NAGPUR METRO RAIL PROJECT

BID DOCUMENTS

FOR

Construction of METRO Train Depot at MIHAN (North-South Corridor) & HINGNA (East-West Corridor) including Civil & E&M Works for Nagpur Metro Rail Corporation Limited

TENDER NO.
N1C-05/2016

PART 4: Financial Bid & Bill of Quantities

Nagpur Metro Rail Corporation Limited
Metro House, Bungalow No: 28/2,
Anand Nagar, CK Naidu Road,
Civil Lines, Nagpur-440001
Maharashtra, INDIA
Website: http://www.metrorailnagpur.com

Preamble:

1. The **"Bill of Quantities"** shall be read in conjunction with the Instructions to Bidders, Conditions of Contract, Notice Inviting Tender, Particular Specifications, Tender Drawings, Schedule, Annexure and Addendums.
2. The quantities given in the **"Bill of Quantities"** are estimated and provisional and are given to provide a common basis for Bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates in the accepted priced **"Bill of Quantities",** where applicable.
3. The bidder should quote his rate only in the Financial Bid / Price Bid Summary sheet provided in the **Commercial Envelope section** of the E-Tender Portal of NMRCL.
4. The percentage shall be quoted only in the **column no 5** of summary sheet of Financial Bid of the Commercial Envelope in e-tender portal of NMRCL. At **column no. 6** at par/ above/ below shall me written in text. The total amount corresponding to each schedule shall be in Indian Rupees in **column no.7**
5. The bidder should ensure that the financial/ commercial quote should be only quoted in the Commercial bid option on E-tender portal of NMRCL & nowhere else. If by mistake/ inadvertently the rate is quoted/ indicated anywhere in the Technical submission/ uploading of the entire Bid document/ Corrigendum / Addendum, the bid will be rejected outright and will not be considered for any further evaluation.
6. The quoted rates are for completed and finished items of work and complete in all respects. It will be deemed to have included all constructional plant, tools, machinery, labour, supervision, materials, fuel, oil, consumables, electric power, water, transportation, all leads and lifts, dewatering, ail temporary works and false works, construction of temporary stores and buildings, fencing, watering, lighting, erection maintenance, night working, inspection facilities, safety measures at work sites/casting yard for workmen and road users, preparation of design and drawings pertaining to the casting yard, staging, shuttering, form work, stacking yard etc, establishment and

overhead charges, labour camps, insurance costs for labour and works, contractor's profit, ail taxes, royalties, duties, cess, octroi, VAT and other levies and other charges together with all general risks, liabilities and obligations set out or implied in the contract and including remedy of any defects during the Defect Liability Period, unless otherwise provided in BOQ. Reinforcement (supply, cutting, bending, placing in position, tying etc.) Shall not be paid separately unless otherwise mentioned in BOQ.

7. Providing concrete for all works deemed to be inclusive of the cost towards production of concrete by Batching Plant, transit mixer, transportation of concrete with all feeds and lifts, form work, shuttering including staging as required, pouring of concrete by pump/tower crane to all heights/ depths, tremie or other approved means, compaction by vibrators, curing by approved means such as water, steam or curing compound and all labour, tools, plants, machinery required for execution of work complete in all respects including de-shuttering after completion of work.
8. The whole cost of complying with the provisions of the Contract shall be deemed to have been included in the quoted rates.
9. General directions and description of works and materials are not necessarily repeated or summarized in the Bill of Quantities.
10. The method of measurement of completed work for payment shall be in accordance with the requirements as stated in the individual sections of the Particular Specifications and Special Conditions of Contract (SCC).
11. Errors will be corrected by the Employer for any arithmetical errors in computation or summation as indicated in Contract Document.
12. Shuttering required for concrete work shall be of steel except wherever there are site constraints as decided by Engineer.
13. In the defined grade of concrete mix, the first figure defines the strength of concrete and second figure defines the maximum size of coarse aggregates to be used for production of particular concrete mix. e.g. M 35/20 means "M-35" is the grade of concrete and "20" is the maximum size of coarse aggregate in mm to be used.
14. Bidder may please note that to perform this contract, nothing extra shall be payable on account of field constraints, availability of front, preparation of detailed scheme for taking necessary clearance and approval from the concerned authority and other local bodies etc.

15. Couplers may be used in pile caps and piers for reinforcement above 25 mm. in diameter. Welding of reinforcement can be permitted by Engineer in lieu of Coupler.
16. Geo technical data given in is an indicative only for bidding purpose. The successful Bidder may have to carry out the Geo-technical Investigations if required and directed by the Engineer to perform this contract.
17. Charted utilities will be shifted by NMRCL. For uncharted utilities, payment for diversion will be made under relevant payment Schedule of CPWD-SOR (Latest Version). If work is stopped due to uncharted utilities, no claim shall be entertained on this account.
18. The Bidder's offer shall be inclusive of all taxes and duties payable by them, income Tax and any other statutory taxes to be deducted at source, if any, will be deducted by the Employer in accordance with the Income Tax Act and any other acts in force and in accordance with instructions issued by the Authorities on this behalf, from time to time.
19. Rate quoted shall be inclusive of VAT both on materials as well as works contract and will not be reimbursed by NMRCL. If Excise duty on precast elements are levied, NMRCL will reimburse the same on submission of documentary proof and a certificate that "no appeal for refund at a later date from revenue authorities will be made".
20. The Bidder is required to furnish the PAN for all members of Group.

IMPORTANT NOTES TO BIDDERS:

1. **The bidder should quote his percentage rate against each Schedule “A” to “H”, in the "Financial Bid" of commercial envelope of e-tender portal of NMRCL.**
2. **For comparison of the quoted bid price by the bidders, the grand total of the quoted amount from schedule “A” to “H” shall be taken in to consideration.**
3. **The total amount mentioned in the Schedule “I” of commercial bid shall be fixed at Rupees Fourteen Crores Only. The bidders should not quote any percentage above/ below in Schedule “I.”**
4. **For arriving at the final contract price of successful bidder, for which the contract agreement shall be executed, Rupees Fourteen Crores fixed amount of Schedule “I” shall be added to the sum total of the quoted amount by the bidder from Schedule A to H.**

5. **The rates for items to be executed under Schedule- "I" shall be as per schedule base rate of CPWD DSR of 2014 with latest amendments / directives as issued by as per relevant circular/ guide lines issued by the office of chief engineer- WR- II at Nagpur.**
6. **Employer reserves the right to omit / partially execute any items in any of the Schedules ("A" to "H") during construction without any liability to either party.**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor) at Ch:19700 & Ch: 18460 Respectively

GRAND SUMMARY SHEET OF BILL OF QUANTITY

SN	SCHEDULE No.	Description of Works	Amount in Indian Rs.	% at par/above/below		Amount in Indian Rs.	
				In figure	In words	Total Amount of Each	
						In figure	In words
1	TOTAL OF SCHEDULE- A	GENERAL	8409630				
2	TOTAL OF SCHEDULE- B (PART-1)	ARCHITECTURAL WORKS (Part-1)	168585286				
3	TOTAL OF SCHEDULE- B (PART-2)	ARCHITECTURAL WORKS (Part-2)	48864893				
4	TOTAL OF SCHEDULE- C (PART-1)	STRUCTURAL WORKS (Part-1)	1263344996				
5	TOTAL OF SCHEDULE- C (PART-2)	STRUCTURAL WORKS (Part-2)	408512983				
6	TOTAL OF SCHEDULE- D (PART-1)	PHE WORKS (Part-1)	38091021				
7	TOTAL OF SCHEDULE- D (PART-2)	PHE WORKS (Part-2)	70262554				
8	TOTAL OF SCHEDULE- E	FIRE SUPPRESSION SYSTEM	108213807				
9	TOTAL OF SCHEDULE- F	ELECTRICAL WORKS	407049243				
10	TOTAL OF SCHEDULE- G	HVAC WORKS	105864339				
11	TOTAL OF SCHEDULE- H	PLANT AND MACHINERY	65725641				
		GRAND TOTAL	**2692924394**				
	***Schedule I : Miscellaneous Works**						
1	Miscellaneous items such as Road repair, Footpath, Dismantling, Tree cutting, Excavation, Turffing in bankign, Utility diversion (Sewerage storm water drain/water supply line) etc , and any other items which are not covered in other schedules. The work will be carried out in CPWD /DSR 2014.		LS	2	50000000.00	10,00,00,000	***not to be qoated by the agency**
2	General Electrical works for execution as per CPWD Electrical works(Latest year)		LS	2	10000000.00	2,00,00,000	***not to be qoated by the agency**
		Total of Schedule I				**12,00,00,000**	
	AMOUNT (IN FIGURES)						
	AMOUNT (IN WORDS)						

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor) at Ch:19700 & Ch: 18460 Respectivly

SCHEDULE -A GENERAL GENERAL

S. NO	DESCRIPTION OF ITEM	UNIT	QTY	ESTIMATED RATE (Rs.)	AMOUNT (IN RUPEES)
1	**Detail survey in MIHAN and HINGANA depot shall be carried out with the following details :-** a) Establishing GPS stations (at every proposed station locations) at the interval of not more than 200-250 m. The GPS station shall be fixing concrete pillar 600 mm x 600 mm x 1000 mm on building roof free with a proper concrete plateform. Stainless Steel (SS) Plate 100 mm x 100 mm x 4 mm with center punch shall be fixed on the top of the station. GPS instrument accuracy shall be minimum horizontal 5 mm + 0.5 ppm and vertical 10 mm + 0.5 ppm in static observation. The base line measurement shall be based on minimum 4 hrs. static observations and other observations shall be with minimum 2 hrs. Static observations. (The observation time may be increased if the no. of satellite is less than 8 as the project corridor is a urban section.) b) Closed traversing shall be carried out storing in total station Angle and Distance from GPS to GPS with an accuracy of 1: 50000 by observing minimum 3 sets of face right and 3 set of face left. Stations shall be established at an interval not more than 200 m. Closing error shall be distributed with least square method and Bowditch Method in commercial software compatible to the intrument used for traversing. The same commercial software shall be supplied to NMRC. Traverse pillar shall be established on permanent structure or providing and fixing concrete pillar 400mm x 400mm x 600mm along the alignment. Total station raw data, calculations shall be submitted to the employer along with before and after adjustment co-ordinates in tabular form. c) Detailed Topographical survey shall be carried out with adjusted traverse co-ordinates. All surface features, ground levels,and over-ground utilities shall be taken. Total Station raw data and calculations shall be submitted to Employer for No Objection. Drawings, raw data and calculations shall be submitted in soft and hard copy.	No	2	395500	791000
	d) A closed circuit leveling shall be run along the entire route connecting one pair of GPS to another pair of GPS station. Km. The accuracy of the leveling will be($6\sqrt{K}$) , where the k is length of the leveling loop . Digital leveling/Auto level instrument shall be used to establish bench mark. Raw data from digital level shall be submitted along with adjusted and unadjusted levels in tabular form. e) For Viaduct portion, survey has to be done from boundary line to boundary line or 50m from each side of alignment, whichever is smaller. For station location, survey at Grid of 5m x 5m covering an area of approx. 100m beyond each side of station including area covering entry/exit structure, split concourse, property development etc. for verifying alignment and station footprint, making vertical & horizontal clearances and establishing triangular points and bench mark of the construction of station building, and matching it with the alignment of the approaches at station ends including correction, if any. f) Establish all control points, traverse, bench mark and TBM. Fixing and Validating Centre line of corridor, GAD and pier locations duly considering feasibility of the pier locations on account of physical site constraints, utilities (by physical verification) and on the basis of Geotechnical Investigation Reports, vertical & horizontal clearances and establishing traverse points and bench mark for the elevated section including modifications, if any, as per drawings. No extra amount will be paid to redo or to re-establish any of the survey points. The work shall be maintained during the Contract Period including the extended contract period till the completion of the work. Rate includes all survey work including preparation of revised GAD in consultation with the Engineer. However, physical verification of utilities and Geotechnical investigations will be paid separately under relevant Schedules.				
	NOTE: i. Digital leveling instrument to be used for the work shall have the minimum accuracy of the order of 0.3 mm per km double run with least count not more than 0.01 mm ii.Total station instrument shall have minimum accuracy for: a) Angle measurements (Hz, V) of the order of 1" b) Distance measurement of the order of 1mm+2ppm Mi. Payment at 50% of total cost of the item on checking and verification of all control points and submission of drawings and approval of the same by the employer. iv. Payment at 40% of total cost of the item equally distributed over the duration of the contract and will be paid on prorata basis. v. Payment at 10% of total cost of the item on satisfactory completion of work along with the final bill.				0
2.1	Submit colour photographs of the works as directed by the Engineer and supply with monthly progress report, or as instructed by the Engineer .One set shall comprise of minimum 25 photographs in 3 soft copy of all photographs on DVD with 3 copies of prints (hard copy) of each photograph of size not less than 225 x 175 mm each in album form. The photographs chosen should cover important activities of the work. Photos should have date and time as per Technical Specifications	per set	48	2034	97632
2.2	Supply of video DVDs of 180 minutes duration comprising one master copy and one extra copy as per technical specifications showing the progress of works and methodology and at interval as directed by Engineer and as per Technical Specifications	per set	24	11300	271200
3.0	Provide furnished office at site , for use of Client's Representative and his supporting staff approximately 180 sqm area at site for each depot as per drawing and Technical Specifications refer annexure IX D (40% payment will be made after fully furnish office handed over to NMRCL. Balance 60% will be made in 24 equal estallment.) After complition of the work the entire property to be handed over to NMRCL	sqm.	250	9605	2401250
4.0	Provide the following vehicles with the full time driver for the use of Engineer and his repersentatives,including fuel and maintenance of the vehicle as per para 3.0 of Appendix-IV of special Conditions of contract and specifications. Incase of breakdown or during maintenance of vehicle the contractor shall make arrangements for providing an alternative vehicle:Note: Payment shall be made as per specifications for each Depots for 4000 kms per month and 24 hrs time.				
4.1	2 Vehicles (Zyxlo/Innova) or similar with seating capacity for atleast 4 persons in addition to the driver	month	48	33900	1627200
4.2	2 Vehicles with driver of (Tavera / Bolerio/Scorpio) or similar with seating capacity for atleast 5 persons.	month	48	33900	1627200

5.0	**Geo-technical works**				
5.1	Drilling 150mm dia boreholes in all types of soil including mobilisation of machinery, conducting all SPT.vane shear test , collection of undisturbed and disturbed samples, setting up machinery, shifting etc. Including all lab, field tests & report preparation(pile foundation recommendations including safe pile capacities , pile settlement calculations, etc incorporating all field and laboratory testing) as per IRC: 78/IS codes.	Meters	500	1299	649468
5.2	Drilling Nx size boreholes in all kinds of rock including mobilisation of machinery, collection of samples, working platform etc. Including all lab, field tests & report preparation(pile foundation recommendations including safe pile capacities, pile settlement calculations, etc incorporating all field and laboratory testing) as per IRC: 78/IS codes	Meters	250	3779	944680
	Total of Schedule A				**8409630**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor)					
Schedule- B (Part-1) Bill of Quantaties for Architectural Works (Part-1)					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**TOTAL QTY**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**BRICK WORK**				
1.1	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in :				
1.1.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	cum	3672	6,294	2,31,09,970
1.2	Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level.				
1.2.1	Cement mortar 1:4 (1 cement :4 coarse sand)	sqm	400	739	2,95,737
1.3	Extra for half brick masonry in superstructure, above floor V level for every four floors or part thereof by mechanical means.	sqm	400	28	11,371
1.3.1	Extra for providing and placing in position **2 Nos 6mm dia. M.S. bars** at every third course of half brick masonry	sqm	400	77	30,871
1.4	Brick work with clay flyash F.P.S. (non modular) brick of class designation 7.5 in superstructure above plinth level up to floor five level in :				
1.4.1	Cement mortar 1:4 (1 cement : 4 coarse sand)	cum	50	6,327	3,16,327
1.5	Providing and laying **autoclaved aerated cement** blocks masonry with 100 mm thick AAC blocks in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand). The rate includes providing and placing in position 2 Nos 6 mm dia M.S. bars at every third course of masonry work.	cum	100	7,092	7,09,243
2.0	**MARBLE & GRANITE WORK**				
2.1	Providing and fixing **18 mm thick gang saw cut**, mirror polished, premouldedand prepolished, machine cut for **kitchen platforms**, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.				
2.1.1	Granite of any colour and shade				
2.1.1.1	Area of slab over 0.50 sqm	sqm	120	4,339	5,20,630
2.2	Providing **edge moulding to 18 mm thick marble stone** counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.				
2.2.1	Granite work	Metre	120	257	30,782
2.3	Extra for fixing marble /granite stone, over and above corresponding basic item, **in facia and drops** of width upto 150 mm with epoxy resin based adhesive, including cleaning etc. complete.	Metre	120	275	32,967

2.4	Extra for providing **opening of required size & shape for wash basin/ kitchen sink in kitchen platform**, vanity counter and similar location in marble/ Granite/stone work, including necessary holes for pillar taps etc. including moulding, rubbing and polishing of cut edges etc. complete.	Each	60	429	25,758
2.5	Providing and fixing cramps of required size & shape in RCC/ CC / Brick masonry backing with cement mortar 1:2 (1 cement :2 coarse sand) including drilling necessary hole in stones and embedding the cramp in the hole (fastener to be paid separately).				
2.5.1	Stainless steel cramps	kg	200	638	1,27,624
2.6	Providing and fixing expansion hold fasteners on C.C. /R.C.C./Brick masonry surface backing including drilling necessary holes and the cost of bolt etc complete.				
2.6.1	Wedge expansion type				
2.6.1.1	Fastener with threaded dia 6 mm	each	2000	30	59,360
2.7	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 1.8 cm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in-charge and finished smooth.				
2.7.1	Granite Stone of approved shade	sqm	50	3,624	1,81,199
2.8	Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge : a. Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	sqm	200	3,603	7,20,542
3.0	**WOOD & PVC WORK**				
3.1	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).				
3.1.1	Second class teak wood	cum	8	1,01,603	8,12,826
3.2	Providing and fixing ISI marked **flush door shutters** conforming to IS : 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters: frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
3.2.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	sqm	600	2,120	12,72,283
3.3	Extra for **providing lipping** with 2nd class teak wood battens 25 mm minimum depth on all edges of flush door shutters (over all area of door shutter to be measured).	sqm	560	406	2,27,506
3.4	Extra for cutting rebate in flush door shutters (Total area of the shutter to be measured).	sqm	50	116	5,805

3.5	Providing and fixing glazed shutters for doors, windows and clerestory windows using 4 mm thick float glass panes, including ISI marked M.S. pressed butt hinges bright finished of required size with necessary screws.				
3.5.1	Second class teak wood				
3.5.1.1	35 mm thick	sqm	50	3,623	1,81,165
3.6	Providing and fixing expandable fasteners of specified size with necessary plastic sleeves and galvanised M.S. screws including drilling holes in masonry work /CC/ R.C.C. and making good etc. complete.				
3.6.1	50 mm long	each	1000	25	25,318
3.7	Providing and fixing M.S. grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.				
3.7.1	Fixed to openings /wooden frames with rawl plugs screws etc	kg	3000	130	3,89,437
3.8	Providing 40x5 mm flat iron hold fast 40 cm long including fixing to frame with 10 mm diameter bolts, nuts and wooden plugs and embedding in cement concrete block 30x10x15cm 1:3:6 mix (1 cement : 3 coarse sand: 6 graded stone aggregate 20mm nominal size).	each	1200	130	1,56,374
3.9	Providing and fixing **aluminium tower bolts**, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete :				
3.9.1	**250x10 mm**	Each	300	106	31,731
3.9.2	**200x10 mm**	Each	40	88	3,520
3.9.3	**100 x 10 mm**	Each	1100	58	63,946
3.10	Providing and fixing **chromium plated brass 100 mm mortice latch and lock** with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.	Each	50	878	43,880
3.10.1	Providing and fixing to existing door frames				
3.11	24 mm thick factory made PVC door shutters made of styles and rails of a uPVC hollow section of size 59x24 mm and wall thickness 2 mm (± 0.2 mm) with inbuilt edging on both sides. The styles and rails mitred and joint at the corners by means of M.S. galvanised/plastic brackets of size 75x220 mm having wall thickness 1.0 mm and stainless steel screws. The styles of the shutter reinforced by inserting galvanised M.S. tube of size 20x20 mm and 1 mm (± 0.1 mm) wall thickness. The lock rail made up of 'H' section, a uPVC hollow section of size 100x24 mm and 2 mm (± 0.2 mm) wall thickness, fixed to the shutter styles by means of plastic/galvanised M.S. 'U' cleats. The shutter frame filled with a uPVC multi-chambered single panel of size not less than 620 mm, having over all thickness of 20 mm and 1 mm (± 0.1 mm) wall thickness. The panels filled vertically and tie bar at two places by inserting horizontally 6 mm galvanised M.S. rod and fastened with nuts and washers, complete as per manufacturer's specification and direction of Engineer-in-charge.				
3.11.1	(For W.C. and bathroom door shutter).	sqm	400	2,848.00	11,39,202

3.12	Providing and fixing factory made P.V.C. door frame of size 50x47 mm with a wall thickness of 5 mm, made out of extruded 5mm rigid PVC foam sheet, mitred at corners and joined with 2 Nos of 150 mm long brackets of 15x15 mm M.S. square tube, the vertical door frame profiles to be reinforced with 19x19 mm M.S. square tube of 19 gauge, EPDM rubber gasket weather seal to be provided through out the frame. The door frame to be fixed to the wall using M.S. screws of 65/100 mm size, complete as per manufacturer's specification and direction of Engineerin-Charge.	metre	210	510	1,07,025
3.13	Providing and fixing aluminium die cast body tubular type **universal hydraulic door closer** (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.	Each	60	837	50,220
3.14	Providing and fixing 50 cm long **aluminium kicking plate of** size 100x3.15 mm, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete.	each	10	188	1,879
3.15	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete :				
3.15.1	125 mm	each	110	78	8,526
3.15.2	100 mm	each	550	61	33,652
3.16	Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. complete.				
3.16.1	Twin rubber stopper	each	120	93	11,187
3.17	Providing and fixing aluminium casement stays, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. complete.	each	200	83	16,646
3.18	Providing and fixing **panic bar / latch** (Double point) fitted with a single body, Trim Latch & Lock on back side of the Panic Latch of reputed brand and manufacture to be approved by the Engineer- in- charge, all complete.	Each	5	6,811	34,053
3.19	Providing and fixing bright finished brass 100 mm **mortice latch** and lock, ISI marked, with six levers and a pair of anodised (anodic coating not less than grade AC 10 as per IS : 1868) aluminium lever handles of approved quality with necessary screws etc. complete.	Each	100	906	90,552
3.20	Providing and fixing bright finished 100 mm mortice lock with 6 levers without pair of handles of approved quality for aluminium door, with necessary screws etc complete as per direction of Engineerin-charge.	Each	25	517	12,935
3.21	Providing & Fixing decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS : 2046 Type S, including cost of adhesive of approved quality.				
3.21.1	1.0 mm thick	sqm	200	717	1,43,397
3.21.2	Dorma or equivalent make Panic Bar for Double leaf door - 2 hrs fire rated.	each	212	6,501	13,78,253
4.0	**STEEL WORKS**				

4.1	Providing and fixing in position collapsible steel shutters with vertical channels 20x10x2 mm and braced with flat iron diagonals 20x5 mm size, with top and bottom rail of T-iron 40x40x6 mm, with 40 mm dia steel pulleys, complete with bolts, nuts, locking arrangement, stoppers, handles, including applying a priming coat of approved steel primer.	sqm	30	5,876	1,76,273
4.2	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer.				
4.2.1	Using M.S. angels 40x40x6 mm for diagonal braces	sqm	80	3,413	2,73,070
4.3	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.				
4.3.1	80x1.20 mm M.S. laths with 1.20 mm thick top cover	sqm	160	2,134	3,41,381
4.3.2	Providing and fixing ball bearing for rolling shutters.	Each	40	487	19,497
4.3.3	Extra for providing mechanical device chain and crank operation for operating rolling shutters.				
4.3.4	Exceeding 10.00 sqm and upto 16.80 sqm in the area	sqm	120	805	96,590
4.3.5	Extra for providing grilled rolling shutters manufactured out of 8 mm dia M.S. bar instead of laths as per design approved by Engineer-in- charge, (area of grill to be measured).	sqm	40	348	13,930
4.4	Providing and fixing pressed steel door frames conforming to IS: 4351, manufactured from commercial mild steel sheet of 1.60 mm thickness, including hinges, jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25 mm, or base ties of 1.60 mm, pressed mild steel welded or rigidly fixed together by mechanical means, including M.S. pressed butt hinges 2.5 mm thick with mortar guards, lock strikeplate and shock absorbers as specified and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineerin- charge:				
4.4.1	Profile B				
4.4.1.1	Fixing with adjustable lugs with split end tail to each jamb	metre	200	419	83,884
4.5	Providing and fixing M.S. Tubular frames for doors, windows, ventilators and cupboard with rectangular/ L-Type sections, made of 1.60 mm thick M.S. Sheet, joints mitred, welded and grinded finish, with profiles of required size, including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primer.				
4.5.1	Fixing with 15x3 mm lugs 10 cm long embedded in cement concrete block 15x10x10 cm of C.C. 1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)	kg	200	154	30,893
4.5.2	Fixing with carbon steel galvanised dash fastener of required dia and size (to be paid for separately)	kg	20	145	2,896
4.6	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
4.6.1	In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	Kg	2000	84	1,67,235
4.6.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	Kg	600	100	60,031

4.70	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approved steel Primer.				
4.7.1	M.S. tube	kg	1720	116	1,99,975
4.8	Providing & fixing fly proof wire gauze to windows, clerestory windows & doors with M.S. Flat 15x3 mm and nuts & bolts complete.				
4.8.1	Galvanised M.S. Wire gauze with 0.63 mm dia wire and 1.4 mm aperture on both sides	sqm	20	598	11,955
4.9	Providing and fixing stainless steel (Grade 304) railing 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 railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	kg	2000	688	13,75,633
5.0	**FLOORING WORKS**				
5.1	52 mm thick cement concrete flooring with concrete hardener topping, under layer 40 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and top layer 12 mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate 6 mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete.	Sqm	18000	594	1,06,98,688
5.2	Cement plaster skirting up to 30 cm height, with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement.				
5.2.1	18 mm thick	Sqm	1880	419	7,87,569
5.3	Chequerred precast cement concrete tiles 22 mm thick in footpath & courtyard, jointed with neat cement slurry mixed with pigment to match the shade of tiles, including rubbing and cleaning etc. complete, on 20 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand).				
5.3.1	Medium shade pigment using 50% white cement 50% Grey cement	sqm	120	1,235	1,48,246
5.4	Providing and fixing 10 mm thick acid and/or alkali resistant tiles of approved make and colour using acid and/or alkali resisting mortar bedding, and joints filled with acid and/or alkali resisting cement as per IS : 4457, complete as per the direction of Engineer-in- Charge.				
5.4.1	In flooring on a bed of 10 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand)				
5.4.1.1	Acid and alkali resistant tile	sqm	50	1,366	68,310
5.4.1.2	In dado/skirting on 12 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand)				
5.4.1.3	Acid and alkali resistant tile	sqm	10	1,436	14,358
5.5	Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :				
5.5.1	25 mm thick	sqm	2340	1,267	29,65,890
5.6	Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	sqm	362	1,323	4,78,865

5.6.1	Extra for pre finished nosing in treads of steps of Kota stone/ sand stone slab.	metre	450	84	37,878
5.6.2	Extra for Kota stone/ sand stone in treads of steps and risers using single length up to 1.05 metre.	sqm	450	19	8,445
5.7	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	Sqm	4555	929	42,31,882
5.80	Providing and laying rectified Glazed Ceramic floor tiles 300x300 mm or more (thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make in colours White, Ivory, Grey, Fume Red Brown, laid on 20mm thick cement mortar 1:4 (1 Cement : 4 Coarse sand) including grouting the joints with white cement and matching pigments etc., complete.	sqm	200	1,055	2,10,998
5.9	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption's less than 0.08% and conforming to IS : 15622 of approved make in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand) including grouting the joints with white cement and matching pigments etc., complete.				
5.9.1	Size of Tile 600x600 mm				
5.9.1.1	Polished vitried tile	sqm	20000	1,561	3,12,24,912
5.9.1.2	Matt finished vitrified floor tiles	sqm	300	1,561	4,68,374
5.10	Crazy ceramic tile flooring, with under layer 12 mm thick cement mortar 1:4 (1 cement: 4 coarse sand), with joints not exceeding 5 mm, including filling the gaps with ordinary cement mixture & mixing with synthetic polyester fibre, triangular in shape having specific gravity of 1.34 to 1.40, cross section size ranging from 10 to 40 micron & length upto 6 mm , mixing fibre @ 125 grams per 50 kg of cement in cement mortar, including providing and mixing water proofing material in mortar @ 1 kg per 50 kg of cement , all complete as per direction of Engineer-in-charge.	sqm	8000	519	41,48,664
5.11	Providing and laying Vitrified tiles in different sizes (thickness to be specified by manufacturer) with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make in all colours & shade in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.				
5.11.1	Size of Tile 600x600 mm	sqm	1000	1,572	15,71,739
5.12	Providing and fixing removable raised/false access flooring with system and its components of approved make for different plenum height with possible height adjustment upto 50 mm, comprising of modular load bearing floor panels supported on G.I. rectangular stinger frame work and G.I. Pedestal etc. all complete, as per the architectural drawings, as specified and as directed by Engineer-in-charge consisting of :				

	Providing at required spacing to form modular framework, pedestals made out of GI tube of thickness minimum 2 mm and 25 mm outer diameter, fully welded on to the G.I. Base plate of size 100mm x 100mm x 3mm at the bottom of the pedestal tube, G.I. pedestal head of size 75mmx75mmx3.5 mm welded with GI fully threaded stud 16mm outer diameter with two GI Check nuts screwed on the stud for level adjustment upto 50mm, locking and stabilizing the pedestal head in position at the required level. The pedestals shall be fixed to the subfloor (base) through base plate using epoxy based adhesive of approved make or the machine screw with rawl plug.				
	Stringers system in all steel construction hot dipped galvanized of rectangular size 570x20x30x0.80mm thick having holes at both ends for securing the stringers on to the pedestal head using fully threaded screws ensuring maximum lateral stability in all directions, the grid formed by the pedestal and stringer assembly shall receive the floor panel, this system shall provide adequate solid, rigid support for access floor panel, the system shall provide a minimum clear uninterrupted clearance between the bottom of the floor for electrical conduits and wiring etc. all complete as per the architectural drawings, as specified and as directed by the Engineer-incharge.				
	Providing and fixing Access Floor panel of 600x600x32 mm medium grade Filled Steel anti static high pressure Lamination of 800H grade (FS800H). Access Floor panel shall be steel welded construction with an enclosed bottom pan with uniform pattern of 64 hemispherical cones. The top and bottom plates of Steel Gauges: top 0.6 mm and bottom 0.7mm fused spot welded together (minimum 64 welds in each dome and 20 welds along each flange). The panel should be Corroresist epoxy coated for lifetime rust protection and cavity formed by the top and bottom plate is filled with Pyrogrip noncombustible Portland cementitious core mixed with lightweight foaming compound. The access floor shall be factory finished with Anti-static High Pressure laminate with Non Warp technology upto 1mm thickness for superior adhesion and Surface flatness within 0.75mm.The panel is to withstand a Concentrated Load of 363 kgs applied on area 25mm x 25mm without collapse in the centre of the panel which is placed on four steel blocks.				
	The panel will withstand and Uniformly istributed Load (UDL) minimum 1250 kg/sqm and an impact load of 50kg all complete as per the approved manufacturers specification and as per the direction of Engineer-in-charge. All specification must be printed on the side of the panel to ensure the quality of the product.				
5.12.1	**300 mm Finished Floor Height (FFH)**	sqm	125	4,441	5,55,166
5.12.2	**450 mm Finished Floor Height (FFH).**	sqm	200	4,424	8,84,778
6.0	**FINISHING**				
6.1	12 mm cement plaster of mix :				
6.1.1	1:4 (1 cement: 4 fine sand)	Sqm.	8000	181	14,51,144
6.2	15 mm cement plaster on the rough side of single or half brick wall of mix :				
6.2.1	1:4 (1 cement: 4 fine sand)	Sqm.	28000	210	58,88,970
6.3	6 mm cement plaster of mix :				
6.3.1	1:3 (1 cement : 3 fine sand)	Sqm.	29000	150	43,37,774

6.4	Extra for providing and mixing water proofing material in cement plaster work in proportion recommended by the manufacturers.	Per bag of 50 kg cement used in the mix	50	56	2,812
6.5	White washing with lime to give an even shade ::				
6.5.1	New work (three or more coats)	sqm	15000	18	2,69,841
6.6	Finishing walls with **textured exterior paint** of required shade :				
6.6.1	New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/ 10 sqm	sqm	48000	163	78,06,061
6.7	Wall painting with **acrylic emulsion paint,** having VOC (Volatile Organic Compound) content less than 50 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required, to achieve even shade and colour.				
6.7.1	Two coats	Sqm.	70200	84	58,73,835
6.8	Painting with **synthetic enamel paint**, having VOC (Volatile Organic Compound) content less than 150 grams/ litre, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
6.8.1	Two coats.	sqm	5000	80	3,97,543
6.9	French spirit polishing :				
6.9.1	Two or more coats on new works including a coat of wood filler	Sqm	100	215	21,537
6.10	Providing and applying white cement based **putty** of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	Sqm	48000	100	47,78,514
6.11	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.				
6.11.1	With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ litre	sqm	200	40	8,017
6.11.2	With ready mixed red oxide zinc chromatic on steel / iron works having VOC content less than 250 grams/ litre	sqm	4800	34	1,64,170
6.11.3	With water thinnable cement primer on wall surface having VOC content less than 50 grams/litre.	sqm	24000	40	9,55,436
7.0	**ROOFING**				
7.1	Providing and fixing GI Clip in **Metal Ceiling** System of 600x600 mm module which includes providing and fixing 'C' wall angle of size 20x30x20 mm made of 0.5 mm thick pre painted steel along the perimeter of the room with help of nylon sleeves and wooden screws at 300 mm center to centre, suspending the main C carrier of size 10x38x10 mm made of G.I steel 0.7 mm thick from the soffit with help of soffit cleat 37x27x25x1.6 mm, rawl plugs of size 38x12 mm and C carrier suspension clip and main carrier bracket at 1000 mm c/c. Inverted triangle shaped Spring Tee having height of 24 mm and width of 34 mm made of GI steel 0.45 mm thick is then fixed to the main C carrier and in direction perpendicular to it at 600 mm centers with help of suspension brackets. Wherever the main C carrier and spring T have to join, C carrier and spring T connectors have to be used. All sections to be galvanized @ 120 gms/sqm (both side inclusive), fixing with clip in tiles into spring 'T' with :				

7.1.1	GI Metal Ceiling Clip in plain Beveled edge global white color tiles of size 600x600 and 0.5 mm thick with 25 mm height,made of G I sheet having galvanizing of 100 gms/ sqm (both sides inclusive) and 20% perforation area with 1.8 mm dia holes and having NRC of 0.5, electro statically polyester powder coated of thickness 60 microns (minimum), including factory painted after bending and perforation.	Sqm	650	2,011	13,07,370
8.0	**CC PAVER BLOCK**				
8.1	Providing and laying factory made coloured chamfered edge Cement Concrete paver blocks of required strength, thickness & size/shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of fine sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with jamuna sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or ight traffic parking etc. complete as per manufacturer's pecifications & direction of Engineerin-Charge. 60mm thick C.C. paver block of M-35 grade with approved colour, design & pattern.	Sqm	10000	822	82,21,261
9.0	**ALUMINIUM WORK**				
9.1	Providing and fixing **aluminium work for doors, windows, ventilators and partitions with extruded built up** standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, paneling and dash fasteners to be paid for separately) :				
9.1.1	For fixed portion				
9.1.1.1	Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)	Kg	8000	428	34,21,093
9.1.2	For shutters of doors, windows & ventilators including providing and fixing hinges/ pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber / neoprene gasket required (Fittings shall be paid for separately)				
9.1.2.2	Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)	kg	8000	492	39,37,233
9.2	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge.				
9.2.1	With float glass panes of 5.50 mm thickness	sqm	250	1,171	2,92,661
9.3	Providing and fixing stainless steel (SS 304 grade) adjustable friction **windows stays** of approved quality with necessary stainless steel screws etc. to the side hung windows as per direction of Engineerin-charge complete.				
9.3.1	205 X 19 mm	Each	900	254	2,28,615
9.4	Providing and fixing **aluminium round shape handle of outer dia 100 mm** with SS screws etc. complete as per direction of Engineerin-charge				
9.4.1	Powder coated minimum thickness 50 micron aluminium	Each	108	81	8,707

9.5	Providing and fixing anodised aluminium grill (anodised transparent or dyed to required shade according to IS: 1868 with minimum anodic coating of grade AC 15) of approved design/pattern, with approved standard section and fixed to the existing window frame with C.P. brass/ stainless steel screws @ 200 mm centre to centre, including cutting the grill to proper opening size for fixing and operation of handles and fixing approved anodised aluminium standard section around the opening, all complete as per requirement and direction of Engineer-in-charge. (Only weight of grill to be measured for payment).	kg	400	448	1,79,161
9.6	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 fittings, all complete as per direction of Engineer-in-charge (Door handle, lock and stopper etc.to be paid separately).	sqm	100	5,271	5,27,050
10.0	**WATER PROOFING**				
10.1	Providing and laying water proofing treatment in sunken portion of WCs, bathroom, kitchen etc., by applying cement slurry mixed with water proofing cement compound consisting of applying :	sqm	500	314	1,57,185
	a) First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/sqm. This layer will be allowed to air cure for 4 hours.				
	b) Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours. The rate includes preparation of surface, treatment and sealing of all joints, corners, junctions of pipes and masonry with polymer mixed slurry.				
10.2	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations: a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment. b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs				
	c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep. e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineerin- Charge :				
10.2.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	sqm	13600	1,132	1,53,89,899
	Grading roof for water proofing treatment with				
10.2.2	Cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size)	cum	20	6,186	1,23,717

11.0	**STRUCTURAL GLAZING AND ALUMINIUM COMPOSITE PANEL**				
11.1	Providing and supplying aluminium extruded tubular and other aluminium sections as per the architectural drawings and approved shop drawings,the aluminium quality as per grade 6063 T5 or T6 as per BS 1474,including super durable powder coating of 60-80 microns conforming to AAMA 2604 of required colour and shade as approved by the Engineer-in-Charge. (The item includes cost of material such as cleats, sleeves, screws etc. necessary for fabrication of extruded aluminium frame work. Nothing extra shall be paid on this account).	kg	1600	376	6,00,979
11.2	Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including: a) Structural analysis & design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)- cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation & drainage and protection against fire hazard including:				
	b) Fabricating and supplying serrated M.S. hot dip galvanised / Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimentional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/ masonry/structural steel framework of building structure using stainless steel anchor fasteners/ bolts, nylon seperator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers. c) Providing and filling, two part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment , including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass.				
	d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight.e) Making provision for drainage of moisture/ water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete. This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified. The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge.				

	The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer- in-Charge. Note:- 1. The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub- head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places.				
	Note:-2. The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accreditated by NABL(National Accreditation Board for Testing and Calibration Laboratories), Department of Science & Technologies, India. Cost of testing is payable separately.The NIT approving authority will decide the necessity of testing on the basis of cost of the work, cost of the test and importance of the work. Performance Testing of Structural glazing system Tests to be conducted in the NBL Certified laboratories 1. Performance Laboratory Test for Air Leakage Test (-50pa to - 300pa) & (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200 mVhr” 2. Static Water Penetration Test. (50pa to 1500pa) as per ASTME- 331-09 testing method for a range up to 2000 ml.” 3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml”	sqm	160	2,838	4,54,159
	4. Structural Performance Deflection and deformation by static air pressure test (1.5 times desing wind pressure without any failure) as per ASTME-330-10 testing method for a range upto 50 mm” 5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test” Tests to be conducted on site. 6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml				
11.3	Providing, assembling and supplying vision glass panels (IGUs) comprising of hermetically-sealed 6-12- 6 mm insulated glass (double glazed) vision panel units of size and shape as required and specified, comprising of an outer heat strengthened float glass 6mm thick, of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade, an inner Heat strengthned clear float glass 6mm thick, spacer tube 12mm wide, dessicants, including primary seal and secondary seal (structural silicone sealant) etc. all complete for the required performances, as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge. The IGUs shall be assembled in the factory/ workshop of the glass processor. (Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.26.2)				

	For payment, only the actual area of glass on face # 1 of the glass panels (excluding the areas of the grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, + 12mm Airgap + 6mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25-0.28) and U value of 3.0 to 3.3 W/m2 degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.	sqm	160	4,543	7,26,851
11.4	Extra for openable side / top hung vision glass panels (IGUs) including providing and supplying at site all accessories and hardwares for the openable panels as specified and of the approved make such as heavy duty stainless steel friction hinges, min 4 -point cremone locking sets with stainless steel plates, handles, buffers etc. including necessary stainless steel screws/ fasteners, nuts, bolts, washers etc. all complete as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer- in-Charge.	sqm	40	3,400	1,36,020
11.5	Providing and supplying Spandrel Glass Panels comprising of 6 mm thick heat strengthened monolithic float glass of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade so as to match the colour and shade of the IGUs in the vision panels etc. ,all complete for the required performances as specified, as per the Architectural drawings, as per the approved shop drawings, as specified, and as directed by the Engineer- in- Charge. For payment, only the actual area of glass on face # 1 of the glass panels (but excluding the area of grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (Payment for fixing of Spandrel Glass Panels in the curtain glazing is included in cost of relevent Item*).	sqm	100	3,328	3,32,831
	(i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m2 degree K etc. . The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
12.0	**HORTICULTURE WORK**				
12.1	Preparation of subgrade by **excavating earth to an average of 225 mm depth, dressing to camber and consolidating** with road roller including making good the undulations etc. and disposal of surplus earth for all lead.	SqM	36000	90	32,49,683
12.2	Supplying and stacking of good earth at site including royalty and carriage up to 1 km (earth measured in stacks will be reduced by 20% for payment).	CuM	10000	356	35,63,453
				Total of Schedule B (Part-1)	**168585286**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor)					
Schedule- B(Part-2) Bill of Quantaties for Architectural Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**TOTAL QTY**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**MARBLE & GRANITE WORK**				
1.1	Providing and fixing dry cladding for all level with 30 mm thick gang saw cut stone with (machine cut edges) of uniform colour and size upto 1mx1m, fixed to structural steel frame work and / or with the help of cramps, pins etc. and sealing the joints with approved weather sealant as per Architectural drawing and direction of Engineer-in-Charge. (The steel frame work, stainless steel cramps and pins etc. shall be paid for separately.) Granite of any colour, 30mm thick Note : All shades and textures of granite available in Quarries of Nearby states (Gurajat,Rajasthan etc.,)	sqm	500	4,537	22,68,475
1.2	Providing and fixing **stainless steel turnstyle** made of 304 grade stainless steel including all fittings etc. complete as per Architectuctural drawings and direction of Architect / Engineer in charge	Kg	400	3,335	13,33,873
2.0	**STEEL WORKS**				
2.1	SITC of electric motor single phase,230 V 50Hz, 600 kg set load lifting force for operating rolling shutter	Nos	6	22,106	1,32,633
2.2	SITC of electric motor single phase,230 V 50Hz, 1000 kg set load lifting force for operating rolling shutter	Nos	16	27,292	4,36,669
3.0	**ROOFING**				
3.1	Providing and Fixing **Texture Steppe edge 15mm for Ceiling** of size 595x595x15mm is to be installed on framework of Anutone Soundskelet, which will comprise of NRC 0.94 base panel with humidity resistance of 90% RH as per ISO-4611,ASTM C-165,ASTM C303, ASTM C-1104 and light reflectance upto 85% with Leed points Green Performance certified, and Thermal conductivity K=0.82 W/MK with sag resistance with normal edge profile. 15 mm for Ceiling tile meet the stringent fire test required having Class 'A' rating for Flame Ignitability test as per ASTM-E-84, with complete framework of as per manufacturers Installation details and the Architectrual drawing.	Sqm	400	1,979	7,91,402

3.2	Providing and Fixing **SoundSoak (Cord) Panel** of size 1200x600x25 mm ND 4 with Sound Profile F-Spline, which will comprise to NRC 0.95 SoundSoak Panel is to be installed on Anutone SoundStrut framework and meet the stringent fire test required having Class 'P' rating for Ignitability test as per BS 476 part 5 and Class '1' rating as per BS 476 part 6 Fire Propagation index and for Flaming ISO 1182 and Smoke density as per ASTM E 662 basides base panel conform to EN 13168 2000 with complete frame work as per manufacturers Installation details and the Architectrual drawing.	Sqm	350	5,252	18,38,351
4.0	**ALUMINIUM WORK**				
4.1	Providing and fixing Aluminium adjustable aluminium louver for windows as per requirement using powder coated aluminium sections of size 63mm x 38 mm frame, U channel, adjustable louver blades size 63 mm.	kg	500	808	4,03,975
5.0	**HORTICULTURE WORK**				
5.1	Fine dressing the ground and **construction of mounds**, 1500 mm high above ground height.	CuM	80	267	21,371
5.2	**Trenching in ordinary soil up to a depth of 60 cm** including removal and stacking of serviceable materials and then disposing of surplus soil, by spreading and neately levelling within a lead of 50 m and making up the trenched area to proper levels by filling with earth or earth mixed with sludge or manure before and after flooding trench with water (Excluding cost of imported earth, sludge or manure).	CuM	11000	42	4,61,153
5.3	**Supplying and stacking at site cowdung manure** from approved source (manure measured in stacks will be reduced by 8% for payment).	CuM	6000	270	16,21,776
5.4	**Rough dressing the trenched ground** including breaking clods.	CuM	11000	81	8,92,474
5.5	**Mixing earth and sludge or manure** in proportion specified or directed by the office-in-charge	CuM	11000	19	2,14,418
5.6	**Spreading of sludge, dump manure or/and good earth** in required thickness (cost of sludge, dump manure or/and good earth to be paid separately) and neatly levelling it.	SqM	11000	28	3,12,615
5.7	**Grassing with selection No. 1 grass** including watering and maintenance of the lawn for 30 days or more till the grass forms a thick lawn, free from weeds and fit for mowing. With grass turf.	SqM	36000	7	2,57,911
5.8	Plugging the bermuda grass in rows 50 mm apart in either direction, to be firmly entrenched into the soil.	SqM	36000	10	3,42,119

5.9	**Renovating lawns including weeding, cheeling the grass**, forking the ground, top dressing with sludge or manure, mixing the same with forked soil, watering and maintaning the lawn for 30 days or more till the grass forms a thick lawn free from weeds and fit for mowing and disposal of rubbish as directed, including supplying good earth if needed but excluding the cost of sludge or manure (the good earth shall be paid separately)	SqM	36000	18	6,61,864
6.0	**Sprinkler and Accessories**				
6.1	Providing & fixing of **Pop up sprinkler** full/part circle having radius of throw 6.7 m-15.2 m & floww of 0.09 -0.16 Ltr /sec at an operative pressure of 2.5- 4.5 kg/cm sq .The sprinkler is gear driven ratary type with RC technology having 3/4'' bottom inlet, with slip clutch mechanism and heavy duty retract spring memory arc,non strippable and brass reinforced nozzle turret.The sprinkler shall have multi-function, pressure activated wiper seal for low pressure operation the sprinkler shall have internal seal A Metric device which prevents low head drainage up to 3.1 m)& hence pudding & erosion.The body of sprinkler is non corrodable heavy duty ,ABS plastic 5505	Nos.	220	2,635	5,79,735
6.2	Providing & fixing of **POP up spray head** having variable adjustable arc and two pieces stem ratchet (0 to 360 degres) nozzle capable of covering 0.9-5.5 m at 1.0-2.1 bars with a discharge rate of 0.23- 0.33 lps .The spray head body ,stem,nozzle,ratchet and screen shall be constructed of heavy duty , ultra voilet resistant plastic and stainless steel with multifunctional wiper seal with small exposed cover US400	Nos.	550	633	3,47,978
6.3	Providing & fixing of **1/2'' pop up connecting swing joint assembly**. The tubing shall be made of polythene having wall thickness of 2.3 mm a working pressure of 5.5 kg/sq cm at 43* c and a surge pressure of 16.6 kg/sq cm .The fittings shall be made of UV resistant thermo plastic SA series.	Nos.	550	664	3,65,069
6.4	Providing & fixing of **3/4'' pop up connecting swing joint Assembly** .The tubling shall be made of polythylene having wall thickness of 2.3 mm a working pressure of 5.5 kg/ sq cm at 43* C and a surge pressure of 16.6 kg/ cm Sq .The fitting shall be made of UV resistant thermo plastic SA series.	Nos.	220	728	1,60,248
7.0	**VALVE & ACCESSORIES**				
7.1	Providing valve 63mm providing & fixing **Brass Ball valve** security pivot to maintain level in space double water tight joint direct injection stem non mechanical with a base which permits maximum penetration in to the valve etc complete as per specification and drawing (Ball vaive 63mm dia)	Nos.	50	3,008	1,50,403
7.2	Providing & fixing of a **double acting Air release valve** 3/4" made of high strength aluminum/plastic with fiber glass reinforced. The Air release valve shall be capable of both releasing and admitting air from and into the line. The working pressure shall be 5 bars.	Nos.	4	889	3,555

7.3	12" Rectangle **valve Box** with green lid and corrugated structure with unique shovel access slot and bolt hole knockout.	Nos.	50	2,249	1,12,429
7.4	Quick **coupling valve** made up of solid brass with locking cover corrosion resistant and stainless steel spring 3RC.	Nos.	4	1,545	6,180
8.0	**VERTICAL JET FOUNTAIN**				
8.1	Vertical Jet Nozzle (40) M.O.C Brass / Gunmetal	No.	2	1,580	3,160
8.2	**Vertical Jet Nozzle (25) M.O.C Brass / Gunmetal**	Nos.	16	1,119	17,901
8.3	**Submersible Pump 5HP**	No.	2	23,305	46,610
8.4	**Submersible Niche Light** (NL1250HN) 12v 50w light in Noryl body to highlight the fountain at night	Nos.	40	3,028	1,21,105
8.5	**Stepdown Transformer** of required capacity for the Lights **(12V1000W)**	No.	2	8,295	16,590
8.6	**Stepdown Transformer** of required capacity for the Lights **(12V500W)**	No.	2	5,530	11,059
8.7	**Weather Proof Junction Box** in FRP	Nos.	8	1,580	12,639
8.8	**FRP sump cover** for pump.	No.	2	3,951	7,901
8.9	Imported **Pressure Sand Filter** (450 dia) with multiport valve & pump	No.	2	43,449	86,898
8.10	50OD **Floor Inlet** (ABS)	Nos.	6	461	2,766
8.11	**Vacuum Point** (ABS)	No.	2	461	922

8.12	**Chlorine dispensing unit**	No.	2	15,800	31,600
8.13	**Water level Controller cum dry run protection** - Electrical type with Solonoid control.	No.	2	26,332	52,665
8.14	**Control Panel** made of 16 gauge CRC sheet powder coated with Starter, Single phase prevention, MCB, volt-meter, Amp meter, TP MCB's, Protection circuits etc and space for step- down Transformers for the lights.	No.	2	48,715	97,430
8.15	Complete **plumbing required for the fountain in uPVC pipe** (10 Kg Pressure) including necessary control valves etc (excluding inlet and drain)	LS	2	55,298	1,10,596
8.16	**Complete electrical work required for the fountain** including pump, light, panel, transformer connections (Individual wires for each light up to junction box within 10M. From water body)	LS	2	43,185	86,371
8.17	**Installing, testing, commissioning**, shop drawings	LS	2	1,48,909	2,97,819
9.0	**MISCELLANEOUS**				
9.1	Model preparation for Mihan DEPOT The model will be make in 1:400 scale. Model are made in plastic acrylic sheet. Model base size will be 11'x3' the colour of the model will be as per view.	Nos	2	3,39,000	6,78,000
10.0	**BRICK WORK**				
10.1	Providing and laying **autoclaved aerated cement** blocks masonry with 200 mm thick AAC blocks in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand)..	cum	1500	6,887	1,03,31,025
11.0	**MARBLE & GRANITE WORK**				
11.1	Providing and laying 18mm thick mirror polished granite stone work of upto and including sizes of 1200mmX600mm of approved colour/ pattern at all levels for lift cladding with cement mortar 1:3 including fixing of SS cramps. fasteners of approved make as per drawings and specifications. The cost of making necessary grooves stone pieces, chamfering of corner edges and polishing are included. (Fastener and cramps are to be paid in separate head)	sqm	100	3,841	3,84,062
12.0	**WOOD & PVC WORK**				
12.1	Providing and fixing PVC white colour door silencer of apptoved make fixed at the back of door with necessary screws etc. complete.	Each	160	62	9,944
13	**FIRE DOORS**				
13.1	Fire check doors supply of approved make 2hrs fire rated door fabricated and successfully tested at CBRI Roorkee in both direction -satisfying two criteria (Stability and Integrity) confirming to BS:476 Part II, IS3614 Part II as per schedule of requirement.	Sqm	400	9,308	37,23,124

13.2	Providing and fixing clear vision panel of 200mm x 300mm complete in all respect 2 hrs fire rated.	each	200	5,660	11,32,034
13.3	Providing and fixing Heavy duty door closer complete in all respect - 2 hrs fire rated.	each	262	3,607	9,45,024
13.4	Providing and fixing Eurofile Mortice lock - 240 with double pin cylinder having master arrangement and ss handles complete in all respect - 2 hrs fire rated.	each	200	4,378	8,75,524
13.5	Providing and fixing concealed SS finish tower bolts (300mm) complete in all respect - 2 hrs fire rated.	each	38	1,283	48,737
13.6	Providing and fixing Magnum or equivalent make SS 4 Ball Bearing hinges complete in all respect - 2 hrs fire rated.	each	1048	377	3,95,536
13.7	Providing and fixing SS handles Dorma or equivalent make for double leaf door complete in all respect - 2 hrs fire rated.	set	200	1,992	3,98,438
13.8	Providing and fixing door with shutter fabricated from18 gauge thick galvanised steel sheets press formed to provide a 46mm thick fully flushed double skin door with lock seam joints at stile edge and infill insulation kraft core. Door frames 60x120 mm approx. to be single rebated made of 16 gauge galvanised steel. Door shutter and frame to be primered in stoving grade epoxy zincphosphate primer and finished in aliphatic grade u.v. resistance polyurethane paint. Door shutter and frames to have all hardware preparations, prepunctured at the factory all complete with and including filling of door frames with P.C.C. 1:5:10 (1 cement : 5 aggregate : 10 coarse sand).	sqm	250	5,650	14,12,500
13.9	Clear Vision Panel of 200mm x 300mm	each	100	2,825	2,82,500
13.10	Heavy Duty Door Closer	each	150	3,955	5,93,250
13.11	Eurofile Mortice lock -240 with double pin cylinder having master arrangement and ss handles	each	175	2,260	3,95,500
13.12	Concealed SS finish tower bolts (300mm)	each	80	1,130	90,400
13.13	Magnum or equivalent make SS 4 Ball Bearing hinges	each	800	57	45,200
13.14	SS handles Dorma or equivalent make for door shutter	set	200	2,034	4,06,800
14.0	**FLOORING WORKS**				
14.1	Colour epoxy coating 2+1mm over prepared surface by surface grinding with diamond cutter, applying epoxy penetration promer,epoxy self levelling screed,epoxy scratch coat and epoxy	sqm	9400	912	85,71,954
15.0	**ROOFING**				

15.1	Providing and installing suspended ceiling system at all levels with interlocking grid of size 1200x6000mm / 600x600mm ceiling module of size (1250x600) consisting of demountable infill units (size 1200x600x1.2mm) having 50mm gap at every 1200mm, gap covered with 82mm wide channel having flanges to hold ceiling panels. The panels and channels shall be made from 1.2mm thick GI sheet, punched and bent to shape. The panels shall have perforated area 30-40%. The ceiling shall be powder coated (PPC, 80micron) on exposed and unexposed surface with approved colour. The grid system shall include hangers and runners of size 50x50x3mm thick hot dip galvanised steel, fixed on soffit of slab with the help of stainless steel expansion fasteners of size 10x75mm (Tam Anchor), The ceiling system to include panels, hanging system including the cost of providing opening and electrical fittings/fixtures, secondary supporting system for opening and below cable tray and duct, access to maintenance, all complete as per requirement of Engineer-in Charge.	Sqm	250	3,955	9,88,750
15.2	Providing & Fixing true horizontal level suspended ceiling comprising of Aluminum Clip-in with double pip self-leveling feature and special tabs to allow removal of tile to enable plenum access with plain visual consisting of 600X600 clip in tiles of 0.7mm thick Aluminum with bevel edge in Global white color precoated with primer coat at the rear side with Light Reflectance > 60% and suitable for Green Building application, with Recycled content of 50%. Tiles would have fire performance of Class A2-s1.d0 as per EN13501.	sqm	250	2,486	6,21,500
16.0	**CC PAVER BLOCK**				0
16.1	Providing & laying of Grasscrete 200 mm deep laid on a consolidated sub-base with a 10/20mm blinding layer of sand. Steel mesh reinforcement (10mm dia), weighing 5.944kgs/m2. Concrete 30MN/m2 at 28 days with air entrainment of 3% 10mm maximum aggregated and 100mm slump placed around formers and mesh and leveled to tops of formers.	sqm	200	3,250	6,49,976
17.0	**ALUMINIUM WORK**				
17.1	Providing and fixing **aluminium work for doors, windows, ventilators and partitions with extruded built up** standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, paneling and dash fasteners to be paid for separately) :				

17.1.1	With 5mm glass having light transmission value 56-57%, external reflecton 16%, internal reflecton 19-25%, solar factor 0.48-0.53, U value 5.6-5.8 w/sq.m-kall	sqm	100	2,390	2,38,995
18.0	**WATER PROOFING**				
18.1	Providing and filling ACC blocks (waste) in sunken area including levelling with light weight beater complete	cum	175	4,830	8,45,184
19.0	**MISCELLANEOUS**				
19.1	Providing and fixing chicken wire mesh (26 gauge) at the junctions of RCC & brick work fixed with wire nail in cement mortar 1:4 (1 cement : 4 fine sand) etc. complete.	sqm	1000	80	80,230
	Total of Schedule B (Part-2)				**48864893**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor) at Ch:19700 & Ch: 18460 Respectivly					
SCHEDULE- C (Part-1) Bill of Quantities for Structural Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**QTY.**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**EARTH WORK - EXCAVATION & BACKFILLING**				
1.1	Earth work in excavation by mechanical means (Hydraulic excavator) over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed. for All kinds of soil cum				
1.1.1	0.00-1.5m	Cum	115000	173	1,98,69,700
1.1.2	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.	Cum	70000	51	35,80,150
1.2	Earth work in excavation by mechanical means (Hydraulic excavator) over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50 m and lift upto 1.5 m, disposed earth to be levelled and neatly dressed for Ordinary rock.				
1.2.1	0.00 -1.5m	Cum	50000	272	1,35,80,720
1.2.2	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.	Cum	40000	92	36,84,560
1.3	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth,	Cum	70000	125	87,37,050
1.4	Providing and filling sand (Zone II) in floors of all building/sheds and/or any other location as specified by Engineer incharge to required depth including watering, ramming, consolidating **with all leads and lifts** complete as per drawing .	Cum	400	1011	4,04,318
2.0	**CONCRETE WORK (PLAIN & REINFORCED)**				
	Rates of all cement concrete items (Plain & Reinforced) described below shall Include work at all levels and locations within the site, and shall in all cases be inclusive of cost of **admixtures** in required dose, formwork, scaffoldings and any other temporary works				
2.1	**PLAIN CEMENT CONCRETE**				

2.1.1	Providing and laying plain cement concrete **M15** grade using OPC/PPC cement for levelling course under foundations, plinth and tie beams, under floors, basements, under base slabs of water tanks, bases of platforms, in window Sills, in fillings,holding down bolts,steel column bases, in fills. or any other works, including necessary dewatering, formwork, mixing in mechanised batch mix plant, transporting, compacting, curing and finishing as directed including all leads, lifts, etc. complete as per approved drawing, specification and as directed by Engineer. Rate shall include preparing surface to receive PCC, shuttering, required dosage of admixture in concrete for obtaining required workability as per specifications and approval of Engineer- in-charge.	Cum	8500	5925	5,03,58,763
2.2	**REINFORCED CEMENT CONCRETE**				
	Providing and laying required grade reinforced cement concrete including casting and placing , shuttering, scaffolding and all related operations required to complete the work at all levels including centering, propping, staging, curing, necessary tools, plants,machinery and all related operations etc.for all heights using steel material for shuttering & steel props. Reinforcement shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per specification & approval of Engineer .				
	Note: (i) The rate is inclusive of all above bonding agents/methods except cost towards reinforcement bars which will be paid against relevant BOQ items . (ii) Concreting must be carried out using concrete pumps. (iii) 53 grade OPC cement to be used in RCC works unless otherwise specified				
2.2.1	For Concrete Grade M30 in Open Foundations for columns and walls, column pedestals, plinth beams, foundation tie beams,Pile Cap,Trenches and other similar works as shown or as directed.				
2.2.1.1	Open Foundation,Trenches of all types, Pedestals, Plinth beams,Foundation tie beams, Pile cap etc or other Similar works	Cum	38000	7295	27,71,98,501
2.2.2	For Concrete Grade M30 for **Columns**, hangers, posts,shells and mullions of all shapes and sizes, retaining walls, basement walls, Facias, parapets, railings, drips and other similar locations. and any other walls straight, bent or curved in plan or in section.	Cum	1400	8092	1,13,29,420
2.2.3	For Concrete Grade M30 for **Floor slabs**, water tank cover slabs, stair landings, waist slabs including steps, folded stairs, inclined / sloping slabs, copings, sills and all such horizontal elements at all levels.	Cum	7825	7295	5,70,81,007
2.2.4	For Concrete Grade M30 for **Floor & roof beams** , landing level beams, spandrels, lintels of all shapes and sizes, including flares in plan or in elevation, pergolas, coffers etc.	Cum	7701	7295	5,61,76,465

2.2.5	Dismantling of new green, partially set or fully set concrete, as per instructions of Engineer.	Cum	150	1446	2,16,922
2.2.6	For Concrete Grade M25 in Open Foundations for columns and walls, column pedestals, plinth beams, foundation tie beams,Pile Cap,Trenches and other similar works as direction of Engineer - in - Charge	Cum	1000	6992	69,91,590
2.3	**PRECAST REINFORCED CONCRETE**				
2.3.1	Providing,hoisting and fixing of Precast RCC M30 in tie beams, gutter, window, sills/lintels steps of staircase, **covers of Drain,covers of Trenches of all types**, sump and manholes and all other locations as called for etc. complete cast to profile and the thickness wherever required and/or as directed including supply of all labour, materials and equipment and performing all operations required for manufacture and transportation of pre-cast reinforced cement concrete items, hoisting and fixing them in position to correct lines and levels, pointing and finishing, cutting, bending ,providing and fixing of lifting hooks, etc, complete and testing of pre-cast elements by the Contractor. Structural steel embedments, if any, as indicated in the working drawings shall also be embedded in concrete.	Cum	1600	9770	1,56,31,312
3.0	**REINFORCEMENT WORK**				
3.1	Providing TMT reinforcement steel of Fe-500D Grade conforming to IS1786 (latest) from approved list of supplier, cost of material, royalty, transportation, handling, storing, straightening, cutting, bending, tying, lap/butt welding placing including 18 gauge GI binding wire in diamond form at each reinforcement junction in all structural concrete at all heights and depths with all leads complete as directed. The rate shall also include the cost of binding wire . labour, all material, tool and plants , all leads , lift etc as per drawings and technical specification as directed by Engineer-In -Charge. The rate shall also include **Protective coating** as per technical specifications.	MT	6000	75622	45,37,32,322
	Dry random rubble stone (600 mm thk.) as a filter media				
3.2	Providing and laying of filter material As per RDSO Specifications underneath pitching in slopes complete as per drawing and Technical specification.	cum	100	1439	1,43,917
	Providing and Fixing Concertina Coil Fencing				
3.3	Providing and Fixing Concertina Coil Fencing with punched tape concertina coil 600mm dia 10 metre openable length (total length 90M) having 50 nos rounds per 6metre lenght, upto 3metre height of wall with existing angle iron 'Y' shaped 3 m apart and with 9 horizontal R.B.T. reinforced barbed wire, stud tied with GI staples and GI clips to retain horizontal including necessary bolt or GI barded wire tied to angle iron all complete as per direction of Engineer Incharge with reinforced barbed tape (R.B.T.)/ Spring core (2.5mm thick) wire of high tensile strength of 165kg/MMsq with tape (0.52 mm Thick) and weight 43.478gm/metre (Cost of angle, CC blocks shall be paid separately)	Rmt	5000	305	15,26,917
4.0	**WATER PROOFING WORK**				
	(a) Applying Epoxy putty known as TECHOXY or equivalent Consisting of 1 part Techoxy and 2 parts of white cement				
	(b) Applying 3 coats of epoxy known as TECHOXY or equivalent	Sqm	2098	531	11,14,164

4.1	Providing and laying integral cement based treatment for water proofing on horizontal surface at all depth below ground level for under ground structures as directed by Engineer-in-Charge and consisting of : i) Ist layer of 22 mm to 25 mm thick approved and specified rough stone slab over a 25 mm thick base of cement mortar 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound conforming to IS:2645 in the recommended proportion over the leveling course (leveling course to be paid separately). Joints sealed and grouted with cement slurry mixed with water proofing compound. ii) 2nd layer of 25 mm thick cement mortar 1:3 (1 cement: 3 coarse sand) mixed with water proofing compound in recommended proportions. iii) Finishing top with stone aggregate of 10 mm to 12 mm nominal size spreading @ 8 cudm/sqm thoroughly embedded in the 2nd layer.				
4.1.1	Using rough kota stone.	Sqm	8001	1135	90,84,221
4.2	Providing and laying integral cement based treatment for water proofing on the vertical surface by fixing specified stone slab 22 mm to 25 mm thick with cement slurry mixed with water proofing compound conforming to IS:2645 in recommended proportions with a gap of 20 mm (minimum) between stone slabs and the receiving surfaces and filling the gaps with neat cement slurry mixed with water proofing compound and finishing the exterior of stone slab with cement mortar 1:3 (1 cement : 3 coarse sand) 20 mm thick with neat cement punning mixed with water proofing compound in recommended proportion complete at all levels and as directed by Engineer-in-charge:				
4.2.1	Using rough Kota stone	Sqm	3221	1381	44,46,830
5.0	**MISCELLANEOUS WORKS**				
5.1	Providing and laying damp-proof course 40 mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 12.5 mm nominal size).	Sqm	1400	286	4,00,786
5.2	Applying a coat of residual petroleum bitumen of grade of VG-10 of approved quality using 1.7 kg per square metre on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.	Sqm	1400	147	2,05,212
	With Stainless Steel Tubes (Grade 304)	MT	10	402929	40,29,293
5.3	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. Complete as per technical Specifications				
5.3.1	In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	MT	25	83617	20,90,433
5.3.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	MT	50	100052	50,02,604
5.3.3	Structural steel work in single section, fixed with or without connecting plate, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	MT	50	74734	37,36,684
5.3.4	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	MT	4	82118	3,28,473
5.4	Finishing with **Epoxy paint** (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete. On all types of steel work	sqm	20600	125	25,67,861
6.0	**Pile WORKS**				

6.1	Boring, providing and installating **bored cast-in-situ** reinforced cement concrete piles as per approved GFC drawing of **600/800/1000** dia with M-35/20 using PPC/PSC grade cement in all soil strata including boulders and kankar ,soft rock/weathered rock as per technical specifications The cost shall also include the cost of empty boring with MS temporary liner as per site requirement. The stated length include test piles for initial load tests. The cost shall also include built up of pile up to the required level (Measurement shall be from theoretical cut-off level to theoretical founding (toe) level as per drawing). The rate shall include all operations required for installation of pile such as installation of rig, shifting of hydraulic rig, construction of approach temporary road / bridge for pilling rig etc.. Any reason for idling of rig will not be payable. The item includes disposal of earth, muck, slush released from piles, top cut portion of pile at dumping ground for all leads. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability				
	as per approval of Engineer in Charge. Drilling shall be done only by use of hydraulic rig using temporary casing of required depth (min of 4.5m), Bentonite slurry to be used and as directed by the Engineer. Reinforcement will be paid separately. Rate shall also include drilling and socketing in rock at required depth. The item shall also include the cost of Bentonite Slurry to be used for stabilisation of bore.				
	Note: Piling should be done only byhydraulic rigs .				
	NOTE :-Contractors will have the option to use driven cast in situ piles instead of bored cast in situ piles as detailed, if they so propose above.rest of the terms and condition remains unchanged.				
6.1.1	1000mm	Metre	11132	9591	10,67,70,750
6.2	Vertical load testing of piles in accordance with IS 2911 (Part IV) including installation of loading platform by **Kentledge method** ,arrangements for measuring settlements/deflection and submitting reports and preparation of pile head or construction of test cap and dismantling of test cap after test etc. complete as per specification & the direction of Engineer in-charge. **Note:** 1. Initial and Routine Load Test shall not be carried out by Dynamic method of testing. Note: 2. Testing agency shall submit the design of loading platform for the approval of Engineer-in-charge.				
6.2.1	**800 mm dia pile (upto 50MT Capacity Pile)**	MT	4	18469	73,876
6.2.2	**1000 mm dia pile (upto 50MT Capacity Pile)**	Nos.	4	18469	73,876
6.3	Integrity testing of Pile using Low Strain/ Sonic Integrity Test/ Sonic Echo Test method in accordance with IS 14893 including surface preparation of pile top by removing soil, mud, dust & chipping lean concrete lumps etc.and use of computerised equipment and high skill trained personal for conducting the test & submission of results, all complete as per direction of Engineer-in-charge.	Nos.	120	791	94,961
	Measurement:-				

	The liner shall be of MS steel plate, of required thickness or as per drawing duly approved. The payment of liner shall be made in MT as per the area of the MS sheet provided in liner multiplied by standard weight coefficient or actual weight, whichever is less. The quoted rates will be applicable for all lengths provided upto the soffit of pile cap. the measurement will be made for actual length of linear provided correct to 1 cm.				
7.0	**ROAD WORK, SUB-BASES, & SHOULDERS**				
7.1	Construction of **Granular sub base (GSB)** by providing, laying, spreading and compacting of coarse graded material confirming to grade-1 (size ranging from 75 mm to 0.075mm, having minimum CBR value 30, spreading in uniform layer with motor grader on prepared surface mixing by mix in place method with rotavator at OMC , and compacting with vibratory roller 8-10 tonnes to achieve the desired density of 98% including protection of edges of GSB layers , cost of all materials, labour, hire charges of machinery ,lighting,gaurding , barricading maintenance of diversion roads, loading & unloading , all lead and lift etc., complete.(Measurement will be for Compacted Thickness) as per MORTH specifications and as directed by engineer. Waste material has to be dumped in contractors dumping yard.	Cum	15000	2354	3,53,10,879
7.2	Providing, laying, spreading and compacting graded stone aggregate (size range 53 mm to 0.075 mm) to wet mix macadam (WMM) specification including premixing the material with water at OMC in for all leads & lifts, laying in uniform layers with mechanical paverfinisher in sub- base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achievethe desired density, complete as per specifications and directions of Engineer-in-Charge.	Cum	9098	2354	2,14,15,659
	BITUMINOUS WORKS				
7.3	Providing and applying tack coat using bitumen emulsion conforming to IS: 8887, using emulsion ssure distributer including preparing the surface & cleaning with mechanical broom.				
	With medium setting bitumen emulsion				
7.3.1	On W.B.M / W.M.M. @ 0.4kg/sqm	Sqm	19803	22	4,35,517
7.3.2	On bituminous surface @ 0.25kg/sqm	Sqm	19803	14	2,82,576
7.4	Providing and laying Dense Graded Bituminous Macadam using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equiped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers as per specifications to achieve the desired compaction and density, complete as per specificatons and directions of Engineer-in-Charge.				
7.4.1	50 to 100 mm average compacted thickness with bitumen of grade VG-30 @5% (percentage by weight of total mix) and lime filler @ 2% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity.	Cum	5100	9762	4,97,86,016
7.5	Providing and laying Bituminous concrete using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equiped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers to achieve the desired compaction and density as per specification, complete and as per directions of Engineer-in-Charge.				
7.5.1	40/50 mm compacted thickness with bitumen of grade VG-30 @5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity.	Cum	2000	10658	2,13,15,536

7.6	Providing and laying **Seal coat** over prepared surface of road with bitumen heated in bitumen boiler fitted with the spray set spraying using 98 kg of bitumen of grade VG - 10 and blinding surface with 0.90 cum of stone aggregate of 6.7 mm size (Passing 11.2 mm sieve and retained on 2.36mm sieve) per 100 sqm of road surface, including rolling and finishingn with power road roller all complete.	Sqm	19803	111	22,06,733
7.7	Providing and laying at or near ground level factory made **kerb stone** of M-25 grade cement concrete in position to the required line, level and curvature,jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).	Cum	700	5881	41,16,601
8.0	**PRE ENGINEERED BUILDINGS**				
8.1	Design, Supply of Structural steel (conforming to IS:2062 Grade B) work using structural sections incl. anchor bolts fabricated /procured to the required profile and shape as called for, hoisted, installed in position incl. all cutting, welding (continuous welding wherever required and directed) grinding & all operations, necessary templates, adequate temporary supports, scaffolding, staging, etc. incl. all tests on material and fabrication as required. Item to include the cost of sand blasting wherever required, primer and painting as per the specifications for internal and external surfaces as per technical specifications. Every precaution to be taken against rusting of sections. (Installation of Columns shall be done by other agency)				
	Rail track supporting columns of approximate length of 1210 mm of HE240 of Jindal Steel Pvt Ltd or equivalent complete with base plate and capping plate, holding down bolts etc complete	tonnes	100	82118	82,11,820
	TOTAL OF SCHEDULE -C (Part-1)				**1263344996**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor) at Ch:19700 & Ch: 18460 Respectivly					
SCHEDULE- C (Part-2) Bill of Quantities for Structural Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**QTY.**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**EARTH WORK - EXCAVATION & BACKFILLING**				
1.1	Earth work for embankment including breaking clods dressing **with all lead and lift** and including watering rolling and consolidation of subgrade in layers of 200mm at O.M.C to required dry density including filling the depressions which occur during the process using power roller 8T to 10T as per Technical specification clause no 9.1 to 9.3.				
	By contractor's own suitable soil brought from outside the depot. The rates are inclusive of procurement of materials **with all lead, lift**, spreading, watering, pacting, contractor's own machineries, equipment labour including all taxes, royalties octroi and necessary environment clearance from Centre / State authorities (if any) etc complete and dressing all slopes and top surface to required level.	Cum	150000	412	6,18,67,500
1.2	Providing and filling sand (Zone II) in floors of all building/sheds and/or any other location as specified by Engineer incharge to required depth including watering, ramming, consolidating **with all leads and lifts** complete as per drawing .	Cum	400	1078	4,31,018
2.0	**Concrete works**				
2.1	Vacuum dewatered concrete M30 for grade slabs using **Polypropylene fibers** at 1.0 kg of fibers per cum of Concrete in floors of Depot sheds as per drawings and technical specifications	Cum	1491	8638	1,28,79,532
2.2	Grade slabs M30 using normal concrete as per drawings and technical specifications.	Cum	6045	7614	4,60,27,409
2.3	Machine foundations, foundation blocks M30 etc to produce F2 type finish.	Cum	100	7995	7,99,475
2.4	Providing **M-35** grade R.C.C. instead of M-30 grade R.C.C in Pile cap, Ramp portion or any other area specified by Engineer-in -charge as per drawing and technical specifications	Cum	10000	183	18,30,600
3.0	**REINFORCEMENT WORK**				

3.1	Supplying and providing welded Wire mesh fabrics per IS :1566 from approved supplier (minimum yield strength of 480 Mpa) ,Straightning ,cutting ,tying and placing in floors of Depot Sheds and/or any other locations as specified by Engineer-in-charge, as per drawings and specifications	MT	150	81804	1,22,70,614
	Dry Random rubble Stone Pitching				
3.2	Providing and laying Pitching with 150mm thick stone boulders weighing not less than 35Kg each with the voids filled with cement sand mortor 1:4 on slopes laid over prepared filter media including boulder apron laid dry in front oftoe of embankment complete as per drawing and technical specifications.(Filter media to be paid separately under the relevant item) (Cement 0.125 MT/M3). For Slopes provided in Embankments in Depot portion	cum	1000	2399	23,98,662
	Pre-Cast RCC M35 in RCC Work of Boundary Wall Pannels				
3.3	Providing, hoisting and fixing in position upto floor two level M35 Grade precast RCC panels upto 3m x 3m size with approved surface design (flutes, logos, etc.) on one surface and plain on other surface as per approved design mix complete including cost of centering shuttering , finishing , Admixture in recommended proportion (as per IS 9103), to accelerate, retard setting of concrete, improve workability without impairing strength and durability, excluding cost of cement and steel reinforcement, as per approved plan, curing, stacking, transportation & fixing in position but excluding the cost of supply of Bolts/ nuts for fixing, drilling holes for the same etc.	cum	2200	6513	1,43,29,229
	Providing and Fixing Concertina Coil Fencing				
3.4	Fixing of precast panels with columns of boundary wall with safety stud anchor HST, and providing M16 x 295 / 180 of HILTI Make inclusive of all taxes, carting to site of work, handling, drilling of holes in concrete panels and columns, cleaning of holes and fixing of bolts with all materials and labour as may be required etc. complete as per direction of Engineer in charge (cost of precast panels and columns are not included). The item also includes drilling of larger hole in the panel for creating recess for the nut / bolt head & the cost of sealing of bolt head with epoxy mortar and making flush with the surface, etc. complete as per the directions of Engineer in charge.	Nos	1000	1243	12,43,000
4.0	**MISCELLANEOUS WORKS**				
4.1	Grouting of anchor bolts (bolts to be supplied by Equipment suppliers) with non-shrink grouting Compound as approved by Engineer-in-charge as per approved drawings	Cum	10	78597	7,85,972

4.2	Supplying, pouring and packing **non-shrink grout** as per manufacturer's specifications under base plates of columns, trusses etc complete as per drawings and specifications, including cost of packing plates.	Cum	5	51331	2,56,657
4.3	Providing and fixing in position approved quality Closed cell Polyethylene foam joint **filler boards** (25 mm thick) at expansion joints of concrete structures, as per drawings and instructions complete including fixing with adhesives.	Sqm	200	1322	2,64,420
4.4	Providing and laying approved quality **silicone sealant** with shore hardness of 22, with a movement accommodation of minimum + 50% of joint width, and having a minimum tensile strength of 1.7 Mpa, suitable for expansion joints in floors and roofs of buildings.	Cucm	380000	9	34,35,200
4.5	**With Stainless Steel Tubes (Grade 304)**	MT	10	429538	42,95,379
4.6	Providing **chain link fencing** 50mm size of 8guage (as per IS 2721) properly streched b/w rectangular poles (upto 3m height) and fixed with suitable bolts&nuts,the free ends shall be welded to the pole and block pipe at top and bottom as required including cost of all materials,labour,lead&lifts,cutting, bending wherever necessary,wastage and lapping etc complete as per diection of the engineer in charge of work including 2 coats of approved quality paint over one coat of shop paint	Sqm	10000	880	88,02,700
4.7	Providing and fixing MS block pipe of 38mmdia,of heavy guage of 14 including removing the bends,cutting the pipe and fixing the pipe in b/w the 2 vertical poles(MS rectangular poles)and spot welding the chain link with MS block pipe including cost of all materials wastage in cutting,and scaffolding wherever necessary with all lead and lift as directed by	Rmt	23000	377	86,80,660
4.8	Providing and Laying Polythen sheet 600 microns for sub grade works	Sqm	2000	67	1,33,340
4.9	Providing and fixing MS bolt of 16mm dia 425 mm long length and threading upto 75mm including using suitable fixing arrangment	Nos	6570	104	6,83,017
4.10	Providing and laying **cinder concrete** in cement 1:15 (1 cement: 15 cinder of 12.5mm nominal gauge) on terreced roof or sunken slabs, laid to slope compacting ,including cost of materials labour, curing complete as per specifications	cum	140	2202	3,08,332
4.11	Providing and laying weep holes in retaining wall by using AC pipes of 100mm diameter including proper grade and joining complete, as per Technical Specifications	Rmt	1700	148	2,52,131

4.12	Supplying and fixing of **GI Sheet** of 16 Gauge for terrace expansion joint including cutting, screwing, placing in position etc complete	sqm	200	1735	3,46,910
5.0	**PILING**				
5.1	Boring, providing and installating **bored cast-in-situ** reinforced cement concrete piles as per approved GFC drawing of **600/800/1000** dia with M-35/20 using PPC/PSC grade cement in all soil strata including boulders and kankar ,soft rock/weathered rock as per technical specifications The cost shall also include the cost of empty boring with MS temporary liner as per site requirement. The stated length include test piles for initial load tests. The cost shall also include built up of pile up to the required level (Measurement shall be from theoretical cut-off level to theoretical founding (toe) level as per drawing). The rate shall include all operations required for installation of pile such as installation of rig, shifting of hydraulic rig, construction of approach temporary road / bridge for pilling rig etc.. Any reason for idling of rig will not be payable. The item includes disposal of earth, muck, slush released from piles, top cut portion of pile at dumping ground for all leads. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer in Charge. Drilling shall be done only by use of hydraulic rig using temporary casing of required depth (min of 4.5m), Bentonite slurry to be used and as directed by the Engineer. Reinforcement will be paid separately. Rate shall also include drilling and socketing in rock at required depth. The item shall also include the cost of Bentonite Slurry to be used for stabilisation of bore.				

	Note: Piling should be done only byhydraulic rigs .				
	NOTE :-Contractors will have the option to use driven cast in situ piles instead of bored cast in situ piles as detailed, if they so propose above.rest of the terms and condition remains unchanged.				
5.1.1	600mm	Metre	50	4150	2,07,493
5.1.2	800mm	Metre	14721	6415	9,44,31,204
5.2	Vertical load testing of piles in accordance with IS 2911 (Part IV) including installation of loading platform by **Kentledge method** ,arrangements for measuring settlements/deflection				
5.2.1	**Initial test**				

5.2.1.1	800 mm dia pile(2.5 times the theoretical design vertical load capacity up to 500 **MT** , The test arrangements to be designed shall cater for additional 25% above test load)	Nos.	8	71531	5,72,248
5.2.1.2	Extra over (a) for every increase of XX MT test load or part thereof over 500 MT.	MT	200	226	45,200
5.2.1.3	1000 mm dia pile (2.5 times the theoretical design vertical load capacity up to 750 **MT**, The test arrangements to be designed shall cater for additional 25% above test load)	Nos.	4	90168	3,60,674
5.2.1.4	Extra over (c) for every increase of XX MT test load or part thereof over 750 MT.	MT	200	226	45,200
5.2.2	**Routine test**				
5.2.2.1	800 mm dia pile(1.5 times the theoretical design vertical load up to 300**MT**)	Nos.	40	51187	20,47,492
5.2.2.2	Extra over 5 (a) for every increase of XX MT test load or part thereof over 300MT.	MT	20	226	4,520
5.2.2.3	**1000 mm dia pile (1.5 times the theoretical design vertical load up to 420 MT)**	Nos.	6	72187	4,33,123
5.2.2.4	Extra over 5 (c) for every increase of XX MT test load or part thereof over 420 MT.	Nos.	20	226	4,520
5.3	Lateral load testing of single pile in accordance with IS Code of practice IS: 2911 (Part IV) including all arrangements for measuring deflections and submitting reports for determining safe allowable lateral load on pile				
5.3.1	Extra over a for every increase of X MT test lateral load or part thereof over 50 MT.	Nos	20	565	11,300
5.3.2	Extra over c for every increase of X MT test lateral load or part thereof over XXX MT.	MT	20	565	11,300

5.4	Providing and fixing permanent MS liner (of required thickness or as directed by Engineer incharge) including cost of liner and driving the same for 600/800/1000 mm dia bored cast in situ piles wherever required as per approved construction drawings and directions of Engineer incharge all complete. Notes:(A) The scope of work in above item includes: a) All incidentals labour, material and works required to execute and complete the job.	MT	16	87451	13,99,211
	Measurement:-				
	The liner shall be of MS steel plate, of required thickness or as per drawing duly approved. The payment of liner shall be made in MT as per the area of the MS sheet provided in liner multiplied by standard weight coefficient or actual weight, whichever is less. The quoted rates will be applicable for all lengths provided upto the soffit of pile cap. the measurement will be made for actual length of linear provided correct to 1 cm.				
6.0	**ROAD WORK, SUB-BASES, & SHOULDERS , BITUMINOUS WORKS**				
6.1	Providing and applying **Primer Coat** with bitumen emulsion on prepared surface of Granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means as per MORT&H "Specifications for Road & Bridge Works" (5th Edition) Clause 502.	Sqm	19803	20	4,02,784
6.2	Providing, and fixing 150 mm dia rigid PVC Pipe of Class 10 (IS-3076 and 4985) under safety kerb all complete as per direction of the engineer.	Mtr.	2700	160	4,33,242
6.3	Construction of **Median** and Island above road level with approved material brought from borrow pits, spread, sloped and compacted as per MORT&H "Specifications for Road & Bridge Works" (5th Edition) Clause 407	Cum	200	148	29,606
7.0	**PRE ENGINEERED BUILDINGS**				

7.1	Designing, providing, fabricating, painting, transporting, erecting (using mechanised erection) and securing in position **structural steel work ,standing seam profiled roof sheeting having provision for supporting Solar panel ,roof monitor, inspection platform** for buildings and workshops complete as per technical specifications, approved shop drawings and / or instructions .Work under this item would generally cover				
	i) All **structural steel work** in the Buildings, including but not being limited to, columns, stanchions, beams, rafters, purlins, runners for cladding, gantry girders, brackets, hangers/ suspenders, runner beams for under slung cranes, bracings, etc. Work to include all intermediate stages of activities not defined herein, but otherwise implied for total completion of work				
	Cost to include but not be limited to, all materials including wastage, all consumables, fasteners of all types for both temporary and permanent stages of work, all temporary stays, labour, temporary works including staging, scaffolding, tools, plant and equipment, and, costs of all incidentals and necessary testing of material, workmanship etc including cost of painting as per Technical specifications Measurement will be on plan areas along center lines of exterior rows of columns for individual buildings - For item 8.1.1 to 8.1.6 and for item no.8.1.7 -payment shall be on overall plan area basis between outer most edges)				
	ii) Designing, Providing, fabricating and erecting hot dipped galvanised " **Rain Water Gutters'** using 3.15 mm thick mild sheets including all accessories, connections sleeves for connecting rain water pipes to Gutters placed at roof along all valleys and edges of Buildings including site seal welding at all joints to make water tight including painting as per specifications.				
	iii) Supplying and fixing of standing seam profiled roof sheeting having provision for supporting Solar panel with roof sheeting 600-630 cover width with rib height 74- 76mm . (Basemetal thickness should be 0.55 mm) or as aproved with hot dip metallic coating of minimum 150 gm/sq.m. zinc-aluminium alloy coating mass (55% Aluminium, 43% zinc and 1.5% silicon) . Coating mass total on both sides AZ-150 or equivalent as per AS 1397- 1993. Minimum 550 Mpa yield strength with silicon modified polyester (SMP) coating, (minimum silicone content 30%-50% or super-polyester XRW quality paint coat of approved colour. Coating shall be as per AS/NZS-2728-1997, Category-3. Total coating thickness of 35 microns, comprising of 20 microns exterior coat of SMP over super- polyester XRW on top surface and 5 micron polyester reverse on back surface over 5 micron primer coats on both surfaces including side and end laps. **(85% of total roof area)**				

	Fixing arrangement - Specially designed roof clips shall be used to hold standing seam roof sheet to the supporting structural member. The clip is designed to move freely in both directions to take care of thermal expansion and contraction. Roof Sheet side laps shall be field seamed by roof runner seaming machine which is self-propelled and portable electricallock-seaming machine. The machine field forms the final 180 degrees of a 360 degree double-lock standing seam, all side lap sealant shall be factory applied butyl rubber hot metal sealant. The panel end lap shall be joined by mean of a two piece clamped connection consisting of a bottom reinforcing plate and top panel strap. Screw bolt type fastener shall be used for fixing standing seam roof sheeting clip as per manufacturer's specification .				
	The Contractor shall give a minimum 10 year guarantee **to the client** for sheets against deterioration, disintegrationloss of lusture, variation in colour etc. and leakages across laps, fasteners etc.All types of steel sheets shall be load tested to satisfy 1.10 times the design wind loads and coating thickness to the satisfaction of the Engineer-in-charge. Fasteners shall also be load tested. The Contractor is to submit design and shop drawing for approval on the sheet profile, design and details before installation.				
	iv) Design, Supply and Erection of Structural steel (conforming to IS:2062 Grade B0) work for inspection platform using structural sections incl. anchor bolts fabricated /procured to the required profile and shape as called for, hoisted, installed in position incl. All cutting, welding (continuous welding wherever required and directed) grinding & all operations, necessary templates, adequate temporary supports, scaffolding, staging, etc. incl. all tests on material and fabrication as required. Item to include the cost of sand blasting wherever required, primer and painting as per the technical specifications for internal and external surfaces .Every precaution to be taken against rusting of sections. (Payment shall be on overall plan area of finished work basis between outermost edges). v) Plain, 0.55 mm Base Metal thickness ,SMP coated Galvalume/superpolyster XRW zincalume steel of similar material for ridge capping pieces at apex of skylights/hips including notching, turning down of edge of capping between ribs etc. all complete				

	vi) Providing, supplying, erecting and fixing in position **3mm thk Polycarbonate sheets** of approved texture and colour for **roof lighting**. Sheets to be profiled to match metal sheets and should include cost of laying sheets in curvature where required. Cost to include jointing, sealing with Butyl adhesives and takes as per manufacturers specifications and cover all costs of labour tools, parts, temporary works etc all complete.				
7.1.1	**Inspection Bays** including ,**side roof inspection platform with access (2Nos.)** (consisting of plates,rolled sections,chequered plates,tubes etc) ,portals, purlins, runners for cladding, gantry girders, Runway beams ,roofing ,gutters,stringer support beam(for all lines) etc.(Suppport arrangement for EOT crane 1.5t-2nos.)	Sqm	1000	12826	1,28,25,500
7.1.2	**Repair Bays** including portals, purlins, runners for cladding, gantry girders, Runway beams,roofing ,gutters etc..(Suppport arrangement for EOT crane 15 t -2Nos , 3.2 t -2 nos.)	Sqm	1214.4	13345	1,62,06,532
7.1.3	**Interior Cleaning Building** including ,**side roof inspection platform with access** (consisting of plates,rolled sections,chequered plates,tubes etc) portals, purlins, runners for cladding ,roofing ,gutters etc.	Sqm	1160	15289	1,77,35,124
7.1.4	**ETU cum Emergency Rerailing Building** including Portals,Purlins,runners for cladding,Gantry Girder ,roofing ,gutters etc.(Suppport arrangement for EOT crane 5t-1 no.)	Sqm	500	14159	70,79,450
7.1.5	**Stabling Shed** including portals, purlins, runners for Cladding ,roofing ,gutters etc.	Sqm	0	6995	0

7.1.6	**Pit Wheel Lathe Building** including portals, purlins, runners for cladding ,Gantry Girders in Pit Wheel Lathe ,roofing ,gutters etc.(Suppport arrangement for EOT crane 3.2t 1 no.)	Sqm	1944	13707	2,66,46,214
7.1.7	**Car Parking Shed and Scooter/Cycle stand** including columns, rafters/trusses, runners, ties, purlins ,roofing, gutters etc as shown in drawings or as directed and approved	Sqm	25	1446	36,160
7.2	NOTE: Providing, fabricating and supplying Hot - Dip Galvanized Holding Down Bolts (As per IS 1367) including all assemblies and accessories etc that are required to be embedded in concrete work by other agencies are included in the rate quoted by the tenderer in item nos. 8.1.1 to 8.1.7. Bolts shall be of sufficient length to ensure that a minimum 40mm length of threaded portion is embedded in concrete. Threaded portion to be left projecting outside the concrete surface shall be as per requirement of supplier's design and approved drawings.Cost of fabricated, assembled and supplied Bolts shall include all necessary expenses incurred , including costs of all washers, nuts, lock nuts and pins that may be required for securing the structural member with the embedded bolts. Work of actual fastening of the structural components with the embedded bolts shall have to be carried out by the supplier of the steel structure. However the foundation bolts shall be installed in foundation by civil contractor for construction of depot.Supplier's quoted rate for the item shall include cost of executing the work for Bolts of all diameters and lengths.				
7.2.1	**Fixing arrangement** -The wall Sheets shall be fixed using polymer coated hot dip galvanized hex head self drilling fasteners as per AS 3566 class 3 on each crest of sheets for connection with purlins/runners and polymer coated hot required. Approved sealing tapes shall be used on side laps and end laps of sheets and closers to be dipped stitching fasteners @ 300 mm c/c on all sides and end laps etc. Measurement shall be based on per unit of finished / laid surface area. Item to include curved sheets also whereever provided at the last end of sheets.	Sqm	2097	622	13,03,024

	The Contractor shall give a minimum 10 year guarantee **to the client** for sheets against deterioration, disintegrationloss of lusture, variation in colour etc. and leakages across laps, fasteners etc.All types of steel sheets shall be load tested to satisfy 1.10 times the design wind loads and coating thickness to the satisfaction of the Engineer-in-charge. Fasteners shall also be load tested. The Contractor is to submit design and shop drawing for approval on the sheet profile, design and details before installation.				
7.3	Providing and fixing **Turbovent** complete as per technical specifications in repair bay or any other location as specified in drawings etc	Nos	64	8475	5,42,400
7.4	**Insulation** in roof of 50mm thick 48kg/m3 density rock wool with one side aluminium panel complete as per specification	sqm	10000	192	19,21,000
7.5	Providing, supplying, erecting and fixing in position **3mm thk Polycarbonate sheets** of approved texture and colour for **side lighting**. Sheets to be profiled to match metal sheets described in item at sl. No. 8.2 and should include cost of laying sheets in curvature where required. Cost to include jointing, sealing with Butyl adhesives and takes as per manufacturers specifications and cover all costs of labour tools, parts, temporary works etc all complete.	Sqm	3095	1695	52,46,025
7.6	Supplying and fixing of **Louver** to structural frame work as per drawing detail including all necessary fixtures and structural framework complete as per direction of Engineer in charge. Leaves will be made by 0.55 BMT Hi tensile Galvalume sheet with both side stiffening rib . Sheet shall have a hot dip metallic Zinc & Aluminium alloy coating . Measurement will be on area basis along outermost edge of frame installed at site	Sqm	1500	2430	36,44,250
7.7	RE WALL: Providing REINFORCED EARTH STRUCTURE with precast cement concrete wall of 180mm thick in M-35, Synthetic Geogrid as per Clause 310.2 & filling approved material including designing, assembling, joining and laying synthetic geogrid, Foundation for Precast CC elements in CC M 15, filter madia of 300mm thick along wall, filling between wall by approved soil, compacting upto required max density. Item includes all labour, material, machineries required for work complete as per Engineer in charge. Spec.No.: As directed by Engineer- in-charge	Cum	5000	6513	3,25,66,431

	TOTAL OF SUBSCHEDULE C (Part-2)				**408512983**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor)					
SCHEDULE- D (PART 1) Bill of Quantities for PHE Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**QTY.**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**SANITARY FIXTURES & FITTINGS**				
1.1	Providing and fixing white vitreous china extended wall mounting **water closet** of size 780x370x690 mm of approved shape including providing & fixing white vitreous china cistern with dual flush fitting, of flushing capacity 3 litre/6 litre (adjustable to 4 litre/8 litres), including seat cover, and cistern fittings, nuts, bolts and gasket etc complete.	Nos	68	11217	7,62,729
1.2	Providing and fixing white vitreous china battery based infrared **sensor operated urinal** of approx. size 610 x 390 x 370 mm having pre & post flushing with water (250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.	Nos	32	18572	5,94,314
1.3	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 1.8 cm thick, fixed in **urinal partitions** by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in-charge and finished smooth.				
1.3.1	Granite Stone of approved shade	Sqm	16	3624	57,984
1.4	Providing and fixing **toilet paper holder** :				
1.4.1	C.P. brass	Nos	84	462	38,794
1.5	Providing and fixing C.P. brass **angle valve** for basin mixer and geyser points of approved quality conforming to IS:8931 a) 15 mm nominal bore				
1.5.1	15mm nominal bore	Nos	272	564	1,53,348
1.6	Providing and fixing P**.V.C. waste pipe** for sink or wash basin including P.V.C. waste fittings complete.				
1.6.1	Semi rigid pipe				
1.6.1.1	32 mm dia	Nos	72	85	6,136
1.6.1.2	40 mm dia	Nos	0	92	0
1.7	Providing and fixing Stainless Steel A ISI 304 (18/8) **kitchen sink** as per IS: 13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required :				
1.7.1	510x1040 mm bowl depth 178 mm	Nos	2	5013	10,026
1.8	Providing and fixing C.P. brass long body **bib cock** of approved quality conforming to IS standards and weighing not less than 690 gms.				
1.8.1	15 mm nominal bore	Nos	6	678	4,069
1.9	Providing and fixing C.P. brass **bib cock** of approved quality conforming to IS:8931 :				
1.9.1	15 mm nominal bore	Nos	6	510	3,062
1.10	Providing and fixing 600x450 mm beveled **edge mirror** of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	Nos	32	882	28,213
2.0	**INTERNAL WATER SUPPLY**				
2.1	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge.				
	Internal work - Exposed on wall				
2.1.1	15 mm nominal outer dia Pipes	RM	10	182	1,816
2.1.2	20 mm nominal outer dia Pipes	RM	40	212	8,464
2.1.3	25 mm nominal outer dia Pipes	RM	60	257	15,411
2.1.4	32 mm nominal outer dia Pipes	RM	80	329	26,358
2.1.5	40 mm nominal outer dia Pipes	RM	60	453	27,177
2.1.6	50 mm nominal outer dia Pipes	RM	320	646	2,06,651
2.1.7	65 mm nominal outer dia Pipes	RM	120	646	77,494
2.1.8	80 mm nominal outer dia Pipes	RM	130	646	83,952
2.2	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings, i/c fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge.				
	Concealed work, including cutting chases and making good the walls etc.				
2.2.1	15 mm nominal outer dia Pipes	RM	326	300	97,742
2.2.2	20 mm nominal outer dia Pipes	RM	225	329	74,056

2.2.3	25 mm nominal outer dia Pipes	RM	106	390	41,351
2.2.4	32 mm nominal outer dia Pipes	RM	42	469	19,700
2.3	Providing and fixing ball valve (brass) of approved quality, High or low pressure, with plastic floats complete :				
2.3.1	15mm dia nominal bore	Nos	0	320	0
2.3.2	20mm dia nominal bore	Nos	0	455	0
2.3.3	25mm dia nominal bore	Nos	0	500	0
2.4	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
2.4.2	25mm dia nominal bore	Nos	18	476	8,572
2.4.3	32mm dia nominal bore	Nos	20	557	11,138
2.4.4	40 mm dia nominal bore	Nos	10	650	6,502
2.4.5	50 mm dia nominal bore	Nos	12	834	10,004
2.5	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
2.5.1	BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/ hot eater circulation as specified				
2.5.1.1	65 mm dia	Nos	6	3630	21,780
2.5.1.2	150 mm dia	Nos	0	6889	0
2.6	Constructing masonry Chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement :4 coarse sand) for stop cock, with C. I. surface box 100x100 x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design :				
2.6.1	With common burnt clay F.P.S (non modular) bricks of class designation 7.5	Nos	10	1286	12,856
2.7	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, ISI : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.			0	0
2.7.1	500 Ltrs (4 Nos.)	per litre	2000	8	16,102
2.7.2	750 Ltrs (8 Nos.)	per litre	6000	8	48,305
2.7.3	1000 Ltrs (4 Nos.)	per litre	4000	8	32,203
2.7.4	1500 Ltrs (8 Nos.)	per litre	12000	8	96,610
2.7.5	2000 Ltrs (8 Nos.)	per litre	16000	8	1,28,813
2.7.6	5000 Ltrs (6 Nos.)	per litre	30000	8	2,41,524
3.0	**EXTERNAL WATER SUPPLY**				
3.1	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :				
3.1.1	All kinds of soil				
3.1.2	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	RM	7950	231	18,38,898
3.2	Providing and laying S&S Centrifugally Cast (Spun) / **Ductile Iron Pipes** conforming to IS : 8329 :				
3.2.1	100 mm dia Ductile Iron Class K-9 pipes	RM	4900	1255	61,51,588
3.2.2	150 mm dia Ductile Iron Class K-9 pipes	RM	3050	1593	48,58,156
3.3	Providing and laying S&S CI standard **specials** such as tees bends collars tapers and caps etc suitable for flanged jointing as per IS : 1538.				
3.3.1	Up to 300 mm dia	quintal	65	7325	4,76,137
3.4	Providing **push-on-joints** to Centrifugally (Spun) Cast Iron Pipes or Ductile Iron Pipes including testing of joints and the cost of rubber gasket :				
3.4.1	100 mm dia pipes	joint	1050	69	72,116
3.4.2	150 mm dia pipes	joint	950	107	1,01,432
3.5	Providing and fixing C.I. double **acting air valve** of approved quality with bolts, nuts, rubber, insertions etc. complete (The tail pieces, tapers etc if required will be paid separately).				

3.5.1	50mm dia	Nos	28	5306	1,48,571
3.6	Providing & Laying **cement concrete** of specified grade excluding the cost of centring & shuttering - All work upto plinth level. (thrust blocks/supports)				
3.6.1	1:2:4 (1 cement : 2 coarse sand : 4 graded stone agrregates 20 mm nominal size)	Cum	14.31	6070	86,863
3.7	Providing and fixing Chlorinated Polyvinyl Chloride (**CPVC) pipes**, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement ,trenching ,refilling & testing of joints complete as per direction of Engineer in Charge.(Garden Irrigation)				
	External Work				
3.7.1	25mm nominal outer dia pipes	RM	550	233	1,27,952
3.7.2	32mm nominal outer dia pipes	RM	500	291	1,45,664
3.7.3	40mm nominal outer dia pipes	RM	250	389	97,304
3.7.4	50mm nominal outer dia pipes	RM	280	582	1,62,957
3.7.5	62.50 mm nominal inner dia Pipes	RM	350	1624	5,68,356
3.7.6	75 mm nominal inner dia Pipes	RM	1200	2278	27,33,387
3.8	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :.(Garden Irrigation)			0	0
3.8.1	25mm dia nominal bore	Nos	108	476	51,432
3.8.2	32mm dia nominal bore	Nos	2	557	1,114
3.8.3	40 mm dia nominal bore	Nos	2	650	1,300
3.8.4	50 mm dia nominal bore	Nos	2	834	1,667
3.9	Constructing masonry **Chamber 30x30x50 cm** inside, in brick work in cement mortar 1:4 (1 cement :4 coarse sand) for stop cock, with C. I. surface box 100x100 x75 mm (inside) with hinged cover fixed in cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design :				
3.9.1	With common burnt clay F.P.S (non modular) bricks of class designation 7.5	Nos	114	1286	1,46,562
3.10	Constructing **masonry Chamber 60x60x75 cm** inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) , i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design :				
3.10.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	Nos	49	7500	3,67,517
3.11	Constructing **masonry Chamber 90x90x100 cm** inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100 mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design :				
3.11.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	Nos	48	12962	6,22,158
3.12	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all-round S.W. pipes including bed concrete as per standard design :				
3.12.1	100 mm dia	RM	50	658	32,903
3.12.2	150 mm dia	RM	50	805	40,237
3.12.3	250 mm dia	RM	30	1085	32,547
3.12.4	300 mm dia	RM	40	1562	62,491
3.13	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
3.13.1	BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/ hot eater circulation as specified				
3.13.2	200 mm dia	Nos	6	12195	73,170
3.13.3	150mm dia	Nos	56	7217	4,04,144

3.13.4	100mm dia	Nos	91	5780	5,25,973
3.13.5	a) 80 mm dia	Nos	6	4040	24,239
3.13.6	65mm dia	Nos	18	3630	65,341
3.14	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
3.14.1	NON - RETURN VALVE with duel plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating for chilled / hot water circulation including insulation as specified.				
3.14.2	100mm dia	Nos	24	4193	1,00,634
3.14.3	65mm dia	Nos	16	2622	41,949
3.15	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
3.15.1	Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer for chilled / hot water circulation including insulation as specified.				
3.15.2	150 mm dia	Nos	8	11569	92,550
4.0	**INTERNAL DRAINAGE (SOIL, WASTE, VENT AND RAIN WATER PIPES)**				
4.1	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15cm dia meter and weighing not less than 440 grams	Nos	218	46	9,949
4.2	Constructing of masonry **Grease Trap** with brick masonry in cement mortar 1:5 (1 cement: 5 fine sand) RCC top slab with 1:2:4 mix (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement: 4 coarse sand: 8 graded stone aggregate 40 mm nominal size) including RCC Baffle walls, excavation and refilling inside plastering 12 mm thick with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) complete with Two nos. CI light duty Manholes covers of size 600x600x600mm at top slab.	Nos	1	18728	18,728
4.2.1	Size 1.5mx0.75mx0.75m deep				
4.3	Providing and fixing square-mouth S.W. gully trap class SP-1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame o f 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design:				
4.3.1	100x100 mm size P type				
4.3.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	7	1745	12,214
5.0	**SUB SCHEDULE 5: EXTERNAL SEWERAGE, EFFLUENT & STORM WATER DRAINAGE**				
	Note : All SFRC manhole covers shall have word 'Sewer' or 'Storm' (as the case may be) and letter "NMRCL" on top.				
	External Sewerage				
5.1	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :				
	All kind of soil				
5.1.1	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	RM	635	231	1,46,881
5.1.2	Pipes, cables etc. exceeding 300 mm dia but not exceeding 600 mm	RM	0	361	0
5.2	Extra for excavating trenches for pipes, cables etc. in all soils for depth exceeding 1.50 m but not exceeding 3.00 Metre.				
5.2.1	Pipes cables etc exceeding 80 mm dia but not exceeding 300 mm dia.	RM	385	315	1,21,114
5.2.2	Pipes cables etc exceeding 300 mm dia but not exceeding 600 mm dia.	RM	0	491	0
5.3	Extra for excavating trenches for pipes, cables etc. in all soils for depth exceeding 3.0 m but not exceeding 4.50 Metre.				
5.3.1	Pipes cables etc exceeding 80 mm dia but not exceeding 300 mm dia.	RM	250	807	2,01,817
5.3.2	Pipes cables etc exceeding 300 mm dia but not exceeding 600 mm dia.	RM	0	1260	0
5.4	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed.				
5.4.1	All kinds of soil	Cu.M	230	173	39,741
5.5	Providing,Laying and jointing glazed stoneware pipes grade 'A'/(SP-1) with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete:				

5.5.1	100 mm dia	RM	0	229	0
5.5.2	150 mm dia	RM	0	349	0
5.6	Providing and laying non pressure NP2 class (light duty) /NP3(Medium Duty) R.C.C. Pipes including collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete:				
5.6.1	150 mm dia NP2 class (Light Duty)	RM	135	387	52,214
5.6.2	250 mm dia NP2 class (Light Duty)	RM	440	520	2,28,958
5.6.3	300 mm dia NP2 class (Light Duty)	RM	0	562	0
5.7	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) up to haunches of S.W. / RCC pipes including bed concrete as per standard design :				
5.7.1	150 mm dia	RM	175	507	88,702
5.7.2	250 mm dia	RM	840	694	5,82,616
5.7.3	300 mm dia	RM	185	800	1,48,057
5.8	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all-round NP2 pipes including bed concrete as per standard design : (Sewer under road crossings and sub soil water conditions)				
5.8.1	150 mm dia	RM	20	805	16,095
5.8.2	250 mm dia	RM	20	1085	21,698
5.9	Constructing brick masonry circular type manhole **0.91 m** internal dia at bottom and 0.56m dia at top in cement mortar 1:4 (1 cement :4 coarse sand), in side cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size), and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				
5.9.1	0.91 m deep with S.F.R.C. cover and frame (heavy duty, HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg., fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12mm thick cement plaster at the external surface shall be paid for separately) :				
5.9.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	27	9704	2,62,002
5.10	Constructing brick masonry circular manhole 1.22 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement :4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				
5.10.1	1.68 m deep with SFRC Cover and frame (heavy duty HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg. fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately) :				
5.10.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	13	18287	2,37,729
5.11	Extra depth for circular type manhole 0.91m internal dia (at bottom) beyond 0.91 m to 1.67 m				
5.11.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	RM	5.5	5377	29,575
5.12	Extra depth for circular type manhole 1.22 m internal dia (at bottom) beyond 1.68 m to 2.29 m :				
5.12.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	RM	5	6963	34,817
5.13	Constructing brick masonry circular type **manhole 1.52m** internal dia at bottom and 0.56 m dia at top with FPS class designation 75 in cement mortar 1:4 (1cement:4 coarse sand), inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 mix (1cement: 3 coarse sand: 6 graded stone aggregate 40 mm nominal size), and making necessary channel in cement concrete 1:2:4 (1 cement :2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, external plastering (1:4) all complete as per design.				
5.13.1	2.3 m deep with S.F.R.C cover and frame (Heavy duty, HD-20 grade designation) 560 mm internal diameter conforming to I.S.12592, fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) excluding excavation, refilling centering shuttering and disposal of surplus earth.	Nos	1	38840	38,840
5.14	Extra depth for circular type manhole 1.52 m i**nternal dia with F.P.S Bricks**				
5.14.1	Beyond 2.30 m	RM	0.55	16482	9,065

5.15	Constructing brick masonary manhole in cement mortar 1:4 (1 cement: 4 coarse sand) R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarsde sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarsde sand : 8 graded stone aggregate 40 mm nominal size) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete1:2:4(1 cement : 2 coarsde sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design:				
5.15.1	Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg)				
5.15.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	22	9447	2,07,826
5.15.1.1.1	Extra for depth for manholes :				
5.15.1.1.2	Size 90x80 cm				
5.15.1.1.3	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	m	2	6261	12,522
5.16	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS:10910 on 12 mm dia steel bar conforming to IS 1786 having minimum cross section as 23 mm x 25 mm and overall minimum length 263 mm and width as 165 mm with space between protruded legs having 2 mm tread on top surface by ribbing on chequering besides necessary and adequate anchoring projections on tall length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacturer's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:2:4 (1 cement:2 coarse sand: 4 graded stone aggregate 20 mm nominal size) complete as per design.	Nos	160	346	55,363
	External Effluent				
5.17	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :				
	All kind of soil				
5.17.1	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	RM	1330	231	3,07,640
5.17.2	Pipes, cables etc. exceeding 300 mm dia but not exceeding 600 mm	RM	150	361	54,168
5.18	Extra for excavating trenches for pipes, cables etc. in all soils for depth exceeding 1.50 m but not exceeding 3.00 Metre.				
5.18.1	Pipes, cables etc. exceeding 80 mm dia but not exceeding 300 mm dia.	RM	800	315	2,51,665
5.18.2	Pipes cables etc exceeding 300 mm dia but not exceeding 600 mm dia	RM	90	491	44,201
5.19	Extra for excavating trenches for pipes, cables etc. in all soils for depth exceeding 3.0 m but not exceeding 4.50 Metre.			0	0
5.19.1	Pipes, cables etc. exceeding 80 mm dia but not exceeding 300 mm dia.	RM	530	807	4,27,852
5.19.2	Pipes cables etc exceeding 300 mm dia but not exceeding 600 mm dia	RM	60	1260	75,619
5.20	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed.				
5.20.1	All kinds of soil	Cu.M	725	173	1,25,271
5.21	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) up to haunches of S.W. pipes including bed concrete as per standard design :				
5.21.1	250 mm dia	RM	2540	694	17,61,721
5.22	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand :10 graded stone aggregate 40 mm nominal size) all-round R.C.C pipes including bed concrete as per standard design :(For Effluent Pipes Under road/track crossings)				
5.22.1	250 mm dia	RM	120	1085	1,30,190
5.23	Constructing brick masonry circular type manhole **0.91 m** internal dia at bottom and 0.56m dia at top in cement mortar 1:4 (1 cement :4 coarse sand), in side cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size), and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				
	0.91 m deep with S.F.R.C. cover and frame (heavy duty, HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg., fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12mm thick cement plaster at the external surface shall be paid for separately) :				
5.23.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	70	9704	6,79,264
5.24	Constructing brick masonry circular manhole 1.22 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement :4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				

5.24.1	1.68 m deep with SFRC Cover and frame (heavy duty HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg. fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately) :				
5.24.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	12	18287	2,19,443
5.25	Extra depth for circular type manhole 0.91m internal dia (at bottom) beyond 0.91 m to 1.67 m			0	0
5.25.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	RM	14	5377	75,282
5.26	Extra depth for circular type manhole 1.22 m internal dia (at bottom) beyond 1.68 m to 2.29 m :				
5.26.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	RM	5	6963	34,817
5.27	Constructing brick masonry circular type manhole 1.52m internal dia at bottom and 0.56 m dia at top with FPS class designation 75 in cement mortar 1:4 (1cement:4 coarse sand), inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 mix (1cement: 3 coarse sand: 6 graded stone aggregate 40 mm nominal size), and making necessary channel in cement concrete 1:2:4 (1 cement :2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, external plastering (1:4) all complete as per design.				
5.27.1	2.3 m deep with S.F.R.C cover and frame (Heavy duty, HD-20 grade designation) 560 mm internal diameter conforming to I.S.12592, fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) excluding excavation, refilling centering shuttering and disposal of surplus earth.	Nos	26	38840	10,09,829
5.28	Extra depth for circular type manhole 1.52 m internal dia with F.P.S Bricks				
5.28.1	Beyond 2.30 m	RM	14	16482	2,30,754
5.29	Constructing brick masonary manhole in cement mortar 1:4 (1 cement: 4 coarse sand) R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarsde sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarsde sand : 8 graded stone aggregate 40 mm nominal size) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete1:2:4(1 cement : 2 coarsde sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design:				
5.29.1	Inside size 120 X 90 cm and 90 cm deep including C.I. cover with frame (Heavy duty) 500 mm internal diameter, total weight of cover and frame to be not less than 116 kg (weight of cover 58 kg and weight of frame 58 kg)				
5.29.1.1	With F.P.S bricks class designation 75	Nos	0	20326	0
5.29.1.2	Extra depth for 120 x 90 cm manhole	RM	0	7500	0
5.30	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS:10910 on 12 mm dia steel bar conforming to IS 1786 having minimum cross section as 23 mm x 25 mm and overall minimum length 263 mm and width as 165 mm with space between protruded legs having 2 mm tread on top surface by ribbing on chequering besides necessary and adequate anchoring projections on tall length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacturer's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:2:4 (1 cement:2 coarse sand: 4 graded stone aggregate 20 mm nominal size) complete as per design.	Nos	430	346	1,48,788

	External Storm Water Drainage				
5.31	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5 m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be levelled and neatly dressed.				
5.31.1	All kinds of soil	Cu.M	130	173	22,462
5.32	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :				
5.32.1	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	RM	1780	231	4,11,728
5.32.2	Pipes, cables etc. exceeding 300 mm dia but not exceeding 600 mm	RM	170	361	61,390
5.33	Extra for excavating trenches for pipes, cables etc. in all kinds of soil for depth exceeding 1.5 m, but not exceeding 3 m.			0	0
5.33.1	Pipes, cables etc. exceeding 80 mm dia but not exceeding 300 mm dia.	RM	1070	315	3,36,602
5.33.2	a) Pipes, cables etc. exceeding 300 mm dia but not exceeding 600 mm	RM	700	491	3,43,785
5.34	Extra for excavating trenches for pipes, cables etc. in all soils for depth exceeding 3.0 m but not exceeding 4.50 Metre.				
5.34.1	Pipes, cables etc. exceeding 80 mm dia but not exceeding 300 mm dia.	RM	700	807	5,65,088
5.34.2	Pipes cables etc exceeding 300 mm dia but not exceeding 600 mm dia	RM	70	1260	88,222
5.35	Providing and laying Non Pressure NP-2, NP-3(Medium Duty)/NP- 4(Heavy Duty) class R.C.C. pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete				
5.35.1	150 mm dia. R.C.C. pipe NP2	RM	30	387	11,603
5.35.2	250 mm dia. R.C.C. pipe NP2	RM	1000	520	5,20,360
5.35.3	300 mm dia. R.C.C. pipe NP2	RM	500	562	2,81,140
5.36	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand :10 graded stone aggregate 40 mm nominal size) all-round RCC pipes including bed concrete as per standard design :				
5.36.1	150 mm dia. R.C.C. pipe NP2	RM	30	805	24,142
5.36.2	250 mm dia. R.C.C. pipe NP2	RM	1000	1085	10,84,916
5.36.3	250 mm dia. R.C.C. pipe NP3	RM	700	1085	7,59,441
5.36.4	300 mm dia. R.C.C. pipe NP2	RM	500	800	4,00,153
5.36.5	300 mm dia. R.C.C. pipe NP3	RM	380	800	3,04,116
5.37	Constructing brick 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	Nos	52	4395	2,28,521
5.38	Constructing brick masonary manhole in cement mortar 1:4 (1 cement: 4 coarse sand) R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarsde sand : 4 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarsde sand : 8 graded stone aggregate 40 mm nominal size) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete1:2:4(1 cement : 2 coarsde sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design:				
	Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg)				
5.38.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	Nos	25	9447	2,36,166
	Extra for depth for manholes : Size 90x80 cm				
5.38.2	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	m	2.5	6261	15,652
6.0	**WATER TREATMENT PLANTS AND MISCELLANEOUS ITEMS**				
6.1	Providing and fixing in position the industrial type pressure gauges with gun metal / brass valves complete as required	Nos	12	1064	12,766
7.0	**SEWAGE TREATMENT PLANT**				
7.1	Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.				

7.1.1	3 x 4 sq.mm	Metre	40	121	4,842
7.1.2	3 x 6 sq.mm	Metre	40	178	7,107
7.2	Supplying and installation following size of perforated pre painted **M.S. cable trays** with perforation not more than 17.5%, in convenient sections, joint with horizontal and vertical bends, reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with M.S. suspenders etc. as required.				

7.2.1	150mm width x 50mm depth x 1.6 mm thickness.	Metre	50	577	28,872
8.0	**EFFLUENT TREATMENT PLANT**				
8.10	Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.				
8.1.1	3 x 4 sq.mm	Metre	40	121	4,842
8.1.2	3 x 6 sq.mm	Metre	40	178	7,107
8.2	Supplying and installation following size of perforated pre painted **M.S. cable trays** with perforation not more than 17.5%, in convenient sections, joint with horizontal and vertical bends, reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with M.S. suspenders etc. as required.				
8.2.1	150mm width x 50mm depth x 1.6 mm thickness.	Metre	50	577	28,872
9.0	**COMPRESSED AIR SYSTEM**				
9.1	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
	Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer for chilled / hot water circulation including insulation as specified.				
9.1.1	150 mm dia	Nos	8	11569	92,550
10.0	**2 NOS. BOREWELLS**				
10.1	Supplying, assembling, lowering and fixing in vertical position in bore well, ERW (Electric Resistance Welded) FE 410 mild steel screwed and socketed/ plain ended casing pipes of required dia, conforming to IS: 4270, of reputed & approved make, including painted with outside surface with two coats of anticorrosive paint of approved brand and manufacture, including required hire & labour charges, fittings & accessories, all complete, for all depths, as per direction of Engineer-in-charge.				
10.1.1	200 mm nominal size dia having minimum wall thickness 5.40 mm	RM	120	1820	2,18,345
10.1.2	150 mm nominal size dia having minimum wall thickness 5.00 mm	RM	40	1483	59,316
10.2	Supplying, assembling, lowering and fixing in vertical position in bore well, ERW (Electric Resistance Welded) FE 410 plain slotted (having slot of size 1.6/3.2mm) mild steel threaded and socketed / plain level ended pipe (type A) of required dia, conforming to IS: 8110, of reputed and approved make, having wall thickness not less than 5.40 mm, including painted with outside surface with two coats of anticorrosive bitumestic paint of approved brand and manufacture, including hire & labour charges, fittings & accessories, all complete, for all depths, as per direction of Engineer-in-charge.				
10.2.1	200 mm nominal size dia	RM	240	1913	4,59,049
10.2.2	150 mm nominal size dia	RM	40	1575	63,014
11.0	**PUMPS & ELECTRICAL PANEL**				
11.1	Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.				
11.1.1	3 x 4 sq.mm	Metre	25	121	3,026
11.1.2	3 x 6 sq.mm	Metre	100	178	17,767

11.2	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
11.2.1	3 X 10 sq. mm (22mm)	Each	25	179	4,470
				TOTAL OF SUBSCHEDULE D (Part-1)	**38091021**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor)					
SCHEDULE- D (Part2) Bill of Quantities for PHE Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**QTY.**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.1	**SANITARY FIXTURES & FITTINGS**				
1.2	Providing and fixing vitreous China Sanitary fixturs and CP fitting and other accessaries for **Handicapped toilet Hindware Cat no. 70002 (Matrix Set-1) & CERA Cat. No.-CRANE-7011**. Each Matrix Set shall comprised (Wash Basin 65 x 35 with one pair mounting brackets, EWC & Cistern complete with fittings & seat cover, one no hinged rail 76 cm and five nos of grab rails 60 cm). complete all respect.	Nos	16	78182	12,50,919
1.3	Providing and fixing white glazed vitreous china **wash basins** with C.P. pillar tap, C.P. brass waste 32mm C.P. bottle trap and unions and sealing of joints between wash basins and counter slabs around the wash basins with Silicone rubber cement of approved make of matching colour all complete including cutting and making good the walls and floors where required.				
1.3.1	Flat back wash basin of size (550x400 mm)	Nos	16	1196	19129
1.4	Providing and fixing white glazed vitreous china **wash basins** with C.P. pillar tap/basin mixer, C.P. brass waste 32mm flexible pipe and unions and sealing of joints between wash basins and counter slabs around the wash basins with Silicone rubber cement of approved make of matching colour all complete including cutting and making good the walls and floors where required.				
1.4.1	Hindware Wash basin **No. 10049 (under counter) ZEN** (56 x 45) or approved equivalent make with C.P. single level basin mixer **Jaquar Cat No. OPL-CHR-15011B** or approved equivalent).	Nos	56	10143	568001
1.5	Providing and fixing C.P. brass **Bib cock** Auto closhing system with Built-in control cock with wall flange (Jaquar Cat NO. PRS-043) or approved equivalent) including cutting and making good the walls wherever required. (with WC)				
1.5.1	15mm dia	Nos	84	2424	203603
1.6	Providing and fixing C.P. brass **sink mixer** with C.P. wall flange, overhead swinging cast spout complete as required.	Nos	2	4042	8084
1.7	Providing and fixing solid state, no touch operating, fully hygienic **hand drier** of approved shade with double blower, continous repeat usage,time delay, summer & winter control 'including providing necessary brackets, cable from drier to Plug, Plug to key and lock etc. complete as required (Sleek model)	Nos		10834	0
1.8	Providing & fixing CP **Health faucet** (ablution spray) with hook eye complete in all respect.	Nos	84	1161	97483
1.9	Providing & fixing **soap dispenser**.	Nos	52	1701	88434
1.10	Providing & fixing **paper towel dispenser**	Nos	26	2007	52179
1.11	Providing & fixing C.P. brass **twin coat hook**	Nos	84	807	67773
1.12	Providing & fixing C.P. **air purifier**	Nos	26	3268	84967
1.13	Providing and fixing C.P. brass **Bottle trap** (Jaquar Cat. No. ALD-769B or approved equivalent including cutting and making good the walls wherever required.	Nos	16	1639	26216
1.14	Providing & Fixing 6mm thick looking **mirror** of Modi float glass/Atul make fixed on 25 dia and 38mm long ss studs, the studs shall be fixed on wall / tile with dash fastener complete.	Sqm.	80	3631	290455
1.15	Providing and fixing automatic high pressure electric water heaters JAQUAR-ELENA Digital or equivalent make VENUS-Magma Digital-/RACOLD-Etrno-2 ER2 with glass lining thermostats with each element and high temperature cut off, necessary insulation, safety valve, etc. all complete.				
1.15.1	15 litres	Nos	2	12397	24794
1.16	Providing and fixing C.P. brass **towel ring JAQUAR Cat No.ACN-CHR-1121BN (CONTINENTAL SERIES)** or approved equivalent complete with C.P. brass brackets fixed to rawl plug of approved design with C.P. brass screws.	Each	48	576	27662
2.0	**INTERNAL WATER SUPPLY**				
2.1	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
2.1.1	20mm dia nominal bore	Nos	14	606	8480
2.2	Supply of solar water heating system with direct heating complete with solar panels, insulated SS 304 storage vessel with cemamic lining inside & interconnecting pipes and valves complete in all respect as per manufacturer specifications. Tank shall be supplied without electrical boosters.				
	(The Vendor shall include in this rate cost of all interconnecting pipes and valves & insulations connecting the panels).			0	0
2.2.1	Capacity 300 LPD (comprising 3 nos. collector panels and 300 ltres SS 304 storage vessel)	Set	2	67800	135600
3.0	**EXTERNAL WATER SUPPLY**				
3.1	Providing and laying non-pressure **NP3 class & NP4 class** (Medium duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete :(For enclosing water supply pipes under road crossing/Track crossing)				
3.1.1	100 mm dia NP3 (Light duty)	RM	50	367	18363
3.1.2	150 mm dia NP3 (Light duty)	RM	50	475	23730
3.1.3	250 mm dia NP3 (Light duty)	RM	30	675	20238
3.1.4	300 mm dia NP4 (Medium duty)	RM	40	1226	49042

3.2	Connection of Water supply line (200mm DI Pipe) with Municipal Main line including providing, water meter, Sluice valve etc complete as directed by Engineer In-charge.	LS	1	113000	113000
3.3	Providing and fixing G.I. suction & delivery headers/pipes for water supply pumps (IS:1239 heavy class) with G.I. Fittings (bends, tees, reducers, plugs, union, flange & blank flanges etc) and clamps and jointing with teflon tape or hold tite including chase cutting and making good the walls, floors etc. wherever required.				
3.3.1	65 mm nominal bore	RM	165	965	159228
3.3.2	100 mm nominal bore	RM	300	1678	503415
3.3.3	150 mm nominal bore	RM	45	2465	110904
3.3.4	200 mm nominal bore	RM	45	2861	128752
3.4	Painting for G.I. Pipes with two or more coats of synthetic enamel paint of approved quality and shade over a coat of approved primer coat as directed including surface preparation (Shade as per pipe colour code)				
3.4.1	65 mm nominal bore	RM	165	57	9323
3.4.2	100 mm nominal bore	RM	300	79	23730
3.4.3	150 mm nominal bore	RM	45	90	4068
3.4.4	200 mm nominal bore	RM	45	102	4577
4.0	**SUB SCHEDULE 4: INTERNAL DRAINAGE (SOIL, WASTE, VENT AND RAIN WATER PIPES)**				
4.1	Providing, fixing & testing uPVC SWR soil,waste, and vent pipes confirming to IS 13592(6kg per sqcm) alongwith all required fittings like tees,bends,crosses with or without access doors jointed with approved solvent cement fixed to walls and ceilings with clamps complete including cutting and making good the floors and walls where required complete of outer diameter.(For soil, waste, irrigation and vent pipes)				
4.1.1	75 mm OD	RM	30	195	5865
4.1.2	110 mm OD	RM	2000	323	646360
4.1.3	160 mm OD	RM	2464	412	1016277
4.2	Providing, fixing & testing uPVC pipes, conforming to IS 4985 class 4 (8 kg per sqcm) including injection moulded fittings, jointing with solvent cement, cutting and making good the floors and walls and jointing to trap/waste pipe, complete of outer dia.				
4.2.1	32 mm O.D.	RM	130	123	16012
4.2.2	40 mm OD	RM	100	137	13673
4.2.3	50 mm OD	RM	90	149	13424
4.2.4	63 mm O.D.	RM		158	0
4.3	Supply and Fixing PVC floor trap 125 x 75mm self cleansing design with or without vent arm, Inlet receiving cap of 50 & 40mm dia complete including cutting and making good the walls and floors	Nos	120	356	42714
4.4	Providing and fixing PVC SWR NAHANI TRAP IS 14735 for drain 100 mm dia with jali of the following nominal diameter of self cleansing design with C.I scread down or hinged grating including the cost of cutting and making good the walls.	Nos		401	0
4.5	Supply and fixing SS hinged grating of 2mm thick 125mm dia with rim including setting in floor with cement mortar (approved type)	Nos	140	153	21357
4.6	Provide and fixing standard uPVC clean out plug with suitable insert key with all required upvc accessories threaded and end cap as per approval				
4.6.1	110 mm	Nos		647	0
4.7	Providing and laying cement concrete 1:2:4 mix (1 cement:2 coarse sand: 4 graded stone aggregate 20 mm nominal size) 75 mm in bed and alround soil & waste pipes including excavation, refilling where required complete in all respect as per standard design.				
4.7.1	Pipe 75 to 110 mm O.D.	RM	420	782	328423
4.7.2	Pipe 40 to 63 mm O.D.	RM		501	0
4.8	Providing and fixing in position 125x125 mm square stainless steel cockroch trap consisting of 0.45 mm thick inner and outer cup and 1.00 mm thick top grating (Jali) with ring to be fixed inside C.I. 'P' traps with cement concrete.(for kitchen and pantry)	Nos		584	0
4.9	Supply of materials & Constructing brick masonry Rain Water Chambers (Catch Basin) with `A' class Table Moulded bricks in cement mortar 1:5 (1 cement : 5 fine sand), R.C.C. Top slab with 1:2:4 Mix (1 Cement : 2 coarse sand: 4 graded stone aggregate), foundation concrete.				
4.9.1	Inside size of 450 x 450 depth of 600mm with RCC cover as per drawings	Nos	670	3546	2375780
5.0	**EXTERNAL SEWERAGE, EFFLUENT & STORM WATER DRAINAGE**				
	Note : All SFRC manhole covers shall have word 'Sewer' or 'Storm' (as the case may be) and letter "NMRCL" on top.				
	External Sewerage				
5.1	Providing and laying non pressure NP2 class (light duty) /NP3(Medium Duty) R.C.C. Pipes including collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete:				

5.1.1	150 mm dia NP3 class (Light Duty)	RM	45	475	21357
5.1.2	150 mm dia NP4 class (Light Duty)	RM	15	551	8272
5.1.3	250 mm dia NP3 class (Light Duty)	RM	420	675	283336
5.1.4	300 mm dia NP3 class (Light Duty)	RM	215	1072	230560
5.1.5	450 mm dia NP3 class (Medium Duty)	RM	0	2170	0
5.2	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) up to haunches of S.W. / RCC pipes including bed concrete as per standard design :				0
5.2.1	400 mm dia	RM		1151	0
5.3	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all-round NP2 pipes including bed concrete as per standard design : (Sewer under road crossings and sub soil water conditions)				0
5.3.1	300 mm dia	RM	30	1244	37327
5.3.2	450 mm dia	RM	0	1665	0
5.4	Providing and laying non-pressure NP3 class (light duty)/NP4 class(Heavy Duty) R.C.C. pipes including collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete :				
5.4.1	250 mm dia NP3 class (Light Duty)	RM	2660	675	1794463
5.4.2	450 mm dia NP4 class (Heavy Duty)	RM	300	2481	744359
5.5	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) up to haunches of S.W. pipes including bed concrete as per standard design :				
5.5.2	450 mm dia	RM	200	1346	269166
5.6	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand :10 graded stone aggregate 40 mm nominal size) all-round R.C.C pipes including bed concrete as per standard design :(For Effluent Pipes Under road/track crossings)				
5.6.1	450 mm dia	RM	100	1665	166506
5.7	Excavating trenches of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms, depth upto 1.5 m, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :				
5.7.1	b) Pipes, cables etc. 1000 mm dia	RM	0	892	0
5.8	Extra for excavating trenches for pipes, cables etc. in all kinds of soil for depth exceeding 1.5 m, but not exceeding 3 m.				
5.8.1	b) Pipes, cables etc. 1000 mm dia	RM	0	1158	0
5.9	Providing and laying Non Pressure NP-2, NP-3(Medium Duty)/NP- 4(Heavy Duty) class R.C.C. pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete				
5.9.1	250 mm dia. R.C.C. pipe NP3	RM	700	675	472227
5.9.2	300 mm dia. R.C.C. pipe NP3	RM	380	1072	407501
5.9.3	450 mm dia.NP3 (Medium Duty)	RM	300	2170	651050
5.9.4	600 mm dia.NP3(Medium Duty)	RM	100	2830	283020
5.9.5	1000 mm dia.NP4(Heavy Duty)	RM	100	7719	771852
5.10	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand :10 graded stone aggregate 40 mm nominal size) all-round RCC pipes including bed concrete as per standard design :				
5.10.1	450 mm dia.NP3	RM	300	1665	499517
5.10.2	600 mm dia.NP3	RM	100	2113	211299
5.10.3	1000 mm dia.NP4	RM	100	3411	341147
5.11	Earth work in excavation over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including filling available earth in layers not exceeding 20 cm in depth , consolidating each deposited layer by ramming and watering, lifting of soil from required depth, in all leads and lifts with in depot area, including disposal of surplus excavated earth; disposed earth to be levelled and neatly dressed. All kinds of soil.(Earth work for RCC Chambers)	Cu.M	0	176	0
5.12	RCC Manholes made of M30 RCC including reinforcement, 250mm thick RCC precast covers with 50 x50x 4 mm edge angle, Approach steel rungs(ladder), with 200mm PCC base, including shuttering etc. of size upto 2m x 2m x 4m(deep) as per drawings or as directed by Engineer In-charge. (for cross drainage work inside the yard) excluding excavation.	Nos	0	77306	0
5.13	Extra depth for road gully chambers 500x450x600 mm.	RM	5	2289	11447

5.14	Extra for providing S.F.R.C cover and frame. 600x600 medium duty. MD-10 grade, conforming to IS.12592, fixed in cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering shuttering all complete.	RM	45	1998	89903
5.15	Constructing masonry chamber 60x60x60 cm inside with 75 class designation brick work in cement mortar 1:5 (1 cement: 5 fine sand) for gate valve complete with C.I. hinged cover with frame of size 600 x 600mm (total wt. 7 kg.) fixed in cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) necessary excavation foundation concrete 1:5:10 mix (1 cement: 5 fine sand:10 graded stone aggregate 40 mm nominal size), and inside plastering with cement mortar 1:3 (1 cement: 3 coarse sand) finished with a floating coat of neat cement, complete as per specifications. (The cost of exavation , refilling and disposal of surplus earth shall be included in rate)				
5.15.1	With F.P.S. bricks class designation 7.5	Nos	70	8475	593250
5.16	Extra depth for road gully chambers. (600x600)	m	7	5650	39550
	Recharge pits				
5.17	Constructing recharge pit of 2.5 m dia & 4 m deep below ground level in brick masonary in cement mortar 1:4 (1 cement:4 coarse sand) with Providing 20mm thick cement plaster in single coat with cement morter 1:4, including necessary earthwork in excavation in all kinds of soil,disposal of surplus excavated earth with all leads and lifts, returning the earth in layers surrounding the brick work /pipes ramming and watering etc., laying 200 mm thick plain cement concrete M10 in base ,150 mm thick RCC top slab including steel reinforcement (Fe500 D) work in cutting ,hoisting and laying in position required for gratings , ladders etc . Boring 300 mm dia bore upto 30 m from base of pit including the cost of transportation of boring machine to site and taking back after completion of work. Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC medium well screen (RMS) pipes(200 mm dia) with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessoriesen ribs etc. all com	Nos	40	131321	5252828
	Providing and fixing bail plug for 200 mm dia pipe. Supplying and filling in 300 mm layers of boulders(50-200 mm size) in first layer, thick gravel(5-10 mm size) in second layer and sand(1.5-2mm size) in third layer. Providing and fixing precast RCC MH cover 560 mm dia with frame (Heavy duty HD-20) in top slab. Complete as per drawings or as directed by Engineer-In-Charge.				
6.0	**WATER TREATMENT PLANTS AND MISCELLANEOUS ITEMS**				
6.1	Providing and fixing skid mounted vertical MSRL Dual Media pressure filter fabricated from IS 226/2062 plate 5mm thick for shell and 6mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete. (For domestic water supply system)				
	For Domestic water supply				
	Capacity 27000 lph.				
	Working pressure 2.5 kg./cm2				
6.1.1	Design pressure 4 kg./cm2	Nos	4	696906	2787624
6.2	Providing and fixing skid mounted vertical MSRL Activated carbon filter fabricated from IS 226/2062 plate 5mm thick for shell and 6mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete as per specifications. (For domestic water supply)				
	For Domestic water supply				
	Capacity 27000 lph.				
	Working pressure 2.5 kg./cm^2				
6.2.1	Design pressure 4 kg./cm^2	Nos	4	890491	3561963
6.3	Providing and fixing skid mounted MSRL, “Cation” ION Exchange water softener fabricated from IS 226/2062 plate 6mm thick for shell and 5mm thick for dished ends complete with MSRL tanks for salt mixing, brine & brine saturation, initial charge of ION Exchange resins face piping and valves, hydraulic brine injection assembly with hose pipes, accessories, painting, testing and commissioning complete				
	Capacity 27000 lph.				
	Total hardness = 600 Mg/L				
	Working pressure 2.5 kg./cm^2				
6.3.1	Design pressure 4 kg./cm^2	Nos	4	2555321	10221284
6.4	Providing and fixing bulk water meter with direct reading dial in KL, all internal parts and strainer in gun metal/brass.				
6.4.1	100mm dia	Nos	12	29522	354269
6.5	Providing and fixing direct reading rate of flow Rota Meter				
6.5.1	For 100mm dia	Nos	12	41815	501774
				0	0
6.6	Supply, assembly, erection, testing and commissioning of chlorinator with metering pump suitable for operation on 220 ± 5% single phase, 50 Hz AC supply, compete in all respects.			0	0

6.6.1	Suitable for flow rate 0 -6 lph	Nos	2	32523	65045
6.7	Providing and fixing 25mm thick C.I. heavy duty grating including C.I. / MS angle iron frame fixed with hold fast at 900mm c/c in flooring for the following sizes:				
6.7.1	300 mm wide x 600 mm long	Nos	40	923	36928
6.8	Providing & fixing M.S. pipe sleeves 1 mtr long of heavy class with both side M.S. flanges, nut, bolts, washers etc. Including cutting the M.S. plates, steel bars & welding MS pipe sleeve to MS plate from both sides including painting two coats of synthetic enamel paint over a coat of primer complete as required.				
6.8.1	a) 100 mm dia	Nos	4	1106	4425
6.8.2	b) 150 mm dia	Nos	4	1819	7277
6.8.3	c) 200 mm dia	Nos	4	2530	10120
6.9	Providing and fixing M.S. puddle flanges fabricated out of 6 mm thick M.S. plate of size 300 x 300mm plus dia of pipe of 750mm long pipe pieces fixed to RCC wall of water tanks. Including painting with two coats of primer complete as required. The entire fitting shall be hot dipped galvanised.				
6.9.1	a) 65 mm dia	Nos	32	758	24263
6.9.2	b) 100 mm dia	Nos	60	864	51867
6.9.3	c) 150 mm dia	Nos	40	1766	70648
6.9.4	d) 200 mm dia	Nos	6	2002	12014
6.9.5	e) 250 mm dia	Nos	4	2715	10862
6.10	Providing and fixing electronic type level indicator for water tanks mounting in panel with the following features, level display, alarm when water level is low or high, full range from one level to four level display and manual reset for alarm etc. with electrical wiring conduit supports from wall & ceiling probs and all other accessories complete as required.	Nos	6	16926	101558
6.11	Providing and fixing in position G.I. vent with brass mosquito proof coupling and air filter including return bend, complete as required.				
6.11.1	a) 100 mm dia	Nos	4	1871	7485
6.12	Providing and fixing automatic brine preparation system with HDP salt mixing tank of capacity for 2 regenerations with chemical and concrete foundation as directed by the Engineer.				
6.12.1	a) For item no. 8	Nos	4	47329	189316
6.13	Providing and fixing C.I. Heavy duty rungs in R.C.C. wall of water tanks etc. Including cutting, chasing the R.C.C. work and making good the same complete as required.	Nos	500	538	268940
6.14	Providing & fixing Electric control panel to open/close the solenoid valve at low/ high water level through level controller in soft water tanks.Including wiring, level controller probes & other accessories as required to operate the system automatically.	SET	4	17032	68130
6.15	Providing & fixing pressure switch for water pumps to start/stop the pump at set pressure. Including wiring, cabling from pump to panel & all other accessories as required to operate the system automatically.	SET	4	7513	30053
6.16	Providing & laying 1:2:4 mixed cement conc. for pipe support and thrust block.	Cu.M	10	6794	67936
7.0	**SEWAGE TREATMENT PLANT**				
7.1	**SEWAGE TREATMENT PLANT**				
	Supply, erection, testing and commissioning of sewage treatment plant of capacity 50 m^3/day based on attached growth FAB technology for the following:				
	Daily Avg. Sewage : 50 m^3/day				
	PH : 6.0 - 8.0				
	BOD 5 : 350 mg/l				
	S. Solids : 250 mg/l				
	COD : 450 mg/l				
	Oil & Grease : upto 50 mg/l				
	Coliform : 10^6 - 10^7 counts / 100 ml				
	Effluent discharge standard after treatment:				
	Conforming to requirement approved standards				

	PH : 6.0 - 8.0				
	BOD 5 : Less than 6 mg/l				
	S. solids : Less than 10mg/l				
	COD : Less than 50 mg/l				
	Oil & Grease : Not detectable				
	Outlet Coliform : < 1000 counts / 100 ml				
	Sewage treatment plant shall include supply erection, testing & commissioning of the following items:				
7.1.1	Manual Bar screen in SS-304 for 50 m^3/day at the inlet of receiving sump .	Each	2	22600	45200
7.2	Sewage pumps: Centrifugal type, non clog self priming pumps complete with suction and delivery valves and non return valves,suction and delivery headers of an approved make of capable of handling minimum 7 to 10mm solids size for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate				
7.2.1	Capacity 2.5m^3/hr at 12m head (For sewage lifting from equilization tank)	Each	4	33900	135600
7.3	Sludge pumps: Centrifugal type, non clog self priming pumps complete with suction and delivery valves and non return valves,suction and delivery headers of an approved make of capable of handling minimum 7 to 10mm solids size for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate				
7.3.1	Capacity 2.5m^3/hr at 12m head (For transfer of sludge from tubesettler to sludge holding tank)	Each	4	33900	135600
7.4	Sludge pumps: Centrifugal type, non clog self priming pumps complete with suction and delivery valves and non return valves,suction and delivery headers of an approved make of capable of handling minimum 7 to 10mm solids size for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate				
7.4.1	Capacity 10.0m^3/hr at 12m head (For transfer of sludge from FAB tank to amoxic tank).	Each	4	50850	203400
7.5	Air Blowers: Twin lobe positive displacement type, rotary air blowers of suitable type with V-belt drive, belt guard, base plate, inlet filter-silencer, flexible connectors, check valve, relief valve, pressure gauge and piping.				
7.5.1	Capacity- 70m^3/hr @ 6000 MMWG	Each	2	101700	203400
7.6	Non-Clogging, freely moving PP media for MBBR reactors.	Cum.	8	33900	271200
7.7	Air Grids : The FAB tanks are equipped with non clog Air Grids for 50m^3/day sewage flow to supply sufficient air for the treatment process and maintain adequate circulation velocity to prevent solids from settling.				
	No. of Diffusers : as required				
	Non submerged air piping : GI				
7.7.1	Submerged Air Piping : SS 304	Sets	2	113000	226000
7.8	Media for tube settler as per design requirement	Cum.	4	20340	81360
				0	0
7.9	Filter Feed pumps: Centrifugal type, monoblock, self priming pumps with bronze in impeller of an approved make and complete with with suction and delivery valves and non return valves,suction and delivery headers capable of handling clear water complete with fan cooled induction motor with class B insulation, mounted on a common structural base plate with 100mm dia pressure gauge with gunmetal isolation cock and suitable vibration elimination pads of approved design for pump foundation. Motor to be suitable for 400/440 volts, 3 phase, 50 cycle AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate			0	0
7.9.1	Capacity 5.0m^3/hr at 30m head.	Nos.	4	28250	113000
7.10	Filter press feed screw pumps of capacity 1.0m3/hr at 40m head.	Nos.	4	28250	113000

7.11	Treated water pumps: Centrifugal type, monoblock, self priming pumps with bronze in impeller of an approved make and complete with suction and delivery valves and non return valves,suction and delivery headers capable of handling clear water complete with fan cooled induction motor with class B insulation, mounted on a common structural base plate with 100mm dia pressure gauge with gunmetal isolation cock and suitable vibration elimination pads of approved design for pump foundation. Motor to be suitable for 400/440 volts, 3 phase, 50 cycle AC supply with rpm, to suit the corresponding pumps.Cost of all suction and delivery valves, pipes and header shall be included in the rate				
7.11.1	Capacity 5m^3/hr at 50m head	Nos.	4	45200	180800
7.12	Filter Press for compression, management & disposal of sludge with 18 Nos plates of 18" x 18" size (Hydraulic operated).	Nos.	2	226000	452000
7.13	Providing and fixing UV reactor for waste water treatment of capacity 5 m3/hr. (Alfa make or approved equivalent).	Nos.	2	90400	180800
7.14	Vertical, MSRL, filter: Fabricated from IS:226/2062 plate 6mm thick for shell and 8mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete.				
7.14.1	Capacity 5.0m^3/hr at 3.0kg/cm^2	Set	2	56500	113000
7.15	Vertical, MSRL, activated carbon filter: Fabricated from IS:226/2062 plate 6mm thick for shell and 8mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete.				
7.15.1	Capacity 5.0m^3/hr at 3.0kg/cm^2	Set	2	79100	158200
7.16	Supply, erection, testing and commissioning of Flow meter suitable for 5m3/hr flow rate.				
7.16.1	40 mm dia.	Nos.	2	79100	158200
7.17	Supply, erection, testing and commissioning of Energy meter before electrical panel.	Nos.	2	11300	22600
7.18	Pipe lines and valves: Galvanized Iron pipes (medium class) conforming to IS:1239 complete with carbon steel fittings IS:1879 e.g. tees, crosses, plugs, sockets, elbows, reducers, supports and clamps, puddle flanges, etc., cutting chases including painting pipes and fittings with epoxy paint over a coat of primer.	Lot	2	135600	271200
7.19	Design, manufacture, supply, installation, testing and commissioning of the following integrated, cubicle type, dead fornt, extensible, sheet steel control panel, to the foundation. The panel shall be suitable for 415 volts, 50 cycles, 4 wire supply. Quoted price shall be including with 25mm thick rubber mats, wiring, cabling of approved size, control wiring and copper earthing from control panel to various equipment like motor starters, pump motors etc. including making end terminations etc. The following components and accessories shall be mounted within each control panel.				
7.19.1	One No. 100 amps TP incoming MCCB complete with the following:				
i)	1 No. 0-500 volts 96x96 sq. mm ammeter with selector switch and fuses.				
ii)	1 No. 0-60 amps 96x96sq.mm ammeter with 60/5 amps ratio CT's and selector switch.				
iii)	Over voltage and under voltage tripping machanism for persistent voltage fluctations of more than ±10% of the rated voltage for more than 5 minutes.				
iv)	Phase indicating lamps with toggle switches.				
v)	Indication lamps for ON/OFF/TRIP status of motors.				
b)	Aluminium bus bar of 100 amps for three phase and neutral.				
c)	Out going feeders/Starters				
i)	7 Nos. 6 amps TP MCB for FAB feed pumps, filter press feed pumps and sludge transfer pumps.				
ii)	3 Nos. 10 amps TP MCBS with DOL starter for filter feed water pumps & drainage pumps.				
iii)	6 Nos. 16 amps TP MCBS with DOL starter for air blowers and treated water pumps and sludge pumps for amoxic tank.				
iv)	1 No. 6 amps TP MCB for metering pump.				
v)	1 Nos. 32 amps Spares TP MCB's.for Ultra filtreration panel				
a)	1 Nos. 32 amps Spares				
Note :					
a)	All switch gear/panels shall be suitable for 25 KA rating.				
b)	All outgoing will have 96 sq. mm size ammeter and CT.				
c)	All starter units for pumps to be provided with 3 level liquid level contractor.				
d)	All outgoing starter units to have "ON" red lamps.				

e)	All pumps to be provided with duty selector switch.				
f)	All pumps to be provided with sequence timer 220/440 V AC/DC and alternate working of pumps between 6 to 8 hours or alternate use of pumps after one service in sequence.				
g)	All pumps to be provided with over load relay.				
h	Necessary cable alleys for space switches, level controller internal wiring and copper earthing of all equipment shall also be included. All switch gears/control gears shall be motor duty rating.	Set	2	339000	678000
7.20	Supplying, installing, testing and commissioning of UF System piping and Valves with all the required accessories & chemical cleaning system, complete in all respects & comprising the following:				
	a) 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 : 3 cum/hr Output				
	Inlet TSS :- 10-30 mg/lt				
	Filtration Flux :- 40 lt/m2/hr				
	Membrane Area - 55-75 M2 as per approved makes				
	Membrane MOC - PVDF				
	Membrane Type :- Pressure Feed Mambrane 25 micron cartridge type, Out to in process				
	No. of UF Membrane - 1 Number				
	Make UF Membrane - DOW / Pureflow / Hydrnautics / Hyflux / GE				
	b) UF Feed Pump 2 Nos. (1W+S) 3 M3/hr each 20-25m head				
	c) UF pre fine filtration				
	d) 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 etc. (Cap. 6m3/hr head 18-20m (1 W+ 1S) Including HDPE back tank of capacity 500 litres.				
	e) Chlorine dosing system				
	f) CEB / CIP dosing station including dosing tank & pumps etc.f				
7.20.1	g) PLC control panel with all automation required like Pneumatic valves, piping in UPVC PLC and other required accessories.	Set	2	904000	1808000
7.21	Approval: Contractor to provide adequacy report consisting of inlet and out test reports, report/drawings as per pollution board requirement. Contractor shall include the cost of all chemicals consumed during testing and commissioning and the cost of such items of works, which are not explicity mentioned above.	Job	2	226000	452000
8.0	**EFFLUENT TREATMENT PLANT**				
8.1	**EFFLUENT TREATMENT PLANT**				
	Supply, erection, testing and commissioning of effluent treatment plant of capacity 70 m^3/day based on attached growth FAB technology for the following:				
	Daily Avg. Sewage : 70 m^3/day				
	PH : 6.5 - 7.5				
	BOD : 100-150 mg/l				
	COD : 500-600 mg/l				
	TSS : 200-300 mg/l				
	Oil & Grease : 60-80 mg/l				
	Effluent discharge standard after treatment:				
	Conforming to requirement approved standards				
	PH : 5.5 - 9.0				
	BOD : 10 mg/l				

	COD : 100 mg/l				
	TSS : 20 mg/l				
	Oil & Grease : 10 mg/l				
	Effluent treatment plant shall include supply erection, testing & commissioning of the following items:				
8.1.1	Manual Bar screen in SS-304 for 70 m^3/day at the inlet of receiving sump .	Each	4	22600	90400
8.2	Effluent pumps: Centrifugal type, non clog self priming pumps complete with suction and delivery valves and non return valves,suction and delivery headers of an approved make of capable of handling minimum 7 to 10mm solids size for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate				
8.2.1	Capacity 3.5m^3/hr at 12m head (For sewage lifting from equilization tank)	Each	4	33900	135600
8.3	Sludge pumps: Centrifugal type, non clog self priming pumps complete with suction and delivery valves and non return valves,suction and delivery headers of an approved make of capable of handling minimum 7 to 10mm solids size for untreated effluent with fan cooled induction motor with class 'B' insulation, mounted on a common structural base plate, suitable vibration eliminated pads of approved design for pump foundation, motor to be suitable for 400/440 volts, 3 phase, 50 cycles AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate				
8.3.1	Capacity 3.5m^3/hr at 12m head (For transfer of sludge)	Each	4	33900	135600
8.4	Air Blowers: Twin lobe positive displacement type, rotary air blowers of suitable type with V-belt drive, belt guard, base plate, inlet filter-silencer, flexible connectors, check valve, relief valve, pressure gauge and piping.				
8.4.1	Capacity- 70m^3/hr @ 6000 MMWG	Each	4	101700	406800
8.5	Supplying, installing, testing and commissioning of Dosing Mixing Tanks, complete in all respects & comprising the following:				
	Chemical Dosing Tanks				
	MoC: LDPE				
	Tank Capacity: 200 Lts				
	With Mixer fitting assembly				
	Geared Mixing Arrangement				
	Motor: 0.5 HP x 1440 RPM (Crompton/ Equivalent)				
	Gear Box (Greaves / Radicon/ Elecon/ Equivalent)				
	Shaft S.S. with stirring blades				
	Platform and bridge support for Motor and Gear Box mounting	Nos.	6	28250	169500
8.6	Supplying, installing, testing and commissioning of Chemicals Dosing, complete in all respects & comprising the following:				
	Alum / Soda / Poly based Dosing System consisting of Storage, & Feeding				
	Dosing with Auto Dosing Pumps				
	Operations: 1 Online, 1 Standby				
	Electronically operated, mechanically actuated diaphragm type pump				
	Adjustable Injection Frequency				
	Pressure: 1 Kg/cm^2				
	MOC: PP, PTFE (Make : Milton Roy / Grundfos)	Nos.	6	28250	169500
8.7	Supplying, installing, testing and commissioning of Flash Mixer with Tank & Mixer , complete in all respects & comprising the following:				
	Construction: MS FRP Lined				
	Dimensions: 600mm x 600 x 1500 mm				
	Leg Supports of ISMC 100x 100				
	FRP Lined from inside, externally primer and enamel coated from outside				
	Geared Mixing Arrangement				
	Motor: 1.0 HP x 1440 RPM (Crompton/ Equivalent)				
	Gear Box (Greaves / Radicon/ Elecon/ Equivalent)				

	Shaft S.S. with stirring blades				
	Platform and bridge support for Motor and Gear Box mounting	Nos.	2	84750	169500
8.8	Supplying, installing, testing and commissioning of Flocculation Tank with Flocculator, complete in all respects & comprising the following:				
	Construction: MS FRP Lined, 5.0mm Thk.				
	Dimensions: 900 mm x 900 mm				
	Straight Height: 1500mm				
	Conical Bottom				
	Leg Supports of ISMC 100x 100				
	FRP Lined from inside, primer and enamel coated from outside				
	Geared Mixing Arrangement				
	Motor: 1.0 HP x 1440 RPM (Crompton/ Equivalent)				
	Gear Box (Greaves / Radicon/ Elecon/ Equivalent)				
	Shaft S.S. with Flocculator Paddles				
	Platform and bridge support for Motor and Gear Box mounting	Nos.	2	84750	169500
8.9	Supplying, installing, testing and commissioning of Primary Tube Settler with Media, complete in all respects & comprising the following:				
	Construction: MS FRP Lined 5.0mm Thk.				
	Plan Area: 1500 mm x 1500 mm				
	Vertical Height: 2100mm				
	Conical (45o) Bottom with sludge drain valve				
	Supporting Structure of ISMC 100 x 50 and 6.0 mm thk. Base Plates and Brackets.				
	Fastening of Flat 50 x 10 and ISA 50 x 6				
	Supporting Structure for Media				
	FRP Lined from inside, primer and enamel coated from outside				
	TubeDek Plastic Media				
	UV Stabilised				
	750mm Straight .Ht.				
	Fitted at 600 inclination				
	Complete structured Media Blocks (Make: Cooldeck / MM Aqua)	Set	2	113000	226000
8.10	Supplying, installing, testing and commissioning of FAB Reactor , complete in all respects & comprising the following:				
	Construction: MS FRP Lined 5mmThk.				
	Dimensions: 1500 mm x 1400 mm				
	Height: 2500mm B514				
	Fastening of Flat 50x8 and ISMA 50x6				
	Complete bracing of ISMC 100x50				
	FRP Lined from inside, primer and enamel coated from outside				
	Floating random Media				
	Hollow Cylindrical				
	PP Media, UV Stabilised				
	Surface Area > 400m2/m3				
	Fine Bubble air Diffusers Sleeve type membrane diffusers				
	Silicon Membrane with SS & PVC Fittings				
	Bubble Size: 1.0 – 2.0mm				
	Membrane Capacity: 8.0 m3/Hr.				
	Complete with Aeration Grid in SS304	Nos.	2	113000	226000
8.11	Supplying, installing, testing and commissioning of Secondary Tube Settler with Media, complete in all respects & comprising the following:				
	Construction: MS FRP Lined 5.0mm Thk.				
	Plan Area: 1500 mm x 1200 mm				
	Vertical Height: 1700mm				
	Conical (45o) Bottom with sludge drain valve				

	Supporting Structure of ISMC 100 x 50 and 10.0mm Thk. Base Plates and Brackets				
	Fastening of Flat 50 x 10 and ISA 50 x 6				
	Supporting Structure for Media				
	FRP Lined from inside, primer and enamel coated from outside				
	TubeDek Plastic Media				
	UV Stabilised				
	750mm Straight .Ht.				
	Fitted at 600 inclination				
	Complete structured Media Blocks (Make: Cooldeck / MM Aqua)	Set	2	113000	226000
8.12	Air Grids : The equilazation tanks and treated water tank shall be equipped with non clog Air Grids for 70m^3/day efflunt flow to supply sufficient air for the treatment process and maintain adequate circulation velocity to prevent solids from settling.				
	No. of Diffusers : as required				
	Non submerged air piping : GI				
	Submerged Air Piping : SS 304	Sets	2	113000	226000
8.13	Filter Feed pumps: Centrifugal type, monoblock, self priming pumps with bronze in impeller of an approved make and complete with with suction and delivery valves and non return valves,suction and delivery headers capable of handling clear water complete with fan cooled induction motor with class B insulation, mounted on a common structural base plate with 100mm dia pressure gauge with gunmetal isolation cock and suitable vibration elimination pads of approved design for pump foundation. Motor to be suitable for 400/440 volts, 3 phase, 50 cycle AC supply with rpm, to suit the corresponding pumps. Cost of all suction and delivery valves, pipes and header shall be included in the rate				
8.13.1	Capacity 7.0m^3/hr at 30m head.	Nos.	4	28250	113000
8.14	Treated water pumps: Centrifugal type, monoblock, self priming pumps with bronze in impeller of an approved make and complete with suction and delivery valves and non return valves,suction and delivery headers capable of handling clear water complete with fan cooled induction motor with class B insulation, mounted on a common structural base plate with 100mm dia pressure gauge with gunmetal isolation cock and suitable vibration elimination pads of approved design for pump foundation. Motor to be suitable for 400/440 volts, 3 phase, 50 cycle AC supply with rpm, to suit the corresponding pumps.Cost of all suction and delivery valves, pipes and header shall be included in the rate				
8.14.1	Capacity 10m^3/hr at 50m head	Nos.	4	45200	180800
8.15	Vertical, MSRL, filter: Fabricated from IS:226/2062 plate 6mm thick for shell and 8mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete.				
8.15.1	Capacity 7.0m^3/hr at 3.0kg/cm^2	Set	2	56500	113000
8.16	Vertical, MSRL, activated carbon filter: Fabricated from IS:226/2062 plate 6mm thick for shell and 8mm thick M.S. plate for dished ends complete with initial charge of filter media, face piping and valves accessories, painting, testing and commissioning complete.				
8.16.1	Capacity 7.0m^3/hr at 3.0kg/cm^2	Set	2	79100	158200
8.17	Supply, erection, testing and commissioning of Flow meter suitable for 7m3/hr flow rate.				
8.17.1	40 mm dia.	Nos.	2	79100	158200
8.18	Supply, erection, testing and commissioning of Energy meter before electrical panel.	Nos.	2	11300	22600
8.19	Interconnecting Pipe lines and valves for pumps and equipmentS: Galvanized Iron pipes (medium class) conforming to IS:1239 complete with carbon steel fittings IS:1879 e.g. tees, crosses, plugs, sockets, elbows, reducers, supports and clamps, puddle flanges, etc., cutting chases including painting pipes and fittings with epoxy paint over a coat of primer.	Lot	2	135600	271200
8.20	Design, manufacture, supply, installation, testing and commissioning of the following integrated, cubicle type, dead fornt, extensible, sheet steel control panel, to the foundation. The panel shall be suitable for 415 volts, 50 cycles, 4 wire supply. Quoted price shall be including with 25mm thick rubber mats, wiring, cabling of approved size, control wiring and copper earthing from control panel to various equipment like motor starters, pump motors etc. including making end terminations etc. The following components and accessories shall be mounted within each control panel.				
8.20.1	One No. 100 amps TP incoming MCCB complete with the following:				
i)	1 No. 0-500 volts 96x96 sq. mm ammeter with selector switch and fuses.				
ii)	1 No. 0-60 amps 96x96sq.mm ammeter with 60/5 amps ratio CT's and selector switch.				
iii)	Over voltage and under voltage tripping machanism for persistent voltage fluctations of more than ±10% of the rated voltage for more than 5 minutes.				

iv)	Phase indicating lamps with toggle switches.				
v)	Indication lamps for ON/OFF/TRIP status of motors.				
b)	Aluminium bus bar of 100 amps for three phase and neutral.				
c)	Out going feeders/Starters				
i)	10 Nos. 6 amps TP MCB for FAB feed pumps, Raw Effluent Lift Pump , sludge transfer pumps ,Flash Mixer and Flocculator				
ii)	6 Nos. 6 amps TP MCB for Mixture chemical dosing and chemical dosing tank.				
iii)	4 Nos. 10 amps TP MCBS with DOL starter for treated water pump & air blowers.				
iv)	1 No. 6 amps TP MCB for metering pump.				
v)	1 Nos. 32 amps Spares TP MCB's.for Ultra filtreration panel				
a)	1 Nos. 32 amps Spares				
Note :					
a)	All switch gear/panels shall be suitable for 25 KA rating.				
b)	All outgoing will have 96 sq. mm size ammeter and CT.				
c)	All starter units for pumps to be provided with 3 level liquid level contractor.				
d)	All outgoing starter units to have "ON" red lamps.				
e)	All pumps to be provided with duty selector switch.				
f)	All pumps to be provided with sequence timer 220/440 V AC/DC and alternate working of pumps between 6 to 8 hours or alternate use of pumps after one service in sequence.				
g)	All pumps to be provided with over load relay.				
h	Necessary cable alleys for space switches, level controller internal wiring and copper earthing of all equipment shall also be included. All switch gears/control gears shall be motor duty rating.	Set	2	339000	678000
8.21	Supplying, installing, testing and commissioning of UF System piping and Valves with all the required accessories & chemical cleaning system, complete in all respects & comprising the following:				
	a) 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 : 3 cum/hr Output				
	Inlet TSS :- 10-30 mg/lt				
	Filtration Flux :- 40 lt/m2/hr				
	Membrane Area - 55-75 M2 as per approved makes				
	Membrane MOC - PVDF				
	Membrane Type :- Pressure Feed Mambrane 25 micron cartridge type, Out to in process				
	No. of UF Membrane - 1 Number				
	Make UF Membrane - DOW / Pureflow / Hydrnautics / Hyflux / GE				
	b) UF Feed Pump 2 Nos. (1W+S) 3 M3/hr each 20-25m head				
	c) UF pre fine filtration				
	d) 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 etc. (Cap. 6m3/hr head 18-20m (1 W+ 1S) Including HDPE back tank of capacity 500 litres.				
	e) Chlorine dosing system				
	f) CEB / CIP dosing station including dosing tank & pumps etc.f				
	g) PLC control panel with all automation required like Pneumatic valves, piping in UPVC PLC and other required accessories.	Set	2	904000	1808000
8.22	Providing Sludge Bed Media for sludge bed	Lot	2	22600	45200
8.23	Providing Skid Mounting Structure for FAB tank, tube settlers ,flash mixture and Flocculation Tank	Set	2	56500	113000

8.24	Approval: Contractor to provide adequacy report consisting of inlet and out test reports, report/drawings as per pollution board requirement. Contractor shall include the cost of all chemicals consumed during testing and commissioning and the cost of such items of works, which are not explicity mentioned above.	Job	2	226000	452000
9.0	**COMPRESSED AIR SYSTEM**				
9.1	Providing, fixing, jointing and testing in position the following heavy class MS pipes conforming to IS:1239 cut to required lengths including all necessary fittings and specials such as bends, tees, unions, reducers, flanges & plugs etc. welding, jointing and making necessary connections at wall/ceiling level supported by clamps, hangers etc. And G.I. Heavy class pipe sleeve of larger diameter shall be provided wherever the pipes are crossing the walls/floors slab and sealing the sleeves with fire proof material. Threading, jointing, and making proper connections, cutting hole in wall/floor/slab and making good the same good with cement concrete 1:2:4, complete as required.				
9.1.1	a) 15 mm dia	RM	90	220	19832
9.1.2	b) 20 mm dia	RM	20	271	5424
9.1.3	c) 25 mm dia	RM	450	372	167297
9.1.4	d) 32 mm dia	RM	20	476	9515
9.1.5	e) 40 mm dia	RM	20	540	10803
9.1.6	f) 50 mm dia	RM	1200	723	867840
9.1.7	g) 65 mm dia	RM	140	922	129091
9.1.8	h) 100 mm dia	RM	1600	1646	2634256
9.2	Providing two coats of Synthetic enamel paint of approved shade over pipes and supports as per pipe colour code over a coat of primer. Including painting of legends with direction arrow.				
9.2.1	a) 15 mm dia	RM	90	31	2746
9.2.2	b) 20 mm dia	RM	20	31	610
9.2.3	c) 25 mm dia	RM	450	31	13730
9.2.4	d) 32 mm dia	RM	20	31	610
9.2.5	e) 40 mm dia	RM	20	31	610
9.2.6	f) 50 mm dia	RM	1200	32	37968
9.2.7	g) 65 mm dia	RM	140	37	5221
9.2.8	h) 100 mm dia	RM	1600	44	70512
9.3	Providing, cutting and chases in walls and floors for 15 mm dia to 65 mm dia MS seamless pipes & fittings for cold and hot water supply pipes. And making good the same using 1:1 cement mortar over wire mesh.	RM	100	58	5763
9.4	Providing, fixing, jointing and testing in position the following heavy class MS pipes conforming to IS:1239 cut to required lengths including all necessary fittings and specials such as bends, tees, union, reducers, flanges & plugs etc. Welding, jointing and making proper connections and 100mm thick fine sand around the pipes. Including excavation in all kind of soil, for pipe running at minimum 1.5m depth, dewatering, refilling, watering, ramming, removing and disposal of the surplus excavated material as per instructions by site incharge and making good the same complete as required.				
9.4.1	a) 100 mm dia	RM	20	1301	26013
9.5	Providing protection to embedded MS pipes and fittings by applying pyp kote primer (@ 100 gm/sqm) thereafter wrapping 4mm thick pyp kote (AW 4mm) protection coating by thermo fusion process. Overlap shall be maintained at 15mm. The application process shall be strictly according to manufacturer's specification.				
9.5.1	a) 100 mm dia	RM	20	136	2712
9.6	Providing and fixing pressure regulator valve with air filter and pressure gauge complete with all necessary fitting				
9.6.1	a) 25 mm dia	Nos	100	6659	665909
9.7	Providing and fixing moisture trap with S.S. ball valve complete with all necessary fitting				

9.7.1	a) 15 mm dia	Nos	20	42042	840833
9.8	Providing & fixing ball valve complete in S.S Tested to a pressure of 10 Kg / Sqcm. Including flanges/union, nuts, bolts, washer etc. Complete as required.				
9.8.1	a) 15 mm dia	Nos	4	598	2391
9.8.2	b) 25 mm dia	Nos	100	716	71642
9.8.3	c) 50 mm dia	Nos	20	2758	55167
9.8.4	d) 100 mm dia	15	15	10803	162042
9.9	Providing & fixing wafer type check valve complete in S.S. tested to a pressure of 10 Kg/sqcm. Including rubber gasket, flanges, union, nuts, bolts, washers & painting complete as required.				
9.9.1	a) 100 mm dia	Nos	6	11967	71800
9.10	Providing and fixing double flanged flexicon rubber expansion joint with unit control as per manufacturers specifications of standard length complete with all accessories tested to a pressure of 10 Kg./sqcm. Including rubber gaskets, flanges, nuts, bolts & washers complete as required.				
9.10.1	a) 100 mm dia	Nos	6	2975	17852
9.11	Supply, installation, testing and commissioning of Air filters for Compressed air supply	Nos	4	131975	527900
10.0	**2 NOS. BOREWELLS**				
10.1	Transportation to and from for drilling rig, pipes, flanges and all other materials at site including erection & dismantling & demolization of drilling equipment, after completion of work including levelling, dressing,for erecting the equipment.	JOB	2	12010	24019
10.2	Drilling with DTH (direct to hole) bore in all kind of soil including hard rock and disposal of surplus soil, removal and dumped to an approved area as instructed.				
	a) 275/200 mm dia				
10.2.1	0 - 30 meters	RM	120	1434	172076
10.2.2	30 - 60 meters	RM	120	1501	180077
10.2.3	60 - 90 meters	RM	120	1649	197840
10.2.4	Extra Depth (Upto 300 m)	RM	840	1731	1454174
10.3	Geophysical investigation of the acquifer by electrologing system with all tools and plants as necessary including supplying of necessary report	ITEM	4	10776	43103
10.4	Labour for making arrangements for showing verticality test including the test for hire charges of tools and plants, scaffolding, labour etc. all completed	ITEM	4	3251	13004
10.5	Supplying and fixing tubewell MS fittings as specified below :				
10.5.1	a. 200mm dia. Housing clamp.	Nos	4	1608	6432
10.5.2	b. 200mm dia. well cap.	Nos	4	1307	5230
10.5.3	c. 200mm dia bail plugs.	Nos	4	2535	10138
10.5.4	d. 1.5. x 2.25 mm Pea Gravels.	Cu.M	20	2562	51234
10.5.5	e. Centering guide	Nos	8	2535	20277
10.6	Developing of both borewells till the sand free discharge is obtained through efficient air compressor.	JOB	4	14145	56581
10.7	Testing and overpumping (25% of tube well for 16hr to record draw down recovering (yield test) including flushing of both borewells.				
10.7.1	a. By compressed air method/pump	JOB	4	3269	13076
10.8	Collecting sample of water for bacteriological and chemical test for any depth at any time during execution of work including hire and labour charges for tools and plants and sterilizing equipments, paying all charges and fees, testing etc. completed in all respects as per direction (As per IS 10500 all parameters	ITEM	4	14313	57250
10.9	Supplying and installing cage for submerisible pumps motor, fabricated out of 40mm x 6mm M.S. flat, welded construction and put to proper shape to hold pump enclosed and fixed around the mouth of pump set including painting with two coats of anticorrosive paint complete as required.	Nos	4	4628	18514
10.10	Providing sanitary sealing on top as per I.S. with 1:3:6 PCC Block of size 1m x 1m x 1m	Nos	4	4736	18943

10.11	Testing, commissioning and lowering of submersible pumps set as per specifications (enclosed in cage) by using `C' class column pipes (pipes included in seperate column of schedule) including binding submersible cable, along with column pipes with suitable size of clamps. The submersible pump set with direct coupled motor rated for 3 phase,50 cycle 415 ± 10% volts A/c supply with the required duty.	SET	4	11142	44567
10.12	Providing and fixing Submersible pump set as per specifications with direct coupled motor rated for 3 Phase, 50 Cycles 415±10% Volts, AC supply with the following duty.				
10.12.1	Approx. Head- 300 m,Flow rate - 20000 ltr/ hr. (Submersible pumps may be of Atlanta / KSB / Kirloskar / Calama makes)	SET	4	97683	390731
10.13	Supply & Installation of G.I. Class `C' column pipe with flanges at 3m intervals including all fittings, flanges, clamps as required.				
10.13.1	a) 65 mm dia	RM	800	706	565000
10.14	Supplying, fitting and fixing electric water level guard with 2 pole electrodes.	Nos	8	7624	60993
10.15	Supplying & Installation as specified the following				
	1) G.I. Bend with Flange				
10.15.1	a) 65 mm dia	Nos	4	2769	11074
	2) Butterfly valve with flanges				
10.15.2	a) 65 mm dia	Nos	4	3800	15201
	3) Wafer type check valve with flange				
10.15.3	a) 65 mm dia	Nos	4	20758	83032
10.15.4	4) Pressure Gauge with isolating valve	Nos	4	1484	5935
10.16	Supply, Installation, testing and commissioning of Electrical Panel Board for Tubewell, duly internally wired, made of 14 SWG sheet with 2 coats of finish painting with powder coating, including fixing the same in wall / floor on Angle Iron Frame as per Site condition and fitted with the following:				
	Incoming				
	a) 63A TP MCCB - 1 No.				
	b) 1 No 96 mm voltmeter 0-500 V, with				
	selector switch & control MCBs.				
	c) 1 No 96 mm Ammeter of suitable				
	range with CT's and Ammeter Selector				
	switch & control MCBs.				
	Bus Bars				
	a) 100A TPN Aluminium bus bar				
	Outgoing				
10.16.1	2 Nos. 40 A TP MCB with DOL starter switch for motor. Each compartment shall contain CT operated ammeter with selector switch / manual selector switch with indicating lamp, ON/OFF status of motor, level button and level cut off.				
10.16.2	40A TP ON load changeover switch for after above two starters	SET	4	32595	130379
10.17	Supplying and Installing of Copper arm cable for submersible pump cable of suitable rating(Tentatively-4 core x 4 sq.mm copper) from pump to Panel Board with cable clips, supporting clamps, glands, grommets etc. as required and as per specifications.	RM	1200	232	277980
11.0	**PUMPS & ELECTRICAL PANEL**				
11.1	Providing, fixing, testing and commissioning of Vertical in line type pump set with SS casing, SS impeller and SS shaft suitable for operation on 400/440 volts, 3 phase 2900 RPM, TEFC electric motor mounted on a common channel base plate with coupling guard, 150mm dia pressure gauge, GM isolation cock and cement concrete foundation with plaster complete as required.				
11.1.1	**Garden Hydrant Pump**				
	Capacity 7.5 lps (Each)				
	Head 70 m	Nos	4	169511	678045
11.1.2	**Raw Water Pumps to Filter**				
	Capacity 7.5 lps				
	Head 24 m	Nos	6	104136	624818
11.1.3	**Treated Water Pumps to OHT**				
	Capacity 7.5 lps				
	Head 45 m	Nos	6	119179	715073

11.2	**Drainage Pump.**				
	Providing, fixing and commissioning non clog type mono block submersible drainage pumps suitable for handling solids of 12 mm size with totally water and dust proof motor as specified				
	(Pumps shall be installed in a set of two pumps One working and One standby in sequence, and also both running on heavy flow)				
11.2.1	Pump Room Drainage Pumps				
	Capacity -500 lpm (Each)				
	Head - 10 m	Nos	4	86151	344605
11.2.2	Pits jack Drainage Pumps				
	Capacity - 225 lpm (Each)				
	Head - 10 m	Nos	12	43076	516907
11.2.3	Drainage Pumps for bogie wash plant				
	Capacity - 225 lpm (Each)				
	Head - 10 m	Nos	4	43076	172302
11.2.1	Admin basement Drainage Pumps				
	Capacity -500 lpm (Each)				
	Head - 10 m	Nos	12	86151	1033814
11.3	Supply, installation, testing and commissioning of dust, damp and vermin proof, free floor standing factory built sheet steel enclosed nondrawout modular panel for water supply pumps, fabricated out of suitable sized square tubular section and covered with 2.0mm thick CRCA sheet, hinged doors of 2mm thick CRCA sheet, duly painted complete with earth bus, necessary metering protections & indications and mounted with the following including all inter connection etc. (Including earthing).				
a)	One No. 150 amps TP incoming MCCB complete with the following:				
i)	1 No. 0-500 volts 96x96 sq. mm ammeter with selector switch and fuses. (1 set).				
ii)	1 No. 0-150 amps 96x96sq.mm ammeter with 60/5 amps ratio CT's and selector switch.				
iii)	Over voltage and under voltage tripping machanism for persistent voltage fluctations of more than ±10% of the rated voltage for more than 5 minutes. (1set)				
iv)	Phase indicating lamps with toggle switches.				
v)	Indication lamps for ON/OFF/TRIP status of motors.				
b)	Aluminium bus bar of 200 amps for three phase and neutral.				
c)	**Outgoing Feeders/Starters.**				
i)	32 amps TPN MCB with DOL starter with built-in SPP each suitable 5 HP filter feed pumps (3Nos).				
ii)	32 amps TPN MCB with DOL starter with built-in SPP each suitable 7.5 HP domestic water transfer pumps (3 Nos).				
iii)	32 amps TPN MCB with DOL starter with built-in SPP each suitable 12.5 HP Garden Hydrant Pump				
iii)	32 amps TPN MCB with built-in SPP each suitable for 5 HP drainage pumps panel in pumproom(1 Set).				
iv)	32 amps TPN MCB with built-in SPP each suitable for 5 HP drainage pumps panel in admin basement(3 Sets).				
v)	16 amps TPN MCB with built-in SPP each suitable for 1 HP drainage pumps panel in Pits jack & bogie wash plant (4 Set).				
vi)	63 amps TPN MCB with built-in SPP each suitable for 5 HP tubewell pumps panel (1 Set).				
	Rotary manual/auto/off switch. (4 Nos.)				
vii)	Spares				
a)	16 amps TPN MCB - 2 Nos.				
b)	32 amps TPN MCB - 2 Nos.				
	Note :				
a)	All switch gear/panels shall be suitable for 10 KA rating.				
b)	All outgoing will have 96 sq. mm size ammeter and CT.				

c)	All starter will have spare 10 amps 230 V coil auxiliary contractor for building Automation system.				
d)	All starter units for pumps to be provided with 3 level liquid level contractor.				
e)	Lamps.				
f)	All pumps to be provided with duty selector switch.				
g)	All pumps to be provided with sequence timer 220/440 V AC/DC and alternate working of pumps between 6 to 8 hours or alternate use of pumps after one service in sequence.				
h)	All pumps to be provided with over load relay.				
i)	All starter to be provided with single phase preventor.				
j)	Necessary cable alleys for space switches, level controller internal wiring and copper earthing of all equipment shall also be included. All switch gears/control gears shall be motor duty rating.	SET	2	283235	566469
11.4	Providing and fixing wall mounted dust and vermin proof motor control panel fabricated from 14 SWG MS sheet with stove enamelled paint and comprising of the following: (For drainage pumps in pump room)				
a)	32 amps incoming MCB (1 No.)				
b)	Fully tapped Copper bus bas of suitable capacity. (1 set)				
c)	Panel type volt meter 96mm square with Rotary selection switch for reading voltage between phase and neutral or incoming feeder. (1 set)				
d)	Phase indicating lights with toggle switches and shall be protected by 2 amps MCB's. (2 sets)				
e)	Ampere meter 96mm square panel type of appropriate range. (1 set)				
f)	16 amps outgoing MCB (2 Nos.)				
g)	Fully automatic DOL starters with push buttons indicating lights and overload relay each for drainage pump. (2 Nos.)				
h)	Single phasing preventors. (2 Nos.)				
i)	Rotary manual/auto/off switch. (2 Nos.)				
j)	Space of one liquid level controller	SET	8	159729	1277831
11.5	Providing and fixing wall mounted dust and vermin proof motor control panel fabricated from 14 SWG MS sheet with stove enamelled paint and comprising of the following: (For drainage pumps in Pits jack & bogie wash plant)				
a)	16 amps incoming MCB (1 No.)				
b)	Fully tapped Copper bus bas of suitable capacity. (1 set)				
c)	Panel type volt meter 96mm square with Rotary selection switch for reading voltage between phase and neutral or incoming feeder. (1 set)				
d)	Phase indicating lights with toggle switches and shall be protected by 2 amps MCB's. (2 sets)				
e)	Ampere meter 96mm square panel type of appropriate range. (1 set)				
f)	10 amps outgoing MCB (2 Nos.)				
g)	Fully automatic DOL starters with push buttons indicating lights and overload relay each for drainage pump. (2 Nos.)				
h)	Single phasing preventors. (2 Nos.)				
i)	Rotary manual/auto/off switch. (2 Nos.)				
j)	Space of one liquid level controller	SET	8	159729	1277831
	TOTAL OF SCHEDULE- D (Part-2)				**70262554**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor

SCHEDULE- E Bill of Quantaties for Fire Fighting Work

SL NO.	DESCRIPTION OF ITEM	UNIT	QTY.	RATE (In Rs.)	AMOUNT (In Rs.)
1.0	**FIRE DETECTION AND ALARM SYSTEM**				
1.1	Supply, installation, testing and commissioning of plug-in type addressable analogue multi-criterion detectors below false ceiling/on ceiling including the cost of base plate, 75 mm dia M.S outlet box for fixing of the detector base, mounting accessories etc. complete as per specifications and as required	Nos	670	3792	25,40,828
1.2	Supply, installation, testing and commissioning of plug-in type addressable analogue photo electric smoke detectors above false ceiling including the cost of base plate, 75 mm dia M.S outlet box for fixing of the detector base, mounting accessories etc. complete as per specifications and as required	Nos	200	3573	7,14,612
1.3	Supply, installation, testing and commissioning of plug-in type rate of rise cum fixed temperature addressable analogue Heat detectors including the cost of base plate, 75 mm dia M.S. outlet box for fixing of the detector base, mounting accessories etc. complete as per specifications and as required.	Nos	20	3356	67,122
1.4	Supply, installation, testing and commissioning of 'X" Loop (540 Detectors, 200 Devices) (Fire Alarm Capability: 1 Loop x 99/125/150 detectors/devices) wall/recess mounting microprocessor based analogue addressable Fire Control Panel expandable by minimum 2 additional loops with minimum 80 character LCD display, 4 access levels, 1000 events historical logging, flash E-PROM, 240VAC power supply, automatic battery charger, 24V SLA batteries suitable for operating the entire system including the talk back units and the hooters/strobes for a minimum of 4 hours in battery condition. The Panel shall have suitable power amplifiers for hooter/strobes. The Panel shall be capable of being Integrated with the BMS System and shall include cost of supply and installation of any additional modules or interfaces required for the same. The panel shall be complete as per specifications and as required.	Nos	2	765772	15,31,543
1.5	Supply, installation, testing and commissioning of Repeater panel including the cost of mounting accessories complete as per specifications and as required	Nos	2	43758	87,516
1.6	Supply, installation, testing and commissioning of dust and vermin proof addressable analogue Manual Call Boxes to initiate audio visual alarm including the cost of mounting accessories complete as per specifications and as required.	Nos	110	5105	5,61,587
1.7	Supply, installation, testing and commissioning of addressable analogue Talk Back jacks with face plates for Fireman's Handsets to initiate audio conversation with Main Fire Alarm Panel including the cost of mounting accessories complete as per specifications and as required.	Nos	2	6826	13,653
1.8	Supply, installation, testing and commissioning of addressable Wall/Ceiling mounting Strobes cum Hooters including the cost of mounting accessories complete as per specifications and as required.	Nos	120	9481	11,37,684
1.9	Supply, installation, testing and commissioning of Control Modules including the cost of mounting accessories complete as per specifications and as required.	Nos	120	5761	6,91,289
1.10	Supply, installation, testing and commissioning of Monitor Modules including the cost of mounting accessories complete as per specifications and as required.	Nos	2	5615	11,230
1.11	Supply, installation, testing and commissioning of Fault Isolator Modules including the cost of mounting accessories complete as per specifications and as required	Nos	90	5251	4,72,600
1.12	Supply installation testing and commissioning of two way Talk Back handsets to initiate audio interface complete as required.	Nos	2	6564	13,128
1.13	Supply, installation, testing and commissioning of wall or ceiling mounted 240VAC illuminated double sided pictorial exit signs provided with appropriate direction arrow painted in green on white with an 11W CFL Lamp including the cost of in-built rechargeable batteries with charger suitable for 90 minute operation and including the cost of accessories for surface/recessed or ceiling suspended mounting complete as required.	Nos	2	1223	2,445
1.14	Supply, installation, testing and commissioning of cable for fire detection and alarm system with 2 core annealed tinned copper conductor PVC sheathed, flexible FRLSZH 2 x 1.5 sq mm cables as per specifications in existing conduits complete as required	RM	19000	68	12,88,200

1.15	Supply, installation, testing and commissioning of following 16 gauge M.S. rigid conduits recessed in RCC walls or clamped on surface in ceilings including clamps hardwares etc complete as per specifications. Quoted price shall include MS flexible conduits to connect from ceiling to false ceiling.				
1.15.1	20 mm dia	RM	20	174	3,480
1.15.2	25 mm dia	RM	9600	207	19,85,184
1.16	Supplying, laying and connecting of single pair PVC insulated twisted 32/0.2 mm dia copper conductor cable for speakers in conduit for hooter power supply.	RM	2600	211	5,49,406
1.17	Supply, laying, testing and commissioning of 4 pair 2.5 sqmm screened copper armoured cable for outdoor use complete with providing sand cushioning brick protection etc.	RM	20	527	10,532
1.18	Supplying , laying , testing and commissioning of 6 core 2.5 sqmm copper armoured cable for outdoor use complete with providing sand cushioning and brick protection etc.	RM	20	372	7,435
1.19	Supplying, laying, testing and commissioning of 50 core 1.5 sqmm copper conductor armoured cable for outdoor use complete with providing sand cushioning and brick protection etc.	RM	20	390	7,797
1.20	Supply, Fixing, Testing and Commissioning of Response Indicators installed within false ceiling and locked rooms.	No	300	1347	4,04,088
2.0	**FIRE PUMPS & EQUIPMENTS**				
2.1	Supply, installation, testing & commissioning of electric driven **Hydrant Pump & Sprinkler pump** suitable for automatic operation consisting of the following:				
	Horizontal end suction centrifugal pump complete with mechanical seal and including necessary arrangement for testing of pump				
	Squirrel cage induction motor suitable for 415 V, 50 Hz, AC supply of suitable rating for the above pump with synchronous speed of 2900 RPM T.E.F.C. type and conforming to IP:55 and flexible coupling and coupling guard with the pump.				
	Common bed plate of fabricated mild steel channel or cast iron type.				
	Suitable reinforced cement concrete pump foundation including cushy foot mounting, foundation bolts, washers as required.				
	The pump shall be of the following specifications:				
	Discharge - 2850 lpm				
	Head - 100 m				
	No. of stage preferred - Single / Double				
	Speed RPM - 2900				
	Material of construction				
	a) Impeller - Bronze				
	b) Casing - C.I.				
	c) Shaft & Shaft Sleeve - SS-410				
	d) Bearing - Grease Lubicated				
	e) Seal & Make - Mechanical				
	Type of pump - End suction	SETS	4	577620	23,10,479
2.2	Supply, installation, testing & commissioning of diesel engine **Hydrant Pump** suitable for automatic operation consisting of the following:				

	Horizontal end suction centrifugal pump complete with mechanical seal and including necessary arrangement for testing of pump				
	Water coolled Diesel Engine developing suitable BHP at 1500-2000 RPM for the Pump, common bed plate for mounting of engine and pump, RCC foundation and vibration damping arrangement by Cushy Foot and engine panel provided by engine manufacturer, connection to Engine Starting Panel as per item (4), sealed maintenance free batteries of 24 V, 88 AH. Rate shall include Exhaust pipe of required length with asbestos lagging, muffler, day oil tank of 400 lts with first charge and manual oil pump set.				
	Flexible coupling and coupling guard with the Pump,				
	Common bed plate of fabricated mild steel channel or cast iron type.				
	Suitable reinforced cement concrete pump foundation including cushy foot mounting, foundation bolts, washers as required.				
	Engine panel				
	Sealed maintenance free batteries of 24 V, 88 AH				
	Exhaust pipe of required length with asbestos lagging, muffler				
	Day oil tank of 400 lts with first charge and manual oil pump set.				
	The pump shall be of the following specifications:				
	Discharge - 2850 lpm				
	Head - 100 m				
	No. of stage preferred - Single / Double				
	Speed RPM - 1450				
	Mover - Diesel engine driven				
	Material of construction				
	a) Impeller - Bronze				
	b) Casing - C.I.				
	c) Shaft & Shaft Sleeve - SS-410				
	d) Bearing - Grease Lubicated				
	e) Seal & Make - Mechanical				
	Type of pump - End Suction	SETS	2	1148540	22,97,080
2.3	Supply, installation, testing & commissioning of electric driven **Jockey Pump** suitable for automatic operation consisting of the following:				
	Horizontally mounted centrifugal end suction pump complete with mechanical seal and including necessary arrangement for testing of pump.				
	Squirrel cage induction motor suitable for 415 V, 50 Hz, AC supply of suitable rating for the above pump with synchronous speed of 2900 RPM T.E.F.C. type and conforming to IP:55 and flexible coupling and coupling guard with the pump.				
	Common bed plate of fabricated mild steel channel or cast iron type.				
	Suitable reinforced cement concrete pump foundation including cushy foot mounting, foundation bolts, washers as required.				
	The pump shall be of the following specifications:				
	Discharge - 300 lpm				

	Head - 100 m				
	No. of stage preferred - Multistage				
	Speed RPM - 2900				
	Material of construction				
	a) Impeller - Bronze				
	b) Casing - C.I.				
	c) Shaft & Shaft Sleeve - SS-410				
	d) Bearing - Grease Lubicated				
	e) Seal & Make - Mechanical				
	Type of pump - End suction	SETS	2	182008	3,64,016
2.4	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
2.4.1	3 X 25 sq. mm (25mm)	Metre	100.00	227	22,729
2.4.2	3 X 95 sq. mm (38mm)	Metre	200.00	491	98,254
2.5	Providing, installation, testing, & commissioning of pressure switches for Hydrant, Sprinkler, Standby and Jockey pump including necessary wiring upto control panel & other materials.	Each	10	12392	1,23,916
2.6	Providing and fixing fire retardent / extinguishing electrical insulated synthetic mat of 3mm thick ±10% conforming to latest BIS doc no.-ET-02(5440) meeting requirements of IS 3043 / IS 5216 (Part I, II & III), IS 8437 & IEC 479 suitable for all voltages not exceeding 3.3 KV AC supply and having minimum width of 1000mm ± 20mm and including supply of required quantity of adhsive / compound and fixing the same at site as per site requirement.	Metre	5	6704	33,521
2.7	Supplying and installation following size of perforated pre painted **M.S. cable trays** with perforation not more than 17.5%, in convenient sections, joint with horizontal and vertical bends, reducers, tees, cross members and other accessories as required and duly suspended from the ceiling with M.S. suspenders etc. as required.				
2.7.1	150mm width x 50mm depth x 1.6 mm thickness.	Metre	50.00	616	30,778
2.8	Earthing with **GI Earth plate** 600 mm x 600 mm x 6 mm th.including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe with charcoal or coke and salt complete as required.	Set	2	5315	10,630
2.9	Providing & fixing 25 mm x 5 mm **G.I. Strip** in on surface or in recess for connections etc as required.	Metre	100.00	168	16,810
2.10	Providing & fixing 25 mm x 5 mm **G.I. Strip** in 40 mm dia GI pipe from earth electrode including connections with GI nut, bolt, spring, washer excavation and re-filling etc. as required.	Metre	20.00	498	9,967
2.11	Providing and fixing in position the industrial type **Pressure Gauges** with gun metal / brass valves complete as required	Each	10	1134	11,341

3.0	**PIPING, HYDRANTS, SPRINKLERS AND ACCESSORIES**				
3.1	Providing, laying, jointing and testing of following sizes of pipes conforming to IS-1239 part 1/1974 and part 11/1979 with all accessories like fittings with welded joint 'shall be used like tees, elbows, reducers, flanges, rubber gaskets, GI nuts bolts, washer. And fixing the pipe on floor / wall /ceiling with suitable size clamps, hangers to be 'provided wherever the pipes are crossing the walls/floors and sealing). Including cutting holes and chases in brick, R.C.C work and making good the same to original conditions complete in all respects for fire fighting works.				
	G.I. `C' Heavy class pipe				
3.1.1	a) 25 mm dia	RM	2300	497	11,43,560
3.1.2	b) 32 mm dia	RM	670	609	4,08,077
3.1.3	c) 40 mm dia	RM	670	739	4,95,143
3.1.4	d) 50 mm dia	RM	70	901	63,043
3.1.5	e) 65 mm dia	RM	60	1118	67,054
3.1.6	f) 80 mm dia	RM	465	1428	6,64,169
3.1.7	g) 100 mm dia	RM	735	2106	15,48,145
3.1.8	h) 150 mm dia	RM	1475	2721	40,13,534
3.1.9	i) 200 mm dia	RM	4195	4224	1,77,19,428
3.1.10	j) 250 mm dia	RM	35	3847	1,34,628
3.2	Providing two coats of synthetic enamel paint of approved shade over a coat of primer over pipes and supports. Including painting of legends both direction arrow as per the approval of the architects/ consultants.				
3.2.1	a) 25 mm dia	RM	2300	37	85,767
3.2.2	b) 32 mm dia	RM	670	43	28,770
3.2.3	c) 40 mm dia	RM	670	55	37,098
3.2.4	d) 50 mm dia	RM	70	62	4,351
3.2.5	e) 65 mm dia	RM	60	75	4,475
3.2.6	f) 80 mm dia	RM	465	75	34,680
3.2.7	g) 100 mm dia	RM	735	93	68,105
3.2.8	h) 150 mm dia	RM	1475	112	1,65,008

3.2.9	i) 200 mm dia	RM	4195	149	6,25,726
3.2.10	j) 250 mm dia	RM	35	170	5,933
3.3	Providing and fixing Orifice plate made out of 8 mm thick stainless plate for pipe to reduce pressure upto 3.5 Kg/sqcm complete in all respects.				
3.3.1	a) 80 mm dia	NOS	75	1553	1,16,447
3.3.2	b) 150 mm dia	NOS	64	1913	1,22,438
3.4	Supplying, fixing, testing and commissioning of following valves,strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
	BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/hot eater circulation as specified				
3.4.1	50 mm dia	NOS	2	3525	7,051
3.4.2	a) 80 mm dia	NOS	83	4307	3,57,450
3.4.3	b) 100 mm dia	NOS	14	6162	86,263
3.4.4	c) 150 mm dia	NOS	34	7693	2,61,577
3.4.5	d) 200 mm dia	NOS	17	11281	1,91,785
3.5	Providing and fixing C.I. Butterfly valves conforming to PN 16/13095 with nuts, bolts, washers, 3mm thick insertion ruber gasket and two matching flanges as per table 'E' etc. complete.				
3.5.1	250 mm dia	NOS	4	23507	94,030
3.6	Supplying, fixing, testing and commissioning of following valves,strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.				
	NON - RETURN VALVE with duel plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pres**sure rating for chilled / hot water circulation including insulation as specified.**				
3.6.1	a) 80 mm dia	NOS	4	3229	12,917
3.6.2	b) 100 mm dia	NOS	8	4470	35,760
3.6.3	c) 150 mm dia	NOS	12	7522	90,261
3.6.4	c) 200 mm dia	NOS	6	11281	67,689
3.7	Providing & Fixing of installation control valve with turbine type automatic Alarm Gong to be connected with control valve, drain & test valve as per manufacturer's specifications complete as required.				
3.7.1	a) 150 mm dia	NOS	2	41246	82,492

3.8	Providing & fixing single acting air release valve with brass gate valve, flanges/ union, Suitable for sprinkler/ wet riser system with all necessary connections.				
3.8.1	a) 25 mm dia	NOS	10	4348	43,482
3.9	Providing and fixing Pot strainer with bronze/ S.S perforated sheet basket tested to a pressure of 15 Kg/sqcm including rubber gasket, flanges, nuts, bolts and washers, complete as required.				
3.9.1	a) 150 mm dia	NOS	10	22984	2,29,842
3.10	Providing & fixing single headed gun metal fire hydrant valve with 75 mm N.B. flanged inlet, brass spindal, 63 mm dia instantaneous type G.M. coupling blank cap, chain. Conforming to IS: 5290. Including tapping from wet riser complete as required.	NOS	139	9318	12,95,199
3.11	Providing & fixing swinging type First Aid hose reel in red colour with 36 mts long and 20 mm dia heavy duty rubber water hose, 20 mm dia globe valve stop cock, terminating with G.M. coupling & nozzle of '5mm outlet with shut off valve confirming to IS 8090 - 1976 complete with drum and brackets for fixing on wall, bolts & nuts conforming to IS:884-1969 complete as required.	NOS	46	17433	8,01,895
3.12	Providing & fixing non-perlocating, rubber reinforced lined fire hose pipe (as per IS : 636) of 63 mm dia and length as described below. The hose shall be rated for brust pressure of 35.7 Kg/sqcm. Hose shall be complete with ISI marked brass male & female coupling (IS:903) bound & rivetted to hose pipe with copper rivets & 1.5 mm copper wire (Location : Internal fire hydrant)				
3.12.1	15 m length	NOS	92	6149	5,65,750
3.13	Providing & fixing controlled perlocation fire hose pipe (as per IS:8423) of 63 mm dia and 15 meter length rated for brust pressure of 35.7 Kg/sqcm. The hose shall be tested for flame resistance test in accordance to IS:8423. Hose shall be complete with ISI marked brass male & female coupling (IS:903) bound & riveted to hose pipe with copper rivets & 1.5 mm copper wire (Location : External fire hydrant)				
3.13.1	15 m length	NOS	150	5901	8,85,129
3.14	Providing and Fixing 63 mm dia instantaneous pattern branch short gunmetal pipe, 16 mm dia nozzle conforming to IS 903, suitable for inter connection to hose pipe coupling complete as required.	NOS	121	3231	3,90,911
3.15	Providing and fixing standard firemans axe with heavy rubber handle.	NOS	46	1057	48,601
3.16	Providing and fixing gun metal collecting head (draw off connection) with 150 mm dia outlet, suitable for local fire tender complete in all respects.	NOS	2	15530	31,059
3.17	Providing and fixing inlet breeching having C.I. body four way gun metal 63 mm dia instantaneous inlets conforming to IS 903 fitted with non return valves, 25 mm dia gun metal drain cock, blank cap, brass chains and 150 mm dia flanges with all accessories suitable for local fire tender complete as required.	NOS	6	18014	1,08,087
3.18	Providing and fixing weather proof cabinet of size not less than 0.9 x 0.6 x 0.45 mtr made out of S.S. sheet not less than 1.5 mm thick having central opening and 4 mm thick glazed glass doors (Two nos.) suitably marked on the outside 'with the letters "FIRE HOSE" including necessary locking arrangement and painting in red signal colour suitable to accommodate, double headed external yard hydrant valve, 2 nos 15 mtr long Hose pipe, 2 Nos branch pipe, nozzle and fire man's axe. It shall be mounted on raised brick platform / MS anticorrosive painted angle complete as required.	NOS	75	14288	10,71,579
3.19	Providing and fixing 4 mm thick glass door of size 2.1m x 0.9m along with anodised aluminium frame with centre opening for fire hose cabinet. Suitably marked on the outside with the letters "FIRE HOSE" including locking arrangement.	NOS	46	12672	5,82,904

3.20	Getting CFO approval for fire fighting installation and for the entire complex.This also includes the contractor for liasoning work such as filling necessary applications, submission of forms for approval to the local authorities, depositing, fees and other amounts as required for getting the approval. All the expenses incurred in this regard shall be borne by the Contractor, except for the payments to be made for any security deposits which will be reimbursed on production of original voucher.	LS	2	186355	3,72,710
3.21	Providing, Fixing Testing & Commissioning 15 mm dia. Quartzite bulb type GEM. Sprinkler head suitable to operate at 68 deg. C (UL/FM/LOC listed/approved)				
3.21.1	Standard Pendent / Upright type in brass/chrome finish.	Nos.	972	385	3,74,541
4.0	**FIRE EXTINGUISHER**				
4.1	Providing and fixing fire extinguisher Co2 gas type conforming to IS:2878 with insulated discharge horn, mounting bracket ISI marked extinguisher and valve, 4.5 kg capacity and initial refill.	NOS	134	8075	10,82,047
4.2	Providing and fixing fire extinguisher Co2 gas type conforming to IS:2878 with insulated discharge horn, mounting bracket ISI marked extinguisher and valve, 6.0 kg capacity and initial refill.	NOS	16	11492	1,83,874
4.3	Providing and fixing Fire Extinguishers (A, B, C type powder) complete with all accessories as per manufacturers specifications.				
4.3.1	a) Capacity 5 Kg	NOS	194	2361	4,57,951
4.4	Providing and fixing mechanical foam type(ISI marked) fire extinguishers consisting of welded M.S. cylindrical body squeeze lever discharge valve 30 cm long high pressure discharge hose, discharge nozzle suspension bracket ISI marked as per IS 933 finished externally with red enamel paint and fixed to wall with brackets complete with internal charger.				
4.4.1	a) 9 litres capacity	NOS	32	2326	74,417
4.4.2	b)50 litres capacity (trolly mounted)	NOS	2	12333	24,666
4.5	Providing and fixing carbon-di-oxide fire extingushers trolley mounted with all accessories internal discharge tube, high pressure discharge hose, discharge nozzle, suspension bracket, ISI marked as per IS:2878 finished externally with red enamel paint and fixed to wall with brackets complete with internal charge.				
4.5.1	a) Capacity 22.5 kg.	NOS	2	21355	42,709
4.6	Providing and fixing full bore type **flow switch** suitable for minimum 60 lpm flow rate.			0	0
4.6.1	100mm dia	NOS	2	6354	12,708
5.0	**MOTOR CONTROL CENTRE**				
5.1	Design,supply,installation, testing and commissioning of non draw out Cubical type sectionalised floor standing powder coated switch board of 31 MVA fault capacity at 415 V +/- 10% complete with 4 strip, 700 A capacity Aluminium Bus - Bar Electrolytic grade, cable alley & supplying & fixing of following switchgears including connections & interconnections complete as required for1 No Hydrant pump, 1 No sprinkler pump,1 No. Jockey Pump, & 1 No. Engine Starting Panel for Diesel Pump.				
	CUBICAL FIRE PANEL BOARD				
	i) For 1 x 90 KW Fire hydrantr pump (motor rating as per pump design)				
	i) For 1 x 90 KW Fire sprinkler pump (motor rating as per pump design)				

	iii) For 1 x 20KW Jockey Pump (motor rating as per pump manufacturer design)				
	INCOMER				
	1 no.600A TPN MCCB with Thermal Magnetic Release & ROH, with 96 mm (0 -1000 A) ammeter with 3 CT and selector switch, 96 mm (0 - 300 V) Voltmeter with selector switch, phase indication light with protection fuse-01 Set.				
	OUTGOINGS				
	i) For 2 x 90 KW Wet Riser & Sprinkler pump.				
	300 A TP MCCB with DOL starter, overload relay start / stop push buttons, 96 mm (0-300 A) ammeter with three CT & selector switch, on / off / trip indication light with protection fuses, single phase preventer. - 02 Sets				
	ii) For 1 x 20 KW Jockey Pump				
	63A TP MCB, 25 A DOL starter, overload relay, start/stop push buttons, ammeter (0-40A) with three CT & selector switch, on/off/trip indication lights with protection fuse, single phase preventer. - 01Set				
	iii) 32 A MCB for battery charging alongwith engine start relay 24V DC with AMF Panel - 01 set				
	iv) Provision for starting the diesel engine fire pump with battery charger for trickle & boost charging. The diesel engine driven fire pump shall start automatically in the event of pressure drop beyong preset limit on mains faulure or failure of electrical driven pumps to start.				
	Note:- CABEL CONNECTION				
	Separate neutral link to be provided wherever TP MCCB are used.				
	Following provisions to be made in the fire panel:				
	Audio visual alarm & indications having disconnect / reset facility with a range of 1/2 km. Annunciator to be provided in the Fire panel with hooter and acknowledge, test and reset P Bs. The indication shall come on when electrical driven pump set fails to start on pressure drop or when there is power failure during pressure drop.				
	Facility for mode selection ie auto or manual test & local/remote.				
	Protection failure & control cabling.				
	Panel shall be interlocked in such a way when fire pump starts on pressure drop in the header, supply to working chiller A/c panel is disconnected.				
	Remote indication of ON/OFF/TRIP shall be provided through potential free contact.				
	Provision of remote starting/stopping (manuals) of the engine shall be made.				
	NOTE :				
	All pumps operation shall be controled by flow switches.				
	The logic of control panel based on specification attached.				
	All pumps shall be works automatically or manually.				
	5 Amp power required for diesel engine pump from main fire fighting panel.				
5.1.1	(panel starter shall be based on pumps motor rating if any changes in motor rating the starter rating shall change and fabrication shall start only after approval of drawing)	sets	2	362302	7,24,603

6.0	**CLEAN AGENT GAS SUPPRESSION SYSTEM**				
A	**CLEAN AGENT BASED FIRE SUPPERSSION SYSTEM**				
	Note: The below quantities are indicative only, the final piping design and pressure calculationsusing manufacturer design software for a given dimension of room duly approved by manufacturer/ distributors shall be submitted prior to starting of the works.				
6.1	Supply, Installation, testing and commissioning of Cylinder UL listed / CCOE Approved, complete with UL listed valve assembly and arrangement for supervisory switch connection for monitoring cylinder pressure,a pressure guage with a safety burst disc ,electronic control head / Solenoid, pressure operated control, head, flexible hose, strap, NRV and a safety cap.				
	Gas.(Quantity would be as per the volume given above and as per the UL certification.) CLEAN AGENT (HFC125/ HFC227ea) (UL Listed) with Zero Ozone Depletion Potential(ODP), has appearance/colour: Colourless gas and has citrus like odour.				
6.1.1	**Signalling Equipment Room**				
6.1.1.1	Main System - 3 X 120 Litres Cylinder filled with HFC 227ea (350 kgs approx.)	Set	2	1749398	34,98,796
6.1.1.2	Standby System - 3 X 120 Litres Cylinder filled with HFC 227ea (350 kgs approx.)	Set	2	1749398	34,98,796
6.1.2	**Backup Operational Control**				
6.1.2.1	Main System - 4 X 120 Litres Cylinder filled with HFC 227ea (421 kgs approx.)	Set	2	2186748	43,73,496
6.1.2.2	Standby System - 4 X 120 Litres Cylinder filled with HFC 227ea (421 kgs approx.)	Set	2	2186748	43,73,496
6.1.3	**AFC Room**				
6.1.3.1	Main System - 3 X 100 Litres Cylinder filled with HFC 227ea (276 kgs approx.)	Set	2	1531365	30,62,729
6.1.3.2	Standby System - 3 X 100 Litres Cylinder filled with HFC 227ea (276 kgs approx.)	Set	2	1531365	30,62,729
6.1.4	**Telecom Equipment Room**				
6.1.4.1	Main System - 4 X 120 Litres Cylinder filled with HFC 227ea (405 kgs approx.)	Set	2	2143141	42,86,282
6.1.4.2	Standby System - 4 X 120 Litres Cylinder filled with HFC 227ea (405 kgs approx.)	Set	2	2143141	42,86,282
6.1.5	**Signaling Room & Telecom Room**				
6.1.5.1	Main System - 3 X 100 Litres Cylinder filled with HFC 227ea (283 kgs approx.)	Set	4	1560863	62,43,453
6.1.5.2	Standby System - 3 X 100 Litres Cylinder filled with HFC 227ea (283 kgs approx.)	Set	4	1560863	62,43,453
6.1.6	Discharge Nozzle (Ul Listed) caliberated as per Computer Generated Results.	Nos	144	6413	9,23,436
6.1.7	Supply of Piping with ASTM sch. 40 pipe	Lot	12	64128	7,69,530
6.1.8	Manifold complete for making header of gas cylinders.	Nos	12	25651	3,07,812
B	**ANALOGUE ADDRESSABLE FIRE ALARM SYSTEM**				
6.1.9	Supply, Installation, testing and commissioning of Microprocesssor based 1 Loop analogue addressable type fire alarm control panel with 80 character LCD display four access levels 500 event historcal logging.	Nos	4	147493	5,89,973

6.1.10	Supply, Installation, testing and commissioning of Analoge addressable Multicriteria detector with mounting based LED, Address Switch to programme the detectors from 01- 99, with BASE complete as required.	Nos	108	3719	4,01,695
6.1.11	Supply, Installation, testing and commissioning of Analoge addressable Photoelectric Smoke detector with mounting based LED, Address Switch to programme the detectors from 01- 99, with BASE complete as required.	Nos	108	3591	3,87,843
6.1.12	Supply of Gas Release Panel/Built in Module with 2-Zone Fire detection and 1-Zone gas discharge module with binary switch timer for release delay and potential free contact to relay "Gas Release" signal to main panel.The panel should also have LCD display for the different functions	Nos	12	21547	2,58,562
6.1.13	Supply , Installation , Testing and Commissioning of 2C x 1.5 sq.mm Fire Survival unarmoured cable (300/500V) with Class-2 Copper conductor having Mineral ceramic glass fire barrier tape covered by an extruded layer of Cross-linkable Low Smoke Zero Halogen (LSZH) insulation as per EI-5 Of BS EN 50363 along with ATC drain wire, aluminium tape screening and LSZH outer sheath as per BS 7629-1 & BS-5839-1 (latest edition). Outer sheath should be Anti Rodent/Anti Termite. Should retain circuit integrity as per BS 8434-2 (930 deg C for 120 mins on single sample).	Mtr	2400	231	5,54,062
6.1.14	Supply, Installation, testing and commissioning of Addressable Manual Call Point (Break Glass), Address Switch to programme the Manual Pull Station from 01- 99, complete as required as per specifications..	Nos	12	3848	46,172
6.1.15	Supply, Installation, testing and commissioning of Hooter cum Flasher	Nos	24	7695	1,84,687
6.1.16	Supply, Installation, testing and commissioning of Manual Abort Station (Pull Type)	Nos	12	4489	53,867
6.1.17	Supply, Installation, testing and commissioning of Manual Release Station (Pull Type).	Nos	12	4489	53,867
6.1.18	Supply, Installation, testing and commissioning of Addressable control module for Hooter, Address Switch to programme the modules from 01- 99, complete as required as per specifications.	Nos	12	5002	60,023
6.1.19	Supply of Addressable relay module for Cross Zoning, Address Switch to programme the modules from 01- 99, complete as required as per specifications.	Nos	24	5002	1,20,047
6.1.20	Supply, Installation, testing and commissioning of Addressable monitor modules for Abort Station& Release stationAddress Switch to programme the modules from 01- 99, complete as required as per specifications	Nos	24	4104	98,500
6.1.21	Cable Tray (100 mm X 25 mm)	Nos		513	0
6.1.22	Photoluminiscent Gas Release caution sign board complete with fixing arrangements	Nos	24	1924	46,172
6.1.23	Supply, Installation, testing and commissioning of Electric Gas Release caution sign boards(24 V DC) for approved locations.	Nos	12	6413	76,953
7.1	**C02 / FM 200 CLEAN AGENT GAS BASED FIRE TRACE TUBE SYSTEM**				

7.1.1	Supply, fixing, testing and commissioning of Polymer Tube Detection based C02 / FM 200 Clean Agent Gas System for Electrical Panels (Firetrace Tube Panel Protection System), consisting of the following components:				
7.1.2	C02 / FM 200 Clean agent Gas Cylinder, 8 kg / 5 kg capacity, complete with all necessary C02 / FM 200 Clean agent Gas, fittings, support and accessories,connected with Valve (with manual release facilitvl.	No.	20	55995	11,19,898
7.1.3	C02 / FM 200 Clean agent Gas Cylinder, 4.5 kg I 5 Kg capacity, complete with all necessary C02 Gas, fittings, support and accessories, connected with Valve (with manual release facilitv).	No.	2	49773	99,546
7.1.4	Filling Adapter	Each	22	2074	45,618
7.1.5	Outlet adapter	Each	22	9333	2,05,319
7.1.6	End of Line adapter	Each	22	5392	1,18,632
7.1.7	Pressure switch	Each	22	9333	2,05,319
7.1.8	Flexible Polymer Detection Tube with all necessary fittings & supports.	M	420	2074	8,70,891
7.1.9	Master Control Unit for controlling each system, complete with pressure switches, buzzers and electronic hooters, including all necessary accessories + electrical wiring to make each entire system functional.	Each	22	60141	13,23,099
7.1.10	Auto weight measuring Unit for Cylinders with automatic audio/visual alarm.	Each	22	31108	6,84,371
	Note: The items indicated above are notable items. The vendor to include all allied and implid items in required lauantitv at no extra cost.				
	TOTAL OF SCHEDULE- E				**108213807**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor) at Ch:19700 & Ch: 18460 Respectively

SCHEDULE- F- ELECTRICAL WORKS (SUMMARY SHEET)

SL NO.	DESCRIPTION OF ITEM	UNIT	QTY.	RATE (In Rs.)	AMOUNT (In Rs.)
1.0	**CIRCUIT CUM POINT WIRING. SUBMAINS AND POWER OUTLETS**				
1.1	Supplying all materials, storing, handling, fixing, laying wiring and testing for light, fan, exhaust fan and 6A Socket points etc starting from the point control box to the point, by using 2.5 sq.mm 1100V grade FRLSZH stranded copper conductor in **concealed HMS PVC conduit pipe** including 2mm thick GI boxes, fan regulator boxes, together with wiring accessories such as 6A moulded flush mounted modular switches, sockets in boxes of suitable sizes including circuit wiring with 2 x 2.5 sq.mm 1100V grade FRLSZH PVC insulated stranded copper conductor along with 1 run of 2.5 sq.mm PVC insulated (green colour) stranded earth wire complete with earthing of fixtures, sockets and boxes. PVC bushes for conduits ends, chrome-plated brass screws, identification ferrules at either ends complete in all respects as per standard specifications. (Lights, fans and 6A socket outlets may be wired on a common circuit, and circuit shall not have more than10 points of light, fans and 6A sockets or a load of 800W which ever is less)				
	(NOTE: Cost of point included the average length of point wiring considered 15-20 mtr. in sheds and 02-06 mtr. in offices and the average length of circuit wiring assumed 30-45 mtr. in sheds and 10-25 mtr. In offices and other areas), However for power sockets average wiring length taken 10-15 mtr in offices and other areas and 30 mtr -70 mtr. for industrial sockets proposed in sheds. All industrial socket shall be PVC insulated and shall be IP-65.				
1.2	**Switch Controlled Primary Light Points**				
1.2.1	Point wiring for switch controlled primary light points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia MS recessed and/or surface conduiting system including cost of wire, cost of providing saddles/ hangers etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing modular grid plate mounted flush mounted 240V, 6A control switch of approved quality & colour housed in zinc chromate passivated MS boxes with moulded cover plate and including cost of circuit wiring (from DB to first switch in the sub circuit) complete as per specifications and as required.	Nos.	1500	1,623	24,34,020
1.3	**DB Controlled Primary Light Points**				
1.3.1	Point wiring for DB controlled primary light points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100 volt grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in **HMS PVC conduit pipe in 25mm** including cost of wire, cost of providing saddles/ hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting complete as per specifications and as required (cost of MCB not included)	Nos.	100	1,356	1,35,600
1.4	**Secondary Light Points**				
1.4.1	Point wiring for Secondary light points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia **HMS PVC conduit pipe** including cost of wire, cost of providing saddles/hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting complete as per specifications and as required.	Nos	2000	974	19,48,120
1.5	**Ceiling Fan Points Point**				
1.5.1	wiring for ceiling fan points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100 volt grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia **HMS PVC conduit pipe** including cost of wire, cost of providing saddles/hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing modular grid plate mounted flush mounted 240V, 6A control switch and space for 240V, 300W, 5 Step electronic speed regulator of an approved quality & colour housed in zinc chromate passivated MS boxes with moulded cover plate and with inter connections complete as per specifications and as required	Nos.	460	2,104	9,67,868
1.6	**Exhaust Fan Points**				
1.6.1	Point wiring for exhaust fan points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia HMS PVC conduit pipe including cost of wire, cost of providing saddles/hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing modular grid plate mounted flush mounted 240V, 6A control switch and including cost of supplying and fixing 240V, 6A socket outlet near exhaust fan of approved quality & colour housed in zinc chromate passivated MS boxes with moulded cover plate and with inter connections complete as per specifications and as required.	Nos.	300	1,865	5,59,350
1.7	**Wiring for Socket Outlets**				

1.7.1	Point wiring for 6A socket outlets with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25 mm dia MS recessed and/or surface conduiting system including the cost of wire, the cost of providing saddles/hangers etc as required and including the cost of cutting/making good chases in brick work and including the cost of supplying and fixing modular grid plate mounted 240V,6A, 5 pin combined shuttered socket outlets along with 240V, 6A control switch of approved quality and colour housed in zinc chromate passivated MS boxes with moulded cover plate and interconnections and including the cost of loop earthing with 2.5 sq mm FRLSZH PVC insulated 660/1100V grade stranded copper conductor wires complete as per specifications and as required.	Nos.	3000	1,737	52,10,430
1.7.2	Point wiring for 16A socket outlets (1 outlet wired on 1 circuit) with 3 x 4 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 25 mm dia HMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing modular grid plate mounted 240V, 16A, 3 pin combined shuttered socket outlets alongwith 240V, 16A control switch of approved quality and colour housed in zinc chromate passivated MS boxes with moulded cover plate with interconnections complete as per specification and as required.	Nos.	1170	3,113	36,42,386
1.7.3	Point wiring of 16 amp socket outlets (2 outlets wired in one subcircuit) with 3 x 4 sq mm (P+N+E) FRLSZH PVC insulated 660/1100 volt grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 25 mm dia HMS PVC conduit pipe including the cost of providing saddles/hangers etc. as required and including the cost of cutting/making good chases in brick work anc including the cost of supplying and fixing modular grid plate mounted 240 volt 16 amp 6 pin combined shuttered socket outlets alongwith 240 volt 16 amp control switch of approved quality and colour housed in zinc chromate passivated MS boxes with interconnections complete as per specifications and as required, (two switched socket outlets shall be connected to one circuit. Both the outlets shall be measured and counted as 1 units)	Nos.	4	2,769	11,074
1.7.4	Point wiring for 20 amp single phase socket outlets with 3 x 6 sq mm (P+N+E) FRLSZH PVC insulated 660/1100 volt grade flexible stranded (84 strands of 0 3 mm dia) copper conductor wires in IS embossed 25 mm disHMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as required and including the cost of cutting/ making good chases in brick work and including the cost ol supplying and fixing 20 amp 10 kA "C" DP MCB and including 240 volt 3 pin 20 amp industrial metal clad socket outlet with interconnections in 16 SWG powder coated MS box and including the cost of 3 pin 240 volts plug top complete as per specifications and as required.	Nos.	1	4,196	4,196
1.7.5	Point wiring for 3 phase 20 amp socket outlets with 6 x 4.0 sq mm stranded copper conductor FRLSZH PVC insulated 1100 volt grade wires (3P+N+2E) 660/1100 volt grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 50 mm dia HMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as ifequire and including the cost of cutting/ making good chases in brick work and including the cost of supplying and fixing industrial type 20 amp 10kA "C" 4P MCB and 415 volt 20 amp industrial metal clad socket outlet in 16 SWG powder coated MS box with interconnections and including the cost of #15 volts 20 amp 4P plug top complete as per specifications and as required.	Nos.	2	11,681	23,362
1.7.6	Point wiring for 3 phase 32 amp socket outlets with 6 x 6.0 sq mm stranded copper conductor FRLSZH PVC insulated 1100 volt grade wires (3P+N+2E) 660/1100 volt grade flexible stranded (84 strands of 0.3 mrr dia) copper, conductor wires in IS embossed 50 mm dia HMS PVC conduit pipeincluding the cost of wire, cost of providing saddles/hangers etc. as required and inducing the cost of cutting/ making good chases in brick work and including trie cost of supplying and fixing industrial type 32 amp 10 kA "C" 4P MCB and 415 volt 32 amp industrial metal clad socket outlet in 16 SWG powder coated MS box with interconnections and including the cost of 415 volts 40 amp 4P plug top complete as per specifications and as required..	Nos.	10	13,059	1,30,594
1.7.7	Point wiring for 3 phase 63 amp socket outlets with 6 x 16.0 sq mrr stranded copper conductor FRLSZH PVC insulated 1100 volt grade wires (3P+N+2E) 660/1100 volt grade flexible stranded copper conductor wires in IS embossed 50 mm dia HMS PVC conduit pipe including the cost of providing saddtesmangers etc. as required anc including the cost of wire, cost of cutting/ making good chases in brick work anc including the cost of supplying and fixing industrial type 63 amp 10 kA "C 4P MCB and 415 volt industrial socket outlet box with Interconnections and including the cost of 415 volts 63 amp 4P plug top complete as per specifications and as required..	Nos.	10	18,273	1,82,732
1.7.8	Point wiring for weather proof 16 amp outlets with 3 X 4 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (56 strands ol 0.3 mm dia) copper conductor wires in IS embossed 25 mm diaHMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as required and including the cost of cutting/making good chases in brick work and including the cost of providing and fixing 2P, 16A switch with 16A, 240V socket outlet and plug top mounted and including a IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection complete as required.	Nos.	100	14,895	14,89,453

1.7.9	Point wiring for weather proof 32 amp outlets with 3 x 6 sq mm (P+N+E) FRLSZH PVC insulated 660/1100 volt grade flexible stranded (84 strands ol 0.3 mm dia) copper conductor wires in IS embossed 32 mm dia HMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as required and including the cost of cutting/making good chases in brick work and including the cost of providing and fixing 2 pole 32 amp switch with 32 amp 240 volts socket outlet and plug top mounted and including a IP 56 rated surface/recessed box with the total lunit having IP 56 ingress protection complete as required.	Nos.	2	19,451	38,901
1.7.10	Point wiring for weathe rproof 3 phase 32 amp socket outlets with 6 x 6.0 sq mm stranded copper conductor. FRLSZH PVC insulated 1100 volt grade wires (3P+N+2E) 660/1100 volt grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 50 mm dia Gl recessed and/or surface conduiting system including the cost of wire, cost of providing saddles/hangers etc. as require and including the cost of cutting/ making good chases in brick work and including the cost of supplying and fixing 4 pole 32 amp switch with 32 amp 240 volts socket outlet and plug top mounted and including a IP 65 rated surface/recessed box with the total unit having IP 65 ingress protection complete as required.	Nos.	1	32,669	32,669
1.7.11	Point wiring for 24V socket outlets (for Inspection pit) with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25 mm diaHMS PVC conduit pipe including the cost of providing saddles/hangers etc as required and including the cost of wire, cost of cutting/making good chases in brick work and including the cost of supplying and fixing modular grid plate mounted 240V, 6A, 5 pin combined shuttered socket outlets along with 240V, 6A control switch of approved quality and colour housed in zinc chromate passivated MS boxes with moulded cover plate and interconnections and including the cost of loop earthing with 2.5 sq mm FRLSZH PVC insulated 660/1100V grade stranded copper conductor wires complete as per specifications and as required.	Nos.	100	1,737	1,73,681
1.7.12	Point wiring for switch controlled primary light points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia HMS PVC conduit pipe including cost of wire, cost of providing saddles/ hangers etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and including the cost of supplying and fixing modular grid plate mounted flush mounted 240V, 6A control switch of approved quality & colour housed in zinc chromate passivated MS boxes with moulded cover plate and including cost of circuit wiring (from DB to first switch in the sub circuit) complete as per specifications and as required.	Nos.	32	6,686	2,13,959
1.8	**DB Controlled Primary Light Points**				
1.8.1	Point wiring for Four/three 400W highbay / 250W high/medium bay light fixtures, DB controlled primary light points with 3 x 4.0 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (56 strands ot 0.3 mm dia) copper conductor wires in IS embossed 32mm dia HMS PVC conduit pipe including cost of wire, cost of providing saddles/ hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting complete as per specifications and as required (cost of MCB not included)	Nos.	202	9,560	19,31,080
1.8.2	Point wiring for DB controlled primary light points with 3 x 2.5 sq mrr (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia HMS PVC conduit pipe including cost of wire, cost of providing saddles/ hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting complete as per specifications and as required (cost of MCB not included)	Nos.	350	9,560	33,45,930
1.9	**Secondary Light Points**				
1.9.1	Secondary light points for Four/three 400W highbay / 250W high/medium bay light fixtures with 3 x 4.0 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 32mm diaHMS PVC conduit pipe including cost of wire, cost of providing saddles/hanger etc for surface conduiting and/or cost of cutting and filling chases for recesses conduiting complete as per specifications and as required.	Nos.	202	6,441	13,01,082
1.9.2	Point wiring for Secondary light points with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25mm dia HMS PVC conduit pipe including cost of wire, cost of providing saddles/hanger etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting complete as per specifications and as required.	Nos.	1174	4,786	56,18,236
1.9.3	Supplying all the material, storing, laying, testing and commissioning and including wiring for the following light points with 2x6+1x2.5/2x4 + 1 x 2.5 sq.mrn FRLSZH PVC insulated copper conductor 1100volts grade stranded wires in surface mounted 25/32 mm dia HMS PVC conduit pipe including cost of circuit wiring from distribution board but controlled by SP MCBs in OB (Cost of MCB not to be included here) Four 15A3pin socket outlets in 2mm thick MS enclosure controlled by one 16A SP MCB in DB for air circulators and wiring with 2 x 6 + 1 x 2.5 Sqmm upto second point and 2 x 4 +1 x 2.5 Sqmm for rest of the sockets.	Nos	10	9,787	97,869

1.9.4	Point wiring for 6 amp socket outlets with 3 x 2.5 sq mm (P+N+E) FRLSZH PVC insulated 660/1100 volt grade flexible stranded (50 strands of 0.25 mm dia) copper conductor wires in IS embossed 25 mm dia MS recessed and/or surface conduiting system including the cost of wire, cost of providing saddles/hangers etc as required and including the cost of cutting/making good chases in brick work and including the cost of supplying and fixing modular grid plate mounted 240 volt 6 amp 5 pin combined shuttered socket outlets atongwrth 240 voft 6 amp control switch of approved quality and colour housed in zinc chromate passivated MS boxes with moulded cover plate and interconnections and including the cost of loop earthing with 2.S sq mm FRLSZH PVC Insulated 660/1100 volt grade stranded copper conductor wires complete as per specifications and as required.	Nos	10	1,737	17,368
1.9.5	Point wiring for 16A socket outlets (1 outlet wired on 1 circuit) with 3 x 4 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 25 mm diaHMS PVC conduit pipe including cost of wire, cost of providing saddles/hangers etc for surface conduiting and/or cost of cutting and filling chases for recessed conduiting and Including the cost of supplying and fixing modular grid plate mounted 240V, 16A, 3 pin combined shuttered socket outlets along with 240V, 16A control switch of approved quality and colour housed in zinc chromate passivated MS boxes with moulded cover plate with interconnections complete as per specifications and as required	Nos.	32	3,113	99,621
1.9.6	Point wiring of 16A socket outlets (2 outlets wired in one sub circuit) with 3 x 4 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 25 mm dia HMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as required and including the cost of cutting/making good chases in brick work and including the cost of supplying and fixing modular grid plate mounted 240V, 16A, 6 pin combined shuttered socket outlets alongwith 240V, 16A control switch of approved quality and colour housed in zinc chromate passivated MS boxes with interconnections complete as per specifications and as required. (2 switched socket outlets shall be connected to one circuit. Both the outlets shall be measured and counted as 1 units)	Nos.	126	2,769	3,48,831
1.9.7	Point wiring for 20A single phase socket outlets with 3 x 6 sq mm (P+N+E) FRLSZH PVC insulated 660/1100V grade flexible stranded (84 strands of 0.3 mm dia) copper conductor wires in IS embossed 25 mm dia HMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as required and including the cost of cutting/ making good chases in brick work and including the cost of supplying and fixing 20A, 10 kA "C" DP MCB and including 240V, 3 pin 20A industrial socket outlet with interconnections and including the cost of 3 pin 240V plug top complete as per specifications and as required.	Nos.	516	4,196	21,64,976
1.9.8	Point wiring for 3 phase 20A socket outlets with 6 x 4.0 sq mm stranded copper conductor FRLSZH PVC insulated 1100V grade wires (3P+N+2E) 660/1100V grade flexible stranded (56 strands of 0.3 mm dia) copper conductor wires in IS embossed 50 mm dia HMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as require and including the cost of cutting/ making good chases in brick work and including the cost of supplying and fixing industrial type 20A,10kA "C" 4P MCB and 415V, 20A industrial metal clad socket outlet in 16 SWG powder coated MS box with inter connections and including the cost of 415V, 20A, 4P plug top complete as per specifications and as required..	Nos	10	11,681	1,16,808
1.9.9	Point wiring for 3 phase 32A socket outlets with 6 x 6.0 sq mm stranded copper conductor FRLSZH PVC insulated 1100V grade wires (3P+N+2E) 660/1100V grade flexible stranded (84 strands of 0.3 mm dia) copper conductor wires in IS embossed 50 mm dia MS Recessed and/or surface conduiting system including the cost of providing saddles/hangers etc. as required and including the cost of wire, cost of cutting/ making good chases in brick work and including the cost of supplying and fixing industrial type 32A, 10 kA "C" 4P MCB and 415V, 32A industrial socket outlet with interconnections and including the cost of 415V, 32A, 4P plug top complete as per specifications and as required.	Nos.	24	13,059	3,13,426
1.9.10	Point wiring for 3 phase 63A socket outlets with 6 x 16.0 sq mm stranded copper conductor FRLSZH PVC insulated 1100V grade wires (3P+N+2E) 660/1100V grade flexible stranded copper conductor wires in IS embossed 50 mm diaHMS PVC conduit pipe including the cost of wire, cost of providing saddles/hangers etc. as required and including the cost of cutting/making good chases in brick work and including the cost of supplying and fixing industrial type 63A 10 kA "C" 4P MCB and 415V, 63A industrial socket outlet with inter connections and including the cost of 415V, 63A, 4P plug top complete as per specifications and as required.	Nos.	36	18,273	6,57,836
1.9.11	Supplying, storing, laying, testing and commissioning of the following FRLSZH copper conductor 1100 volt grade stranded wires In conduit. including providing and fixing of conduits concealed or surface mounted, with conduit accessories, green colour copper wire for earthing and making connections (terminations) complete, for following sizes of submain wires upto final distribution boards /three phase power outlets.				
1.9.11.1	4x25 + 2x16sq.mmFRLSZH copperwires	RM	20	1,214	24,272

1.9.11.2	4x16 + 2x10 sq.mm FRLSZH copperwires	RM	20	904	18,080
1.9.11.3	4x10 + 2x6 sq.mm FRLSZH copperwires	RM	20	518	10,351
1.9.11.4	2x16 + 1x10 sq.mm FRLSZH copperwires	RM	20	468	9,356
1.9.11.5	2x10 + 1x6 sq.mm FRLSZH copperwires	RM	20	321	6,418
1.9.12 .1	Supplying installation testing and commissioning of 32 ATP+N MCCB (25 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection with RYB indicating lamps in incoming with trip indications.	Nos	2	11,405	22,810
1.9.12 .2	Supplying, installation, testing and commissioning of 63A, TP+N MCCB (25 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection with RYB indicating lamps in incoming with trip indications.	Nos.	44	11,405	5,01,824
1.9.12 .3	Supplying installation testing and commissioning of 63 ATP+N MCCB (35 KA) in IR 56 rated surface/recessed box with the total unit having IP 56 ingress protection with RYB indicating lamps in incoming with trip indications.	Nos	2	12,882	25,764
1.9.13.1	Supplying, installation testing and commissioning of 100 A TP+N MCCB (25 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indication	Nos	2	12,471	24,941
1.9.13.2	Supplying, installation testing and commissioning of 100 A TP+N MCCB (35 KA) in IP 56 rated surface/recessed box with the4otal unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indication	Nos	2	12,471	24,941
1.9.14.1	Supplying, installation, testing and commissioning of 160A, TP+N MCCB (25 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indication	Nos.	12	16,888	2,02,654
1.9.14.2	Supplying, installation testing and commissioning of 160 A TP N MCCB (35 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indication	Nos	2	16,888	33,776
1.9.15	Supplying, installation, testing and commissioning of 200A, TP+N MCCB (35 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indications	Nos.	12	26,645	3,19,745
1.9.16	Supplying, installation, testing and commissioning of 250A, TP+N MCCB (35 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indications	Nos.	10	26,645	2,66,454
1.9.17	Supplying, installation, testing and commissioning of 400A, TP+N MCCB (35 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection of suitable size with RYB indicating lamps in incoming with trip indications	Nos.	2	32,581	65,163
1.9.18	Supplying installation testing and commissioning of 32 A TP+N MCB (10 KA) in IP 56 rated surface/recessed box with the total unit having IP 56 ingress protection complete as required.	Nos	2	1,809	3,618
1.9.19.1	Supply and installation for floor boxes (200 * 180 * 180 mm) for mobile jacks to be buried in the workshop floor for mounting the sockets fof electrical power supply to jacks consisting of 10 mm thick steel plate witr hinged cover made of 8 mm thick chequered plate as per tender specifications	Nos	2	963	1,926
1.9.19.2	Supply and installation of floor boxes (400 * 250 * 250 mm) for control panel of mobile jacks to be buried in the workshop floor for the sockets ft* electrical power supply to jacks consisting of 10 mm thick steel plate with hinged cover made of 8 mm thick chequered plate as per tender specifications	Nos	2	2,189	4,378
1.9.20.1	Junction Box & accessories (Total surface area of junction box to be considered in sq cm as per unit quantity)	sq cm	1200000	1	6,10,200
1.9.20.2	6A, DP MCB	Nos	300	915	2,74,590
2.0	**L.T. PANELS AND DISTRIBUTION BOARDS**				

2.1	Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of Main LT panel/Main distribution panels/sub- distribution panels fabricated out of 3 mm thick for structural members and 2 mm thick for door and covers CRCA sheet steel in cubicle compartmentalised free standing floor mounted, dust and vermin proof with reinforcement of suitable size angle iron, channel T irons and/or flats wherever necessary. 16 gauge CRCA sheet steel shall be used for final distribution panels. 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 zinc chromate primer and final approved shade of enamelled paint. 2 Nos. earthing terminals shall be provided for all distribution panels. Panels shall be suitable for 415V, 3 phase, 4 wire, 50 HZ supply system and with 15% spare space, lifting hooks shall also be provided in case of large panels. Approval shall be takeny (4) IEC 60364 : Electrical Installation of Buildings with zinc passivation shall be used in fabrication of panels.				
	The panels to confirm IP-43 for indoor & IP-55 for outdoor.				
Note:	RATING AND SWITCH BOARDS WILL BE DESIGNED AS PER ACTUAL				
	(NOTE: Unless not specified all incomers and outgoings ACBs/MCCBs of main LT panel shall be Microprocessor based with 485 communication port for BMS (Building Management system) connectivity through MODBUS protocol, as specified in TS 2.2.10)				
2.1.1	**MAIN LT PANEL**				
	SECTION - I				
	Incoming Air Circuit Breaker A' (Transformer-1)				
	4000A, 4 pole electrically operated (motorised) fully draw out type air circuit breaker with built in micro processor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories :				
	Electronic energy meter of accuracy class-1 with 3 Nos 4000/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				
	0-500V digital voltmeter with selector switch with 6A MCB's - 1 Set				
	0-4000A digital ammeter with selector switch and 4000/5A, 15VA, CLASS 1, CT - 1 Set				
	Phase indicating lights and protected by 2A MCB's - 1 Sets				
	Breaker ON/OFF/TRIP indicating lights and push button -1 Set				
	24V, shunt trip coil - 1 Set				
	1 CT 4000/5A, 15VA, CL 5P10 consisting of				
	Undervoltage Relay (27) - 1 set				
	Over voltage relay (59)- 1 Set				
	Over current Relay (51) - 1 set				
	Earth fault Protective Device (51N) 1 set				
	4000/5A,15VA, CLASS-1, CT on Y Phase for APFCR.				
	Auxiliary contacts required for necessary interlocking of breakers.				
	Bus Bars				
	5000A, TPN copper bus bars with heat shrinkable insulation sleeves 1Set				
	Outgoing				
	1250 amps TPN ACB draw out type (manually operated) 1 No				
	1000 amps TPN ACB draw out type (manually operated) 1 No				
	630 amps TPN (50 kA) MCCB 1 Nos				
	400 amps TPN (50 kA) MCCB 6 Nos				
	250 amps TPN (50 kA) MCCB 7 Nos				
	200 amps TPN (50 kA) MCCB 5 Nos				
	100 amps TPN (50 kA) MCCB 4 Nos				

	63 amps TPN (50 kA) MCCB 4 Nos				
	Bus Coupler-: Breaker "C				
	4000A, 4 pole electrically operated (motorised) fully drawotd type air circuit breaker with ON/OFF/TRIP indicating lamps & auxiliary contacts required for necessary interlocking of breakers - 1 Set				
	SECTION= II				
	Incoming Air Circuit Breaker B' (Transformer-II)				
	4000A, 4 pole electrically operated (motorised) fully draw out type air circuit breaker, with built in micro processor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories :				
	Electronic energy meter of accuracy class-1 with 3 Nos 4000/5A, 15VA CTs to measure and display the following electrical quantities :				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				
	0-500V digital voltmeter with selector switch with 6A MCB's - 1 Set				
	0-4000A digital ammeter with selector switch and 4000/5A, 15VA,CLASS 1, CTs - 1 Set				
	Phase indicating lights and protected by 2A MCB's - 1 Set				
	Breaker ON/OFF/TRIP indicating lights and push button - 1 Set				
	24V shunt trip coil - 1 Set				
	1 Ct 4000/5,15VA,CL5P10 consisting of				
	Under Voltage relay (27) - 1 Set				
	Over voltage relay(59) - 1 Set				
	Overcurrent Relay(51)- 1 set				
	Earth fault Protective Device (51N) - 1 set				
	4000/5A, 15VA, CLASS-1, CT on Y Phase for APFCR.				
	Auxiliary contacts required for necessary interlocking of breakers.				
	Bus Bars				
	5000A, TPN copper bus bars with heat shrinkable insulation sleeves 1Set				
	Outgoing				
	1250 amps TPN ACB draw out type (manually operated) 1 No				
	1000 amps TPN ACB draw out type (manually operated) 1 No				
	630 amps TPN (50 kA) MCCB 1 Nos				
	400 amps TPN (50 kA) MCCB 7 Nos				
	250 amps TPN (50 kA) MCCB 7 Nos				
	200 amps TPN (50 kA) MCCB 4 Nos				
	100 amps TPN (50 kA) MCCB 3 Nos				
	63 amps TPN (50 kA) MCCB 5 Nos				
	Red indicating light 230V (56 Nos.), Green indicating light 230V (56 Nos.), MCCB Aux. Contact Block T1-T6 (56 Nos.), MCB 6A SP 10KA (56 Nos.), CT 4000/5A CL-PS 15VA (08 Nos.)				
	Note -1. All outgoing feeders shall have suitable range of following (except capacitor feeders)				
	a. Digital electronic ammeter with selector swtich and CTs - 3 Nos				
	b. Phase indicating light protected by 2A MCB's - 3 Nos				
	2. All incoming / outgoing ACB and MCCB shall be 50 KA breaking capacity				
	3. The two incomer shall be interlocked elecrtically and mechanically operated ACBs with Automatic source transfer system. so that only one supply can be swithed ON at a time.				
	Main LT Panel as described above	Set	2	99,22,424	1,98,44,848
2.2	**MAIN EMERGENCY PANEL**				
	Incoming Air Circuit Breaker A'				

	1000 A, 4 pole electrically operated (motorised) fully draw out type air circuit breaker with built in micro processor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories :				
	Electronic energy meter of accuracy class-1 with 3 Nos. 1000/5A, 15VA CTs to measure and display the following electrical quantities :				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	0-500V digital voltmeter with selector switch with 6A MCB's - 1 Set				
	0-1000A digital ammeter with selector switch and 1000/5A, 15VA, CLASS 1CT - 1 Set				
	Phase indicating lights and protected by 2A MCB's - 1 Sets				
	Breaker ON /OFF /TRIP indicating lights and push button - 1 Set				
	1 CT, 1000/5A, 15VA, CL 5P10 consisting of				
	Under Voltage relay (27) - 1 Set				
	Over voltage relay (59) - 1 Set				
	Overcurrent Relay (51)- 1 Set				
	Earth fault protection device (51N)- 1 Set				
	Auxiliary contacts required for necessary interlocking of breakers.				
	Breaker control switch - 1 Set				
	Under Voltage release - 1 Set				
	Auto Manual selector switch - 1 Set				
	Voltage sensing relay & timer for auto change over.				
	24V shunt trip coil				
	Bus Bars				
	1250A, TPN copper bus bars with heat shrinkable insulation sleeves 1 Set				
	Outgoings				
	400 amps TPN (50 kA) MCCB 3 Nos				
	250 amps TPN (50 kA) MCCB 3 Nos				
	200 amps TPN (50 kA) MCCB 5 Nos				
	100 amps TPN (50 kA) MCCB 2 Nos				
	63 amps TPN (50 kA) MCCB 7 Nos				
	Bus Coupler				
	1 No. 1000A, 4 Pole ACB electrically operated drawout type with necessary potential free contacts for inter lockings and with breaker control switch, ON/OFF/TRIP indicating lamps with control MCB/s The two incomer shall be interlocked elecrtically and mechanically operated ACBs with Automatic source transfermer system. so that only one supply can be swithed ON at a time.				
	SECTION - II				
	Incoming Air Circuit Breaker B'				
	1000A, 4 pole electrically operated (motorised) fully draw out type air circuit breaker with built in micro processor based release unit for short circuit, over current and earth fault protection with adjustable setting and with the following accessories:				
	Electronic energy meter of accuracy class-1 with 3 Nos. 1000/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				

	Current				
	Voltage				
	Frequency / Harmonics				
	0-500V digital voltmeter with selector switch with 6A MCB's - 1 Set				
	0-1000 A digital ammeter with selector switch and 1000/5A, 15VA,CLASS,1CTs - 1 Set				
	Phase indicating lights and protected by 2A MCB's - 1 Set				
	Breaker ON/OFF/TRIP indicating lights and push button - 1 Set				
	1 CT, 1000/5A, 15VA, CL 5P10 consisting of				
	Under Voltage relay (27) - 1 Set				
	Over voltage relay (59) - 1 Set				
	Overcurrent Relay (51)- 1 Set				
	Earth fault protection device (51N)- 1 Set				
	Auxiliary contacts required for necessary interlocking of breakers				
	Breaker control switch - 1 Set				
	Under Voltage release - 1 Set				
	Auto Manual selector switch - 1 Set				
	Voltage sensing relay & timer for auto changeover				
	24V shunt trip coil				
	Bus Bars				
	1250A TPN copper bus bars with heat shrinkable insulation sleeves - 1 Set				
	Outgoings				
	630 amps TPN (50 kA) MCCB 1 Nos				
	400 amps TPN (50 kA) MCCB 2 Nos				
	250 amps TPN (50 kA) MCCB 3 Nos				
	200 amps TPN (50 kA) MCCB 3 Nos				
	100 amps TPN (50 kA) MCCB 6 Nos				
	63 amps TPN (50 kA) MCCB 6 Nos				
	Note -1. All outgoing feeders shall have suitable range of following				
	a. Digital electronic ammeter with selector swtich and CTs - 3 Nos				
	b. Phase indicating light protected by 2A MCB's - 3 Nos				
	2. All incoming / outgoing ACB and MCCBs shall be 50 KA (1 sec) breaking capacity				
	Main Emergency Panel as described above	Set	2	39,12,908	78,25,815
2.3	**MDB - N1 (STREET LIGHT)**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 10 Nos				
	Note . No MCCB shall be of less than 35 kA capacity				

	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (10 Nos.), Green indicating light 230V (10 Nos.), Amber indicating light 230V (01 No.), MCCB Aux. Contact Block T1- T6 (10 Nos.), MCB 6A SP 10KA (10 Nos.)				
	MDB- N01 as described above	Set	2	2,34,546	4,69,092
2.4	**MDB - E01 (STREET LIGHT & HIGH MAST)**				
	Incoming:				
	400A, TPN MCCB with following accessories.				
	0-500V digital voltmeter with selector switch and shall be protected by 6A MCB's - 1 Set				
	Phase indicating light and shall be protected by 2A MCB'S - 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 400/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	500A, TPN copper bus bars with heat shrinkable insulation sleeves.				
	OutGoing				
	250A, TPN MCCB - 2 Nos				
	63A, TPN MCCB - 1 Nos				
	40A, TPN MCCB - 8 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (11 Nos.), Green indicating light 230V (11 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (11 Nos.), MCB 6A SP 10KA (11 Nos.)				
	Note. No MCCB shall be of less than 35 kA capacity				
	MDB- E1 as described above	Set	2	3,67,551	7,35,101
2.5	**MDB -N2 (INSPECTION BAY), MDB -E2 (INSPECTION BAY)**				
	Incoming:				
	250A, TPN MCCB with following accessories.				
	0-500V digital voltmeter with selector switch and shall be protected by 6A MCB's - 1 Set				
	Phase indicating light and shall be protected by 2A MCBs - 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 250/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	300A, TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63A, TPN MCCB - 15 Nos				

	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (16 Nos.), Green indicating light 230V (15 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (16 Nos.), MCB 6A SP 10KA (16 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N2, E2 as described above	Set	4	3,91,863	15,67,450
2.6	**MDB - N3A (REPAIR BAY AB-BAY), MDB - E3B (REPAIR BAY**				
	BC-BAY)				
	Incoming :				
	400 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's.1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 400/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	500 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	100 amps TPN MCCB 3 Nos				
	63 amps TPN MCCB 12 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (15 Nos.), Green indicating light 230V (15 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (15 Nos.), MCB 6A SP 10KA (15 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N3A, E3B as described above	Set	4	3,80,421	15,21,685
2.7	**MDB - N3B (REPAIR BAY BC- BAY), MDB- E3A (REPAIR BAY**				
	AB- BAY)				
	Incoming :				
	250 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 250/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars :				
	300 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				

	100 amps TPN MCCB 2 Nos				
	63 amps TPN MCCB 8 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (10 Nos.), Green indicating light 230V (10 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (10 Nos.), MCB 6A SP 10KA (10 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N3B, E3A as described above	Set	4	2,71,730	10,86,920
2.8	**MDB - N4A (REPAIR-OFFICE (PART-A)), MDB - N4B (REPAIR-**				
	OFFICE (PART-B))				
	Incoming :				
	400 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 400/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	500 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	100 amps TPN MCCB 2 Nos				
	63 amps TPN MCCB 6 Nos				
	32 amps TPN MCCB 3 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (11 Nos.), Green indicating light 230V (11 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (11 Nos.), MCB 6A SP 10KA (11 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N4A, MDB-N4B as described above	Set	4	3,30,366	13,21,463
2.9	**MDB - E4A (REPAIR OFFICE (PART-A)),**				
	Incoming :				
	200 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				

	250 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 5 Nos				
	32 amps TPN MCCB 2 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (07 Nos.), Green indicating light 230V (07 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (07 Nos.), MCB 6A SP 10KA (07 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E4A as described above	Set	2	2,27,394	4,54,789
2.10	**MDB - E 4B(REPAIR OFFICES (PART-B))**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 4 Nos				
	32 amps TPN MCCB 4 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (09 Nos.), Green indicating light 230V (08 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (09 Nos.), MCB 6A SP 10KA (09 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E4B as described above	Set	2	2,10,233	4,20,466
2.11	**MDB - N5 (INSPECTION OFFICES)**				
	Incoming :				
	200 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				

	250 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 4 Nos				
	32 amps TPN MCCB 7 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (11 Nos.), Green indicating light 230V (11 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (11 Nos.), MCB 6A SP 10KA (11 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N5 as described above	Set	2	2,71,730	5,43,459
2.12	**MDB - E5 (INSPECTION OFFICES)**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	32 amps TPN MCCB 7 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (07 Nos.), Green indicating light 230V (07 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (07 Nos.), MCB 6A SP 10KA (07 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E5 as described above	Set	2	1,98,792	3,97,584
2.13	**MDB - N6 (STABLING SHED)**				
	Incoming :				
	200 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	250 amps TPN copper bus bars with heat shrinkable insulation sleeves.				

	Out Going				
	100 amps TPN MCCB 2 Nos				
	63 amps TPN MCCB 5 Nos				
	32 amps TPN MCCB 4 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (11 Nos.), Green indicating light 230V (11 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (11 Nos.), MCB 6A SP 10KA (11 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N6 as described above	Set	2	2,71,730	5,43,459
2.14	**MDB - E6 (STABLING SHED)**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 2 Nos				
	32 amps TPN MCCB 9 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (11 Nos.), Green indicating light 230V (11 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (11 Nos.), MCB 6A SP 10KA (11 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E6 as described above	Set	2	2,45,987	4,91,975
2.15	**MDB - N7 (Internal Cleaning), MDB - E7 (Internal Cleaning),**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				

	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 2 Nos				
	32 amps TPN MCCB 3 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (05 Nos.), Green indicating light 230V (05 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (05 Nos.), MCB 6A SP 10KA (05 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N7, MDB-E7 as described above	Set	4	1,74,479	6,97,915
2.16	**MDB - N8 (Pit Wheel),MDB - E8 (Pit Wheel)**				
	Incoming :				
	200 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	250 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 5 Nos				
	32 amps TPN MCCB 2 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (07 Nos.), Green indicating light 230V (07 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (07 Nos.), MCB 6A SP 10KA (07 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N8, E8 as described above	Set	4	2,27,394	9,09,578
2.17	**MDB - N9 ETU CUM EMERGENCY REARAILING) + (WORKSHOP**				
	& OFFICES (E&M, TRACTION, P.WAY)				
	Incoming :				
	250 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 250/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				

	Bus Bars				
	300 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 8 Nos				
	32 amps TPN MCCB 9 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (17 Nos.), Green indicating light 230V (17 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (17 Nos.), MCB 6A SP 10KA (17 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N9 as described above	Set	2	4,10,454	8,20,909
2.18	**MDB - E9 (ETU CUM EMERGENCY REARAILING +WORKSHOP**				
	& OFFICES(E&M, TRACTION, P.WAY)				
	Incoming :				
	200 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	250 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 7 Nos				
	32 amps TPN MCCB 9 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (16 Nos.), Green indicating light 230V (16 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (16 Nos.), MCB 6A SP 10KA (16 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E9 as described above	Set	2	3,90,433	7,80,866
2.19	**MDB - N11 (Pump Room & U.G. Water Tank)**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Realtime				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KVWMW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				

	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 5 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (05 Nos.), Green indicating light 230V (05 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (05 Nos.), MCB 6A SP 10KA (05 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N11 as described above	Set	2	1,74,765	3,49,529
2.20	**MDB - E11 (Pump Room & U.G. Water Tank)**				
	Incoming :				
	400A, TPN MCCB with following accessories.				
	0-500V digital voltmeter with selector switch and shall be protected by 6A MCB's - 1 Set				
	Phase indicating light and shall be protected by 2A MCB's - 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 400/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	500A, TPN copper bus bars with heat shrinkable insulation sleeves.				
	OutGoing				
	250A, TPN MCCB - 2 Nos				
	63A, TPN MCCB - 3 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (05 Nos.), Green indicating light 230V (05 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (05 Nos.), MCB 6A SP 10KA (05 Nos.)				
	Note. No MCCB shall be of less than 35 kA capacity				
	MDB-E11 as described above	Set	2	3,08,914	6,17,828
2.21	**MDB - N16 (ADMIN. BLOCK)**				
	Incoming :				
	250 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 250/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				

	Bus Bars				
	300 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	100 amps TPN MCCB 3 Nos				
	63 amps TPN MCCB 5 Nos				
	32 amps TPN MCCB 6 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (14 Nos.), Green indicating light 230V (14 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (14 Nos.), MCB 6A SP 10KA (14 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N16 as described above	Set	2	3,90,433	7,80,866
2.22	**MDB- E16 (ADMIN. BLOCK)**				
	Incoming:				
	200A, TPN MCCB with following accessories.				
	0-500V digital voltmeter with selector switch and shall be protected by 6A MCB's - 1 Set				
	Phase indicating light and shall be protected by 2A MCB's -13 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	250A, TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63A, TPN MCCB - 8 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (09 Nos.), Green indicating light 230V (08 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (09 Nos.), MCB 6A SP 10KA (09 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E16 as described above	Set	2	2,40,266	4,80,533
2.23	**MDB - N17 (TRAINING CENTRE)**				
	Incoming :				
	400 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 400/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				

	Bus Bars				
	500 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	100 amps TPN MCCB 3 Nos				
	63 amps TPN MCCB 12 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (15 Nos.), Green indicating light 230V (15 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (15 Nos.), MCB 6A SP 10KA (15 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N17 as described above	Set	2	3,94,724	7,89,447
2.24	**MDB - N18 (WORKSHOP & OFFICES S&T, AFC), MDB - E18 (WORKSHOP & OFFICES S&T, AFC), MDB - E17 (TRAINING**				
	CENTRE)				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 4 Nos				
	32 amps TPN MCCB 4 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (09 Nos.), Green indicating light 230V (08 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (09 Nos.), MCB 6A SP 10KA (09 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N18,E18 & E17 as described above	Set	6	2,10,233	12,61,399
2.25	**MDB - N19 (DEPOT STORE)**				
	Incoming :				
	100 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 100/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				

	Frequency / Harmonics				
	Bus Bars				
	125 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	63 amps TPN MCCB 3 Nos				
	32 amps TPN MCCB 8 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (11 Nos.), Green indicating light 230V (11 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (11 Nos.), MCB 6A SP 10KA (11 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N19 as described above	Set	2	2,45,987	4,91,975
2.26	**MDB - E19 (DEPOT STORE)**				
	Incoming :				
	63 amps TPN MCCB with following accessories.				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 6 amps MCB's. 1 Set				
	Phase indicating light and shall be protected by 2 amps MCB's. 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 63/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	100 amps TPN copper bus bars with heat shrinkable insulation sleeves.				
	Out Going				
	32 amps TPN MCCB 5 Nos				
	Load Manager EM6400 CL 1.0 CTR-/5A with RS485 (01 No.), Red indicating light 230V (05 Nos.), Green indicating light 230V (05 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1 T6 (05 Nos.), MCB 6A SP 10KA (05 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E19 as described above	Set	2	1,87,351	3,74,701
2.27	**MDB - N20 (DCC & BCC)**				
	Incoming:				
	200A, TPN MCCB with following accessories.				
	0-500V digital voltmeter with selector switch and shall be protected by 6A MCB's - 1 Set				
	Phase indicating light and shall be protected by 2A MCB's - 1 Sets				
	Electronic energy meter of accuracy class-1 with 3 Nos. 200/5A, 15VA CTs to measure and display the following electrical quantities :				
	Realtime				
	Total active energv (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW7MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day eneigy.				
	Current				
	Voltage				
	Frequency / Harmonics				

	Bus Bars				
	250A, TPN copper bus bars with heat shrinkable insulation sleeves.				
	OutGoing				
	63A, TPN MCCB - 8 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (09 Nos.), Green indicating light 230V (08 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (09 Nos.), MCB 6A SP 10KA (09 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-N20 as described above	Set	2	2,58,858	5,17,717
2.28	**MDB - E20 (DCC & BCC)**				
	Incoming :				
	630A, TPN MCCB with following accessories.				
	0-500V digital voltmeter with selector switch and shall be protected by 6A MCB's - 1 Set				
	Phase indicating light and shall be protected by 2A MCB's - 1 Set				
	Electronic energy meter of accuracy class-1 with 3 Nos. 630/5A, 15VA CTs to measure and display the following electrical quantities:				
	Real time				
	Total active energy (KWH/MWH)				
	Maximum Demand (KVA/MVA) (KW/MW)				
	Maximum Demand reset count				
	Instantaneous power factor				
	Eight time of a day energy.				
	Current				
	Voltage				
	Frequency / Harmonics				
	Bus Bars				
	800A, TPN copper bus bars with heat shrinkable insulation sleeves.				
	OutGoing				
	250A, TPN MCCB - 4 Nos				
	125A, TPN MCCB - 4 Nos				
	100A, TPN MCCB - 2 Nos				
	63A, TPN MCCB - 8 Nos				
	AC-Ammeter-Three Phase CL-1.0-DM3110 (01 No.), Red indicating light 230V (18 Nos.), Green indicating light 230V (18 Nos.), Amber indicating light 230V (01 Nos.), MCCB Aux. Contact Block T1-T6 (18 Nos.), MCB 6A SP 10KA (18 Nos.)				
	Note . No MCCB shall be of less than 35 kA capacity				
	MDB-E20 as described above	Set	2	6,63,593	13,27,185
2.29	**FEEDER PILLARS**				
	FP-11N &E, FP-12N&E, FP-13N&E, FP-21N&E, FP-22N&E, FP- 23N&E.				
	Incoming:				
	3 Nos. 0-24 Hrs double dial timer - 2 Sets				
	3 Nos. Auto / manual selector switch - 2 Sets				
	3 Nos. 16A TPN contactor with necessary NO& NC auxiliary contacts - 2 Sets				
	1 Job control flexible cabling from contactor to Timer - 2 Sets				
	3 Nos 40A DP ELCBs (**100 mA**) - 2 Sets				
	1 No 40A TPN MCB Isolator (10 KA) - 2 Sets				
	Bus Bars				
	100A, TPN copper bus bars with heat shrinkable insulation sleeve - 2 Sets				
	Outgoing				
	10A, SP MCBs - 6 Nos - 2 Sets				
	Feeder Pillars as described above	Set	12	1,11,552	13,38,630

2.30	Supply, installation, testing and commissioning of following step down transformer in 1.6 mm thick MS enclosure of approved make and design input voltage 220V ± 10% and output voltage of 24V with tapping of 26V, 28V and 30V.				
2.30.1	1.0 KVA	Nos	2	36,942	73,884
2.30.2	1.5 KVA	Nos	14	53,782	7,52,953
2.30.3	2.0 KVA	Nos	2	67,364	1,34,728
2.31	Supply and fixing in position 1000 mm wide rubber matting of 1100V grade as per electrical rules (exact length rubber mats to be worked out as per site requirement), thickness of rubber mats shall not be less than 6 mm	RM	240	2,338	5,61,113
2.32	Adjustment rates for addition/ deletion of compartmentalized switchgear ir above panels / board of following rating including the supply, fabrication, extension, modification of the enclosure, earthing, busbar, other subsystems, accessories etc. complete as required and as per specifications.				
2.32.1	630 *A.* 415 V,50 W, *TPN.* MCCB with bimetallic over current and magnetic short circuit releases and 1 set of three white phases	No	2	24,839	49,677
2.32.2	300-400 A, 415 V. 50 KA, *TPN.* MCCB with bimetallic over current and magnetic short circuit releases and 1 set of three white phases	No	2	21,753	43,505
2.32.3	250 *A.* 415 V . 50 KA, *TPN.* MCCB with bimetallic over current and magnetic short circuit releases and 1 set of three white phases	No	2	17,390	34,779
2.32.4	300-400 A. 415 V. 35 KA.-TPN. MCCB with bimetallic over current and maqnetic short circuit releases and 1 set of three white phases	No	2	21,753	43,505
2.32.5	250 *A,* 415 V , 35 KA, *TPN.* MCCB with bimetallic over current anc magnetic short circuit releases and 1 set of three white phases	•No	2	17,390	34,779
2.32.6	160-200 A 415 V . 35 KA, *TPN.* MCCB with bimetallic over current and maqnetic short circuit releases and 1 set of three white phases	No	2	16,063	32,126
2.32.7	63-100 A. 415 V. 35 KA. *TPN.* MCCB with bimetallic over current and magnetic short circuit releases and 1 set of three white phases	No	2	6,987	13,974
2.32.8	160-200 A. 415 V . 25 KA. TPN. MCCB with bimetallic over current and magnetic short circuit releases and 1 set of three white phases	No	2	16,063	32,126
2.32.9	63-100 A. 415 V . 25 KA. TPW. MCCB with bimetallic over current anc maqnetic short circuit releases and 1 set of three white phases	No	2	6,987	13,974
2.32.10	32-63 *A,* 415 V , 25 KA, *TPN,* MCCB with bimetallic over current and maqnetic short circuit releases and 1 set of three white phases	No	2	6,987	13,974
2.32.11	63ATPNMCB	No	40	1,283	51,302
2.32.12	40ATPNMCB	No	40	1,283	51,302
2.32.13	32ADPMCB	No	40	521	20,837
2.32.14	16 ADPMCB	No	40	521	20,837
2.32.15	6-20ASPMCB	No	40	220	8,814
3.0	**CAPACITOR BANKS**				
3.1	**CAPACITOR BANKS AND AUTOMATIC CONTROL PANELS**				
	Supply, installation, testing and commissioning of cubicle type, free floor mounted front operated panel with following capacitor units in formation including cost of tier formation, interconnections upto panel, connection to earthing system complete as specified for following rating capacitor unit suitable for operation on automatic control and shall form part of automatic control in cubicle form made out of 14 gauge CRCA stove enamelled sheet steel complete with 50 x 6 mm aluminium earth tape from end to end of the panel for following capacities of Capacitor Panels :				
3.1.1	400 KVAR CAPACITOR PANEL comprising of following:				
	Incoming				

	1250 amps TPN ACB with following accessories				
	0-500 volts, digital voltmeter with selector switch and shall be protected by 2 amps MCB's. 1 Set				
	0-1250 amps digital ammeter with selector switch and 1250/5 amps 15 VA,CL 1 CTs 1 Set.				
	Phase indicating light with toggle switches and shall be protected by 2 amps MCB's. 3 Sets				
	Automatic microprocessor based digital type power factor compensating relay (including power factor meter) in 8 steps for automatic cut off or add on capacitor units to keep the power factor at 0.95 with variation of loads. All associated auxiliary contactors/relays to be provided. Visual alarms, to display shortfall of P.T., automatic lockout of faulty Step, over temperature protrections. Auto manual selection and indications 1 Set				
	Bus Bars :				
	1600 amps TPN copper bus bars with heat Shrinkable insulated sleeves.				
	Outgoings :				
	Outgoing feeders consisting of following accessories.				
	250 amps TPN MCCB with backup fuses of suitable capacity 2 Nos				
	200 amps TPN MCCB with backup fuses of suitable capacity 2 Nos				
	100 amps TPN MCCB with backup fuses of suitable capacity 4 Nos				
	250 amps 415 volts 50Hz heavy duty contactors. 2 Nos				
	200 amps 415 volts 50Hz heavy duty contactors. 2 Nos				
	100 amps 415 volts 50Hz heavy duty contactors. 4 Nos				
	"ON" /"OFF" push buttons and indicating lamps. 8 Nos				
	250 amps rating TP terminal blocks 2 Nos.				
	200 amps rating TP terminal blocks 2 Nos.				
	100 amps rating TP terminal blocks 4 Nos.				
	100 KVAR, 415V, Harmatic sealed heavy mixed di-electric type capacitors units in well ventilated enclosure complete as per application duty and as required in bank form - 2Nos				
	50 KVAR 415 V Haimatic sealed heavy mixed di-electric type capacitors units in well ventilated enclosure complete as per application duty and as required in bank form - 2 Nos				
	25 KVAR 415 V Harmatic sealed heavy mixed di-electric type capacitors units in well ventilated enclosure complete as per application duty and as required in bank form - 4 Nos				
	NOTE: All MCCB's shall be of 50 KA breaking capacity.				
	Capacitor automatic selection control panel (400 KVAR) as described above.	Sets	4	16,04,635	64,18,540
4.0	**FINAL DISTRIBUTION BOARDS**				
4.1	**FINAL DISTRIBUTION BOARDS :**				
	Supply, installation, testing and commissioning of factory fabricated and factory assembled, sheet steel clad powder coated, wall/recess mounting dust and vermin proof (IP-54 ingress protection) double door vertical type Distribution Boards fabricated from 16 SWG sheet steel provided with hinged gasketted door with padlocking facility and including suitably rated PVC insulated copper busbars with interconnections and neutral bar assembly, earthing terminals etc. complete as required, as below and as per. sample to be approved by architects and as per specifications				
	All MCB's shall have 'C' tripping characteristics kA values indicated shall be Ics breaking capacity.				
4.1.1	1-16 amp DP 10 kA MCB with thermal magnetic protective releases incoming 1-16 amp **DP 100mA ELCB** incoming and 4 nos 10/16 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	5,380	10,760
4.1.2	1-25 amp DP 10 kA MCB with thermal magnetic protective releases incoming 1-25 amp **DP 100mA ELCB** incoming and 6 nos 10/16 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	5,564	11,128
4.1.3	1-40A, DP 10 kA MCB with thermal magnetic protective releases incoming 1-40A, **DP 100mA ELCB** incoming and 4 nos 6/10/16/20A, SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	7,380	14,760
4.1.4	1-40A, DP 10 kA MCB with thermal magnetic protective releases incoming 1-40A, **DP 100mA ELCB** incoming and 6 nos 6/10/16/20A, SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	4	7,668	30,673
4.1.5	1-40A, DP 10 kA MCB with thermal magnetic protective releases incoming 1-40A, **DP, 30 mA, ELCB** incoming and 8 nos 6/10/16/20A, SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	9,082	18,164
4.1.6	1-40 amp 4P 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 40 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and 3 single phase banks each comprising ot 1-40 amp DP MCB incoming and 6 nos 10/16/20/40 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	22,731	45,462
4.1.7	1-40A, TPN 10 kA MCB with thermal magnetic protective releases incoming with 4P, 40A HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and wtth 3 single phase banks each comprising of 1-40A, **DP 100mA ELCB** incoming and 4 nos 10/16/20/32A, SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	14	18,008	2,52,108

4.1.8	1-40A, TPN 10 kA MCB with thermal magnetic protective releases incoming with 4P, 40A HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and with 3 single phase banks each comprising of 1-40A, **DP 100mA ELCB** incoming and 6 nos 10/16/20/32A, SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	64	41,912	26,82,349
4.1.9	1-63 amp 4P 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 63 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and 3 single phase banks each comprising of 1-63 amp DP MCB incoming and 6 nos 10/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	17,591	35,181
4.1.10	1-63 amp 4P 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 63 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and 3 single phase banks each comprising of 1-63 amp DP MCB incoming and 10 nos 10/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	22,849	45,697
4.1.11	1-32 amp TPN 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 40 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and with 3 single phase banks each comprising of 1-32 amp **DP 30mA ELCB** incoming and 4 nos 10/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	13,992	27,983
4.1.12	1-63 amp TPN 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 63 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and with 3 single phase banks each comprising of 1-63 amp **DP 100mA ELCB** incoming and 6 nos 10/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	24,599	49,198
4.1.13	1-63 amp TPN 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 63 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and with 3 single phase banks each comprising of 1-63 amp **DP 100mA ELCB** incoming and 8 nos 10/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	62	24,180	14,99,144
4.1.14	1-63 amp TPN 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 63 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and with 3 single phase banks each comprising of 1-63 amp **DP 100mA ELCB** incoming and10 nos 10/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	28,652	57,305
4.1.15	1-63 amp TPN 10 kA MCB with thermal magnetic protective releases incoming with 4 pole 63 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and with 3 single phase banks each comprising of 1-63 amp **DP 100mA ELCB** incoming and	Nos	100	29,438	29,43,763
4.1.16	1-100 amp TPN 10 kA MCB isolators with thermal magnetic protective releases incoming with 4 pole 100 amp HDHC tinned copper bus bar with coloured heat shrinkable PVC sleeves and 6 nos 32 amps DP & 10 nos 32 TPN 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	36,544	73,088
4.1.17	6 WAY TPN with Timer on 2-phases 1-40 amp TPN 10 kA MCB with thermal magnetic protective releases incoming with 1 single phase bank comprising of 1-40 amp **DP 100mA ELCB**incoming anc 6 no. 6/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings 2 single phase banks each comprising of 1-40 amp 30 mA DP ELCB incoming with 32 amp ON position latched contactor and 24 hours programe timer for operation of incoming and 6 no. 6/16/20 amps SP 10 kA MCB with thermal magnetic protective releases out goings	Nos	2	71,695	1,43,390
5.0	**MV CABLES**				
5.1	Supplying and laying of following 1100V grade XLPE FR **LSZH** copper conductor armoured cables to be laid in ground (over bed of sand including excavation, back filling and providing sand and bricks etc) or on existing cable trays / along the trusses including dressing, saddling, clamping etc or in existing brick trenches / ducts including sand filling etc. (including cost of excavation, sand & bricks where required) as per IS Specifications including clampped to wall suitable clamps, saddles bolts, etc				
5.1.1	4 core 16 Sq.mm XLPE copper conductor armoured cables	RM	8100	643	52,08,057
5.1.2	4 core 10 Sq.mm XLPE copper conductor armoured cables	RM	8000	454	36,34,080
5.1.3	4 core 6 Sq.mm XLPE copper conductor armoured cables	RM	6600	301	19,83,828
5.1.4	4 core 4 Sq.mm XLPE copper conductor armoured cables	RM	20	224	4,475
5.1.5	2 core 16 Sq.mm XLPE copper conductor armoured cables	RM	20	372	7,435
5.1.6	2 core 10 Sq.mm XLPE copper conductor armoured cables	RM	20	269	5,379

5.1.7	2 core 6 Sq.mm XLPE copper conductor armoured cables	RM	20	188	3,752
5.1.8	3 core 16 Sq.mm XLPE copper conductor armoured cables	RM	20	496	9,921
5.1.9	3 core 10 Sq.mm XLPE copper conductor armoured cables	RM	1800	358	6,44,778
5.1.10	3 core 6 Sq.mm XLPE copper conductor armoured cables	RM	20	240	4,791
5.1.11	3 core 4 Sq.mm XLPE copper conductor armoured cables	RM	20	181	3,616
5.1.12	4 core 2.5 Sq.mm PVC insulated copper conductor armoured control cables	RM	20	171	3,413
5.1.13	10 core 2.5 Sq.mm PVC insulated copper conductor armoured control cables	RM	20	324	6,486
5.1.14	12 core 2.5 Sq.mm PVC insulated copper conductor armoured control cables	RM	20	376	7,526
5.2	Cable end termination of the following XLPE FR LSZH copper conductor armoured cables of 1100V grade including supplying and fixing of crimping lugs, double compression glands, cable sockets, insulation tape etc.				
5.2.1	4 x 16 Sq.mm	Nos	284	304	86,327
5.2.2	4 x 10 Sq.mm	Nos	346	304	1,05,174
5.2.3	4 x 6 Sq.mm	Nos	100	206	20,566
5.2.4	4 x 4 Sq.mm	Nos	20	192	3,842
5.2.5	2 x 16 Sq.mm	Nos	20	238	4,769
5.2.6	2 x 10 Sq.mm	Nos	20	198	3,955
5.2.7	2 x 6 Sq.mm	Nos	20	185	3,706
5.2.8	3 x 16 Sq.mm	Nos	20	284	5,673
5.2.9	3 x 10 Sq.mm	Nos	50	253	12,656
5.2.10	3 x 6 Sq.mm	Nos	20	245	4,904
5.2.11	3 x 4 Sq.mm	Nos	20	199	3,978
5.2.12	4 x 2.5 Sq.mm Control cable	Nns	20	184	3,684
5.2.13	10 x 2.5 Sq.mm Control cable	Nos	20	271	5,424
5.2.14	12 x 2.5 Sq.mm Control cable	Nos	20	341	6,825
5.3	Supply and installation of following hume pipe, as per recommendation of latest addition of related IS for said subject under paved areas including necessary excavation & backfilling, Note: Minimum NP-2 class hume shall be used to lay cables				
5.3.1	450 mm dia	RM	20	1,043	20,860
5.3.2	250 mm dia	RM	20	586	11,729

5.3.3	200 mm dia	RM	20	586	11,729
5.3.4	150 mm dia	RM	20	527	10,532
5.4	Supply & laying Double walled corrugated (DWC) HDPE pipe withnecessary connecting sockets /coupling/Tees/Bends of same materials in existing trench as per IS 14930 part II suitable for drawing under ground cables.				
5.4.1	160mm OD	RM	17000	916	1,55,79,310
5.4.2	200mmOD	RM	2400	1,203	28,88,280
5.4.3	250mmOD/ 217 mmID	RM	9000	989	88,98,750
5.5	Supply and installation of following heavy/medium grade Gl pipes, as per recommendation of latest addition of related IS for said subject for cables crossing the rail tracks with all bendings complete as required				
5.5.1	150 mm dia Gl pipe	RM	20	2,121	42,420
5.5.2	100 mm dia GI pipe	RM	500	1,472	7,36,195
5.5.3	80 mm dia GI pipe	RM	1000	1,057	10,56,550
5.5.4	40 mm dia Gl pipe	RM	20	512	10,238
5.6	Supply and fixing of pregalvanized factory fabricated GI perforated 2.0 mm thick cable trays in following sizes as per drawing including having suitable size rods/supporting bracekes, clamps, hardwares, suspenders complete with painting and welding to reinforcement for support. Each cable tray shall be earthed at both ends properly.				
5.6.1	50 x 450 x 50 x 2 mm	RM	1200	1,468	17,61,444
5.6.2	40 x 300 x 40 x 2 mm	RM	5600	739	41,38,512
5.6.3	40 x 150 x 40 x 2 mm	RM	5000	654	32,71,350
5.7	Supply and fixing of sheet steel perforated 2.0 mm thick cable trays in following sizes as per drawing including having suitable size rods/supporting bracekes. clamps, hardwares, suspenders complete with pointing and welding to reinforcement for support. Cable trays shall be provided with 1 No. 25 x 6 mm copper continuous earthing strip all alone the length.				
5.7.1	50 x 600 x 50 x 2 mm	RM	20	1,401	28,024
5.7.2	50 x 450 x 50 x 2 mm	RM	20	831	16,611
5.7.3	40x300x40x2mm	RM	20	780	15,594
5.7.4	40 x 150x40x2 mm	RM	20	401	8,023
5.8	Supply and fixing pregalvanized factory fabricated Gl ladder type cable trays with radial bends, supports of the following sizes as per specifications				
5.8.1	1500 mm wide				
	Runners 25 x 10 x 25 x 3 mm				

	Rungs 20x40x20x3 mm 250 mm C/C				
	Suspenders 25x25x5 mm angle 1500 mm C/C	RM	20	2,856	57,110
5.8.2	1200 mm wide				
	Runners 25 x 10 x 25 x 3 mm				
	Rungs 20 x 40 x 20 x 3 mm 250 mm C/C				
	Suspenders 25 x 25 x 5 mm angle 1500 mm C/C	RM	20	2,492	49,833
5.8.3	1000 mm wide				
	Runners 25 x 10 x 25 x 3 mm				
	Rungs 20x40x20x3 mm 250 mm C/C				
	Suspenders 25 x 25 x 5 mm angle 1500 mm C/C	RM	20	2,280	45,607
5.8.4	750 mm wide				
	Runners 20 x 75 X 20 x 2.5 mm				
	Rungs 20 x 30 x 20 x 2.5 mm 250 mm C/C				
	Suspenders 25 x 25 x 4 mm angle 1800 mm C/C	RM	20	1,420	28,408
5.8.5	600mm Wide				
	Runners: 25 x 10 x 25 x 2.5 mm				
	Rungs: 20 x 40 x 20 x 3 mm 250 mm C/C				
	Suspenders: 25 x 25 x 4 mm angle 1800 mm C/C	RM	400	1,306	5,22,512
5.8.6	450 mm wide				
	Runners: 25 x 10 x 25 x 2.5 mm				
	Rungs: 20 x 40 x 20 x 3 mm 250 mm C/C				
	Suspenders: 25 x 25 x 4mm angle 1800 mm C/C	RM	200	1,189	2,37,752
5.8.7	300 mm wide				
	Runners: 25 x 10 x 25 x 2.5 mm				
	Rungs: 20 x 40 x 20 x 3 mm 250 mm C/C				
	Suspenders: 25 x 25 x 4 mm angle 1800 mm C/C	RM	1200	401	4,81,380
5.9	**CABLE TRAY SUPPORTS**				

5.9.1	Supply cost for Profile - 1 consisting of Verical support-Pre Galvanished 3mm Thick (wall mounting) 0.90 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 200 mm long (To be fixed on the Vertical Support) - 3 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 06 Nos.	Set	1100	1,884	20,72,081
5.9.2	Supply cost for Profile -2 consisting of Verical support- Pre Galvanished 3mm Thick (wall mounting) 1 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 450 mm long (To be fixed on the Vertical Support) - 3 NOs and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 6 Nos.	Set	2000	2,338	46,75,940
5.9.3	Supply cost for Profile - 3 consisting of Verical support-Pre Galvanished 3mm Thick (wall mounting) 1 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 600 mm long (To be fixed on the Vertical Support) - 3 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 6 Nos.	Set	900	2,510	22,58,757
5.9.4	Erection cost for all Profile types of Cable tray Supports including Shifting of materials from Store to work spot, Vertical support fixing with Anchor Bolt at every 800 mm interval in trench & HOM of drilling Equipment - 1 No.	Set	4000	310	12,38,480
5.9.5	Supply & erection cost for Profile - 1 consisting of Vertical support- Pre Galvanished 3mm Thick (wall mounting) 0.90 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 450 mm long (To be fixed on the Vertical Support) - 3 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 06 Nos.	Set	1200	2,653	31,83,888
5.9.6	Supply & erection cost for Profile -2 consisting of Vertical support- Pre Galvanished 3mm Thick (wall mounting) 0.90 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 600 mm long (To be fixed on the Vertical Support) - 3 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 6 Nos.	Set	3500	2,831	99,07,275
5.9.7	Supply & erection cost for Profile - 3 consisting of Vertical support- Pre Galvanished 3mm Thick (wall mounting) 0.65 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar)- 1 No, Horizontal supports-Pre Galvanished 3mm Thick 300 mm long (To be fixed on the Vertical Support) - 3 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 6 Nos.	Set	900	2,257	20,30,949
5.9.8	Supply & erection cost for Profile - 4 consisting of Vertical support- Pre Galvanished 3mm Thick (wall mounting) 1.10 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 600 mm long (To be fixed on the Vertical Support) - 5 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 4 Nos.	Set	20	3,617	72,343
5.9.9	Supply & erection cost for Profile - 5 consisting of Vertical support- Pre Galvanished 3mm Thick (wall mounting) 1.10 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) - 1 No, Horizontal supports-Pre Galvanished 3mm Thick 1000 mm long (To be fixed on the Vertical Support) - 5 Nos and Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 4 Nos.	Set	20	4,798	95,960
5.9.10	Supply & erection cost for Profile - 6 consisting of Verical support- Pre Galvanished 3mm Thick (wall mounting) 0.90 meter long 100mm(W) X 30mm(H) X 30mm(H) X 25mm(Collar) X 25mm (collar) Horizontal supports-Pre Galvanished 3mm Thick 1000 mm long (To be fixed on the Vertical Support) - Anchor Fastner-Hilti Model No: 255840 (H.S.A M10X90/20/25) - 4nos	Set	1000	3,358	33,58,360
5.10	Providing and laying or factory fabricated GI raceways made with 1.6 mm thk complete with all necessery require accessories e.g. bends, junction boxes, access box ec.				
5.10.1	150 mm wide x 40 mm deep raceway	RM	1400	1,301	18,20,882
5.10.2	100 mm wide x 40 mm deep raceway	RM	3300	1,031	34,00,848
5.10.3	50 mm wide x 25 mm deep raceway	RM	20	389	7,774
5.11	Supplying and laying of following 1100V grade XLPE **FR LSZH** aluminium conductor armoured cables to be laid in ground (over bed of sand back filling and providing sand and bricks etc) or on existing cable trays / along the trusses, walls, columns, including dressing, saddling, clamping etc. or in existing brick trenches / ducts including identification tags, cable route markers at every 20 metere distance **or as require** etc. (including cost of excavation, sand & bricks where required) including clampped to wall suitable clamps, saddles, bolts etc. as per IS specification.				
5.11.1	3.5 core 400 Sq.mm XLPE aluminium conductor armoured cables	RM	700	1,702	11,91,246
5.11.2	3.5 core 300 Sq.mm XLPE aluminium conductor armoured cables	RM	7520	1,365	1,02,65,101

5.11.3	3.5 core 240 Sq.mm XLPE aluminium conductor armoured cables	RM	4000	1,138	45,51,640
5.11.4	3.5 core 185 Sq.mm XLPE aluminium conductor armoured cables	RM	10800	892	96,28,956
5.11.5	3.5 core 150 Sq.mm XLPE aluminium conductor armoured cables	RM	6000	735	44,07,000
5.11.6	3.5 core 120 Sq.mm XLPE aluminium conductor armoured cables	RM	3400	633	21,51,520
5.11.7	3.5 core 95 Sq.mm XLPE aluminium conductor armoured cables	RM	3800	513	19,49,476
5.11.8	3.5 core 70 Sq.mm XLPE aluminium conductor armoured cables	RM	1700	428	7,28,059
5.11.9	3.5 core 50 Sq.mm XLPE aluminium conductor armoured cables	RM	4000	337	13,46,960
5.11.10	3.5 core 35 Sq.mm XLPE aluminium conductor armoured cables	RM	14000	227	31,79,820
5.11.11	4 core 25 Sq.mm XLPE aluminium conductor armoured cables	RM	22800	201	45,85,992
5.12	Cable end termination of the following XLPE FR LSZH aluminium conductor armoured cables of 1100V grade including supplying and fixing of crimping lugs, double compression glands, cable sockets, insulation tape etc.				
5.12.1	3.5 core 400 Sq.mm	Nos	4	1,547	6,188
5.12.2	3.5 core 300 Sq.mm	Nos	42	1,227	51,542
5.12.3	3.5 core 240 Sq.mm	Nos	108	1,095	1,18,257
5.12.4	3.5 core 185 Sq.mm	Nos	90	886	79,733
5.12.5	3.5 core 150 Sq.mm	Nos	26	651	16,923
5.12.6	3.5 core 120 Sq.mm	Nos	28	547	15,314
5.12.7	3.5 core 95 Sq.mm	Nos	32	527	16,851
5.12.8	3.5 core 70 Sq.mm	Nos	28	432	12,086
5.12.9	3.5 core 50 Sq.mm	Nos	28	386	10,821
5.12.10	3.5 core 35 Sq.mm	Nos	90	305	27,459
5.12.11	4 core 25 Sq.mm	Nos	724	280	2,02,894
6.0	**LIGHTING FIXTURES**				
	SUPPLY AND FIXING OF LIGHTING FIXTURES:				
6.1	**LIGHTING FIXTURES FOR INDOOR**				
	Supply, installation, testing & commissioning of the following lighting fixtures including fixing arrangement and with all accessories like tubes / incandescent lamp / Halogen lamps as required for the following complete with necessary GI pipe required for hanging of lighting fixtures:				
	LED LIGHTING FIXTURES				
6.1.1	Supply, installation, testing and commissioning of LED 2x2 recessed fixture, with system lumen output of 3700 lumens at a system power of 40W. The luminaire shall have powder coated CRCA housing and light output with diffusion optics similar to Philips RC240B LED37- 5000 PSE OD-WH or Surya Cat No.: SLE MDR 40 22 or equivalent approved make	Nos	340	5,198	17,67,320

6.2	Supply, installation, testing and commissioning of surface mounted LED Batten, with a system lumen output of 2000 lumens and a minimum system efficacy of 100 lumen/watt. The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70, driver THD <10%. The luminaire is made of CRCA housing and shall have diffused optics similar to Philips Endura LED Batten or equivalent in Surya make	Nos	694	4,520	31,36,880
6.3	Supply, installation, testing and commissioning of surface mounted LED Batten, with a system lumen output of 4000 lumens and a minimum system efficacy of 100 lumen/watt. The luminaire shall have a CRI of greater than 80 with rated system lifetime of 50,000 hours at L70, driver THD<10%. The luminaire is made of CRCA housing and shall have diffused optics similar to Philips Endura LED Batten or equivalent in Surya make	Nos	1164	5,085	59,18,940
6.4	Supply, installation, testing and commissioning of LED Linear 1x4 recessed fixture, with a system lumen output of 3000 lumens. The luminaire shall have powder coated CRCA housing and light output is by means of Semi High Gloss optics with 3D Lamellea and High Purity Anodized Aluminium mirrors similar to RC869 B W30 L120 LED or equivalent in Surya make	Nos	460	10,170	46,78,200
6.5	Supply, installation, testing and commissioning of LED suspended fixture, with system lumen output of 4400 lumens (approximate 1100 lumens downwards) at a system efficacy of 80 lumen/W. The luminaire shall have powder coated extruded housing with diffusion optics, CRI>80, DALI dimmable driver similar to Philips SP790P LED44S-5000 PSD or equivalent in Surya make	Nos	10	15,707	1,57,070
6.6	Supply, installation, testing and commissioning of LED surface mounted downlighter with a system lumen output of 900 lumens with a CRI at least 80 with system efficacy of 85 lumen/watt, depth of product should be not more than 80 mm similar to Philips SM518 C or Surya Cat No.: SLE DS 20 11S or equivalent approved make.	Nos	172	3,955	6,80,260
6.7	Supply, installation, testing and commissioning of LED Downlighter with a system lumen output of 2100 lumens and a minimum system efficacy of 85 lm/W. The luminaire shall have a CRI greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. Height of luminaire shall not be more than 60 mm similar to Philips DN395B LED21S-6500 PSU WH or Surya Cat No.: SLE DLR 24 M or equivalent approved make	Nos	292	4,294	12,53,848
6.8	Supply, installation, testing and commissioning of LED wall mount with a system lumen output of 200 lumens and shall have IP 65, IK 08 ratings. The luminaire shall have a CRI of greater than 70 with rated system lifetime of 25000 hours at L70. The luminaire shall be surface mounted with depth less than 75mm and diameter of not more than 250mm. Translucent diffuse, opal shall serve as optical cover for luminaire similar to Philips BWS150 or equivalent in Surya make	Nos	56	11,526	6,45,456
6.9	Supply, installation, testing and commissioning of surface mounted LED Batten with a system lumen output of 3500 lumens and a system efficacy of 90 lumen/watt. The luminaire shall be IP65 rated and shall have a CRI greater than 80 with rated system lifetime of 50,000 hours at L70. The housing and cover is made of polycarbonate or Surya Cat No: SLE WPL 36W or equivalent approved make	Nos	494	7,741	38,23,807
6.10	Supply, installation, testing and commissioning of LED surface mounted luminaire with a system lumen output of at least 1600 lumens. The Luminaire shall be IP66, IK10 rated and shall have a life of 50,000 hours at L70 with a system efficacy of 95 lumen/watt. The luminaire shall have a high efficiency glass cover and LM6 PDC housing similar to Philips BWP120 LED 16 FG PSU or equivalent in Surya make.	Nos	10	9,040	90,400
6.11	**HIGH/MEDIUM / LOW BAY FIXTURES**				
6.11.1	Supply of LED highbay fixture having system lumen output of >15000 lumens at a system power of 165W. Fixture shall be made from PDC aluminium hosuing and dedicated les optics to ensure IP65 protection, discrete high power LED, THD < 10% internal surge protecction of 5KV, Similar to Philips Cat No.:BY415P LED145S CW WB FG PSU GR or Surya Cat No.: SLE MHB 165W or equivalent approved make	Nos	10	18,984	1,89,840
6.11.2	Supply of LED highbay fixture having system lumen output of >14000 lumens at a system power of 150W. Fixture shall be made from PDC aluminium hosuing and dedicated les optics to ensure IP65 protection, discrete high power LED, THD < 10% internal surge protecction of 5KV, Similar to Philips Cat No.:BY415P LED145S CW WB FG PSU GR or Surya Cat No.: SLE MHB 150 or equivalent approved make	Nos	300	17,515	52,54,500
6.11.3	Supply of LED Midbay fixture having system lumen output of >8000 lumens at a system power of 90W. Fixture shall be made from PDC aluminium hosuing and dedicated les optics to ensure IP65 protection, discrete high power LED, THD < 10% internal surge protecction of 5KV, Similar to Philips Cat No.:BY415P LED80S CW WB FG PSU GR or Surya Cat No.: SLE MMB 90W or equivalent approved make	Nos	700	10,057	70,39,900

6.11.4	Supply of LED Midbay fixture having system lumen output of >8000 lumens at a system power of 90W. Fixture shall be made from PDC aluminium hosuing and dedicated les optics to ensure IP65 protection, discrete high power LED, THD < 10% internal surge protecction of 5KV, Similar to Philips Cat No.:BY415P LED80S CW WB FG PSU GR or Surya Cat No.: SLE MMB 90W or equivalent approved make	Nos.	198	10,057	19,91,286
6.12	**EXTERNAL LIGHTING FIXTURES**				
6.12.1	Supply, installation, testing and commissioning of the following lighting fixtures including fixing arrangement and with all accessories and lamps as required for				
6.12.2	LED Street light fixture with IP66 protected high pressure aluminum die cast housing capable of delivering a nominal system lumen output of 12000 lumens with a minimum system efficacy of 100 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 Philips cat ref:BRP322 LED 122 CW HE MR PC S3 XT or Surya Cat No.:SLE UL 120W IP66 PLX or equivalent approved make	Nos.	166	18,645	30,95,070
6.12.3	LED Street light luminaire made up of LM6 high pressure die cast aluminum delivering a system light output of 9000 lumens with a luminous efficacy of at least 95 lumen/Watt and shall be IP65 rated with life of 50,000 hours @ L70 Philips cat ref:BRP322 LED 90 CW HE MR PC S3 XT or Surya Cat No.:SLE UL 90W IP66 PLX or equivalent approved make	Nos.	106	14,464	15,33,184
6.12.4	LED Flood light fixture with IP65 protected high pressure aluminum die cast housing capable of delivering a nominal system lumen output of >22000 lumens with minimum system efficacy of >90 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 Philips cat ref:BVP410 LED 210 CW HE NB FG S3 XT or Surya Cat No.:SLE FL-M 250W IP65 or equivalent approved make	Nos	12	31,075	3,72,900
6.12.5	LED Flood light fixture with IP65 protected high pressure aluminum die cast housing capable of delivering a nominal system lumen output of >22000 lumens with minimum system efficacy of >90 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 Philips cat ref:BVP410 LED 210 CW HE NB FG S3 XT or Surya Cat No.:SLE FL-M 250W IP65 or equivalent approved make	Nos	8	31,075	2,48,600
6.12.6	LED Flood light fixture with IP65 protected high pressure aluminum die cast housing capable of delivering a nominal system lumen output of >36000 lumens with minimum system efficacy of >90 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 Philips cat ref:BVP410 LED 360 CW HE NB FG S3 XT or Surya Cat No.:SLE FL-M 400W IP65 or equivalent approved make	Nos	10	49,720	4,97,200
6.12.7	LED PostTop light fixture with IP65 protected high pressure aluminum die cast housing capable of delivering a nominal system lumen output of >2400 lumens with minimum system efficacy of >80 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 Philips cat ref:BCP151 or Surya Cat No.: SLE PT-M 30 or equivalent approved make	Nos	22	18,080	3,97,760
6.12.8	Flood light fitting of Philips type RVP 301/2 x 400Wor similar approved make with High pressure sodium vapour lamps complete with appropriate control gear unit to be mounted on shed structure.	Nos	2	30,409	60,819
6.12.9	Street lighting luminaire of Philips type TRC-33/236 D6 or equivalent as per approved list with floursoent lamp and electronic ballast mounted on existing 40mm dia heavy duty Gl pipe complete as required	Nos	2	3,717	7,433
6.12.10	Supply, fabrication and installation of 1 meter high, 65 mm dia class B Gl pipe 0.5 meter above top of boundary wall with Thermoplastic cable junction boxes IP 65 "Halogen free and weather proof" with metric knockout for entry of bottom portion of 65 mm Gl pipe, having 1 no. 6 ampSP MCB, 10 kA rating, fixing on a din bar and terminals for wiring from junction box to light fixture with 3 x 2.5 sq mm FRLSZH PVC insulated copper wires installed at 500 mm from top of boundary wall and grounted on the wall with the above Gl pipe in 1:3:6 ratio cement -concrete (1 cement: 3 course sand : 6 graded stone aggregated 40 mm nominal size) complete as required.	Nos	4	5,425	21,701
	Note : The height of 65 mm dia heavy duty pipe may vary as pel requirement at site.	RM	20	1,318	26,352
6.13	Supply and fixing of additional 65 mm Gl pipe heavy duty complete with 3 x 2.5 sq mm FRLSZH PVC insulated copper wire including painting etc. complete as required.				
6.13.1	Underwater luminaire of Philips type LED 12W or equivalent as per approved list complete with all appropriate control gear unit required for fixing	Nos	10	7,550	75,495
6.13.2	Supplying and installing of following Swaged Poles made from steel of 42 Kgf mmsq ultimate tensile strength with single arm in following dimensions:				
6.13.3	9 mtr octagonal Hot-dip Galvanized street light pole with top 70 bottom 155, PCD 260 with single arm sword type bracket.	Nos	156	33,900	52,88,400
6.13.4	7 mtr octagonal Hot-dip Galvanized street light pole with top 70 bottom 130, PCD 220 with single arm sword type bracket.	Nos	106	28,250	29,94,500

Note:	All the above poles shall be supplied with 600 x 600 x 10m thick MS base plate and weather proof MS junction boxes made out of 16 SWG CRCA . sheet enclosing 1 No. 6A/10A DP MCB, 16A rating connecting terminals for 3 Nos single phase cables and wiring from junction box to light fixture with 2x4+ 1x21 Sqmm PVC insulated copper wires. The box shall be painted with stove enamelled paint over two coats of primer, complete with required in 1 3:6 ratio cement concrete 450 x 450 x 600mm deep size, above 75mm thick lean concrete complete. Cost of concrete junction box and lean concrete is not to be included here, this shall be paid extra ir some other items				
6.14	3.5 meter high, 65 mm dia MS "C class straight tubular pole with base plate and weather proof MS junction box (made of 16 SWG CRCA sheet having 1 No. 6 A DP MCB, 15 A rating connecting terminals for 3 Nos. 1 phase cables, wiring from junction box to light fitting with 3 x 2.5 sq.mrr FRLSZH PVC insulated copper wires, the box shall be painted with stove enamelled paint over two coats of primer, installed at 300 mm above ground level) and required foundation in 1:3:6 ratio cement concrete 450 x 450 x 600 mm deep size above 100 mm thick lean concrete complete Cost of foundation is not to be calculated with the item, this shall be paid in other items.	Nos	22	6,615	1,45,530
6.15	Supply, installation, testing and commissioning of 30 M high mast system with its accessories. Mast shaft shall be in three sections, hot dip galvanised and suitable for wind velocity as per IS 875. It shall also include accessories for high mast including head frame, steel wire rope 6 mm dia (7/19 construction), trailing cable, double drum winch, Galvanised Lantern carriage arrangement suitable for 16 luminaires symmetrically & its contra gear boxes and lightning finial. The mast shall have an External power tool installed inside the base compartment for its operation and including following	Set	20	9,61,932	1,92,38,634
6.15.1	Foundation bolts manufactured from special steel along with nuts, washers, anchor plates and templates.				
6.15.2	LED Flood light fixture with IP65 protected high pressure aluminum die cast housing capable of delivering a nominal system lumen output of >36000 lumens with minimum system efficacy of >90 lumen/watt and a CRI greater than 70. The luminaire shall have a life class of 50,000 hours @ L70 Philips cat ref:BVP410 LED 360 CW HE NB FG S3 XT or Surya Cat No.:SLE FL-M 400W IP65 or equivalent approved make				
6.15.3	twin LED aviation light with IP65 protected.				
6.15.4	Control panel housing 63A, TPN MCB incomer, single dial timer contactor circuit for the automatic control of luminaries.				
6.15.5	Common power tool for the operation of the mast with single phase single speed motor along with reversing gear, stand, control push button and other accessories.				
6.15.6	Earth Station of Pipe earthing as per IS:3043-1987 & IEEE:80-2000, including duplicate earth connection to the mast with 25x3 mm size Gl Strip.				
6.16	**OTHER LED FIXTURES**				
6.16.1	Supply, installation, testing and commissioning of LED 2x2 recessed fixture, with system lumen output of 2800 lumens, 40W. The luminaire shall have powder coated CRCA housing and light output is by means of Semi High Gloss optics with 3D Lamellea and High Purity Anodized Aluminium mirror similar to Philips RC869 B W60 L60 LED or Surya Cat No.: SLE MDR 40 22 or equivalent approved make.		2	5,695	11,390
6.16.2	Supply, installation, testing and commissioning of LED 2'x2' recessed fixture, with system lumen output of 3400 lumens at a system efficacy of 100 lumen/W. The luminaire shall have powder coated CRCA housing and light output with diffusion optics, CRI>80, DALI dimmable driver and built in sensor on the luminaire for use in cabins/conference room, UGR<19 compliant, similar to Philips RC460B G2 IN LED34S/840 PSD W60L60 VPC ACL PIP or Surya Cat No.: SLE MDR 40 22 or equivalent approved make.		2	22,035	44,070
6.16.3	Supply of rigid frame LED cove lighting system operating on 24V DC including external power supply & leader/jumper cable. The cove lighting shall be available in 1ft and 4ft length with height not more than 25 mm and width less than 35 mm. The luminaire shall be available in CRI of atleast 80, system efficacy >55 lumen/Watt, CCT of 3000K, 4000K. The housing shall be made from extruded polycarbonate and the luminare shall be compatible with 0-10V or 1- 10V dimming similar to Philips Vaya cove or equivalent in surya make.	RM	5	5,424	27,120
6.16.4	Supply, installation, testing and commissioning of LED 1'x4' recessed fixture, with system lumen output of 3400 lumens at a system efficacy of 100 lumen/W. The luminaire shall have powder coated CRCA housing and light output with diffusion optics, CRI>80, DALI dimmable driver and built in sensor on the luminaire for use in cabins, cubicles & conference room, UGR<19 compliant, similar to Philips RC460B G2 IN LED34S/840 PSD W30L120 VPC ACL PIP or equivalent in surya make.		2	31,640	63,280
6.16.5	Supply, installation, testing and commissioning of LED Downlighter with a system lumen output of 1200 lumens and a minimum system efficacy of 85 lm/W. The luminaire shall have a CRI greater than 80 with rated system lifetime of 50,000 hours at L70. The luminaire optics shall have a high efficiency diffuser with more than 85% transmittance. Height of luminaire shall not be more than 60 mm similar to Philips DN393B LED12S-6500 PSU WH or equivalent in surya make.		2	2,204	4,407

6.16.6	Outdoor IP65, IK10 LED bollard of 0.8M height extrusion housing and polycarbonate diffuser. The light emitted shall have a CRI>75, CCT of 4000K, nominal system power of 8W, lifeclass of 25,000 hours at L70 similar to Philips BCP 151 or equivalent in surya make.		2	15,029	30,058
6.17	**SUPPLY AND FIXING OF FANS**				
6.17.1	Supply, installation, testing & commissioning of the following fans including fixing arrangement and with all accessories like down rods, 5 step electronic fan regulators, cover plates, cups as required for the following complete with necessary Gl pipe required for hanging of the fans etc.				
6.17.2	Ceilng fan 1200 mm sweep with Electronic regulator complete with all accessories required.	Nos	10	1,949	19,493
6.17.3	Ceilng fan 1400 mm sweep with Electronic regulator complete with all accessories required.	Nos	400	2,036	8,14,504
6.17.4	36" Air Circulator Fans, 230 to 240 volts, 1 phase, 50 Hz complete with stand, ground, regulator, pedestal as required.	Nos	160	8,046	12,87,296
6.18	**MISCELLANEOUS LIGHTING FIXTURES & FANS**				
6.18.1	Wall mounting type cabin fan, 600 mm dia , 1 phase 230V complete witr guard screen and with built in low medium and high speed regulating push button	Nos	20	3,527	70,535
6.18.2	Supply of 450 mm dia 240V, 1 phase, 50 Hz Exhaust fans with shutter, motor etc., GEC/Crompton make complete as required	Nos	160	5,695	9,11,232
6.18.3	Supply, installation, testing & commissioning of the following lighting fixtures including fixing arrangement and with all accessories like tubes / incandescent lamp / Halogen lamps as required for the following complete with necessary Gl pipe required for hanging of lighting fixtures:				
6.18.3.1	CFL surface mounted fixture of Philips type FCS 518/218 W, CFL lamp or equivalent as per approved list	Nos	2	2,272	4,545
6.18.3.2	CFL surface mounted fixture of Philips type FCS 100/118 W, CFL lamp or equivalent as per approved list	Nos	2	1,629	3,259
6.18.3.3	CFL Recessed mounted fixture of Philips type FBH 145/218 HF watt CFL lamp or equivalent as per approved list	Nos	2	4,040	8,080
6.18.3.4	Surface mounted wall step light fixture of Philips DCP 715/2 x PLC 18W or equivalent as per approved list with lamps complete as required (ECB 300)	Nos	2	5,829	11,657
6.18.3.5	Surface mounted fixture of Philips TCW 097/136 HF or equivalent as per approved list with lamps complete as required (TCW 450/136HF)	Nos	2	4,792	9,585
6.18.3.6	Surface mounted fixture of Schreder MY1/CFL/1x36W/1338/IP67/HF or equivalent as per approved list with lamps complete as required	Nos	2	10,445	20,889
6.18.3.7	Surface mounted fixture of Philips TCS 19/136 HF or equivalent as per approved list with lamps complete as required	Nos	2	2,746	5,492
6.18.4	Outdoor light bollard light fitting of Philips FGC 100 with 9 W PL-S lamp	Nos	10	6,042	60,421
6.18.5	Street lighting luminaire of Philips type SRP-51/250 SON-T or equivalent as per approved list mounted on 1.6 meter height 40 mm Gl pipe fpt boundaryy lighting complete with 250 W SON-T lam and clamps etc required for fixing with wall	Nos	2	10,399	20,799
6.18.6	Street lighting fixture of Philips type SRP-51/250 SON-T or equivalent as per approved list with' 'acrylic' cover with 250W high pressure sodium vapour lamp to be mounted on 9 mtr. high MS tabular pole.	Nos	2	9,856	19,712
6.18.7	Street lighting fixture of Philips type SRP-51/150 SON-T or equivalent as per approved list with 'acrylic' cover with 150W high pressure sodium vapour lamp to be mounted on 7.5 mtr. high MS tabular pole.	Nos	2	10,354	20,708
6.18.8	Neon/LED sign board for maintenance depot over stabling shed	sq m	160	18,245	29,19,197
7.0	**LIGHTNING PROTECTION & EARTHING SYSTEM**				
7.1	**LIGHTNING PROTECTION & EARTHING SYSTEM**				
7.1.1	Supply and fixing of following bare copper / Gl tapes / wires including all necessary fixing accessories including supports, effecting connections to all panels, MDBs, structure cable trays etc. and effecting connections as per specifications				
	For Lightning Protectlon				

7.1.1.1	20 x 3 mm thick Gl tape	RM	20	177	3,548
7.1.1.2	32 x 6 mm thick Gl tape	RM	20	148	2,961
7.1.1.3	50x6 mm thick Gl tape.	RM	20	297	5,944
7.1.1.4	25 x 6 mm thick Gl tape	RM	800	179	1,42,832
7.2	**EARTHING**				
7.2.1	Supply and fixing of following bare copper/GI tapes / wires including all necessary fixing accessories and effecting connections as per specifications:				
7.2.1.1	65 x 8 mm thick copper tape.	RM	20	3,147	62,941
7.2.1.2	40 x 6 mm thick copper tape.	RM	20	1,355	27,097
7.2.1.3	50 x 6 mm thick copper tape.	RM	20	1,623	32,454
7.2.1.4	25 x 6 mm thick copper tape.	RM	20	901	18,012
7.2.2	Supplying and Running G.I/Copper Conductor for grounding and(along with Other wires in Conduit system of wiring)using nessasary suitable size clamps nails guttas / spacers etc- 8 SWG	RM	31000	27	8,40,720
7.2.2	Supply and laying medium class Gl pipe under wall crossing etc including earth excavation refilling ramming and making good.				
7.2.2.1	32 mm dia Gl Pipe	RM	20	494	9,876
7.2.2.2	40 mm dia Gl Pipe	RM	20	560	11,210
7.2.2.3	50 mm dia Gl Pipe	RM	20	766	15,323
7.2.2.4	80 mm dia Gl Pipe	RM	20	1,202	24,046
7.2.3	Supply and fixing of lightning arrestor finials with Gl tube 25 mm dia 1200 mm long, having single pole at the top with 85 mm dia 3 mm thick Gl base plate including the cost of fixing hardware complete	Nos	2	841	1,681
7.2.4	Supplying and fixing of test isolation junction box with Gl test link and hardwares in 16 SWG water tigh enclosure with hinged door & latch complete complete as per standards including painting work as required	Nos	20	194	3,887
7.2.5	Providing and laying of 600 x 600 x 6 mm thick tined G.I plate with 1 No. 50 x 6 mm Gl strip from earth electrode to inspection chamber, 50 mm dia medium class Gl pipe, CI funnel with 20 gauge Gl wire mesh, masonry chamber 300 x 300 mm with concrete base CI manhole cover with frame painted with bitumastic paint and packing with mixtures of charcoal and common salt around plate electrode including digging of pit upto permanent moisture level but not less than 3 meters to ensure earth resistance less than one ohm and back filling as required.	Nos	154	4,312	6,64,060
7.2.6	Same as per item no. 2.6 above but for 600 x 600 x 3mm thick copper plate with 2 Nos. 50 x 6 mm copper strip from earth electrode to inspection chambers to ensure earth resistance as per specifications and as required	Nos	4	10,572	42,289
7.2.7	Providing & laying of 50 mm dia minimum 3.0m long perforated Gl pipe of thickness 2.0mm earthing electrode with masonary chamber 400 x 400mm with concrete base Cl cover with mixture of charcol & comman salt around the copper pipe electrode including digging of pit & back fill. Copper pipe electrode to be cut tapered at the bottom & provided with holes of 12mm dia drilled not less than 150mm from each other upto minimum 2.75m length from bottom as per interface drawing of Designated Contractor	Nos	40	4,332	1,73,297
7.2.8	Supply, Fixing, Testing and Commissioning of earth pit with 100mm dia, 2.7m long cast iron pipe electrode, relevent all materials, construction of masanary chamber/cover slab etc. as per IS-3043.	No	30	10,454	3,13,609
7.3	**EARTH MAT**				
7.3.1	Supply, laying, testing and commissioning of 25mm MS Rod for earth mat at minimum 700mm to 1000mm deep as per approved drawing and as directed as per specifications including lap of not less than 150mm & cross weld (cad weld/exothermic weld) joints and providing bitumin coat at every joint as and if required. Risers from earth mat to be brought out as per approved drawings & specifications (Cost of risers not included in this item)	RM	3000	5,075	1,52,24,490

7.3.2	Supply, laying, testing and commissioning of 25mm MS Rod for vertical earth electrodes 3m deep for earth mat incl. weld(cad weld/exothermic weld) joints with earth mat as per approved drawing and specifications. The weld joints to be provide* with bitumin coat.	Nos	10	5,075	50,748
7.3.3	Supply and laying, testing and commissioning of copper/GI strips/wire for interconnecting the earth stations, panels, DBs, etc. of the following sizes in built up trenches/surface/wall /ground complete with holes & fixing, jointing / terminating accessories as per specifications and drawing as required. (Quantity shall be paid as per approved drawings as executed, how ever direct measurement shall not exceed the quantity indicated in drawing approved)				
7.3.3.1	50 x 6 mm G.I strip	RM	6700	203	13,62,780
7.3.3.2	25 x 6 mm G.I strip	RM	880	114	1,00,434
7.3.3.3	20 x 3mm G.I tape	RM	20	79	1,582
7.3.3.4	50 x 6 mm Cu. strip	RM	400	1,466	5,86,244
Note 1:	In case of non availability of any of the sizes mentioned above, next highei size available in market shall be provided at the same rate.				
Note 2:	No additional payment will be made for providing Main Earth Terminal! (made out of GI/CU strips from within the above sizes). The METs will be required to be fixed on walls as required and will be required to be provided with 12/16/20mm holes for connections of individual equipments including of other contractors.				
7.4	Extra for bituminous coating and hessian tape wrap or polyetylene facec hessian complete for buried 50mm x 6mm x 75mm strip as pel specifications and drawings as required	RM	20	449	8,972
8.0	**CONDUITING AND GI SLEEVES FOR TELEPHONE, LAN & PA SYSTEM**				
8.1	**CONDUITING AND GI SLEEVES FOR TELEPHONE SYSTEM**				
8.1.1	Providing and fixing in position the following 16 gauge MS Conduit concealed or exposed as called for including all accessories i.e. bends, junction boxes of approved make and design.				
8.1.1.1	25 mm dia	RM	4750	163	7,72,920
8.2	Providing and laying of following heavy/medium class GI pipe including all fixing accessories concealed or exposed as called for:				
8.2.1	40 mm dia	RM	1370	799	10,94,507
8.2.2	100 mm dia	RM	20	2,413	48,251
9.0	**DIESEL GENERATING SETS**				
9.1	**DIESEL GENERATING SETS**				
9.1.1	Supply, installation, testing and commissioning of 3 phase 415V, 50Hz, 1500RPM Radiator Cooled Silent **640** kVA Diesel Generator Set including Acoustic enclosure and Exhaust Piping. The DG set shall be suitable for being overloaded upto 10% of the rated capacity for 1 hour in every 12 hours.				
	The Engine shall include:				
	Flywheel to suit flexible coupling with guard				
	Air cleaner				
	Blower fan				
	Electronic governor				
	Fuel and lube oil filters and pumps				
	Water pump				
	900 litre day Fuel tank				
	Residential silencer				
	Batteries				
	Safety controls				

	Instrument panel				
	The Alternator shall be of self excited, self regulated type with static excitation unit and class 'H' insulation.				
	The DG set shall be mounted on a fabricated rigid common base frame with GERB make resilient anti-vibration mountings to provide 98% vibratror isolation				
	The Acoustic Enclosure fabricated from high quality sheet steel of minimum 2 mm thickness finished with powder coating shall be of weather proof construction, designed to reduce noise level to maximum 75 dB at 1 m distance.				
	Exhaust piping with class 'B' MS pipes shall be let out at a height of 5.5m above the terrace of the Sub-Station building including the cost of pipe supports, bends, flexible joints, etc complete as required for commissioning				
	For pipe dia more than 150mm 4.85 mm thick black pipe shall be used				
	The all inclusive quoted rate shall include the cost of all accessories, fittings, protections, instruments, safety controls and alarms, indications etc. complete as per specifications and as required	Nos	2	62,95,158	1,25,90,315
9.1.2	Supply, installation, testing and commissioning of AMF Panel suitable for operation of **640** kVA DG set comprising of:				
	1 no. 415V, 1250A, 4-pole power contactor for MAINS				
	1 no. 415V, 1250A, 4-pole power contactor for ALTERNATOR				
	0-500V digital electronic voltmeter with selector switch and control MCB's.				
	0-1250A digital electronic ammeter with selector switch and 3 Nos 1250/5A, 15VA, CLASS:1, CTs.				
	Digital electronic KWH meter with metering class- I CTs				
	Digital Electronic Frequency Meter.				
	Digital Electronic Kilowatt meter with metering class- I CTs.				
	3 Nos. phase indicating light with control MCB's				
	Reverse power relay type CCUM 21 or equivalent with 1250/5A, 5 P10, 15 VA CTs and 415/110V, 50VA PT.				
	Restricted earth fault relay for rotor protection type CAG-14 or equivalent with PS class CTs and suitable rating stabilizing resistor.				
	Under voltage relay VDG-13 type or equivalent.				
	Overvoltage relay VDG-11 type or equivalent				
	24 V DC shunt trip.				
	Mains supply voltage sensing relay.				
	Emergency stop push button.				
	DC control contactors/timers incorporating engine start/stop three attempt starting facility and failure to start lockout.				
	Selector switch for Auto / Manual / Test				
	Selector switch for engine control ON/OFF.				
	Five push buttons - start, stop, reset, test and accept				
	Three indicating lamps "load on set", "Load on Mains" and "Set fail to start".				
	8 Window alarm annunicator panel with hooter, push buttons, aux Contactors etc as required as per specification.				
	One set of relays for automatic closing and opening of the Mains and alternator power contactors as required.				
	Three Indicating lamp "Load on set" "Load on Mains" "Set fails to start".				
	Five Indicating lamps for shut down for "Low oil pressure" "High water Temp." "over speed" "low fuel" "lub oil temperature"				
	One counter to indicate number of times set has operated.				
	One Hour meter to indicate the number of hours set has operated				
	One set of Battery charger and SLA Batteries consisting of				
	Transformer/Rectifier				
	DC Ammeter				
	DC Voltmeter				
	Charging rate selector switch OFF/Trickle/ Boost.				
	AMF Panel include all control cabling interconnections between the Panel and the engine complete as per specifications and and as required.	Nos	2	7,80,155	15,60,311
9.1.3	Supply, erection, testing and commissioning of a semi rotary hand pump for filling fuel in daily Fuel Tank including the cost of suitable fuel piping and connections complete as required.	Nos	2	5,980	11,960
9.1.4	Supply, installation testing and commissioning of fuel oil piping system fabricated from Class B following size MS pipes cut to required lengths and installed with all welded joints including providing and fixing in position the necessary fittings like elbows, tees, reducers, duly coated with one coat of primer and two coats of approved enamel paint complete as per specifications and as required				
9.1.4.1	25mm dia	m	20	311	6,215

9.1.4.2	40mm dia	m	50	608	30,397
9.1.5	Supply, installation testing and commissioning of following oil piping accessories complete as required				
9.15.1	25 NB ball valve	Nos	2	857	1,713
9.15.2	25 NB float valve	Nos	2	724	1,449
9.1.6	Supply, erection, testing and commissioning of 600 liters capacity Fuel Tank, to receive fuel oil from Supplier, fabricated from 2 mm thick MS sheets including the cost of removable cover with locking arrangement and including the cost of painting and including the cost of providing all the required appurtenances like inlet and outlet connections including the cost of flanges & fittings, float valve, foot valve, drain connection, over flow connection to oil sump etc. and including the cost of fuel level indicator with high and low level visual indication and including the cost of Inter connection piping to provide gravity flow of oil from the buffer tank to the 2 nos Day fuel tanks (capacity - 990 litres) and including the cost of support arrangement complete as required.	Nos	2	27,397	54,794
9.1.7	Supply and erection of canopy type MS structure made out of 40 mm medium class MS pipe (class B), 25 x 25 x 3 mm angle iron frame work and 14 SWG GI sheet structure shall be grouted in 1:2:4 CC foundation for handing 8 nos 9 lit each fire fighting buckets including providing buckets with two coats of anticorrosive paints etc. complete as required.	Set	2	8,263	16,525
9.1.8	Providing and fixing NO SMOKING & DANGER ZONE self luminous signages complete as required	Nos	10	9,729	97,293
9.1.9	C02 4.5 kg capacity as per IS2878	Nos	2	6,339	12,679
9.1.10	Chemical foam type of 9 litre as per IS:993 (Trolly marker)	Nos	2	5,251	10,502
10.0	**ACCESS CONTROL SYSTEM**				
10.1	Supply, Installation, testing and commissioning of the access control system based on the following components including but not restricted to gold plated connecting leads, connectors, jumpers, nuts, screws, bolts, mounting plates, cover plates, back boxes etc and as required to make the system complete and operational in all respects complete as per specifications and as required				
10.1.1	Supply, installation, testing and commissioning of Access Intelligent Controller **(AIC)** support 4 standard Weigand Interface or up to 8 serial interface on RS 485 bus technology , 8 Input & 8 Output port as per the specification with enclosure , power supply & Maintenance free Batteries with 30 minutes back up. The controller should be minimum 32 bit embedded microprocessor chip and on board TCP /IP as per the Specification..The Controller Should have minimum of min 2GB flash Memory , can store minimum 200000 Card holder Access profile & 4 lakhs transaction in offline mode. The Controller should have a liquid crystal display (LCD) , and a button provided for selective display to show all its network parameters and actual status like - IP address of the controller; MAC address of the controller as per the specification Controller Should be UL 294, FCC, CE,EN as per the specification	Nos	42	1,06,754	44,83,689
10.1.2	100mm Read range Contactless smartcard readers as per tender specification suitable for mounting on metal surface/metal frames or wooden frames wall or as required based on site conditions including all accessories, complete as required	Nos	132	13,560	17,89,920
10.1.3	Recessed/Surface mounted Electromagnetic Locks suitable for glass/ wood doors capable of withstanding a minimum force of 600 lbs complete as per specifications and as per models specified:				
10.1.3.1	For Single Leaf Door	Nos	32	5,085	1,62,720
10.1.3.2	For Double Leaf Door	Nos	10	9,040	90,400
10.1.4	Recessed/ surface mounted Magnetic Contact Door Sensor for monitoring the status of the doors (OPEN/CLOSE) as mentioned in Item 1.5 above complete as per specifications and as per models specified.	Nos	52	2,034	1,05,768
10.1.5	Supply, installation, testing and commissioning of door open break glass switch for individual access control door. This shall be located in a powder coated lockable enclosure housed in control room. Quoted price shall be inclusive of wires running in 25 mm dia MS conduit between door and this switch.	Nos	42	1,356	56,952

10.1.6	Supply, installation & commissioning of Access Management Software with networked multi-user option/client & server configuration complete as per specifications and as required and including cost of PC as required. Software to be interfaced with time and attendance management software and to be suitable to interface with the Client's existing access management system. (Please indicate nos of clients softwares being provided) (Minimum recommended configuration of PC to be included in the price is detailed below) PC with 4th Gen Intel Core i7 quad core, 3.2 G Hz or above, 1TB SATA HDD, 8 GB RAM, Intel Integrated Graphics Card, DVD 8x max slimline R/W, Keyboard, Optical Mouse, 3-USB Ports, 2-Serial Ports, 1-Parallel Port, 1-10/100/1000 Mbps Network Card and 23" WLED Full HD Display.	Set	2	6,21,500	12,43,000
10.1.7	Desk Jet Printer A3/A4 size of approved make or as approved by engineer incharge	Nos	2	8,977	17,953
10.1.8	Supply, installation, testing and commissioning of card operated road barriers of 3 m width alongwith vehicle loop detectors and accessories mentioned in the tender specification.	Nos	4	3,70,278	14,81,114
10.1.9	Supply, installation, testing and commissioning of Half height, tripod turn stile gate as per tender specification.(Set of 3)	Set	8	2,24,411	17,95,290
10.1.10	4 Core 1.5 Sqmm armoured FRLSZH PVC insulated and sheathed copper conductor cables in 25 mm dia conduit including clamps and crimped terminations complete as per specifications required for Access Control System.	RM	3600	237	8,54,280
10.1.11	8 Core 1.5 Sqmm armoured FRLSZH PVC insulated and sheathed copper conductor cables in 50 mm dia conduit including clamps and crimped teminations complete as per specifications required for Access Control System	RM	6600	283	18,64,500
10.1.12	Data cables (CAT 5E LAN Cable) including clamps and crimped teminations complete as per specifications required for Access Control System.	RM	2100	90	1,89,840
10.1.13	4 Pair 2.5 sq.mm screened copper armoured cable for outdoor use complete with providing sand cushioning brick protection etc.	RM	1000	170	1,69,500
10.1.14	Supply, laying, testing and commissioning of the cables conduits/cable trays/ducts etc. with all accessories including glanding and termination. Quoted price shall be considering cabling for each door including that from card reader, push button, between controllers, door strike and magnetic contact	Job	2	56,500	1,13,000
11.0	**LAN SYSTEM**				
11.1	**ACTIVE COMPONENTS-SUPPLY PORTION**				
11.1.1	Supply of Network Rack as per specs	Nos.	2	33,459	66,919
11.1.2	Supply of Switch 8 port (Without SFP) as per specs	Nos.	2	35,002	70,004
11.1.3	Supply of Switch 24 port (With SFP)as per specs	Nos.	4	1,18,057	4,72,227
11.1.4	Supply of Switch 48 port (Without SFP) as per specs	Nos.	12	1,96,366	23,56,389
11.1.5	Supply of Switch 48 port (With SFP) as per specs	Nos.	10	1,96,010	19,60,098
11.1.6	Supply of GE SFP, LC Connector LX/LHas per specs	Nos.	40	17,798	7,11,900
11.1.7	Supply of 1000 Base-T SFP as per specs	Nos.	20	19,577	3,91,545
11.1.8	Supply of Firewall as per specs	Nos.	2	1,95,773	3,91,545
11.1.9	Supply of Router as per specs	Nos.	2	74,156	1,48,313
11.1.10	Software NMS (Network Management System) IP management license for up to 50 devices as per specs	Nos.	2	2,25,139	4,50,278
11.2	**ACTIVE COMPONENTS-SERVICE PORTION**				
11.2.1	Installation of Network Rack along with all associated accessories like cable manager, power distribution strip etc.	Mtr	2	10,793	21,585
11.2.2	Installation, Testing, configuration & commissioning of Switch 8 port (Without SFP)	Nos.	2	635	1,270

11.2.3	Installation, Testing, configuration & commissioning of Switch 24 port (With SFP)	Nos.	4	3,174	12,697
11.2.4	Installation, Testing, configuration & commissioning of Switch 48 port (Without SFP)	Nos.	12	5,713	68,559
11.2.5	Installation, Testing, configuration & commissioning of Switch 48 port (With SFP)	Nos.	10	5,713	57,133
11.2.6	Installation, Testing, configuration & commissioning of GE SFP, LC Connector LX/LH	Nos.	40	635	25,402
11.2.7	Installation, Testing, configuration & commissioning of 1000 Base- T SFP	Nos.	20	635	12,701
11.2.8	Installation, Testing, configuration & commissioning of Firewall	Nos.	2	19,045	38,090
11.2.9	Installation, Testing, configuration & commissioning of Router	Nos.	2	3,174	6,348
11.2.10	Installation, Testing, configuration & commissioning of Software NMS (Network Management System) IP management sw license for up to 50 devices	Nos.	2	12,697	25,393
11.3	**PASSIVE COMPONENTS**				
11.3.1	Supply, installation, testing & commissioning of Cat-6 UTP FRLSZH Cable	Mtr	60000	38	23,05,200
11.3.2	Supply, installation, testing & commissioning of Cat-6 I/O Jacks	Nos.	1000	203	2,03,400
11.3.3	Supply, installation, testing & commissioning of Cat-6 face Plate With Dual I/O Slot with shutter	Nos.	1000	102	1,01,700
11.3.4	Supply, installation, testing & commissioning of Cat6 Mounting cords (4 ft)	Nos.	500	170	84,750
11.3.5	Supply, installation, testing & commissioning of Cat6 Mounting cords (7 ft)	Nos.	500	181	90,400
11.3.6	Supply, installation, testing & commissioning of Cat6 Jack Panel 24 port with fully loaded I/O Jacks	Nos.	160	6,215	9,94,400
11.3.7	Supply & installation of Cable Manager	Nos.	160	174	27,843
11.3.8	Supply & installation of Cantilever Tray	Nos.	10	972	9,718
11.3.9	Supply, installation, testing & commissioning of 15 U Rack with front glass door lock & key, hardware pkt., power manager (6 ports, 15A/230V), Fan Assembly (2 Nos.) & cable manager.	Nos.	30	7,967	2,38,995
11.3.10	Supply, installation, testing & commissioning of 6 core optical fiber outdoor armored single mode cable	Mtr	6000	81	4,88,160
11.3.11	Supply, installation, testing & commissioning of Rack mounted LIU 24 way Loaded with SC coupler	Nos.	16	9,266	1,48,256
11.3.12	Supply, installation, testing & commissioning of SC connector	Nos.	300	407	1,22,040
11.3.13	Supply, installation, testing & commissioning of LXLC to SC duplex Fiber Patch Cord (3 Mt)	Nos.	80	1,752	1,40,120
11.3.14	Supply, installation, testing & commissioning of LXLC to SC duplex Fiber Patch Cord (10 Mt)	Nos.	20	2,430	48,590
11.3.15	Supply, installation, testing & commissioning of PVC Gang box for I/O	Nos.	1000	57	56,500
11.3.16	Supply, installation, testing & commissioning of 25 mm dia flexible GI Conduit / for Cat 6 Cables	Mtr	20000	52	10,39,600
11.3.17	Penta Scanning of I/O Points	Nos.	1000	79	79,100
11.3.18	OTDR Scanning of Fiber Nodes	Nos.	528	260	1,37,227
11.3.19	Supply, installation, testing & commissioning of 3 Core 1.5 sq mm indoor power cable	Mtr	500	70	35,030

11.3.20	Supply, installation, testing & commissioning of Modular Power Socket, on/off switch with face plate and Gang Box	Nos.	60	593	35,595
11.3.21	Supply & Laying of 40mm dia HDPE Pipe with essential fixtures	Mtr	6000	66	3,93,240
11.3.22	Supply & Fixing of 100 mm Cable Tray	Mtr	200	509	1,01,700
11.3.23	Supply & Fixing of 150 mm Cable Tray	Mtr	200	667	1,33,340
11.3.24	Supply & Installation of ISI marked medium grade 25 mm dia GI conduit pipe complete with all fixing accessories like saddle, saddle base, straight bands, elbow, T- junction box, inspection band etc. as per site requirement.	Mtr	400	463	1,85,320
11.3.25	Supply & Installation of solid GI Raceway of size 150mm x 40mm x10mm x 2.5 mtr length covered with flat GI sheet of size 150mm x 2.5 mtr having cut-outs for I/o & power sockets complete with all fixing accessories.	Mtr	200	1,011	2,02,270
11.3.26	Provision of Modular 6/16 amp 5 pin power socket, switch and face plate etc. complete with all fixing accessories.	Nos.	40	701	28,024
11.3.27	Supply and laying of 3 x 16 sq mm copper conductor PVC insulated ISI marked outdoor power cable from UPS room to server room including with all dressing, labelling & testing termination etc.	Mtr	500	887	4,43,525
11.3.28	Supply & fixing of 25mm x 12mm PVC Channel with cover lockable ISI marked complete with all fixing accessories.	Mtr	7000	32	2,21,480
11.3.29	Supply & Installation of AC Distribution Board panel complete with all required MCB's, ELCB's, Incomers & connectors etc. as per site requirements.	Set	2	28,815	57,630
11.3.30	Supply, installation, testing & commissioning of Industrial power point 20 Amp with MCB	Set	20	1,311	26,216
11.3.31	Supply & fixing of 10 sq mm multistrand copper conductor PVC insulated ISI marked Green colour earthing wire complete with accessories like thimble, ferrulelabels, cabletie etc. as per site requirement.	Mtr	400	101	40,228
11.3.32	Supply & laying of 6 sqmm PVC Wire	Mtr	1000	51	50,850
11.3.33	Supply, installation &connectorisation of RJ-45 connectors & PVC Boots	Set	200	34	6,780
12.0	**BUILDING MANAGEMENT SYSTEM**				
12.1	**Control Centre SCADA Software & Hardware**				
12.1.1	Control Centre SCADA: SCADA Software Developer Version with Unlimited tags including development of graphics, alarms, reports, communication interfaces etc at Depot Control Centre as per technical specification attached. Suitable SCADA-software for BMS , as described in the specifications, incl. the described process pictures, installing and testing the software, the licenses shall be handed over to the employer.	Set	2	3,84,200	7,68,400
12.1.1.1	PLC Programming Software & Graphics Development Software	Set	2	3,16,400	6,32,800
12.1.1.2	Server System ,including all equipment, cabling, accessories and mounting. CPU: 2xDualCore, minimum 2.66 GHz, 64 bit	Set	2	2,03,400	4,06,800
12.1.1.3	Operator Workstation for BMS including all equipment, cabling, accessories and mounting. CPU: DualCore, minimum 2.66 GHz, 64 bit Memory: 4 GB expandable to 8 GB Hard disk: minimum 2x1000 GB SATA, 7200 rotations / minute	Set	4	73,450	2,93,800
12.1.1.4	**BMS PLC Equipment & Local/Distributed IO's**				
12.1.1.5	PLC Processor System				
12.2	PLC System complete with Processor, Rack Power Supply, I/O Chassis, Ethernet & Control Net Communication Modules at Depot Control Centre buildings with fully wired panel.	Set	2	14,69,000	29,38,000
	I/O System				
12.2.1	I/O Rack, Rack Power Supply with DI, DO & AI Modules to meet the requirement of I/Os complete with fully wired panel.	Lot	2	20,34,000	40,68,000
	Field Instrumentation				

12.3	Space Temperature & Humidity Sensors	Nos	24	9,605	2,30,520
12.3.1	Ambient Temperature & Humidity Sensors	Nos	2	10,170	20,340
12.3.2	Differential Pressure Air Flow Switch	Nos	12	1,978	23,730
12.3.3	Differential Pressure Water Flow Switch	Nos	16	7,345	1,17,520
12.3.4	Water Level Switches	Nos	12	6,215	74,580
12.3.5	Water Level Switches-Flame Proof- DG Applications	Nos	4	12,995	51,980
12.4	**Signal & Control Cables**				
	Siganl & Control Cables of following sizes complete as per the specifications:				
12.4.1	2Cx1.5sq.mm	Lot	2	11,30,000	22,60,000
12.4.2	4Cx1.5sq.mm				
12.5	**Earthing**				
12.5	Copper Strips/ LSZH wire for interconnecting the equipments, panels, etc. of the following sizes in built up trenches/surface/wall/ground & alongwith cable trays etc complete with holes and fixing, jointing/terminating accessories as per specifications.	Lot	2	56,500	1,13,000
12.6	**UNINTERRUPTED POWER SUPPLY SYSTEM**				
12.6.1	Supply, Installation, Testing and Commissioning of true parallel redundant 2 x 20 kVA, online, UPS system suitable for providing power supply to emergency lighting at station & viaduct, Platform edge door and Computerised Control panel load of approved make, suitable for incoming 415 volts, 3 phase +10 % -20%, 50 Hz, supply and single phase output voltage, variation ± 1%, including transformer, rectifier/dual converter, static switch, inverter, filter, Bypass & static transfer switch for automatic switch over without giving any break of power, maintenance bypass switch, Micro processor/ software controlled annunciation,protection(including against input phase reverssal), and menu run diagnostic module,associated cabling and connections/ terminations, complete as per specifications and as required.	SET	2	7,11,900	14,23,800
	Note-1: The price of above item is inclusive of a manual chnageover switch suitable for terminating 2 nos. of 4-core aluminium conductor armoured cables on the incoming side of UPS. The manual change over switch may be wall mounted in the UPS room. RS 485 port for display of ON/OFF status of UPS on BMS work station through MODBUS protocol is also included in the price.				
	Supply, Installation, Testing and Commissioning of valve regulated lead acid-sealed maintenance free suitable for 30-minute-battery backup to the each UPS of item 1.1, Battery shall comply with relevant regulations & Battery racks shall be made of acid resistant material complete as per specifications & as required.				
12.7	**LIGHTING CONTROL SYSTEM**				

12.7.1	Supply, Installation ,Testing and commissioning of Lighting control panel to achieve 33%,66% and 100% on/off the lighting. The Lighting Control System shall be integrated with the E& M SCADA . Each lighting circuit from the lighting control panels (LCP) shall be controlled by the SCADA between the LCP and RTU.The Schedule for control and monitoring of lighting circuits and graphic of lighting control floor plan shall be from the E & M SCADA work station in SCR and OCC . The lighting control system configuration such as graphic, layout, setting, etc., shall be adjusted to harmonize with Architectural finishes. This is also applied to third party vendors interfaces with the system. The lighting control system shall comply with the following codes and standards: (1) IEEE 802 : Standard for Information Technology – Telecommunications and Information exchange between systems (2) IEC 60529/1989 : Degree of protection provided by enclosures (IP Code) (3) IEC 60255 : Electrical Relay (4) IEC 60364 : Electrical Installation of Buildings				
12.7.2	LX Lighting Control Panels with encloser,24 Relay Spaces, Relays Ratings : 120, 277, and 347VAC 20 Amp Single Pole Input: 120/277/347VAC multi-tap transformer.	No	30	3,27,564	98,26,932
12.7.3	Power Supply for LX Panel Input: 120VAC Output: LON Protocol	No	2	73,947	1,47,894
12.7.4	LX Switches for Manual Override, 5 Switches, White Color	No	60	12,102	7,26,138
12.7.5	Graphic User Interface for LX Panel for Local Control	No	2	37,921	75,841
12.7.6	PC Integration Tool for remote controlling Panels Via IP Address Inpu	No	2	2,38,684	4,77,369
12.7.7	Building Automation multi-protocol gateway (BACnet, Metasys N2 by JCI, and Modbus) for providing control and access to LX Network Lighting Control Panel system Input: 24VDC	No	2	1,69,836	3,39,671
12.7.8	Power Supply for Proto Cessor Input: 100-240VAC, 1.5A Output: 24V, 1.5A	No	2	606	1,211
12.7.9	Control Cable for LON Communication between Panels (100 Ft Reel)	No	2	13,124	26,248
12.7.10	Surface Mounted Cabinet for LX Panel Accessories	No	2	4,303	8,606
13.0	**LIFTS**				
13.1	10 Passenger, Machine Room less, 1.0MPS/ 5 stops, stainless steel car/ stainless steel car door/ stainless steel landing door, Automatic Rescue Device/, Overload warning indicator/ Floor Annunciator with music, Full car length operating, stainless steel door frames, stainless steel false ceiling, Fireman switch, stainlesss steel handrails, Intercom system, MBW, Scaffolding, Lift Licence, One year free service	Nos	2	38,92,353	77,84,706
	TOTAL OF SCHEDULE- F				**407049243**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor) at Ch:19700 & Ch: 18460 Respectively					
SCHEDULE- G Bill of Quantaties for HVAC Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**QTY.**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**EQUIPMENT**				
1.1	Supply, Installation, testing and commissioning of Air Cooled Variable Refrigerant Volume System for R410A suitable for 415 ± 10% , 50 Hz, AC supply. The unit shall consist of indoor units and external condensing units and other accessaries as listed below complete in all respects.				
1.1.1	**hvac**				
	Supply Instalaltion, testing & commissioning of Modular type outdoor units (COP 3.7 at AHRI condition) equipped with highly efficient scroll compressors with all inverter speed type compressor (s) , special heat exchanger, low noise condenser fan , auto check function for connection error, auto address setting and capacity as mentioned below.				
a)	**DCC, Administrative Office, Training school / Canteen building**				
-	18 HP	Nos	7	585680	40,99,761
-	22 HP	Nos	3	958064	28,74,191
-	24 HP	Nos	2	681164	13,62,328
	26 HP	Nos	1	958064	9,58,064
-	36 HP	Nos	9	1193899	1,07,45,093
-	48 HP	Nos	4	1362328	54,49,312
b)	**Inspection. Repair Bay offices**				
-	14 HP	Nos	3	540503	16,21,508
-	22 HP	Nos	1	958064	9,58,064
-	36 HP	Nos	3	1193899	35,81,698
c)	**Workshop & Offices: P. way, S&T, E&M, Traction**				
	26 HP	Nos	1	958064	9,58,064
	36 HP	Nos	2	1193899	23,87,798
1.1.2	**Indoor Units**				
	Supply, installation, tesing and commissioning of ductable / builtin type/Ceiling mounted type indoor units each complete with coil, pre-filter, etc. Indoor unit shall have fresh air intake connection. The units shall be suitable for 220 volt, 1 phase, 50 Hz, AC supply.				
	The capacities shall be as follows:				
a)	**DCC, Administrative Office, Training school / Canteen building**				
i	700 CFM built in	Nos	9	94923	8,54,311
ii	1100 CFM, ductable	Nos	8	114356	9,14,848
iii.	1200 CFM, builtin	Nos	31	102436	31,75,505
iv.	1340 CFM, ductable	Nos	18	102436	18,43,841
v.	1600 CFM, ductable	Nos	13	215125	27,96,623
vi	2000 CFM, ductable	Nos	40	215125	86,04,995
vii	2500 CFM, ductable	Nos	22	192665	42,38,630
b)	**Inspection offices/ Repair Bay offices**				
i.	1200 CFM, builtin	Nos	14	102436	14,34,099
ii.	1340 CFM, ductable	Nos	5	102436	5,12,178
iii.	2000 CFM, ductable	Nos	8	215125	17,20,999
iv	2500 CFM, ductable	Nos	6	192665	11,55,990
c)	**Workshop & Offices: P. way, S&T, E&M, Traction**				
i	1100 CFM, ductable	Nos	4	114356	4,57,424
ii	1340 CFM, ductable	Nos	3	102436	3,07,307
iii.	2000 CFM, ductable	Nos	9	215125	19,36,124

d)	**Cassette Units**				
i.	1.0TR, Cassette	Nos	1	46828	46,828
ii.	1.3TR, Cassette	Nos	1	47528	47,528
iii.	1.5TR, Cassette	Nos	1	47305	47,305
iii.	1.7TR, Cassette	Nos	1	47741	47,741
iv.	2.0TR, Cassette	Nos	1	48590	48,590
v.	2.3TR, Cassette	Nos	1	47623	47,623
vi	2.8TR, Cassette	Nos	1	53051	53,051
vii	3.2TR, Cassette	Nos	1	53319	53,319
viii.	4.0TR, Cassette	Nos	1	55480	55,480
1.1.3	Supply, installation, tesing and commissioning of Imported Remote controllers (Corded) for operation of indoor units	Nos	190	4265	8,10,278
1.1.4	Supply, installation, tesing and commissioning of fittings Y-joints, distributer and headers for all Indoor units at both the floors layout as per layout drawings	LOT	2	676137	13,52,273
1.2	**Refrigerant Piping**				
	Supply,installation,testing and commissioning of Interconnecting refrigerant pipe work with (19mm/13 mm thick) closed cell elastomeric nitrile rubber tubular insulation between each set of indoor & outdoor units as per specifications, all piping inside the room shall be properly supported with MS hanger & clamps.				
a)	41.3 mm O.D. (insulation : 19 mm)	Rm	700	2436	17,05,396
b)	34.9 mm O.D. (insulation : 19 mm)	Rm	700	2029	14,20,636
c)	28.6 mm O.D. (insulation : 19 mm)	Rm	300	1625	4,87,482
d)	22.2 mm O.D. (insulation : 13 mm)	Rm	300	1350	4,05,105
e)	19.1 mm O.D. (insulation : 13 mm)	Rm	1400	1086	15,20,302
f)	15.9 mm O.D. (insulation : 13 mm)	Rm	800	944	7,54,840
g)	12.7 mm O.D. (insulation : 13 mm)	Rm	200	812	1,62,494
h)	9.5 mm O.D. (insulation : 13 mm)	Rm	1100	681	7,49,529
i)	6.4 mm O.D. (insulation : 13 mm)	Rm	150	538	80,682
j)	Performing GI Tray with hangers & supports for copper piping (300 mm wide)	RO			
1.3	Supply,installation,testing and commissioning of **GI** drain piping complete with fittings, supports as per specifications and duly insulated with 6 mm thick closed cell nitrile rubber insulation.				
a)	50 mm dia	Rm	250	944	2,35,888
b)	40 mm dia	Rm	450	741	3,33,576
c)	32 mm dia	Rm	300	580	1,73,907
d)	25 mm dia	Rm	500	507	2,53,685
1.4	Supplying, installing, testing and commissioning of direct driven wall mounted type axial fans complete with motor suitable for 415 ± 10% 3 Phase 50 cycle AC supply with supporting structure and louvers at outlet side of the fan.				
a)	380 mm / 1400 RPM flame proof fan with 0.37 kW motor. Price shall include flame proof motor starter panel and electrical FRLSZH copper wiring considering upto 10 m length for each fan (for DCO store)	Nos	8	22419	1,79,354
b)	Capacity 41000 CFM at 15 mm static pressure, motor rating 9.3 kW (for DG area exhaust)	Nos	5	351592	17,57,958
c)	Capacity 41000 CFM at 5 mm static pressure, motor rating 7.5 kW (for DG area supply air)	Nos	5	338068	16,90,339

b)	Capacity 5100 CMH at 15 mm static pressures (for LT panel room exhaust)	Nos	5	87898	4,39,491
1.5	Supply, installation, testing and commissioning of Inline Fan exhaust fan with centrifugal blower and motor encased in sheet metal casing, as per specifications. The motor shall be suitable for 220 ± 6% V, 50 Hz AC supply. The price shall include fan speed regulator and cowl with bird screen and electrical wiring from socket to fan considering 3 m distance between socket and fan.				
a)	Capacity 3600 CMH at 15 mm static pressures (for pneumatic test screen of workshop offices building)	Nos	4	78828	3,15,311
1.6	Supplying, installing, testing and commissioning of direct driven PROPELLER FANS for air as shown in drawings. Each fan shall be complete with permanent split capacitor or shaded pole motor, mounting plate, accessories like wire guard, bird screen and fixed louvers for weather protection as required. Electrical characteristics shall be 220 volt, 1 phase, 50 Hz, AC supply. The prices shall include electrical wiring from socket to fan considering 3 m distance between socket and fan. Sizes are:				
a)	450 mm dia 900 RPM fan suitable for 220±6% volts 50 cycles, 1 phase AC	Nos	30	6081	1,82,416
b)	380 mm dia 900 RPM fan suitable for 220±6% volts 50 cycles, 1 phase AC	Nos	40	4730	1,89,207
c)	300 mm dia 900 RPM fan suitable for 220±6% volts 50 cycles, 1 phase AC supply.	Nos	70	4061	2,84,285
1.7	Supplying , installing , testing and commissioning of double skin ventilation unit for Filteration room exhaust complete with fan section and cowl with bird screen each complete with TEFC squirrel cage induction motor, centrifugal DIW forward curved blower, belt drive and vibration isolators. Motor shall be suitable for 415±10% volts, 50 cycles, 3 phase AC supply.				
a)	Capacity 10000 CFM at 40 mm static pressure, motor rating 5.5 kW	Nos	4	405682	16,22,730
1.8	Supplying , installing , testing and commissioning of 2 bank air wash/scrubber with minimum 90% saturation effeciency, complete with 16 gauge GSS casing, 3 mm thick MS plate water tank duly hot dipped galvanised, brass nozzles, GI spray headers, internals, air distribution plate, 4 bens PVC eliminators, strainer with brass jali, cenrifugal forward curved fan,fan motor, suitable for 65 mm static pressure, 2 Nos. include cost of GI piping from pump to air washer, valves strainer, gauges and fittings, GSS housing interconnection air washer, and fan section ect. The capacity for air washer shall be as follows. The price shall include FRP housing for the pumps.				
	Fan and pumps shall be suitable for 415 volt+10%, 50 Cycle, 3 phase AC supply				
a)	Kitchen Exhaust-capacity 8000 CFM, fan motor rating 3.7 kW, pump rating 1.1 kw minimum, static pressure of 65 mm WC	Nos	5	1208806	60,44,031
1.9	Supplying , installing , testing and commissioning of double skin draw thru type AIR HANDLING UNITS (FAN SECTION ONLY) compelete with 50 mm thick aluminium filteras per specification, each compelete with TEFC squirrel cage induction motor, centrifugal DIW forward curved bloward curved blower, belt drive and vibration isolators. Motor shall be suitable for 415+10% volts, 50 cycles, 3 phase AC supply				
a)	Capacity 7200 CFM at 25 mm static pressure, motor rating 3.7 kW (for Canteen fresh air supply)	Nos	5	271234	13,56,170
1.10	**DX wall mounted Split Unit**				
1.10.1	Providing, fixing, testing and commissioning of Hi wall split unit air conditioing air cooled type with evaporator coil, fan and fan motor ,air cooled condenser with hermatically sealed recipcating compressor, condenser coil and complete with electrical Wiring as required (Voltage stablizers are not to be provided)				
	Note:Providing and fixing of M.S. angle iron frame work for outdoor unit including P.O. painting of the same is also included in the above scope. Contractor to submit design/Scheme for Iron frame and obtain approval of engineer-in-chage before proceeding further.				
a)	Nominal capacity 1.5 TR	Nos	25	50850	12,71,250
1.10.2	Providing, fixing and testing of copper refrigerant piping of apppriate sizes duly insulated with nitrile rubber insulation of 9 mm thickness for all types of split AC units. The pipes plus nitrile rubber insulation are to be covered with PVC flexible conduits for protection.	Rmt	120	2091	2,50,860

2.0	**AIR DISTRIBUTION SYSTEM**				
2.1	Supply, installation, balancing and commissioning of site made/ 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.				
	Note : The duct shall be fabricated **(Site made / Factory made)** out of galvanised sheet, class VIII (Zinc coating 120 gm/m² as per the parameters given below which are conforming to IS 655-1963.				
a)	Thickness 0.63 mm sheet	SQM	2600	858	22,31,440
b)	Thickness 0.80 mm sheet	SQM	300	1054	3,16,071
c)	Thickness 1.00 mm sheet	SQM	500	1189	5,94,262
d)	Thickness 1.25 mm sheet	SQM	100	1488	1,48,802
2.2	Supply, fabrication, installation and testing of fire retardent flexible connections as per the approved shop drawings.	SQM	160	3260	5,21,608
2.3	Supply, installation and testing of galvanised steel dampers within ducts to be provided with suitable ducts lever and quadrants for manual control of volume of air flow and for proper balancing of the air distribution system.	SQM	60	7821	4,69,244
2.3.1	Supplying, fixing testing commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core.	SQM	50	10253	5,12,639
2.3.2	Supplying, fixing testing commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti smudge ring & removable core.	SQM	10	6622	66,221
2.4	Supply, installation, testing and balancing of powder coated extruded aluminium linear grilles in accordance with the approved shop drawings and specifications:	SQM	350	11081	38,78,273
2.5	Supply, installation, testing and balancing of extruded aluminium dampers for supply air collers for grills in black matt finish	SQM	100	4561	4,56,068
2.5.1	Supplying & fixing of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers as per specifications.	SQM	25	8413	2,10,330
2.5.2	Supplying & fixing of powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers complete as required.	SQM	5	4783	23,913
2.6	Supply, installation, testing and balancing of fresh air louvers 50 mm deep with bird screen and volume damper of powder coated extruded aluminium consutruction for fresh air as per specifications and approved shop drawings.	SQM	60	13039	7,82,344
2.7	Supply, installation, testing and balancing of motorized GI fire dampers of 120				
a)	Damper area	SQM	4	39115	1,56,460
b)	Control panels and actuators	NOS	4	19558	78,232
2.8	Supplying and fixing of external thermal insulation on ducts with Closed Cell Cross Linked Polythylene (XLPE) Foam of density 33 Kg/m³ with 12/13 mm thick & thermal Conductivy not exceding 0.035 W/mK at an average Temperature of 40°C. The Material Shall be rated as Class O, As per BS476 Part 7 , The Smoke Density as per AS - 1530.3 Shall not exceed 1. The Material shall have Fire Approval from CBRI - Roorkie & no toxicity under flaming and non- flaming condition as per AITM 3.000 (1993) . Adhesive used for setting the insulation shall be non - flammable, Vapour Proof. All Joints should be sealed with 3 mm thick 50 mm wide PE tape and Flange to be overlapped by 6" width of the same material thickness. Finally Duct insulated should be strapped by 12 mm Plastic Packing strip at every random meter and conforming to standard Specification				
a)	12 / 13 mm thick Closed Cell Cross Linked Polythylene(XLPE) Foam with Factory Laminated Al PE Foil for Supply Air Duct	SQM	3600	655	23,59,440
3.0	**ELECTRICAL WORKS**				
3.1	Supply,installation,testing and commisioning of control cum transmission wiring of 2 core x 1.5 sqmm copper in suitable GI conduits between indoor and outdoor unit and from indoor to controller	Rm	1100	349	3,84,087
3.2	Supply,installation,testing and commissioning of armoured XLPE cables for connection between outdoor condensing units and MCCB isolators complete with clamps & fixing arrangement as per specifications and drawing, based on location of MCCB at a distance not exceeding 5 m from each condensing units.	Lot	4	15187	60,749

3.3	Design, manufacture, supplying fixing in position, testing and commissioning of the following front operated cubicle type, front access 2mm thick steel enclosed free standing, dust and vermin proof, switchboard with IP54 protection with hinged and lockable doors complete with interconnections, copper crimping lugs, brass glands, bonding to earth and powder coated painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hertz system.				
	All switchboards shall have provision for entry of cables from the top or bottom as required.				
	All live accessible parts shall be shrouded and all equipment shall be finger touch proof. The busbar insulation shall be with heat shrinkable sleeves. SMC/DMC shrouds and busbar supports shall be used.				
	All wiring shall be XLPE wiring				
3.3.1	Supply, installation, testing and commissioning of electrical panel of Filtration plant ventilation unit with 1 nos Motor Protection Circuit Breakers with short circuit magnetic releases suitable for motor rating of 5.5 kW complete with	Nos	4	31362	1,25,448
a)	Automatic DOL starter contactor with bimetal overload releases and NO/NC for remote operation.				
b)	Single phase preventor				
c)	Ammeter				
	PANEL FOR DG ROOM VENTILATION				
	INCOMING				
	1 nos 100 Amps TPN MCCB.				
	INDICATING PANEL				
	The each incomer shall have the following indicating panel				
a)	96 mm sq. flush voltmeter scaled 0-500 volt with selector switch				
b)	96 mm square flush mounting 0-100/5 amp ammeter with selector switch				
c)	One set of three phase Indicating Lights				
	BUSBAR				
	Electrolytic high conductivity copper as per specifications				
	OUTGOING UNITS				
	2 nos Motor Protection Circuit Breakers with short circuit magnetic releases suitable for 9.3 kW exhaut fan each complete with				
a)	Automatic Star/Delta starter contactor with bimetal overload releases and NO/NC for remote operation.				
b)	Single phase preventor				
c)	Ammeter				
	1 nos 32 amp TPN MCBs as spare				
a)	Automatic DOL starter contactor with bimetal overload releases and NO/NC for remote operation.				
b)	Single phase preventor				
c)	Ammeter				
	1 nos 32 amp TPN MCBs as spare				
3.1.2	**PANEL FOR DG ROOM VENTILATION**				
	INCOMING				
	1 nos 100 Amps TPN MCCB.				
	INDICATING PANEL				
	The each incomer shall have the following indicating panel				
a)	96 mm sq. flush voltmeter scaled 0-500 volt with selector switch				
b)	96 mm square flush mounting 0-100/5 amp ammeter with selector switch				
c)	One set of three phase Indicating Lights				
	BUSBAR				
	Electrolytic high conductivity copper as per specifications				
	OUTGOING UNITS				
	2 nos Motor Protection Circuit Breakers with short circuit magnetic releases suitable for 9.3 kW exhaut fan each complete with				
a)	Automatic Star/Delta starter contactor with bimetal overload releases and NO/NC for remote operation.				

b)	Single phase preventor				
c)	Ammeter				
	1 nos Motor Protection Circuit Breakers with short circuit magnetic releases suitable for 7.5 kW Fresh air fan motor each complete with				
a)	Automatic DOL starter contactor with bimetal overload releases and NO/NC for remote operation.				
b)	Single phase preventor				
c)	Ammeter				
	1 nos 32 amp TPN MCBs as spare				
3.1.2.1	The Switchboard shall be complete with all interconnections, risers, internal wiring, labels etc. complete as required.	Nos	4	121350	4,85,398
3.2	Supply, laying testing and commissioning of 1100 volt grade armored XLPE. insulated and sheathed aluminium conductor cables of sizes as below, on cable trays with suitable clamps, saddles, hooks, bolts etc. complete as per specifications and as required. The quoted rate shall include the cost of proper dressing of cables and also providing identification tags as required.				
a)	3 core 6 Sq. mm	RM	300	911	2,73,234
b)	3 core 4 Sq. mm	RM	200	608	1,21,588
3.3	Cable termination jointing of the following XLPE cables 1100 Volt grade including cost of crimping tinned copper heavy duty lugs, double compression glands, insulation tape and all requisite material for completion of joints complete as per specifications and as required.				
a)	3 core 6 Sq. mm	Nos	50	304	15,199
b)	3 core 4 Sq. mm	Nos	30	198	5,933
3.4	Supply and fixing earthing conductor of 6 SWG GI wire for loop earthing complete as required.	RM	600	45	27,120
4.0	**CIVIL WORKS**				
4.1	Civil works comrizing of cement concrete foundation for outdoor units, floor mounted fans, air washers and electrical Panel	Cum	20	6029	1,20,577
4.2	Minor civil works like opening for ducts, cables and pipings	Cum	12	1164	13,967
	Total of Schedule-G				**105864339**

Construction of Metro Train Depot at Mihan (North-South Corridor) & Hingana (East-West Corridor)					
SCHEDULE- H Bill of Quantaties for M&P Works					
SL NO.	**DESCRIPTION OF ITEM**	**UNIT**	**QTY.**	**RATE (In Rs.)**	**AMOUNT (In Rs.)**
1.0	**CRANES**				
1.1	Supply, Installation, Testing and commissioning of 15/2 ton Electric Overhead complete with gantry rail and downshop leads (" I " section gantry girders shall be provided by building structural contractor) as per specification in Workshop bay span 20.1 m / as per approved drawings	Nos	4	7454927.53	2,98,19,710.12
1.2	Supply, Installation, Testing and commissioning of 3.2 ton Electric Overhead complete with gantry rail and downshop leads (" I " section gantry girders shall be provided by building structural contractor) as per specification in Workshop bay span 20.1m / as per approved drawings	Nos	4	5339250.00	2,13,57,000.00
1.3	Supply, Installation, Testing and commissioning of 3.2 ton Electric Overhead complete with gantry rail and downshop leads (" I " section gantry girders shall be provided by building structural contractor) as per specification in Pit Wheel Lathe bay span 11.5m / as per approved drawings	Nos	2	1468293.75	29,36,587.50
1.4	Supply, Installation, Testing and commissioning of 5 ton Electric Overhead complete with gantry rail and downshop leads (" I " section gantry girders shall be provided by building structural contractor) as per specification in ETU Workshop bay span 11.5m / as per approved drawings	Nos	2	1668516.19	33,37,032.38
1.5	Supply, Installation, Testing and commissioning of 1.5 ton Electric Overhead complete with gantry rail and downshop leads (" I " section gantry girders shall be provided by building structural contractor) as per specification in inspection bay span 8m / as per approved drawings	**Nos**	**0**	2736366.19	0.00
2.0	**COMPRESSOR**				
2.1	Supply, Installation, Testing and commissioning of 10.8 m3/min capacity, 10 Kg/cm2 pressure Air Compressor complete with associated piping, control equipment, valves, air dryer and reservoir as per specification / engineer incharge	Nos	4	2068827.73	82,75,310.92
	TOTAL OF SCHEDULE-H				**65725641**