP-65 Approved Makes : Bosch/TOA/Bose		
104	Supply, installation, testing and commissioning of 2x1.5sq. mm. 600V Mineral Insulated Copper Cable with seamless outer copper sheath Fire Survival type, which can withstand 1010 Deg C for two hours as per UL standards and shall also withstand CWZ test on one single Cable as per UL 2196. The cable shall be approved by UL, and the outer sheath of the cable shall be seamless in construction, The cable should be supplied and installed with all accessories as per UL Standards Make: nVent / PYROTENAX / JIULI / DRAKA / RSCC	2000	Mtr
105	Supply, installation, testing and commissioning of EN 54 certified Remote call station with interface unit is to be used for calling purpose and other applications with following features: - Connects to call station interface via CAT-5 cable - Up to 1 km from digital public address optical network - Built-in limiter - 2 supervised control inputs Approved Makes : Bosch/TOA/Bose	2	Nos
106	Supply, installation, testing and commissioning of EN 54 certified Digital call station extension keypad with 8 freely programmable keys with the following features- - compliant to IEC60849 - keys can be programme recall of selection, live speech call, cancel selection, BGM off, BGM volume control, programmable key for any action - Select resources: BGM selection, pre-recorded message selection, attention and alarm tone selection - 2 color LEDs on Each key at the call station keypad - a label slot for indicating the name of the action assigned to that particular key Approved Makes : Bosch/TOA/Bose	2	Nos
107	Supply, installation, testing and commissioning of 6W ceiling mount EN 54 certified speaker with suitable fire dome having the following specification: - Max Power: 9W, Rated Power: 6Watts, Power Tapping: 6/3/1.5W - Effective frequency range(-10 dB) :90 Hz to 20KHz - SPL at rated power (1Khz at 1 m) 98 dB - Opening Angle 1 KHz / 4 KHz (-6 dB): 180/50 Diameter 216 mm (8.5 in) Maximum depth 90 mm (3.54 in) Approved Makes : Bosch/TOA/Bose	8	Nos
108	Supply, installation, testing and commissioning of Rugged & beautiful green garden speaker which harmoniously merges with the outdoor garden environment. Fitted with two nos. of wide response and water resistant polypropylene speakers. Input Power - 40W RMS Power Taps on 100V - 40/20/10/5W Impedance - 250/500/1k/2kΩ Frequency Response 160-16,000Hz SPL at 1kHz (1W/1m) 88dB Approved Makes : Bosch/TOA/IC Audio/Ahuja	78	Nos
109	Supply, installation, testing and commissioning of EN 54 certified 10 W high-efficiency ABS horn loudspeaker with weather protection IP65 - Max. Power: 15 W, Rated Power: 10 Watts, Power tapping: 10 / 5 / 2.5 / 1.25 W - Effective frequency range(-10 dB) :280 Hz to 5800 Hz - SPL at rated power (1Khz) 112 dB, Opening angle at 1 kHz / 4 kHz (-6 dB) Horizontal 120° / 35° Vertical 125° / 35° - Self extinguishing acc. to UL94 V0 - IP65 acc. to IEC 60529, Safety acc. to EN60065 Approved Makes : Bosch/TOA/Bose	95	Nos



110	Supply, installation, testing and commissioning of Glands & seals for above cable complete as required. Make: TYCO / PYROTENAX / JIULI/ nVent	490	Nos
111	Supply, installation, testing and commissioning of Network cable assembly 0.5m LBB4416/01	20	Nos
112	Supply, installation, testing and commissioning of Network cable assembly 5 m LBB4416/05	2	Nos
113	Supply, installation, testing and commissioning of Network cable assembly 10 m LBB4416/10	2	Nos
114	Supply, installation, testing and commissioning of Speaker Junction Box 3x3 size of Mild Steel.	245	Nos
<b>SOUND &amp; VIDEO SYSTEM</b>			
115	Supply, Installation, Testing & Commissioning of Compact 2 Way/ 3 Way Line array element, with dispersion pattern (H) 90° or better ; a Frequency Response (-3dB):- 80 Hz – 19 kHz or better & Continuous Power Handling (RMS) range from 400W- 700W (100 Hrs testing).The loudspeaker should have a sensitivity of >= 101dB.The Loudspeaker should have a Max. SPL (Peak) of >=130 dB. It should have Minimum 2 x 8" or Better Driver for LF; >= 2 x 1" drivers for HF reproduction or more. Makes: d&b/EV/Adamsons	8	Each
116	Supply, Installation, Testing & Commissioning of Supply, Installation, Testing & Commissioning OEM Manufactured Grid suitable for hanging Line array speakers & subwoofers Makes: d&b/HARMAN/Adamsons	2	Each
117	Supply, Installation, Testing & Commissioning of flying Dual 15" arrayable subwoofer with same footprints as Main Line array elements for Arraying in the same frame, having a Freq. Range (-10 dB) of 30 Hz - 250Hz & Freq. It should have an axial Sensitivity of > = 99dB (1W/1m) or more delivering a Max. Calculated SPL(Continious) of >=128 dB.The loudspeaker should have a nominal impedance :4ohm and continuous Power Handling of 1000W or more.Makes: d&b/EV/Adamsons	2	Each
118	Supply, Installation, Testing & Commissioning of compact two-way loudspeaker Freq. Response1 (-3 dB):70 Hz - 16 kHz Freq. Range1 (-10 dB):60 Hz - 20 kHz Rotatable Coverage: 90° x 50° Axial Sensitivity1: 94 dB (1 W/1 m) Max.Calculated SPL1: 122 dB or more, Passive Power Handling: 200 W continuous, 800 W peak Impedance: 8 ohms (nominal), 6.0 ohms (min.) Makes: d&b/EV/Adamsons	4	Each
119	Supply, Installation, Testing & Commissioning of Dual 6" two-Way Speaker with a Frequency Range(-10dB):- 62Hz-20Khz & Long Term Power Handling of>=150W (at Nominal Impedance of 8ohms). The Loudspeaker should have a Sensitivity(1W/1m) of 94dB with a Max. SPL of >=118dB. It should have Built in LMT with Power Taps of 7.5/15/30W at70/100V Line. The Sound Dispersion should be 100x80 Degrees or better. The Speaker Should Come with OEM wall Mounting Bracket with a Sweep Range of upto 100Degrees.Makes: d&b/EV/Adamsons	1	Pair
120	Supply, Installation, Testing & Commissioning of 12" Two-way Powered Speaker with one 1" HF transducer with a Frequency Response(-3dB):- 65Hz-18KHz & In built class D Power amplifier of 1000 W or better. The Loudspeaker should have a Max. SPL of >=126dB.The Sound Dispersion should be 90x60 Degress. The speaker should have both built in line level inputs & multiple DSP functions like delay.Makes: d&b/EV/Adamsons	2	Each
121	Supply installation testing and commissioning of Dual channel Class AB/Class D power amplifier with inbuilt DSP, Max Midband Output Power >=950W @ 8 Ω; >=1800W @ 4 Ω &>=3200W @ 2 Ω,Max Bridged Output Power>=6000W @ 4 ohms,70 V & 100 V Operation,Frequency Response, ref. 1 KHz: 10Hz - 21 KHz (±1dB), THD:<0.05%, Max input level >= +21 dBu, input impedance:20 kΩ, Signal	3	Each

	to Noise ratio $\geq 109$ dB, Crosstalk $< -80$ dB with built in protection such as Audio Limiters,output delay per channel,31 band GEQ per channel,PEQ per channel, Power remote via switch,delay time selectable,floating relay contacts,inputs for presets selection. Makes : Adamsons/ d&b / Dynacord /		
122	Supply installation testing and commissioning of Dual channel Class H/Class D power amplifier with inbuilt DSP, Max Midband Output Power $\geq 350W @ 8 \Omega$ ; $\geq 660W @ 4 \Omega$ & $\geq 1100W @ 2 \Omega$ ,Max Bridged Output Power $\geq 2000W @ 4$ ohms,70 V & 100 V Operation,Frequency Response, ref. 1 KHz: 10Hz - 21 KHz ( $\pm 1dB$ ), THD: $< 0.05\%$ , Max input level $\geq +21$ dBu, input impedance:20 k $\Omega$ , Signal to Noise ratio $\geq 104$ dB, Crosstalk $< -80$ dB with built in protection such as Audio Limiters,output delay per channel,31 band GEQ per channel,PEQ per channel, Power remote via switch,delay time selectable,floating relay contacts,inputs for presets selection. Makes : Adamsons / d&b /Dynacord /	3	Each
123	Supply, Installation, Testing & Commissioning of Single Channel amplifier providing 70V/100V Rated Output Power (*Rated Load); THD $< 1\%$ , 1kHz; 270W ;Rated Output Power (*Rated Load) ;THD $< 0.2\%$ , 20Hz...20kHz ; 250W Slew Rate at 1kHz 41V/ $\mu s$ ;Frequency Response, (-1dB,). 1kHz 70Hz - 20kHz; Power Bandwidth THD=1%,Half Power : 45Hz - $> 20$ kHz;Input Impedance, 20Hz ... 20kHz, Balanced; $> 20$ kOhm; Signal-to-Noise Ratio, A-Weighted $> 101$ dB. Makes: /Dynacord/Adamsons/d&b	1	Each
124	Supply, Installation, Testing & Commissioning of Digital Signal Processor with 2 x XLR IN, electronically balanced audio input,6 x XLR OUT, electronically balanced audio output with 2 x XLR Thru out ,and 1x XLR AES/EBU IN digital input,with Nominal Input Voltage:1.23V / +4 dBu, maximum output voltage:8.7V / +21 dBu,input impedance :10k Ohm,CMR:-80dB@1kHz,A/D & D/A coversion :24 bit sigma delta,THD+N $< 0.01\%$ .Makes: d&b/EV/Adamsons	1	Each
125	Supply, Installation, Testing & Commissioning of 22 channel Compact Mixing System (18 x Mic/Line + 4 x Mic/Stereo-Line), Auxiliarys (MON, FX, AUX) : 2 Pre, 2 Post, 2 Pre/Post switchable, Frequency Response, -3 dB, ref. 1 kHz : 15 Hz to 65 kHz, Crosstalk, 1 kHz Channel to Channel $< -80$ dB, THD at 1 kHz $< 0.005\%$ , CMRR MIC input 1 kHz $> 80$ dB, Dual stereo 24/48-bit multi effects processors, 100 Factory + 20 User, Tap-Delay, Digital Audio Interface Channels : 4 In / 4 Out, AD/DA Conversion, Sampling Rate : 24-bit, 44.1 / 48 / 88.2 / 96 kHz.Makes: Midas,Dynacord,SSL	1	Each
126	Supply, Installation, Testing & Commissioning of Corded Vocal Microphone with ON/OFF switch with Dynamic neodymium magnet based microphone element with frequency response of 80Hz-16kHz or better ,sensitivity of $\geq 2.2$ mV/Pa ,rated impedance of 600 ohm.Makes: Shure,EV(Bosch),Sennheiser	4	Each
127	Supply, Installation, Testing & Commissioning of Tight cardioid Condenser microphone with frequency response of 48Hz-15kHz or better ,Cardioid polar pattern,sensitivity of $\geq 7.0$ mV/Pa ,rated impedance of $\geq 200$ ohm Makes: Shure,EV(Bosch),Sennheiser	4	Each
128	Supply, Installation, Testing & Commissioning of Freestanding Gooseneck Mic with base for podium having dual condensor back electret microphone element ,Selectable Omnidirectional/ Cardioid/ Supercardioid/ Hyper Cardioid polar pattern,LED status display and with programmable button for Push to Talk or Push to Mute functions having ,frequency response 50Hz-20kHz ,sensitivity 5.5mV/Pa,clipping level $> 125$ dB SPL ,output impedance 200 ohm, Dynamic Range $> 100$ dBShure,EV(Bosch),Alteclansing .	1	Each
129	Supply, Installation, Testing & Commissioning of Handheld Wireless Mic with Cardioid polar pattern for transmitter, Dynamic microphone with Neodymium magnet , Receiver frequency response 80Hz-18kHz,Receiver RF sensitivity $< 1.0$ $\mu V$ ,Receiver Image rejection $> 55$ dB,Receiver Dyanmic range $> 95$ dB and receiver having 32 channels possible, Receiver S/N ratio $> 100$ dB A,distortion $< 1$ %,	2	Each

	Transmitter sensitivity - 3.2 mV/Pa, modulation: +/-40kHz Makes: Shure, EV(Bosch), Sennheiser		
130	Supply, Installation, Testing & Commissioning of 2 core 2.5 sq mm armored copper Speaker cable	2000	Mtr
131	Supply, Installation, Testing & Commissioning of 3 core 1.5 sq mm armored copper Power cable	1000	Mtr
132	Supply, Installation, Testing & Commissioning of 2 core 4 sq mm armored copper Speaker cable	400	Mtr
133	Supply and installation of Microphone stand with base	1	Lot
134	Supply and Installation of Leads & Connectors such as XLR Socket / Connector/Phono Socket/ Speaker Socket/ Mounting Brackets etc... with Suitable Accessories.	1	Lot
135	S/I/T/C of 7000 Lumens projector with fixed type mounting arrangement	1	No
136	S/I/T/C of Motorized Projection screen size 15x18 feet with remote control	1	No
137	S/I/T/C of Dolby digital processor with <ul style="list-style-type: none"> <li>• Eight-Channel Digital Input (4 × AES/EBU) for Digital Cinema Server</li> <li>Includes support for Dolby Surround 7.1</li> <li>• Two Digital Pair Inputs (1 × AES/EBU) Connects alternative content sources (for example, preshow server, satellite receiver)</li> <li>• Toslink™ Digital Input Connects alternative content sources that output optical digital audio</li> <li>• Eight-Channel Analog Input Connects existing film or alternative sound processor</li> <li>• USB Connector Enables easy system setup from a PC</li> <li>• Ethernet Connector Connects with Dolby Show Manager network and/or can be monitored, controlled, or upgraded anywhere on the network for glitch-free shows. Also supports ASCII commands or remote control of the processor using the CP750 setup application</li> <li>• Premium Surround Sound Supports 5.1 and Dolby Surround 7.1 sound</li> </ul>	1	No
138	Supply, installation, testing and commissioning of Cable & connectors	1	Lot
	<b>HVAC WORKS :</b>		
139	TUBE AXIAL FLOW FANS (Smoke exhaust) Supply, Installation, Testing & Commissioning of long casing(GSS) Tube Axial flow type fans complete with aluminium alloy blades with aerofoil design, bird screen, flexible connection & gravity louvers at outlet. Motor shall be of 415 + 10% volts, 50 Hz. Sound level at 3mt distance from fan outlet shall not be more than 90dbA (Room Condition). Capacity shall be as follows & as per detailed technical specification: Fans should be AMCA certified 2 hour fire rated at 250 deg C. ." RPM Should Not exceed 1450. 31000 cfm capacity with 25 mm static pressure	8	Each
140	AIR COOLED DUCTABLE SPLIT AC SITC of split type Ductable indoor unit and air cooled outdoor condensing units with scroll type compressor, condenser fan, outer casing etc. Indoor unit consisting of centrifugal fan with motor, dx cooling coil outer casing, filter, control and power panel with remote control, MS stand for ODU shall be included. The unit has full charge of refrigerant gas oil confirming to specifications. Complete as required. Outdoor Air cooled condensing unit consisting of scroll type compressor ,copper tube aluminium finned condenser coil, with suitable size low speed fan, all mounted in heavy gauge sheet steel enclosure with protective painting. Evaporating Unit consisting of copper tube aluminium finned high heat transfer cooling coil, refrigerant distributor and thermostatic expansion Valve along with blower and filters all in heavy gauge sheet steel metal enclosure with protective painting.etc as required.		

	i) 8.5 TR Ceiling suspended Ductable split units	1	Set
	ii) 11.00 TR Ceiling suspended Ductable split units	3	Set
141	AIR DISTRIBUTION SHEET METAL DUCT: Supply, installation, balancing and commissioning of factory fabricated GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.		
	(i)Thickness 0.63 mm sheet (24G)	578	Sqm
	(ii)Thickness 0.80 mm sheet (22G)	1519	Sqm
	(iii)Thickness 1.00 mm sheet (20G)	3150	Sqm
	(iv)Thickness 1.25 mm sheet (18G)	400	Sqm
142	Supplying, fixing testing commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti-smudge ring & removable core.	5	Sqm
143	AIR DISTRIBUTION Supplying, installing, testing and commissioning of Back Draft damper having 18 gauge G.I. frame and Blade in accordance with approved shop drawings and specifications complete as required.	13	Sqm
144	AIR DISTRIBUTION Supplying, installing and testing of extruded aluminium Air louvers with bird screen in accordance with approved shop drawings and specifications complete as required.	30.50	sqm
145	REFRIGERANT PIPING Supply Installation, testing, commissioning and Interconnecting refrigerant copper pipe work with closed cell elastomeric nitrile rubber tubular insulation between indoor & outdoor units as per specifications, all piping inside the room shall be properly supported with MS slotted angle, including cutting chases, hole in walls/slabs and making good the walls/slabs etc. all external piping shall run in covered cable tray item for cable tray shall be quote separately.	45	Metre
	(i) 9.53 mm dia 13mm thick insulation	45	Metre
	(ii) 12.7 mm dia 13mm thick insulation	15	Metre
	(iii) 15.9 mm dia 13mm thick insulation	50	Metre
	(iv) 19.05 mm dia 13mm thick insulation	45	Metre
	(iv) 22.2 mm dia 19mm thick insulation	15	Metre
	(iv) 28.6 mm dia 19mm thick insulation	50	Metre
146	DRAIN PIPING Providing and fixing of PVC drain pipe of 6 Kg /cm2 pressure rating complete with 6mm thick closed cell nitrile rubber insulation, fittings, supports, valves as per specifications & drawings. (32 mm dia)	85	Metre
147	TOILET VENTILATION INLINE FAN Supply, Installation, Testing and commissioning of Fresh/exhaust air fan suitable for Inline mounting comprising of forward curved centrifugal blower complete with induction motor metal clad MCB, canvas connection all compete as required, motor suitable for single phase, 230 volts, 50Hz AC. supply as per specifications of following capacities: Noise level should not exceed 65dB (A)at 3 meter in room condition.		

	(i) 900 cfm capacity with 15 mm static pressure	2	Each
	(ii) 600 cfm capacity with 15 mm static pressure	12	Each
	(iii) 500 cfm capacity with 15 mm static pressure	1	Each
148	Basement parking Exhaust fan Starter panel 100 A, TPN MCCB (25 KA) with adjustable O/L fix short circuit, Metering: 0-500 Volts, digital Voltmeter with S/S and shall be protected by 2 Amps MCBs, 0-100 Amps digital Ammeter and 100/5A, 10VA, CL-1 CTs and selector switch, Phase indicating lamps and shall be protected by 2 Amps MCBs, Bus Bars: 150 Amps TPN Aluminum bus bars, color coded with heat shrinkable insulation sleeves. Outgoing: 2 Nos. 4 Pole MPCB with SD starter with contactor, O/L relay with single phase preventer suitable for 15 KW Fan motor with ON/OFF/Trip indication lamps and push buttons, potential free contacts for remote operation in each feeder and Auto Manual Selector Switch as required including auxiliary contacts for smoke signal, One (1) Nos. 16 A TPN MCB as spare.	4	Set
	<b>FOR PHE SYSTEM</b>		
149	Sewage Treatment Plant 100 KLD Capacity (SBR Technology) Note : All Civil Works with Structural Walk Ways/ Railings, General Lighting and Ventilation to be Done by Client/Owner. Design, Supplying, Installing, Testing & Commissioning of Sewage Treatment Plant capacity 100 KLD (excluding excavation, back filling & disposal of surplus earth /Civil construction work) for the following duty: Nature of effluent - Domestic Sewage from Toilet use , kitchen waste. Incoming parameters: pH - 6 - 8.5 BOD5 - upto 250-350 Mg/L S. Solids - 250 - 400 Mg/L COD - upto 450-600 Mg/L Oil & Grease - 50-100 Mg / L Final effluent discharge standard after treatment pH - 6.0 - 8 BOD5 - Less than 10 Mg/L S. Solids - Less than 30 Mg/L COD - Less than 80 Mg/L Oil & Grease - Less than 10 Mg/L E Coli – Nil Note:- Contractor shall ensure submission of detailed GA drawings (Plan & Section), P&I diagram, schematic diagram for the above said component and additional component if so required for the complete working of the STP. a) Supply, installation, testing & commissioning set of 2 Nos Manual Stainless Steel Bar Screen with suitable lifting arrangement for required sizes (size 800 mm wide x 900 mm high approx. b) Supply, installation, testing & commissioning one lot of electronic type level indicator and controller for automatic operation of the system with high/low level alarm complete with auxiliary NO/NC contacts. c) Supply, installation, testing & commissioning of non clog open impeller type pumps, having CI casing & CI impeller complete with all accessories, motor of required capacity. Delivery header with isolation valve and NRV, lifting arrangement, pressure gauge on delivery line with isolation cock level controller with wiring to control the level of sump automatically. Pump shall have following duty for reference and vendor to confirm on design base. c1.) Submersible Sewage Transfer Pumps 2 Nos. ( 1 Working + 1 Standby ) (Solid handling cap. 35 mm) Flow rate (each) = 25 M3 / hr Head = 10 Mtr c2.) Sludge Transfer Pumps 2 Nos (1 Working + 1 Standby) (Solid handling cap. 8.5 mm) Flow rate (each) = 5 M3 / hr	1	each

Head = 12 Mtr

d) Supply, installation, testing & commissioning two Nos. of Twin type rotary air blowers (1 W + 1 S) Capable of delivering 200 cum/hr (each) of free air at 0.6 kg/cm<sup>2</sup> driven through "V" belt or directly coupled through flexible coupling to a TEFC motor of suitable HP Suitable for 415 ± 10% volts, 3 phase, 50 cycles a/c supply.

e) Supply, installation, testing & commissioning One Lot of Air piping shall comprise of pipes droppers/ laterals with MS (epoxy coated) Header complete with all fittings such as tees, crosses, plugs, sockets, elbows, reducers, supports & clamps, puddle flanges etc cutting chases & making good in Plant Room. All submerged piping will be SS-304

f) Supply, installation, testing & commissioning of Non clog type air dispersion system capable of handling 3-5 cfm of air with oxygen transfer efficiency of 3-4% per/meter water depth. Air dispersion grid shall be assembled in modular form so that they can be replaced / repaired Fine /coarse aeration bubble diffusers as required. For sludge holding tank - 1 No. & For SBR reactor tank- 1 No.

g) Supply, installation, testing & commissioning of Air dispersion system shall be provided for Sludge holding Tank and SBR reactor Tanks

SS 304 : Submerged air piping

MS Epoxy : Air piping, Filters & other Eqp.

PVC piping ASTM SCH 40 :Pumped effluent & tank overflow pipe line

h) Supplying, installing, testing & commissioning of 150 M<sup>3</sup>/Hr CI Submersible Jet Aerator in Equalization Tank 1 No.

i) Supply, installation, testing & commissioning One No. of motorized Moving Decanter to suit SBR tank with MOC SS-304 with scum guard and connected with ultrasonic level transmitter & ultrasonic level element for automatic control etc. complete as required.

j) Providing and fixing One No. of wall mounted Oxylite (Mixed Oxidant)

Generation System, based on ECA Technology, producing non toxic mixed

Oxidant Solution at 1000 ppm of Oxidant Concentration . The solution should

be at a pH -7 (Neutral ) suitable for 24x7 operations should produce 720 L per

day .The system should have a single cell & supplied complete with appropriate

dosing pumps , valves, piping, fittings, chemical dosing tank etc.

k) Supply, installation, testing & commissioning of vertical inline multistage pumping set with Stainless steel-304 body, Stainless steel-304 impeller, Stainless steel-304 casing, shaft of Stainless steel-316 and C.I. base & head with mechanical seal, connected to a TEFC induction motor suitable for 415+/- 10% volts, 3 phase 50 cycles A.C. supply with 150 mm dia pressure gauge with gunmetal isolation cock, vibration eliminating pads under foundations, 80x40 mm I section base plate bolted to cement concrete foundations complete. Vendor to submit performance curves and technical catalogue of the proposed model for review and information.

k1) One Set of Filter Feed Pumps

Capacity : 10 M<sup>3</sup> / Hr

Head : 25 M

Set of Two Pumps (1 Working + 1 Standby)

l) Supplying, installing, testing and commissioning of MSEP vessel filter with all necessary accessories. Filter shall be suitable for minimum working pressure of 5 kg / cm<sup>2</sup> and shall include media, standard fittings like pressure gauges, sampling cock, rinse drain, vacuum breaker etc. The MS sheet thickness for shell shall be min. 8 mm and for dishes shall 10 mm. The internal surfaces of tank shall be treated with epoxy coating and external surface with primer and anticorrosive enamel paint (Min. 2 coats). with frontal piping shall be 100 mm dia MSEP along with valves PN 1.0, test cock, air inlet for back washing and pressure gauges at inlet and outlet.

l1) One No. of Multi grade Pressure Sand Filter

Flow Rate = 10 M<sup>3</sup> / Hr

Filtration velocity : 15 Cum/Hr/Sqm

Filter HOS : 1800 MM

Filter Diameter : 1000 MM.

l2) One No. of Activated Carbon Filter

Flow Rate = 10 M3 / Hr

Filtration velocity : 15 Cum/Hr/Sqm

Filter HOS : 1800 MM

Filter Diameter : 1000 MM.

m) Supply, installation, testing and commissioning One Set of Filter Press of plate as required (size 24"x 24" x 23 nos plate for reference) with screw feed pumps of 2 m3/hr with adequate head (1Working+1Standby) with interconnecting piping and poly dosing system all complete.

n) Supply, installation testing and commissioning One Set of Magnetic flow meter suitable for 100 KLD Plant with preamplifier and microprocessor including necessary cabling, conduit, etc complete suitable for raw sewage application.

o) Supply, installation, testing & commissioning One No. of the PLC based control panel with interlocking arrangement with supply pumps, suction pumps, modulating or shut-off valves including necessary wiring, magnetic switches & sensors complete to make the system functional with following interlocking

p) Construction: Compartmentalized Type Skid Mounted, MCC Cum PLC Control panel will be free standing; vertical, fabricated from CRCA steel sheet 14/16 G conforming to degree of protection IP-52 or better. Cable entry will be from bottom. Colour shade - RAL 7032

System Voltage: 380 to 410 Volts & 50HZ ( 415 V  $\pm$ 10% , AC, 50 HZ  $\pm$ 5% for India ). Surge protection to be provided at every applicable point.

PLC: The Programmable Logic Controller [PLC] shall consist of a PLC hardware, with 16k (min) program memory shall be protected by a backup battery with further memory protection from an EEPROM.

HMI: 5.5 Inch Colour Touch screen HMI, will be mounted on A Man-Machine Interface Terminal (MMI) shall be mounted on the front of the main control panel for control of the activated sludge plant. It will provide a display of the process parameters and equipment status. The display will have an associated keypad. The system will allow operator changes to set points and control of equipment. The terminal shall include an alarm annunciation with a dedicated alarm page and allow acknowledgment of alarms.

q) Design, fabrication, assembling, wiring, supply, installation, testing and commissioning One No. of motor control centre shall be fabricated with reinforcement of suitable size angle iron, channel 'T' sections irons and/or flats wherever necessary. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of red oxide primer and final approved shade of powder coated paint. 2 Nos. earthing terminals shall be provided for 3 phase, 4 wire, 50 Hz supply system. Lifting hooks shall also be provided in case of large panels.

Incoming

300 amps TPN MCCB with the following accessories:

a. 0-500 volts 96 x 96 mm square electronic voltmeter with selector switch shall be protected by 2 amps TP MCB. 1 Set

b. 0-100 amps 96 x 96 mm square electronic ammeter with selector switch and 100./5 amps 10 VA CL:1 CTs. 1 Set

c. Phase indicating lamps shall be protected by 2 amp SP MCB 3 Sets

Bus Bar

200 amps TPN (15 KA) copper bus bar with heat shrinkable insulation sleeves.

Required Nos of required capacity TPN MCB for direct on line starter/star delta starters and outgoing feeders to all the pumps/blowers etc. (including standbys). Each compartment shall contain auto / manual selector switch and indicating lamp with MCB's for 'ON/OFF/TRIP' status of motor

Spare MCB's of following capacities: 32 amps TPN MCB's 3 Nos.

All MCCBs / MCBs shall be of 15 KA breaking capacity and suitable for motor duty application.

All motor starters shall be provided with Automatic level controller

DOL starters shall be used for mototrs below 10HP and Star-Delta Starters for other motors

Provision shall be made for providing potential free contacts to all pumps

	<p>starters</p> <p>r) Supplying &amp; Fixing One Lot of Cables , Connector, Cable Trays, to make Electrical Installation Complete. Necessary cable alleys, internal / cabling, wiring, cabling from MCC to various pumps / equipment and interlocking, earthing and earthing pits for all equipment Ultrafiltration System - 5 KL/Hr - For Generating 60 KL water for Flushing</p> <p>s) Providing &amp; Fixing One Set of UF Module (Hollow Fibre -outside in type porocity 0.1 to 0.01 micron) including micron cartridge filter in PP housing, Pneumatic Valve, PLC Electrical Panel, flow meter, compressor and all other accessories making the system complete Flow rate : 6 cum/hr Output Inlet TSS :- 10-30 mg/lit Filtration Flux :- 45 lt/m2/hr Membrane Area - 64 M2 as per approved makes Membrane MOC - PVDF / PES Membrane Type :- Pressure Feed Membrane 0.01-0.04 Micron rating type, Out to in process No. of UF Membrane - 2 Number Make UF Membrane - Norit / Pureflow / Koch / Dow / GE</p> <p>t) Providing &amp; Fixing One Set of UF Feed Pump Capacity 6 M3/hr each (1 W + 1 SB) Head 20-25 Mts RPM 2900 Make - Grundfos / Wilo / Frenklin</p> <p>u) Supply, installation, testing &amp; commissioning One of UF pre fine filtration. It can be micron filter or Bag filter as per vendor design. The MOC of housing of filter shall be PP</p> <p>v) Supplying, installing, testing, commissioning One Set of centrifugal Vertical UF Backwash pumps with Complete SS - 304 with motor, pressure gauge with isolation cock, Isolation valve, NRV on delivery line. Isolation valve, strainer at suction. The pump shall be suitable for 415±10% volts 3 phase AC supply. Capacity :- 12 M<sup>3</sup>/h Head :- 18- 20 m No. of Pumps: 2 Nos ( 1 Working + 1 Standby) Make - Grundfos / Wilo / Frenklin</p> <p>w) Supplying, Installation, testing and commissioning One Set of chlorine dosing system comprising of Sintex Tank with inlet/ outlet connection, piping and valves alongwith metering pump of 6 LPH for dosing. Make - Asia LMI or equivalent make</p> <p>x) Supply, Installation, testing and commissioning One Set of CEB / CIP dosing station including dosing tank, pumps complete in all respect as per UF membrane specification requirement</p> <p>y) Supply installation commissioning One Set of PLC control panel with all automation required like Pneumatic valves, piping in uPVC PLC and other required accessories. Make PLC - Delta, Pneumatic Valve / Solenoid Valves, uPVC Pipe - Supreme/ Finolex, Compressor – Jeet</p> <p>z) Providing &amp; Fixing One Set of MS epoxy coated skid for the complete plant.</p> <p>aa) Supply, installation &amp; commissioning One Set of HDPE backwash tank of 500 Litre capacity including required level controller inlet, outlet, overflow and drain connection. Sewage Treatment Plant as Describe Above</p>		
	<p><b>ELECTRICAL WORKS ( FOR PHE SYSTEM )</b></p>		
150	<p>Water Supply &amp; Drainage Pumps</p> <p>Providing, installing, testing and commissioning of variable speed (VSPS) hydro pneumatic system mounted on a common base plate comprising of vertical centrifugal pumping set with S.S body, stainless steel impeller and mechanical seal, shaft directly coupled to a TEFC induction motor suitable for 400/440 volts, 3 phase, 50 cycles AC supply with 150 mm dia pressure gauge with gunmetal isolation cock, vibration eliminating pads under foundation, one No. microprocessor based controller, dedicated variable frequency drive for each</p>	1	Set



	<p>pump, one No. remote sensors, pressure transducers, sequence running controller, dry running Protection, motor control centre, necessary power and control cabling from MCC to pumps including required rating of MCB, one No. 60 litre capacity M.S diaphragm tank with interchangeable butyl rubber membrane, complete in all respects including stainless steel grade 316 pipe suction and delivery headers and isolation/ control valves( ball valves/butterfly valves/ Nan return valves/ vibration eliminators etc as required) , power box, equipped with fuses/ isolators/circuit breakers as required.</p> <p>The entire Hydro pneumatic system shall be factory fitted.</p> <p>Make-Grundfos/Wilo/Zylem</p> <p>For Domestic Water Supply at Water Supply Pump Room</p> <p>Set of Two Pumps ( 1 Working + 1 Standby)</p> <p>Capacity - 4.5 LPS (Each)</p> <p>Head - 45.0 M.</p> <p>H.P. - 5.0 HP (Approx.)</p>		
151	<p>Water Supply &amp; Drainge Pumps</p> <p>Providing, installing, testing and commissioning of variable speed (VSPS) hydro pneumatic system mounted on a common base plate comprising of vertical centrifugal pumping set with S.S body, stainless steel impeller and mechanical seal, shaft directly coupled to a TEFC induction motor suitable for 400/440 volts, 3 phase, 50 cycles AC supply with 150 mm dia pressure gauge with gunmetal isolation cock, vibration eliminating pads under foundation, one No. microprocessor based controller, dedicated variable frequency drive for each pump, one No. remote sensors, pressure transducers, sequence running controller, dry running Protection, motor control centre, necessary power and control cabling from MCC to pumps including required rating of MCB, one No. 60 litre capacity M.S diaphragm tank with interchangeable butyl rubber membrane, complete in all respects including stainless steel grade 316 pipe suction and delivery headers and isolation/ control valves( ball valves/butterfly valves/ Nan return valves/ vibration eliminators etc as required) , power box, equipped with fuses/ isolators/circuit breakers as required.</p> <p>The entire Hydro pneumatic system shall be factory fitted.</p> <p>Make-Grundfos/Wilo/Zylem</p> <p>For RO Water Supply at Water Supply Pump Room</p> <p>Set of Two Pumps ( 1 Working + 1 Standby)</p> <p>Capacity - 2.5 LPS (Each)</p> <p>Head - 45.0 M.</p> <p>H.P. - 3.0 HP (Approx.)</p>	1	Set
152	<p>Supply, installing, testing and commissioning of submersible open impeller non-clog pumps with C.I.body and to TEFC submersible motor for 415 + 10% volts, 3 phase, 50 cycles A.C. power supply with mechanical seal, pump connector unit with rubber diaphragm and bend, vertical discharge pipe, guide pipe and chain in built level controller, sequence running controller, arrangement for both pumps together incase of emergency, audible hooter for failure or flooding, dry running Protection, including GI Medium class pipe delivery header with CI Butter fly valve, CI Dual plate non return valve, rubber vibration eliminators &amp; level controller complete in all respects., painting, testing and commissioning complete with approved quality and make as required as per instruction of site incharge.</p> <p>(Pumps shall be installed in a set of two pumps One working and One standby)</p> <p>Make-Grundfos/Wilo/Zylem</p> <p>Basement &amp; Pump Room Drainage Pumps</p> <p>(Pumps to be suitable to handle solids upto 12 mm size)</p> <p>Capacity - 4.0 LPS (Each)</p>	5	Set

	Head - 15 M H.P. - 1.5 HP Approx.		
153	<p>Supply, installing, testing and commissioning of submersible open impeller non-clog pumps with C.I. body and to TEFC submersible motor for 415 + 10% volts, 3 phase, 50 cycles A.C. power supply with mechanical seal, pump connector unit with rubber diaphragm and bend, vertical discharge pipe, guide pipe and chain in built level controller, sequence running controller, arrangement for both pumps together in case of emergency, audible hooter for failure or flooding, dry running Protection, including GI Medium class pipe delivery header with CI Butter fly valve, CI Dual plate non return valve, rubber vibration eliminators &amp; level controller complete in all respects., painting, testing and commissioning complete with approved quality and make as required as per instruction of site incharge.</p> <p>(Pumps shall be installed in a set of two pumps One working and One standby) Make-Grundfos/Wilo/Zylem Sewage Sump Pumps (Pumps to be suitable to handle solids upto 40 mm size) Capacity - 4.0 LPS (Each) Head - 15 M H.P. - 2.0 HP Approx.</p>	2	Set
154	<p>Supply Installation, Testing &amp; Commissioning of vertical self supporting Filter fabricated from MS sheet as per IS: 2825, ((minimum thickness of shall 6 mm and dished end 8 mm)) pressure gauges, sample cock, GI class 'C' face piping, CI butterfly valves and all accessories, with initial charge of filter media including anthracite, painting inside with epoxy paint and outside with two coat of red oxide primer and two or more coat of synthetic enamel paint, testing and commissioning complete.</p> <p>Make- Pentair/ION Exchange/Thermax Dual Media Filter For Domestic Water Supply Capacity- 7200 LPH Filtration rate- 14000 LPH/Sqm. Filter dia approx. - 900 MM Working pressure: 3.0 Kg/sq cm. Test pressure : 4.5 Kg/sq cm</p>	1	each
155	<p>Supply Installation, Testing &amp; Commissioning of vertical self supporting Filter fabricated from MS sheet as per IS: 2825, ((minimum thickness of shall 6 mm and dished end 8 mm)) pressure gauges, sample cock, GI class 'C' face piping, CI butterfly valves and all accessories, with initial charge of filter media including anthracite, painting inside with epoxy paint and outside with two coat of red oxide primer and two or more coat of synthetic enamel paint, testing and commissioning complete.</p> <p>Make- Pentair/ION Exchange/Thermax Activated Carbon Filter For Domestic Water Supply Capacity- 32400 LPH Filtration rate- 14000 LPH/Sqm. Filter dia approx. - 900 MM Working pressure: 3.0 Kg/sq cm. Test pressure : 4.5 Kg/sq cm</p>	1	each
156	<p>Supply Installation, Testing &amp; Commissioning of metering pump type chemical doser with 100 lits. HDPE chemical grade solution tank, injection fitting assembly, suction and delivery hose upto the point of injection, capacity 0-6 lph, complete in all respects.</p> <p>Make-Asia LMI or equivalent make Chlorination of Domestic Water</p>	1	each

157	<p>Supplying, installation, testing and commissioning of skid mounted fully automatic Reverse Osmosis System of output capacity 600 litres / hour designed at a minimum Flux at inlet complete as required with the following items:</p> <p>Make- Eureka Forbes/ AO Smith/ ION Exchange</p> <p>Garnet Filter (GF) - 1 No.</p> <p>Media for GF - 1 LOT</p> <p>Antiscalant Dosing System with level sensors - 1 Lot</p> <p>Cartridge Filter - 1 No.</p> <p>High pressure pump - 2 Nos (1W + 1St).</p> <p>R.O. Block - 1 No.</p> <p>Membranes - As per manufacturer design</p> <p>Pressure Tubes - 1 No.</p> <p>RO skid - 1 No.</p> <p>pH correction system - 1 No.</p> <p>Necessary instruments - 1 Lot</p> <p>Interconnecting pipe with necessary valve work - 1 Lot</p> <p>PVC (upto HP Pump) - 1 Lot</p> <p>SS (HP Pump to Membrane) - 1 Lot</p> <p>Pressure gauges - 5 Nos.</p> <p>Rotameter - 2 Nos.</p> <p>PPLC cum instrument panel - 1 No.</p> <p>Conductivity Indicator - 1 No.</p> <p>Level sensors (Antiscalant Tank) - H/L</p> <p>Level sensors (Permeate Tank) - H/L</p> <p>Solenoid Valve (Inlet) to R.O. tank - 1 No.</p> <p>Solenoid Valve (Reject) - 1 No.</p> <p>The reverse osmosis block shall be duly supplemented with adequate pretreatment and post treatment equipment such as filter sodium metabisulphate dosing, anti-scalant dosing and post RO treatment pH correction dosing etc. in line with the raw water characteristics and the required treated water parameters. The plant should consist of the following automation:</p> <p>The plant starts when the level at R.O. water storage tank is low and stops when the level at R.O. water storage tank is high.</p> <p>When the level is low, the raw water pump starts. High pressure pumps starts after two minutes of starting of raw water pump.</p> <p>The reject valve closes after 1 minute of starting of high pressure pump.</p> <p>If the pressure at high pressure pumps suction is low / high, the plant trips.</p> <p>When the plant stops due to high level, first the high pressure pump stops and the dump valves opens, after two minutes the raw water pumps and dosing pump stops.</p> <p>When the connectivity is high an alarm is given.</p> <p>The MIMIC provides indications for all the I/Ps and the respective O/Ps.</p> <p>R.O. plant as described above</p>	2	Set
158	<p>Supply, installation, testing and commissioning of stainless steel R.O water storage tank (SS 316) with minimum thickness of shell is 4 mm and base is 5 mm placed at Pump Room with inlet, outlet, overflow connection complete with 25 mm dia bend for vent, ball valve for scour, mosquito proof brass overflow grating and 600 mm dia manhole cover with lockable arrangement, insulated with 50 mm thick glass wool and wrapping with 24g aluminium sheet duly riveted complete as per direction of Engineer-in-charge.</p> <p>3000 Litres Capacity</p>	2	each

159	<p>Design, manufacture, supplying, fixing in position, testing and commissioning of the following front operated cubicle type, front access 2mm thick mild steel sheet, free standing, dust and vermin proof, switchboard with IP42 protection with hinged and lockable doors complete with interconnections, tinned copper crimping lugs, bonding to earth and painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hz system and suitable for a fault level of 25 MVA symmetrical at 415 volts.</p> <p>All switchboards shall have provision for entry of cables from the top or bottom as required.</p> <p>All live accessible parts shall be shrouded and all equipment shall be finger touch proof. The busbars insulation shall be with heat shrinkable sleeves. SMC/DMC shrouds and busbar supports shall be used. Padlocking facility shall be provided on all outgoing feeders doors and switch handles shall be lockable in OFF position.</p> <p>Electric Panel For Water Supply Pumps at Water Supply Pump Room INCOMING</p> <p>a)1 No. 200 amps TPN MCCB with the following accessories: b)1 No. square flush mounting 0-500 volts scaled voltmeter with three way and OFF switch. c)Three phase indicating lights.</p> <p>Electrolytic high conductivity three phase and neutral tinned copper bus bar rated at 300 amps having a current density of 1 amp per Sqmm suitable to with stand symmetrical fault level of 25 MVA at 415 volts. The neutral bus bar is to be of 100% capacity.</p> <p>OUTGOING UNITS</p> <p>d) Four 32 Amp. TP + NL M.C.C.B. with rotary handle of breaking capacity 25KA e) Four 63 Amp. TP + NL M.C.C.B. with rotary handle of breaking capacity 25KA f) 02 Nos. TPN MCCB of 125 A with 25 KA service breaking capacity for domestic &amp; RO water hydro pneumatic pumps. (Only connection to inbuilt panel of Domestic /RO water hydro pneumatic system) g ) 4 Nos. fully automatic DOL starters with push buttons and ON/OFF indicating lights and overload relays for 1.5 to 7.5 HP pump . h) 4 Nos. rotary selector switch for selecting mode of operation i.e. auto/manual/off. i) 4 Nos. cyclic relay for automatic duty changeover of pumps. j) 4 No. single phase preventers. k) 4 Nos. square flush mounting 0-30 amps scaled ammeters with three way and OFF selector switch. l) Space for 2 Nos. Level Controllers. m) Switchgear shall be suitable for the HPS of various motors. n) 4 Nos. 63 Amp. TPN MCB for Hydra pneumatic Pumps. o) 4 Nos. 32 Amp. TPN MCB Spare.</p> <p>The motor control panel shall be prewired with colour coded wires with identification labels complete in all respects as required.</p>	1	Set
160	<p>For Drainage Sump Pump</p> <p>One incoming main MCCB unit of 63 amps rating.</p> <p>Copper bus bar is separate chamber fully taped of 100 amps capacity.</p> <p>Two MCB units of 25 amps</p> <p>Two fully automatic DOL starters with push buttons and on/off indicating lights.</p> <p>One rotary duty selector switch</p> <p>Two manual/auto/off switches.</p> <p>Two single phasing presenters.</p> <p>One panel type voltmeter with rotary selector switch for reading voltage</p>	6	Set

	<p>between phases.</p> <p>Two ampere meters one for each motor.</p> <p>Three neon phase indicating lights on the incoming mains.</p> <p>Space for one liquid level controllers.</p> <p>All internal wiring colour coded from incoming mains to various switchgear, starters, meters, indicating lamps and bus bar with a changeover facility to run each pump alternatively with an alarm bell in case of both pump's running at one time. Switchgear offered must be compatible with the HP of the motors offered.</p> <p>Motor control centre as described above</p>		
161	Providing & Fixing 1000 Litres per hour capacity water chilling plant complete with all respect.	1	Set
	<b>FIRE ALARM SYSTEM</b>		
162	supply, installation, Testing & commissioning of Analogue Addressable Fire Alarm Control Panel expandable via plug-in loop driver boards, loop current 500mA maximum per loop, dual flash based microprocessor, supports to connect 240 addressable devices one each loop via fully digital communication protocol, equipped with a white backlit display (240x64 pixel resolution) graphical LCD Display with at least 6 lines of information, 400 fire zones (soft zones), fully programmable via alphanumeric keypad or configuration software, dedicated USB and RS-232 serial port for direct or PC connection. 5000 events storage, loop current 500 mA, panel shall be equipped with in-built multi-meter for live monitoring of loop current, earth voltage, loop voltage etc., installer's logo application, network card to network with compatible addressable panel(s) and repeater panel(s), capable to connect maximum 200 network nodes on a standard network, features battery charger status and temperature, supports programmable cause / effect on outputs, panel housing meets IP30 ingress protection classification finished in RAL 7035, 1 Year Warranty, Independently certified as complying with requirements of BS EN 54 Part 2, 4, and 13. Approved by: British Standards Institute (BSI) and VertrauendurchSicherheit (VdS). Make : ADVANCED/APOLLO/NOHMI 4 Loops	1	No.
163	supply, installation, Testing & commissioning of Intelligent Analogue Optical Smoke Detector with advanced optical chamber and smoke inlet design to provide resistance to entry of dust to provide immunity to false alarms, programmable multiple smoke sensitivity level setting, bi-directional in-built short circuit isolator to protect against cable faults, dual bi-colour LED's with 360o view of status, auto-addressable/electronically addressed, utilizes fully digital communication addressable protocol with high noise rejection (For Detectors/Device without inbuilt isolator, Fault Isolator or Isolator base to be provided with each detector/device). Approved by LPCB for EN 54-7 & EN 54-17 standard. Make : ADVANCED/APOLLO/NOHMI	160	Nos.
164	supply, installation, Testing & commissioning of Intelligent Analogue Class-P Heat Detector with two thermal sensitivity level, the two level corresponds to rate-of-rise (ROR) A1R Class (most sensitive) and Class BS (least sensitive), thermal alarm threshold for ROR A1R Class 58oC and BS Class 58oC, bi-directional in-built short circuit isolator to protect against cable faults, dual bi-colour LED's with 360o view of status, auto- addressable/ electronically addressed, utilises fully digital communication addressable protocol with high noise rejection (For Detectors/Device without inbuilt isolator, Fault Isolator or Isolator base to be provided with each detector/device). Approved by LPCB for EN 54-5 & EN 54-17 standard. Make : ADVANCED/APOLLO/NOHMI	10	Nos.
165	supply, installation, Testing & commissioning of Conventional Wall Sounder with Beacon for providing Audible and Visual Alarms in response to the output	8	Nos.

	signal from the control panel, 32 selectable tone and adjustable sound level, maximum output volume @ 1M distance 100 dB(A), output tone frequency range 440 Hz to 2900 Hz, Visual alarm device output frequency 0.5 Hz, Approved by LPCB for EN 54-3 standard. Make : ADVANCED/APOLLO/NOHMI		
166	supply, installation, Testing & commissioning of Intelligent Analogue Manual Call Point with resettable operating element, with in-built bi-directional short circuit isolator. Bi-Colour LED for local indication of device status, single action operation, reset to normal condition using special reset key, clearly visible alarm flag in the activated state (For Detectors/Device without inbuilt isolator, Fault Isolator or Isolator base to be provided with each detector/device). Approved by LCPB for EN 54-11 standard. Make : ADVANCED/APOLLO/NOHMI	8	Nos.
167	supply, installation, Testing & commissioning of Intelligent Analogue Single Relay Output Module, microprocessor controlled interface module for control of third party/auxiliary devices using single volt-free change-over relay contact, with in-built short circuit isolator, Bi-colour LED's for local indication of device status, auto-addressable/ electronically addressed, utilizes fully digital communication addressable protocol with high noise rejection (For Detectors/Device without inbuilt isolator, Fault Isolator or Isolator base to be provided with each detector/device). Approved by BSI for EN 54-17 & EN 54-18 standard. Make : ADVANCED/APOLLO/NOHMI	4	Nos.
168	supply, installation, Testing & commissioning of Intelligent Analogue Monitor Module, microprocessor controlled interface module for control of third party/auxiliary devices using single volt-free change-over relay contact, with in-built short circuit isolator, Bi-colour LED's for local indication of device status, auto-addressable/ electronically addressed, utilises fully digital communication addressable protocol with high noise rejection (For Detectors/Device without inbuilt isolator, Fault Isolator or Isolator base to be provided with each detector/device). Approved by BSI for EN 54-17 & EN 54-18 standard. Make : ADVANCED/APOLLO/NOHMI	4	Nos.
169	Supply, installation, testing and commissioning of 2x1.5sq. mm. 600V Mineral Insulated Copper Cable with seamless outer copper sheath Fire Survival type, which can withstand 1010 Deg C for two hours as per UL standards and shall also withstand CWZ test on one single Cable as per UL 2196. The cable shall be approved by UL, and the outer sheath of the cable shall be seamless in construction, The cable should be supplied and installed with all accessories as per UL Standards Make: nVent / PYROTENAX / JIULI	3000	Mtr
170	Supply, installation, testing and commissioning of Glands & seals for above cable complete as required. Make:-nVent/ PYROTENAX/ JIULI.	388	Nos.
	<b>FIRE FIGHTING SYSTEM :</b>		
171	Providing and fixing 15 mm dia forged brass window nozzle type sprinkler head (K-23, with an angle of 180 Degree) with a flow rate of 40 LPM at pressure of 3.0 Kg/cm2 . Make-Tyco / Viking / HD	73	Each
172	Providing and fixing installation valve with turbine type automatic alarm to be connected with control valve drain and test valve as per manufacturer's design. Make-HD / Tyco/Viking	1	Each
173	Providing and fixing 25 mm dia inspecting & testing assembly with built in bye pass arrangement and connection to drain line. Make-Giocomini	10	Each
174	Providing and fixing of Deluge valve with automatic alarm system suitable for 150 mm dia pipe including with all necessary accessories to be connected with control valve drain and test valve as per manufacturer's design. Make-Victolic / Tyco/Viking	2	Each
175	Supply, installation, testing and commissioning of Diesel Engine driven fire pump suitable for automatic operation comprising of the following and	1	Each

	<p>conforming to BS 649/IS 10002 all amended up-to-date. Horizontal multi stage, split casing centrifugal pump, suitable for diesel engine operation . The installation shall be complete with flexible coupling and coupling guard as required. Fire pump shall have CI casing, CS diffusers, bronze impeller (hard finished and dynamically balanced) and SS (304) shaft with mechanical seal, pump shall ensure a minimum pressure of 3.5 Kg/Sqcm at the farthest or topmost hydrant / sprinkler. The installation shall be complete with necessary pressure gauge on delivery side. Heat exchanger cooled (secondary cooling) diesel engine of speed 1500 RPM suitable for the above pump with automatic starting mechanism and other accessories including fuel tank (fabricated from 6mm MS sheet, painted with two coats of synthetic enamel paint over a coat of primer) of capacity adequate to sustain pump operation for 8 hours continuous working. The tank shall be fitted with Magnetic oil level indicator, MH with cover, drain valve, air vent including structural supports (painted with approved shade), 2 Nos. x 12 volt battery (alternator of engine and panel is suitable for 12 volt current rating) with stand heat exchanger with necessary piping connections &amp; fittings complete as required Common base frame for (a) and (b) from M.S. Channel for required size. Suitable RCC / cement concrete foundation with plaster and MS angle epoxy coated edging (design and drawing to be provided by the Contractor. Complete with anti-vibration arrangement of cushy foot mountings. Make- Kirloskar/Matterplatt/KSB Capacity- 2850 LPM at Head- 76 M.</p>		
176	<p>Design, manufacture, supplying, fixing in position, testing and commissioning of the following front operated cubicle type, front access 2mm thick mild steel sheet, free standing, dust and vermin proof, switchboard with IP42 protection with hinged and lockable doors complete with interconnections, tinned copper crimping lugs, bonding to earth and painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hz system and suitable for a fault level of 25 MVA symmetrical at 415 volts.</p> <p>All switchboards shall have provision for entry of cables from the top or bottom as required.</p> <p>All live accessible parts shall be shrouded and all equipment shall be finger touch proof. The busbars insulation shall be with heat shrinkable sleeves. SMC/DMC shrouds and busbar supports shall be used. Padlocking facility shall be provided on all outgoing feeders doors and switch handles shall be lockable in OFF position.</p> <p>MCC for Fire Fighting Pumps at Main Pump Room</p> <p>Incoming</p> <p>One incoming main TPN MCCB of 400 amp, 25 KA required rating. One-Digital voltmeter with phase selection push button = 1Nos.3 Phase indicating lamps, instrument fuses and switches.1 No. Digital Ammeter</p> <p>Bus Bar &amp; Outgoing</p> <p>630 Amp TPN tinned copper Bus Bar. with heat shrinkable insulation sleeve.</p> <p>Two 200 Amp. TP + NL M.C.C.B. with rotary handle of breaking capacity 25KA</p> <p>One 63 Amp.TP +NL M.C.C.B. with rotary handle of breaking capacity 25KA</p> <p>One Fully Automatic Star-Delta starters suitable for 75-100 HP Pump Motor with over load relay timer push buttons and Auto/Manual selector switch and single phase preventer relay.</p> <p>One Fully Automatic Star-Delta starters suitable for Jockey Pump Motor 15 HP with over load relay, timer push buttons and Auto/Manual selector switch and single phase preventer relay. Two panel type Digital Amp. meters one for each motor with ASS. CTS etc.</p> <p>Two sets of On/Off - neon indicating lamp.</p> <p>One 200 Amp. TP + NL M.C.C.B. with rotary handle of breaking capacity 25KA</p>	1	Each

	<p>Spare Diesel Engine Control)</p> <p>i) Automatic selector switch and 3 attempts starting devices, electronic timer, relays, auxiliary switches, tripping relays, contactors, push buttons for manual start/stop etc., to make the equipment automatic as per the functional requirement.</p> <p>ii) Battery charging unit suitable for 24 V DC with boost &amp; trickle charger, selector switch with suitable rating transformer, rectifier, RC filter network, fuses on AC or DC protection 0-30 A DC digital Ammeter. Charger should be cut off when the engine is started &amp; battery shall be charged from battery charging alternator provided in the engine.</p> <p>iii) Suitable type &amp; rating standard relays, contactors &amp; other accessories for automatic operation the diesel engine.</p> <p>iv) Indication LED's for high/low lub oil pressure, water temperature engine on indicator with suitable alarms &amp; acknowledge button etc.</p> <p>System Controller</p> <p>i) Designing, supply, install, testing &amp; commissioning of system controller to control operation of main electrification pump, diesel engine pump, main sprinkler fire pump, pressurisation pump, terrace pump in sequence as per specifications. The system controller should be compatible with BMS.</p> <p>All interconnecting power &amp; control wires/cables suitable size within the panel. MCC as described above</p>		

The sealed quotations in physical form of submission will be received up-to 2.00 p.m. on **27/09/2021** in the office of the Superintending Engineer NMRDA, Gokulpeth Market, West high court road, Nagpur and will be opened on **27/09/2021** at 4.00 p.m. or as decided by NMRDA.

**The applicant should note the following point before quoting the rates of the item.**

- a) The rates of the items shall be inclusive of all the leads and lift for all material and labour both on site and off site and inclusive of royalty charges and excluding GST.
- b) The applicant should submit detailed rate analysis to support for rate quoted for items.
- c) The rate of the item will be inclusive of Supply, Installation, Testing and Commissioning.
- d) The agencies will have to write name of work & name of agency, contact number on sealed envelopes of quotation
- e) These rates will be used for estimation purpose only.

**-Sd-  
Superintending Engineer  
NMRDA, Nagpur.**

**No. SE (NMRDA)/ 05/2021-22  
Dated :- 20 /09 /2021.**